



Bird niches in human culture and why they matter

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People care about birds far more than they do about most forms of biodiversity. Birds share our sensory modalities, they are mostly diurnal, and their ability to fly makes them conspicuous and aesthetically attractive. Birds occur virtually everywhere we do, even in the center of the largest cities. They play prominent roles in religion, sports, arts, and conservation (1). Conservation strategies often focus on saving birds, even if there are more endangered but less popular taxa at risk. Arguably, the bipartisan support that led to the passage of the US Endangered Species Act arose at least partly from the desire to prevent the extinction of the national bird, the bald eagle (*Haliaeetus leucocephalus*) (2). One of the most important books in the history of conservation derived much of its power by evoking a “silent spring” (3) devoid of bird song in a world contaminated by pesticides. In their PNAS article “Characterizing the cultural niches of North American birds,” Schuetz and Johnston (4) argue that there is an urgent need to understand what factors shape bird niches in human culture so that we can use this knowledge to advance conservation.

Schuetz and Johnston (4), however, do not have an existing blueprint for measuring cultural niches. Scientists quantify ecological niches of birds by measuring traits such as their position along climatic gradients, diet, the sites where they forage, and the tactics used to catch prey (5). Cultural niches, on the other hand, require measuring human responses to birds, a process complicated by the difficulties of interviewing humans directly, the many different ways people respond to birds, and the large number of bird species involved. Even North America, one of the world’s least biodiverse regions, has about 671 regularly occurring bird species, each with its own cultural niche.

Schuetz and Johnston’s (4) approach to measuring cultural niches is remarkably simple and avoids the problem of dealing directly with people. They measured popularity using Google search engines and controlled for likelihood of encounter using eBird data to measure the abundance of each bird species in each state. eBird is an enormous (over 500 million records) citizen science

database generated by hundreds of thousands of mostly amateur birdwatchers and is run by the Cornell Laboratory of Ornithology (6). All of these data are available in the public domain and can be accessed easily thanks to the efforts of the people who run these databases. Indeed, this project had no budget or formal funding; all that was required was the idea and, of course, the time and expertise to analyze big data.

Perhaps the most important result in ref. 4 is the schematic in figure 3, which divides cultural niche space into four quadrants, based on popularity and congruence metrics. “Celebrity” birds are popular, even where they do not occur; “friend” or “enemy” species receive the most attention in the regions where they occur; “neighbor” birds receive more interest in regions where they occur but less interest than would be predicted by their abundance; and “stranger” birds are ignored everywhere. The authors argue that celebrity birds can be used to promote conservation efforts at the national or even international levels, whereas friends or enemies can be used to promote more local efforts to conserve friends or to eradicate enemies such as introduced pests. Strangers and neighbors that are endangered can be targeted for publicity campaigns designed to shift their cultural niches into more favorable celebrity or friend positions. Indeed, this approach has been used successfully in the past to create flagship species that motivate local people to conserve them and attract funding from international agencies (7).

Managing Cultural Niches

A much more difficult task is managing the popularity of celebrity species that may not need conservation or that suffer from excessive attention (8). Popular introduced species such as the monk parakeet (*Myiopsitta monachus*), for example, are also vilified as potential crop pests whose nests disrupt our power supply (9). Monk parakeets, however, receive protection in some Chicago neighborhoods because of public anger over attempts to eradicate

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them from residential neighborhoods where they are popular feeder birds (9). The competing cultural niches of monk parakeets have created a standoff in which this species is tolerated in some areas and actively eradicated from others.

Brood parasites also have problems with their status as enemies. Rather than build their own nests, brood parasites lay their eggs in the nests of other species, which then raise the parasitic young, usually at the expense of raising some or all of their own (10). This life-history tactic makes them easy to vilify; the word “cuckoldry” derives from the many species of cuckoos (*Cuculiformes*) that are obligate brood parasites. In North America, the brown-headed cowbird (*Molothrus ater*) is an obligate brood parasite with more than 200 known host species, some of which are endangered and heavily parasitized (10). Managers trap and kill thousands of cowbirds in areas where they reduce the nesting success of endangered hosts. The cowbird cultural niche is so negative that the public tolerates these control efforts, even though the cowbird is a native migratory songbird. Some conservation biologists fear that these control efforts miss the point that habitat loss and degradation are far greater threats than cowbirds to most of these endangered species (11).

Too much publicity potentially creates problems for other highly endangered birds (12). The ivory-billed woodpecker (*Campephilus principalis*) is such a powerful symbol of endangerment that any rediscovered populations would have to be protected from the masses of people who would do just about anything to see one. As Schuetz and Johnston (4) point out, the excessive popularity of owls as cage birds following the Harry Potter series threatens many owl populations, especially on islands (13).

Some of the results of Schuetz and Johnston’s (4) analyses are not necessarily surprising but are demonstrated quantitatively for the first time. Popularity measured by the number of Google searches varies over 4 orders of magnitude, a strong indication of the power of just a few species. People tend to be more interested in colorful birds with strong local ties, such as endangered species and team mascots, and to certain taxonomic groupings such as the ever-popular owls. Comparable analyses in other parts of the world would undoubtedly show different patterns of popularity, such as pheasants in southeastern Asia and parrots in much of the tropics. Other results were less intuitive, such as the increased popularity of migratory birds and the surprising unpopularity of shorebirds and gulls.

Cultural niches of birds matter, often in surprising ways. They are not necessarily fixed—they evolve, often rapidly. Schuetz and Johnston (4) argue that the rise of bird feeding caused a shift of many neighbor and stranger birds to the status of friends and celebrities. The popularity of hummingbirds led to widespread hummingbird feeding, which has changed the geographic distributions of many species (14). These changes threaten the genetic integrity of some species that are coming into contact for the first time and are hybridizing (14).

One curious implication of this study is that taxonomy strongly affects cultural niches. The Baltimore oriole (*Icterus galbula*), for example, has long been the mascot of a baseball team. When taxonomists changed its name to the northern oriole when it was lumped with the Bullock’s oriole (*Icterus bullockii*) (15), they risked altering the cultural niche of this species, a problem that disappeared when the two species were restored to full species status. The same dilemma faces those who would standardize English names (16). The common loon (*Gavia immer*), for example, is called the great northern diver in the United Kingdom. By the laws of taxonomy, we should give priority to the older English

name. The name “loon,” however, is such a fixture in North American culture, language, and even economics (“loonie” is the universal nickname for the Canadian dollar coin) that any attempt to change the name would be extremely unpopular in North America. Such seemingly arcane changes in nomenclature can erode the public image of the scientists who feel compelled by our own laws to make such changes. A possible compromise name, the great northern loon diver, probably pleases no one but seems to be the only option that retains the cultural niche of this species in both regions.

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Cultural niches of birds also influence scientific discourse. The controversy about whether birds are dinosaurs or descendants of older lineages of reptiles (1) generated an enormous amount of attention, controversy, and funding, partly because of the important cultural niches occupied by both dinosaurs and birds. The appealing prospect that birds are dinosaurs contributed to the often-contentious debate as scientists waged their wars in the public spotlight (1). Even the publication process was affected—any new fossil discoveries that shed light on this debate were eagerly published in the highest-ranking journals in all of science.

Future Directions

Given the success and relative simplicity of the approaches developed in Schuetz and Johnston’s (4) paper and the ease of access to data, I can envision many future studies that refine and expand the concept of cultural niches. A frequent topic of discussion in avian biology class at the University of Florida, for example, is the importance of birds in internet memes, which have become a major way in which an entire generation communicates with each other. Memes have a long history; indeed, the term derived at least in part from studies of how culture evolves in birds (17). Although bird memes are far less popular than those involving cats, memes involving parrots and a variety of small birds with angry or belligerent expressions or behavior frequently go viral. Characterizing the niches of these birds would require different axes reflecting politics, social issues, and the attitudes expressed in each meme, but the data are readily available.

Other potential large datasets available to provide insights into the cultural niches of birds are the websites of amateur wildlife photographers. Thanks to the availability of new cameras and digital technology, wildlife photography has become enormously popular and is rapidly becoming the most profitable form of ecotourism. Not surprisingly, birds are among the most popular subjects for photographers, which has resulted in both conservation benefits (many formerly exploited species are now protected to attract photographers) and costs (harassment by too many photographers).

We now live in the Anthropocene, an era in which humans dominate the world’s environments and control the fates of many species. The niches of birds in human culture, therefore, may be just as important as their ecological niches when designing conservation strategies. Schuetz and Johnston’s (4) paper is the first in

a promising new research area in which cultural niches become the subject of scientific study. Birds are a great starting point because of the availability of large quantities of citizen science data provided by birdwatchers to complement data available from internet search engines.

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- 1 F. B. Gill, R. O. Prum, *Ornithology* (WH Freeman, New York, NY, 2019).
- 2 S. Peterson, Congress and charismatic megafauna: A legislative history of the endangered species act. *Environ. Law* **29**, 463–496 (1999).
- 3 R. Carson, *Silent Spring* (Houghton-Mifflin, Boston, MA, 1962).
- 4 J. G. Schuetz, A. Johnston, Characterizing the cultural niches of North American birds. *Proc. Natl. Acad. Sci. U.S.A.* **116**, 10868–10873 (2019).
- 5 J. M. Chase, M. A. Leibold, *Ecological Niches: Linking Classical and Contemporary Approaches* (The University of Chicago Press, Chicago, IL, 2003).
- 6 B. L. Sullivan et al., eBird: A citizen-based bird observation network in the biological sciences. *Biol. Conserv.* **142**, 2282–2292 (2009).
- 7 D. Verissimo, I. Fraser, J. Groombridge, R. Bristol, D. C. MacMillan, Birds as tourism flagship species: A case study of tropical islands. *Anim. Conserv.* **12**, 549–558 (2009).
- 8 F. Courchamp et al., The paradoxical extinction of the most charismatic animals. *PLoS Biol.* **16**, e2003997 (2018).
- 9 S. Pruett-Jones et al., Urban parakeets in Northern Illinois: A 40-year perspective. *Urban Ecosyst.* **15**, 709–719 (2012).
- 10 N. B. Davies, *Cuckoos, Cowbirds and Other Cheats* (T & AD Poyser, London, UK, 2000).
- 11 S. I. Rothstein, B. D. Peer, Conservation solutions for threatened and endangered cowbird (*Molothrus ater*) hosts: Separating fact from fiction. *Ornithol. Monogr.* **57**, 98–114 (2005).
- 12 E. Meijaard, V. Nijman, Secrecy considerations for conserving Lazarus species. *Biol. Conserv.* **175**, 21–24 (2014).
- 13 V. Nijman, K. A.-I. Nekaris, The Harry Potter effect: The rise of trade of owls as pets in Java and Bali, Indonesia. *Glob. Ecol. Conserv.* **11**, 84–94 (2017).
- 14 E. I. Greig, E. M. Wood, D. N. Bonter, Winter range expansion of a hummingbird is associated with urbanization and supplementary feeding. *Proc. Biol. Sci.* **284**, 20170256 (2017).
- 15 J. D. Rising, The progress of oriole hybridization in Kansas. *Auk* **100**, 885–897 (1983).
- 16 F. B. Gill, M. T. Wright, *Birds of the World: Recommended English Names* (Princeton University Press, Princeton, NJ, 2006).
- 17 S. Blackmore, *The Meme Machine* (Oxford University Press, London, UK, 2000).