

# Eavesdropping comes naturally to young song sparrows

May 29 2007

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Long before the National Security Agency began eavesdropping on the phone calls of Americans, young song sparrows were listening to and learning the tunes sung by their neighbors.

University of Washington researchers exploring how male song sparrows (*Melospiza melodia*) acquire their song repertoires have found the first evidence that young birds choose many of their songs by eavesdropping on the tuneful interactions between other sparrows.

In laboratory experiments, the young sparrows were exposed to two adult "tutors," one of which they directly interacted with vocally and a second one that they only overheard singing with another young bird. Even though they learned from both tutors, the young birds acquired more than twice as many songs from the tutor on which they eavesdropped, said Michael Beecher, lead author of the study and a UW psychology and biology professor.

Scientists study song learning in songbirds in part because it has a number of parallels with human language learning, and Beecher thinks eavesdropping also could play a role in how infants learn language.

Sparrows in the wild are thought to learn their songs in two phases. The first phase occurs in their first summer, when they hear and memorize songs sung by adult birds. The following spring, when the young birds are establishing their own territory, they modify and prune their repertoire so their songs are more similar to their neighbors'. A song

sparrow's repertoire crystallizes at around 10 to 11 months of age and does not change.

Beecher and his colleagues earlier proposed that eavesdropping and interactive singing are critical in song learning. However, they could not determine if the young birds learned more by direct interaction with a tutor or by eavesdropping.

To answer that question, the researchers collected and raised eight baby sparrows for a two-part experiment. When they were about 15 days old, the birds were exposed to four adult sparrows for two months. Song sparrows typically have repertoires of about 10 songs, and the tutors in the study had no song types in common. That meant the young birds heard 40 different songs. The young birds were rotated between two rooms, each of which housed two of the adult tutors. The young sparrows, which had not begun to sing, were exposed to the tutor for four days and then rotated to the other room where they heard the songs of the other two tutors for four days. At the end of two months the young birds were isolated from hearing one another or the tutors.

The second phase of the study began when the birds were about 8 months old. This time only two of the adult tutors were used. Each young bird was paired up with an adult in a large chamber and their vocal interactions were recorded and played to a second young bird in a separate chamber. The next day, the second young bird was paired with a second tutor and the first young sparrow, now in a separate chamber by himself, overheard their interactions.

The songs of all of the young sparrows were recorded when they were nearly a year old, as were the songs of the tutors. Analysis showed that 51 percent of the young birds' songs were learned from tutors they overheard interacting with another sparrow in the second phase of the study. Just 19 percent came from interacting directly with a tutor. The

remaining 30 percent of songs were acquired when they were listening to tutors early in life.

Beecher thinks the young birds learn more by eavesdropping because it is less threatening than interacting face-to-face with an adult. In a parallel line of research, Beecher and his colleagues are tracking song sparrows by radio in the field. Preliminary analysis of the tracking data suggests that young birds don't have many direct interactions with adults, and so are likely to be learning their songs by eavesdropping.

When it comes to research about how babies learn language, most work has focused on interactions between a parent and an infant, but infants may learn language in part by eavesdropping on conversations between their parents or a sibling, Beecher said.

"Do kids learn from parents talking to them or from other people talking and interacting? We don't know. We do know that children's comprehension is much farther ahead than their language production ability, certainly in the first couple of years of life. They can't say very much, but they can understand a good deal," he added.

Co-authors of the National Science Foundation funded study are John Burt and Adrian O'Loghlen; UW research scientists, Christopher Templeton, a UW biology doctoral student; and Elizabeth Campbell, a research technician. The on-line edition of the journal *Animal Behaviour* published the paper. It will appear in the June print issue of the journal.

Source: University of Washington

Citation: Eavesdropping comes naturally to young song sparrows (2007, May 29) retrieved 1 May 2024 from <https://phys.org/news/2007-05-eavesdropping-naturally-young-song-sparrows.html>

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