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Noisy Environments Make Young Songbirds Shuffle Their Tunes: Baby Songbirds Shape Their Species' Playlist

ScienceDaily (June 19, 2012) — iPod owners aren't the only ones who frequently shuffle their favorite tunes. Baby songbirds do it, too, a new study shows.

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A baby songbird prefers to learn the clearest versions of songs he hears and uses them to build his personal playlist for life. As a result, noise, from nature and humans, influences which songs a bird learns to sing and can create lasting changes to his species' top tunes, the study's results suggest.

"There's been an enormous amount of interest in how anthropogenic factors affect the channels animals use for communication and in particular how human noise affects birdsong," said Duke biologist and study co-author Steve Nowicki. "As far as we know, this is the first study that can link noise to cultural evolution of bird song."

The team designed the study to test a 30-year-old hypothesis suggesting that young birds memorize and later sing the clearest songs they hear during their critical learning period. In the experiment, Nowicki and his collaborators collected nine male, swamp-sparrow nestlings and hand-raised them in a soundproof room.

Twice a day for 12 weeks, the birds heard recordings of 16 song types sung by adult males of their species. Eight song types were degraded, or noisy, by being broadcast across a typical sparrow territory of 25 meters and then re-recorded. The other eight were clean copies of similar-sounding, but different songs. When the birds later matured and began to sing, they only repeated the clear songs.

"It wasn't too surprising that the sparrows preferred them," said Duke behavioral ecologist Susan Peters, lead author of the study. "What is exciting is how clear-cut the results are. All of the birds learned clear songs and none learned any of the degraded songs," she said.

The results appeared online June 20 in the journal *Biology Letters*.

This "simple" but "elegant" experiment "says a great deal about how birds put to use their extraordinary ability to hear small-time differences," said Eugene Morton, a biologist at York University in Canada who was not involved in the study.

The birds use this ability to learn songs that transmit through their habitat with the least amount of degradation. "In this way, the birds themselves reject songs less well suited to their environment," an example of cultural selection, Morton said.

Scientists consider the song shifts to be selected culturally, rather than naturally, because the songs are learned, not innate.

"This is important because cultural selection can happen more rapidly than natural selection," Peters said. "It helps to explain why birdsong is so diverse," and shows evidence that song variation depends on the bird's habitat.

She added that noise from cities and humans would have the same effect on song selection. "We already knew that some birds can adjust some features of their song when confronted with anthropogenic noise, and now we know that this may have an impact on cultural transmission of their song," she said.

If naturally noisy songs are less desirable to learn, then songs shaped by human noise are probably less likely to be passed down and learned generation after generation. "Who would have thought that a swamp sparrow song might be affected by human activity?" Peters said.



A male swamp sparrow belts out his best tune.
(Credit: Robert Lachlan, Duke)

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Peters and Nowicki worked on the NSF-funded study with Elizabeth Derryberry, a behavioral ecologist at Tulane University and Louisiana State University.

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1. S. Peters, E. P. Derryberry, S. Nowicki. **Songbirds learn songs least degraded by environmental transmission.** *Biology Letters*, 2012; DOI: [10.1098/rsbl.2012.0446](https://doi.org/10.1098/rsbl.2012.0446)

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