

# Are Birds More Intelligent Than We Thought?

Birds' brains have perplexed scientists over the years because they lack a cerebral cortex - the area of the brain in mammals responsible for advanced cognitive skills. But now researchers have made an exciting discovery that may mean they're way smarter than we ever thought.

**Analysis by Dr. Karen Shaw Becker**

Apr 22, 2023 • 4 min read

## STORY AT-A-GLANCE

- Researchers uncovered a previously undetected brain structure in birds that may act similarly to mammals' cerebral cortex, explaining the longstanding mystery of how birds achieve such incredible cognitive feats
- Researchers found a region in birds' forebrain called the pallium, which has fibers organized similar to those in mammals' cortexes
- A second study used a test that signals signs of consciousness in primates, namely looking for a sudden activation of neurons in response to certain cues
- As occurs in primates, when carrion crows responded to a cue they'd been trained to react to, specific neurons located in the pallium reacted, which might be a broad marker for consciousness
- The emerging research on birds' significant cognitive abilities serves as a reminder to provide ample social and mental stimulation if you act as their guardian

Many birds are incredibly intelligent, with an ability to recognize individual faces, plan for the future<sup>1</sup> and even hold grudges when they've been wronged in the past.<sup>2</sup> Their exceptional cognitive abilities are similar to those found in some mammals, a puzzle that has riddled scientists because birds lack a cerebral cortex — the area of the brain in mammals that's often assumed to be responsible for advanced cognitive skills.<sup>3</sup>

Researchers at Ruhr-University Bochum in Germany have now uncovered, however, that a previously undetected brain structure in birds may act similarly to the cerebral cortex, explaining the longstanding mystery of how birds achieve such incredible cognitive feats.

## Pallium in Birds' Forebrain Contain High Cognitive Abilities

When researchers used 3D polarized light imaging to analyze the brains of three homing pigeons, they found a region in the forebrain called the pallium, which has fibers organized similar to those in mammals' cortexes.

"This research confirms the old adage that looks can be deceiving," John Marzluff, a crow specialist at the University of Washington, Seattle, who was not involved in the study, told Science magazine, noting that although the brains "look very different, this study shows us they are actually wired in very complementary ways."<sup>4</sup>

Specifically, the cerebral cortex in mammals has a distinctive layered architecture, which is similar to that found in the bird pallium. “Despite the nuclear organization of the bird pallium, it has a cyto-architectonic organization that is reminiscent of the mammalian cortex,” the researchers wrote in *Science*, adding:

*“Our findings suggest that it is likely that an ancient microcircuit that already existed in the last common stem amniote might have been evolutionarily conserved and partly modified in birds and mammals.*

*The avian version of this connectivity blueprint could conceivably generate computational properties reminiscent of the neocortex and would thus provide a neurobiological explanation for the comparable and outstanding perceptual and cognitive feats that occur in both taxa.”<sup>5</sup>*

## **Crows Are Likely Self-Aware**

A second study adds to the exciting findings that humans’ have likely been incorrectly dismissing birds’ potential for intelligence and self-awareness for decades. In a second study published in *Science*, researchers from the University of Tübingen used a test that signals signs of consciousness in primates, namely looking for a sudden activation of neurons in response to certain cues.

As occurs in primates, when carrion crows responded to a cue they’d been trained to react to by either moving or staying still, specific neurons reacted, suggesting they had consciously reacted to the cue. The neurons that reacted were located in the pallium and the researchers suggested, “Such activity might be a broad marker for consciousness.”<sup>6</sup>

In an analysis of the two studies, Suzana Herculano-Houzel of the Vanderbilt Brain Institute at Vanderbilt University in Tennessee scolded humans for selling birds short: “The term ‘birdbrain’ used to be derogatory. But humans, with their limited brain size, should have known better than to use the meager proportions of the bird brain as an insult.”<sup>7</sup>

Taken together, she noted, the studies show birds do have a brain “cortex” and “think.” Further, “Because their neurons are smaller, the pallium of songbirds and parrots actually comprises many more information-processing neuronal units than the equivalent-sized mammalian cortices.”<sup>8</sup>

She told *Stat News*, the crows’ reactions were “exactly what one would expect from neurons that participated in building the thoughts that we later report,” adding evidence that the birds “are as cognitively capable as monkeys and even great apes.”<sup>9</sup>

While some researchers remain reluctant to admit that species other than humans could have consciousness, the study reveals that the crows in the study were aware of the cues they were shown and “know what they know.”<sup>10</sup> Study author Andreas Nieder told *Stat News*:

*“I think it demonstrates convincingly that crows and probably other advanced birds have sensory awareness, in the sense that they have specific subjective experiences that they can communicate. Besides crows, this kind of neurobiological evidence for sensory consciousness only exists in humans and macaque monkeys.”<sup>11</sup>*

# Birds as Pets Need Mental Stimulation

Crows belong to the corvid family along with ravens, magpies, jackdaws and jays. These birds are known for their uncanny intelligence that's far above that of most other birds and even many mammals, but other birds, such as African grey parrots and blue-headed macaws, are also known for their high intelligence.

Parrots, for instance, demonstrate acts of altruism, voluntarily helping each other to obtain food rewards, even if there's no incentive in it for themselves. The emerging research on birds' significant cognitive abilities not only serves as a reminder to respect other creatures on Earth, even if they appear different from us, but also to give them proper care if you end up as their guardian.

If you are interested in sharing your home with one of these fascinating creatures, be aware that they're high-maintenance pets that require a great deal of specialized care, including social interaction and mental stimulation on par with what you would give to at least a preschooler, to avoid developing behavioral problems.

## Sources and References

<sup>1</sup> [Nature. 2007 Feb 22;445\(7130\):919-21](#)

<sup>2</sup> [Animal Behaviour June 2017, Volume 128, Pages 69-78](#)

<sup>3,5</sup> [Science September 25, 2020](#)

<sup>4</sup> [Science Magazine September 24, 2020](#)

<sup>6</sup> [Science 25 Sep 2020: Vol. 369, Issue 6511, pp. 1626-1629 DOI: 10.1126/science.abb1447](#)

<sup>7,8</sup> [Science 25 Sep 2020: Vol. 369, Issue 6511, pp. 1567-1568 DOI: 10.1126/science.abe0536](#)

<sup>9,10,11</sup> [Stat News September 24, 2020](#)

<sup>12</sup> [Current Biology January 9, 2020](#)

---