Crows can evaluate visual info twice as fast as mammals

The first is simply size. Flight imposes strict weight limits, so birds pack enormous numbers of very small neurons into very small brains. Their axons, the long cable-like fibers that transmit electrical and chemical signals between cells, are shorter.

“Long lines take time. Short lines speed everything up,” Nieder said.

The second factor is temperature. Humans’ body temperature is about 36.6° Celsius, while birds go up to 41, or even 42°. This higher body temperature speeds up all chemical processes in birds’ bodies.

“Every ion channel would open and close faster. Every transmitter would move through the synaptic cleft faster,” Nieder explained. “Evolution really took their bodies to the limit. This is life in the fast lane, not only in the brain, but also respiration, the cardiovascular system—everything is going toward the limit in birds.”

But calling crows (or birds in general) decision-making speed demons comes with a few caveats.

Picking the smartest

First, the study included only two birds, a rather small sample. “On the one hand, that’s a valid constraint,” Nieder said. “On the other hand, when you look at monkey studies, that’s the standard number of animals that we have for these very complex types of studies, combining behavior and

electrophysiology.”

Also, the decision-making time of 235 milliseconds in crows and above 400 milliseconds in primates is not an absolute limit. These times apply to the random dot-motion task, which inherently requires waiting to see which way things are drifting.

Finally, it might be hard to learn whether the results extend beyond corvids or crows specifically. “The problem with many other birds is that they are not as smart as corvids and crows and you need a smart bird in order to train it to do exactly this task,” Nieder said.

So far, he admitted, we can’t be sure whether excellent decision-making skills of crows in his lab are due to birds’ brains being speedy in general or to crows simply being smarter than other avians. “Among birds, the corvids are renowned to be extremely intelligent, so maybe there’s something special about them,” Nieder said.

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