

Back-and-forth  
with a Duo  
of Birdsong  
Experts:  
Lauryn Benedict  
& David Logue

Birds duet. What does that mean? It means they *sing together*. Sometimes their song parts overlap, and sometimes they alternate, but duets always include coordinated sounds from two contributors.

To write an article about avian duets, we thought we should follow the birds' lead. Instead of singing solo, we are working together. The two of us came up with a series of questions about avian duets, and now we'll answer each other back and forth. Read on to find out how coordinated our answers might be!

*What is your connection to avian duet research?*

• **David:** On the first day of graduate school, my supervisor had me read a chapter about vocal behavior in tropical birds. As soon as I read the section about duetting, I knew it was what I wanted to study. Duetting was romantic and mysterious. At the time, nobody knew why birds did it. Most important to me, research on duetting would allow me to work in the tropical forest. I made my way to Panama and began to study duets in Black-bellied Wrens. I ran experiments to figure out why these wrens duet, and how the males and females coordinate their songs during duets. As the years passed, I went on to study duetting theory, with a particular emphasis on the evolution of duetting. These days, my graduate student and I study Adelaide's Warblers' duets in Puerto Rico.

• **Lauryn:** It all started for me when I took a job as a field tech studying Acorn Woodpeckers in Carmel Valley, California. Acorn Woodpeckers are fascinating birds, but I kept getting distracted

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LAURYN BENEDICT  
Fort Collins, Colorado  
lauryn.benedict@unco.edu

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DAVID LOGUE  
Lethbridge, Alberta  
david.logue@uleth.ca

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by another species, the California Towhee. The more I watched the towhees, the more I became intrigued by their behavior. I was fascinated by the way partners in mated pairs use a distinct “squeal” duet to locate one another. I had known that many tropical species give elaborate coordinated duets, but I was surprised to find duetting birds in my own backyard. That interest led me to study California Towhee duetting behavior for my Ph. D. Since then, I’ve spent my career studying multiple aspects of bird song and singing behavior, including duetting.

*What is the coolest avian duet?*

• **Lauryn:** California Towhees are pretty great, but I am willing to admit that they don’t have the coolest duets. So I’ll pick a few others. One of my favorites is the Hunter’s Cisticola. Cisticolas in general are a fascinating group. There are nearly 50 species in the

genus, almost all found only in Africa, and they’re the ultimate Little Brown Jobs. If you think it’s hard to ID sparrows, try cisticolas! Although they all look alike, they have very distinctive songs and calls, and at least 10 species sing duets. The Hunter’s Cisticola duet is my favorite. The female sings a series of ticking notes that rise and fall, while the male pipes up with longer flute-like notes that he times with the rise and fall of the female trill. It’s captivating to listen to—it can go on and on forever on repeat.

Another great duet is that of the Eastern Whipbird from Australia. The male starts the duet with a haunting whistle and then abruptly shifts to make a sound that is aptly described as the cracking of a whip. Immediately afterwards, the female chimes in with two notes of her own. It’s a dramatic sound, and

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The California Towhee is a notable example of a duetting species in the ABA Area. These towhees use duets to defend territories and to coordinate activities with their mates.

*Palo Alto Baylands Nature Preserve, Santa Clara County, California; May 18, 2017.*

*Photo by © Dorian Anderson.*

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it seems to represent drama in the birds' relationships. In many duetting species, mated males and females sing coordinated duets because the two birds are cooperating to defend their shared territory or other resources. Eastern Whipbird partners might not be so cooperative. Females create more duets when they hear other females, suggesting that their duet

This Plain-tailed Wren might be singing as part of a duet or in a chorus. When these wrens sing in groups, they synchronize their sounds so tightly that duets can be easily mistaken for the song of a single bird. *Trocha Cresta de San Lorenzo, Amazonas, Peru; Sept. 21, 2019. Photo by © Nick Athanas.*

contributions say something along the lines of "Back off—he's mine!"

Finally, I must mention manakins. Most avian duets are between a mated male and female, but manakins buck that trend. In several species of manakin, males work together to court females with elaborate song-and-dance routines. In a species like the Lance-tailed Manakin, two males sing together with a series of whistles and then a complicated "chirring" noise that accompanies their coordinated movements. It's a unique and dramatic style of duet.

• **David:** Like you, I'm partial to the first duetting species I studied. Black-bellied Wren pairs sing long, boisterous duets, full of glissandos. Their song stands out like a lead melody against the chaotic backing band of cicadas and toucans.

• **Lauryn:** Agreed. Wrens have amazing duets. For complicated coordination and precise timing, you can't beat Plain-tailed Wrens. Adults of this species live in groups of two to seven individuals. A male and female in the group will regularly duet, alternating song notes so precisely that they sound like a single bird. Sometimes two more birds join in to form a chorus where two females sing their part in near-perfect synchrony; and then two males respond in kind.

• **David:** Yeah, Plain-tails are the coordination champs. To add a few more... Parrot duets are cool because the mates alternate calls so quickly, although their duets are more cacophonous than beautiful. I should also mention barbet duets. Although they're not as melodic as songbird duets, they have this mystical, trance-like quality. But to get back to the original question, the coolest duet is probably one I've never heard before! There are thousands of duetting species, and ornithologists know next to nothing about most of them.

*Why do birds duet?*

• **David:** The main reason birds duet is to cooperatively defend shared resources, like a territory or a nest site. Mated birds share an interest in reproducing successfully together. When one bird sings, and its partner "answers" to form a duet, they are signaling, "We're partners who will both defend this territory from intruders." In this sense, duets are similar to other group territorial signals in animals, like howls from a wolfpack or roars from a pride of lions. All these signals communicate the intention to defend a space and the number of defenders in the coalition.



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A **Black-bellied Wren** sings from a perch in the forest understory. Black-bellied wrens' loud duets and sharp *cream-o-wheat!* calls feature prominently in the Central American forest soundscape. Pipeline Road, Colón, Panama; Feb. 17, 2020. Photo by © Cameron Eckert.

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There is a lot of evidence to support this interpretation of duetting. For example, pairs of duetting birds work together to defend their shared territories against intruders of either sex. Typical non-duetting birds are more self-centered: Males defend against other males, and females defend against other females. We also know that duetting evolves when pairs stay together over multiple years, often because they do not have to migrate. According to evolutionary theory, long-term partnerships promote the evolution of cooperative behaviors. We know that, in some species, duets get more coordinated the longer the birds stay together, so birds might communicate the strength of their pair bonds with duets.

• **Lauryn:** Okay, I'll fill in the last few functions of duetting. In addition to all of the reasons David mentioned, duets are often used during pair formation, suggesting they help each partner assess how committed the other would be as a mate. We also know that birds use duets to locate their mates in dense vegetation, like in the children's game Marco Polo. Sometimes, as I mentioned earlier for whipbirds, birds use duets to make sure they don't lose their mate to a usurper. If you think of the two male manakins I also mentioned a moment ago, they're duetting to obtain mates. That's the exception to the duetting rule, though, as the vast majority of avian duets are given by mated male–female pairs.

*What is the relationship between female song and duetting?*



• **Lauryn:** Duets are often formed when a male and a female combine their songs, but not always. Some species use calls to create duets, or duet with other vocalizations we wouldn't typically classify as song. In California Towhees, for example, the species' song is a series of metallic *tink* notes that form an accelerating trill. My research shows that male birds sing this song only right after they've found their territory, when they are trying to attract a mate. Once a female has joined them on that territory, they stop singing almost entirely. As these birds stay on one territory with one mate for life, this means they "sing" for only a very short part of their existence. For the rest of their lives, they use calls (a brief metallic *tink*), and they duet with their mates to defend the territory and coordinate important behaviors like raising young. Their duets have a distinctive "squeal" sound to them and aren't officially considered song. Nevertheless, for most of their lifespans, duets form a much more important part of the communication system of California Towhees than songs do.

• **David:** Right, female song and duetting of



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**Adelaide's Warblers** are among the most abundant birds in the Puerto Rican dry forest. The males' trilled songs fill the air, but the females' quiet responses are imperceptible to all but the most attentive listeners. Bosque Estatal de Guánica, Guánica, Puerto Rico. Apr. 20, 2014. Photo by © Jay McGowan.

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ten come as a package, but you can get one without the other. In addition to California Towhees, species like Carolina Wrens and Adelaide's Warblers duet without female song. Then you've got a bunch of tropical and Southern Hemisphere species like Banded Wrens, where females sing but do not duet. It seems clear that both female song and duetting are involved in territoriality. My best guess is that female song evolves when females defend territories, and duetting evolves when females defend territories cooperatively with their mates, but that's just speculation at this point.

*Do any North American birds duet?*

• **David:** Lauryn's the expert at this one, so I'll keep my answer short. While there is not nearly the diversity of duetters that you find in the tropics or Southern Hemisphere, a handful of continental U. S. and Canadian species do produce duets. Some of these are larger birds, such as Canada Geese. Others are tropical species that occur in the southern reaches of the U. S., such as the Great Kiskadee. Some of the most widespread North American species—for example, House Sparrows and Red-winged Blackbirds—have been reported to duet, but don't seem to do so very often. And then there are the songbirds that breed in temperate North America and duet frequently—like Lauryn's towhees.

• **Lauryn:** Yes, I love this topic! It isn't just California Towhees that duet. All of the "brown" towhees give "squeal" duets, and several other sparrow species duet with varied sounds. You can listen for duets among Baltimore Orioles, Red-winged Blackbirds, Pygmy Nuthatches, Wrentits, Western Tanagers, House Sparrows, Painted Redstarts, and more. Many non-songbirds—for example, owls—duet in really interesting ways.

• **David:** Oh yeah, I forgot about the owls! Loads of them duet.

• **Lauryn:** And you could argue that coordinated visual and vocal displays like those of mating grebes should be considered duets. The term "duet" isn't perfectly defined, but I consider a duet to be any vocal signal



for which two individuals regularly and predictably coordinate their own contributions. Make of that what you will, and look for other sounds that fit the bill!

*What are some of the most important things we've learned from studying avian duets?*

• **Lauryn:** When researchers began studying avian duets, they generally thought they were an expression of love and harmony between the duetting partners. As more work has been done, we've realized that duets are more complicated than that. While they are used to coordinate partner activities, they can also emerge from conflict between mates. Some birds use duets to keep tabs on a mate's location or to prevent that mate from communicating with other birds. This kind of conflict was the focus of many studies for a while, but now most research has swung back in the other direction; researchers now tend to agree that most duets are used cooperatively. I think this is a great illustration of how scientific thinking evolves.

**Red-winged Blackbird** males often sing solo, but they are sometimes answered by females. When females participate in duets, males put more energy into defending their nest and less into harassing the female. Fort De Soto Park, St. Petersburg, Pinellas County, Florida; Apr. 13, 2007. Photo by © Christina L. Evans.

• **David:** Well put! Discoveries about cooperation and conflict between mates are definitely among the most important in duetting research.

• **Lauryn:** We have also learned some fascinating things about how birds' brains work by studying duetting. Do birds "think"? We don't yet know if they think in the same way we do, but one study of duetting got at this question in an interesting way. It found that when a male and a female Plain-tailed Wren sing a duet, the neurons in their brains fire similarly, both when they are singing their part and when their partner is singing. They're not

producing both behaviors, but it seems like they may be “thinking” them.

• **David:** That study blows my mind! It’s part of a body of research that uses duetting as a model of “interactive communication”—when two or more individuals signal back and forth to each other. Those studies ask how duetting birds choose what to sing in response to their mate’s song, and when to sing it. It turns out they follow very specific rules. Some birds learn the rules from their parents and refine them by interacting with their mates. That’s where the neuroscience study comes in: It shows *how* the brain encodes answering rules. Humans also communicate interactively, of course. We have conversations with other people, as well as with artificial communication devices like Siri. Research on bird duets could help us understand and treat communication deficiencies in humans and improve artificial communication systems.

*What is the most interesting thing you’ve learned from your study species?*

• **David:** The most interesting thing I’ve learned from my research is that duetting wrens follow learned rules linking the songs they hear to the songs they sing as answers. For example, each female Black-bellied Wren has about 20 song types in her repertoire, while each male has about 40 song types. As an aside, you can think of avian song types like human songs. When two people sing “Happy Birthday,” each person sings it a little differently, but the song retains its characteristic structure. Anyway, I ran song playback experiments in which I pretended to be a male bird. I played different songs, and the female answered my playback as if I were her mate. I learned that when a female hears her mate sing, she very quickly chooses a song type to answer with. That female almost always chooses the same song in response to that particular song from her mate. If the male sings a different song type, the female picks a different answer. So, females abide by a set of rules, called a “duet code,” that links the songs they hear to the songs they sing in response. Different females have different



**Carolina Wrens** are vocal at all times, with both sexes and all ages joining in the music-making. Female wrens often “chatter” over the songs of their mates. Listen for this duet year-round—and especially during the lengthy breeding season. *Largo, Pinellas County, Florida; Apr. 26, 2020. Photo by © Christina L. Evans.*



**Western Tanager** duets are something of a mystery, but reports suggest that the birds use them early in the breeding season. With more study we might clarify why and how members of this species duet. *Morgan County, Utah; Aug. 24, 2018. Photo by © Mia McPherson.*

duet codes. When I made an artificial song by combining two different male song types, the female still answered as if it were one of the original songs. In fact, she based her response on which whole song was most similar to the artificial song! That shows that females can generalize their duet codes to new song types. Males answer according to codes, too, but in Black-bellied Wrens, they adhere to codes much more loosely than females.

• **Lauryn:** But we still don't know why they do that!

• **David:** No, we don't, so here are three guesses. First, coded answering could help neighboring birds identify pairs by making duet structures more consistent. It is beneficial for pairs to be recognized because neighbors show less territorial aggression to known pairs. Second, duet codes could act as a password system that birds use to identify themselves to their partners. When the female sings, the male needs to know whether that song is coming from his mate or a female intruder. By answering according to a unique code, she lets him know that she's his mate, even if she's out of sight in dense vegetation. Finally, coded answering may help birds coordinate the timing of their duet contributions.

Tightly coordinated duets are more threatening territorial signals. It may be useful to know how long your partner's duet contribution is going to be, so that you can get ready to answer right away.

• **Lauryn:** I feel like I learned a lot from California Towhees. And my lessons weren't all the same as David's—not surprising since we studied different species. One of my biggest takeaways is this: Duets don't do just one thing. The California Towhee squeal sound can be used by pairs in different ways: to defend territories, to locate an individual, to help new pairs organize territorial behavior, and to help older pairs be good parents. Much like an English word with multiple meanings, duets can serve a range of functions in a range of contexts.

When I started studying California Towhees, more than one person—really, it was closer to 10 or 20 people—told me I had chosen the most boring bird possible. California Towhees are entirely common, I was told, they're drab in coloration, they skulk around in the bushes not doing much, and they have the least interesting vocal behavior around—all you hear from them 90% of the time is their call note, that brief, metallic *tink*. But when I looked and listened more closely, a whole world of fascinating research questions opened up. This boring, drab bird offers one of the best examples of duetting in North America. It affirms that duets are not purely a tropical phenomenon.

*What are the biggest unanswered questions about duetting?*

• **Lauryn:** There are so many! How widespread are duets across all bird groups? At what point does an overlapping song become a duet? Is there something fundamentally different about tightly and loosely synchronized duets? Do they mean different things to different listeners? Do birds that duet better

have better lifetime success and leave more offspring? And what exactly is it that makes a duet “better”? We know that in many species of birds, better songs are longer or more complex, or more precisely timed. Do those same general rules apply to duets?

• **David:** Yeah, how come some duets have mates singing back and forth 10 or 20 times, while others are just two songs slapped together? And what is happening in the many families of duetting birds that have not been studied intensively? We know very little about duetting in some groups that duet a lot, like honeyeaters, babblers, Old World warblers, starlings, tanagers, and vangas.

We need more work on learning and the brain, too. What happens in the brain when an animal learns a new code element? And similarly, what controls the brain's ability to learn new rules? Research on song learning in birds has taught us a great deal about how human children learn words. Research on duet code acquisition could advance our understanding of how people learn the rules that govern conversation.

• **Lauryn:** I also think there are a lot of important questions about song learning and

song production that studies of duetting would help to answer. How do birds learn to duet? How does the behavior develop in one individual over time? Are males and females learning in the same way? Do the parts of their brains that control duetting differ? Do their vocal organs differ? I could go on... We have so much to learn! 🎧

TOP: This **Black-bellied Wren** duet shows evidence of the female's “duet code.” The male's first and third phrases are the same, so they evoke the same response from the female. His second phrase, however, is different from the other two. Accordingly, the female answers with a different phrase from her repertoire. *Gamboa, Panama; month 2004. Recording by © David Logue.*

BOTTOM: In this duet, a female **Hunter's Cisticola** sings an undulating series of ticks, while the male pipes up with whistled notes that follow the female's timing. *Kenya; Aug. 20, 1988. Recording by Claude Chappuis, courtesy of the British Library.*

