

# The smart, irrational bird brain

Research on hummingbird cognition shows they have exceptional memory and spatial skills, but can make irrational choices, just like humans, writes **Andrew Read**

**E**ver come out of a shop wondering if you'd made the wrong choice? Marketing experts have long known that by manipulating the choices on offer we can be made to buy things we would not otherwise have bought. Recent work on hummingbirds suggests irrational choices are not a uniquely human failing.

Rufous hummingbirds weigh just three grams, but each year they migrate from Mexico to Canada's Rocky Mountains, where they breed. "Feeding is a hassle for the males," says Dr Susan Healy, of Scotland's Edinburgh University, who has been studying learning in hummingbirds with Dr Andrew Hurley of Lethbridge University in Alberta.

The males sit on the highest trees in their territories looking out for females and other males. Feeding distracts from these important tasks, but it has to be done, she says, so the birds feed in bursts of 10 to 20 seconds, grabbing nectar from flowers before returning to their posts.

But flowers take three to four hours to refill with nectar, so Healy and Hurley reasoned that males should have highly developed memories of where they had been so they didn't waste time visiting empty flowers.

It turned out that the birds had exceptional memories, rarely revisiting flowers until they were full of nectar again. This requires a well-developed spatial and temporal sense.

Experimental work with artificial flowers showed that the birds could remember the precise location of the flowers for the whole season. This is perhaps unsurprising for a bird that can return to exactly the same feeder after navigating from Canada to Mexico and

back, but as Healy pointed out, it is still very good going for an animal with a brain the size of a grain of rice.

But what if the birds are faced with two flowers at the same location? Standard theory in animal behaviour assumes that animals always choose what is best for them: the most attractive mate or the most nutritious food. Only in the 1990s was the possibility even raised that animal decisions might, like ours, be affected by what else is on offer.

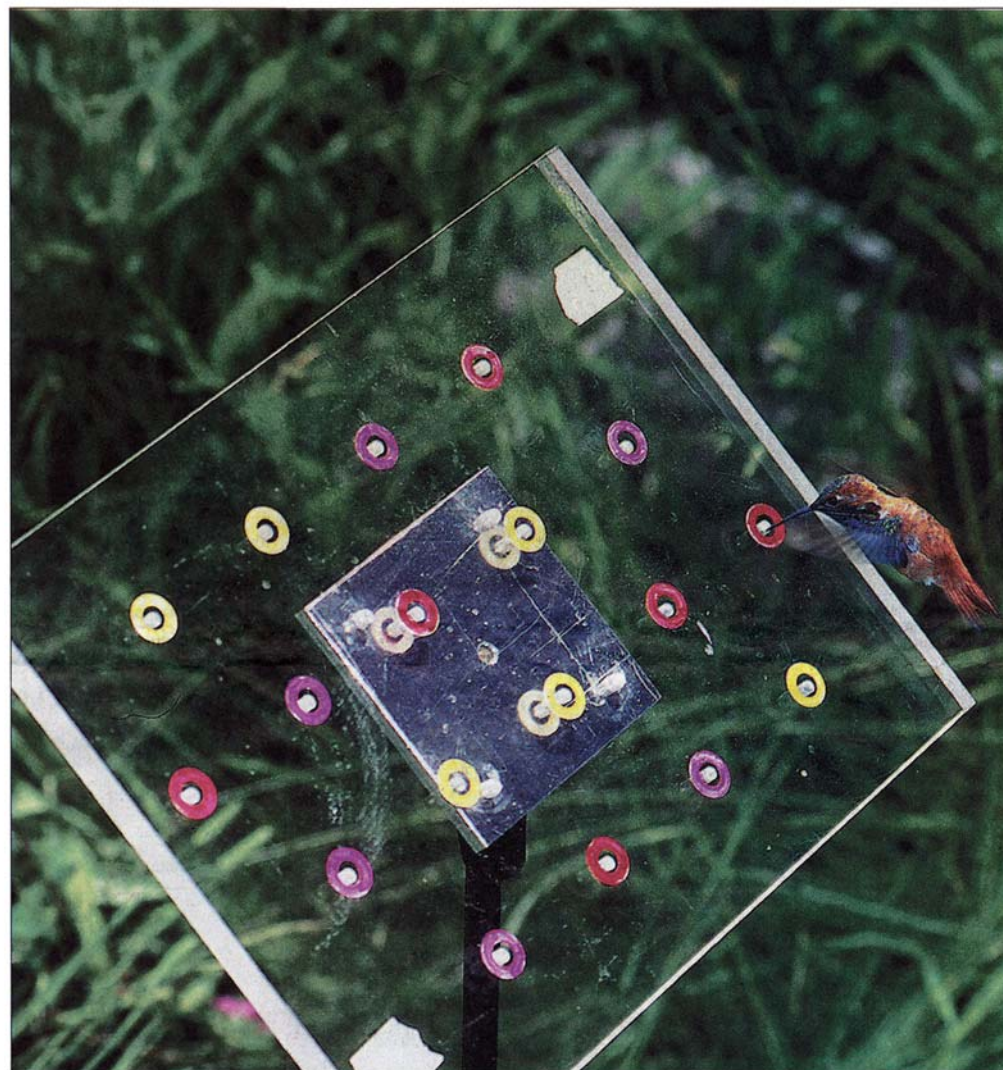
To test this, Healy and Hurley teamed up with Dr Melissa Bateson of the University of Newcastle Upon Tyne in England. Bateson had been reading the work of marketing theorists who have known – probably ever since shops became large – that some people can be persuaded to spend more money if they are offered alternatives, known as decoy products.

The theorists call this the "asymmetrically dominated effect" and it has been experimentally demonstrated on humans, according to Bateson. Imagine you are offered the choice of two cars to buy, and you choose the cheaper on grounds of cost.

Now imagine instead you had been offered the same two cars, and also a third, which is much more expensive, despite having only a few additional features. Against the most expensive car,

the middle-priced car you originally passed over now looks like a bargain, and you buy it.

**Humming birds have exceptional memories, and a well-developed spatial and temporal sense**



**A hummingbird feeds off an experimental plate. Hummingbirds remember the precise location of flowers they have fed off.**  
Photograph: T. Andrew Hurley

It turns out that hummingbirds make equally irrational choices. Using artificial flowers, the three researchers gave birds the choice of flowers containing very sweet nectar, or flowers containing a greater volume of less sugary nectar. The birds chose the more concentrated nectar. But then the researchers added a third choice, the decoy, with volumes and concentrations chosen using marketing theory.

The decoys themselves were never chosen by the birds. But the mere exist-

ence of a third choice made some birds change their minds about what they wanted. Just like us, the hummingbirds do not always making rational decisions about what is best for them. If they did, their choice would not be affected by decoys.

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