



## ScienceWatch – Thinking About Thinking

**“Some birds study for a test like humans do.” – A. Watanabe**

We humans like to think only we are endowed with special aspects of cognition, but studies with birds, especially corvids, continue to prove us wrong. For example, rooks (*Corvus frugilegus*) can readily demonstrate their keen problem-solving-ability just as described in Aesop’s fable, “The Crow and the Pitcher”. When presented with a cylinder containing water and a floating food item, they will add stones to raise the level until they can reach the food. Given a choice they will pick out larger stones to gain access more quickly (<http://www.hras.org/sw/swoct09.html>). New Caledonia crows (*Corvus moneduloides*) can even plan ahead. When faced with the need to retrieve food from a hole, they will fashion the right tool by cutting a branch into the shape of a hook. Once they make a hook they like, they carry it with them to use as needed (<http://www.hras.org/sw/swjan08.html>). Scrub jays (*Aphelocoma coerulescens*) not only remember the numerous locations where they cache food for the winter, they recall how long ago they did it (*ScienceWatch*, Nov/Dec. 1998).

Western scrub jays (*Aphelocoma californica*) have the ability to attribute mental states—desires, knowledge and intentions—to others. If a jay notices another jay watching it caching food, it will return later to move the cache because it knows the observer will pilfer it. This ability to know what others are thinking, known as theory of mind, was once thought to be exclusively human—my wife says she always knows what I’m thinking.

Now a new study on jays in the July 2014 issue of *Animal Cognition* suggests that they can also identify their own state of knowledge—know what they know. Arii Watanabe, Uri Grodzinski and Nicola Clayton, psychologists at the University of Cambridge, UK, have devised a simple experiment to see if western scrub jays have this ability, known as metacognition.

Five birds were separately trained to watch a researcher bury a treat, a wax worm, in either of two side-by-side compartments. Each compartment had four cups containing sand. But in one (Forced Choice), lids covered three cups and the worm was always buried in the randomly preselected open cup. In the other (Free Choice), all the cups were uncovered and the worm was buried randomly. A partition separated the bird from each compartment, which had its own peephole so the bird could watch the baiting.



Immediately after the worm was buried, the bird was allowed to enter and choose a cup.

During training the Forced Choice and Free Choice baitings were done at different times. But during testing both compartments were baited simultaneously and the bird could subsequently enter them. This forced the bird to choose which peephole to look through during baiting in order to gather the information it needed to make the right choices.

Watanabe *et al.* reasoned that if the birds were capable of knowing what they needed to know, *i.e.*, metacognition, they would realize they needed to spend more time looking through the Free Choice peephole. That is exactly what happened. The birds spent significantly more time at the Free Choice peephole watching that setup than they did at the Forced Choice peephole where the hiding place was always obvious.

When we realize we do not know the answer to a question we devise a strategy for finding the information. Evidently, scrub jays can do that too.

Saul Scheinbach