Crows look plain black to us, but their feathers contain a secret visual code that changes with age

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To understand birds—their social relationships, their choices, even their feathers—you need to understand the way they see the world. That can be a challenging task, because birds and humans literally see their environments differently. Primates have three types of cone cells in their eyes, which provide the range of colors that we see; avians have four, explained Binghamton University Associate Professor Emerita of Biological Sciences Anne B. Clark.

"They actually see further into the UV (ultraviolet) range than we do," Clark said. "That gives them a channel of communication that we may not detect."

Research recently published in the *Journal of Avian Biology* takes an in-depth look at how crows see each other. Co-authored by Jessica Yorzinski of Texas A&M University's Department of Conservation Biology and Binghamton's Clark, "Inter- and intra-individual variation in the feather coloration of American crows" used a full-spectrum camera and visual modeling to analyze the plumage of 28 museum specimens from a crow's visual perspective.

What crow feathers reveal in UV

The feathers of melanistic birds, such as crows, haven't been heavily studied by researchers. Unlike species such as fish crows or grackles, American crows aren't known for iridescence, which, in black feathers, shows up as light refracted to create subtle purple or greenish hues. To human eyes, crows are difficult to tell apart: solid black, with no visual demarcation between males and females.

Research has shown that some bird species have feather patches that reflect UV light, perhaps to signal health status or biological sex; these include blue tits, a British species related to chickadees, as well as budgerigars, the small parakeets commonly kept as pets.

Credit: Alexas Fotos from Pexels

It turns out that crows lack UV-reflective patches, and that the sexes really do look the same, plumage-wise. However, the research in Yorzinski's lab unearthed subtle changes that indicate age: On the sides, back and even under the tail, feathers changed in hue, both in the human visual range and in the UV or violet range as the birds reached the age of 3.

"There are many possible mechanisms. There may be a greater concentration of melanin, or changes in the feather structure," Clark said.

The reasons behind the changing hue could be reproductive in nature. Under the age of 3, crows are typically unable to find mates or defend territory, Clark said. Attractive feathers may indicate the birds' prime of life, health status, and resources to potential mates.

Some age-linked differences are apparent to the naked eye. Yearling birds have poor-quality feathers that tend to take on a brownish cast until they experience their first molt. And Clark, who researches crow populations, notes that elderly birds—18 or 19 years old—tend to look their age, so to speak, when it comes to the condition of their feathers.

"There's a sense that perhaps feathers get better and better, and then that falls off as they age," Clark said. "Unfortunately, this should be familiar to most people; it gets harder to look great."

How do crows tell each other apart?

The experiment showed something else: Crows' foreheads are even blacker than the rest of their plumage and don't reflect the light. Crows are ground foragers, and these ultra-black feathers above their eyes may reduce glare in strong sunlight, essentially functioning like a baseball cap.

"It may help augment their vision and cut down on hyper-reflections from the ground," Clark said. "That's all hypothesis, but it runs across all of the crow species we have looked at."

With the same black plumage, how do crows tell one another apart? Earlier research has shown that their calls are individually specific, functioning in the same way as human voices. Female crows tend to have higher voices than males, partly due to body size.

Crows also vary in body size and shape and have similarly diverse bills;

the tips grow continuously, but the bill shape is stable nearer the base. One crow family that Clark has observed featured a member with a bill shaped almost like a Roman nose, while his mate had a petite, straight bill; their offspring exhibited one or the other.

Clark hypothesizes that, like humans, crows may also be able to recognize individuals by how they move—in their case, fly. One older crow, sitting in her territory at sunset, didn't respond as other crows winged by overhead, returning home after a day of foraging. That is, until she saw one specific bird fly overhead; she perked up and apparently called a greeting, at which it looked down while in flight and replied, Clark recounted.

"Our recognition of the quality and identity of our social companions uses many sensory modalities," Clark said. "What we've shown is that the black of a crow does vary and has information in it, even though it's sexually monomorphic."

More information: Jessica L. Yorzinski et al, Inter- and intra-individual variation in the feather coloration of American crows, *Journal of Avian Biology* (2026). DOI: 10.1002/jav.03604

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