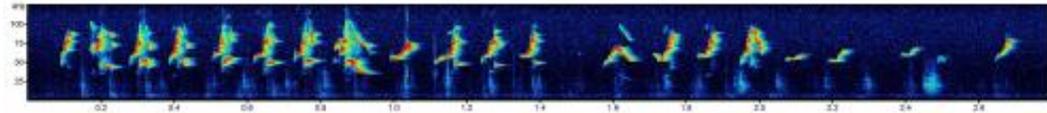


Mice sing like songbirds to woo mates

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After smelling the urine of a female mouse, a male mouse starts to call to her using a complex string of utterances (depicted in the sonogram which shows frequency of sound over time). Researchers think that such songs give way to simpler tunes after the male is in the physical presence of the female. Credit: Credit - Jonathan Chabout, Duke University

Male mice sing surprisingly complex songs to seduce females, sort of like songbirds, according to a new Duke study appearing April 1 in the *Frontiers of Behavioral Neuroscience*.

For more than 50 years, it has been known that [mice](#) sing. That is, they emit what's called 'ultrasonic vocalizations' or USVs, sounds so high-pitched that people can't hear them.

These vocalizations are known to occur in the wild when a mouse pup calls for its mother. And USVs grow more complex as mice reach adulthood. But researchers are still trying to decode the songs and determine how they vary across different social situations.

The new results add to evidence suggesting that although mice have a more limited ability to modify their songs than songbirds, they may be

useful in research to understand some features of vocal communication and communication disorders, said co-corresponding author Erich Jarvis, an associate professor of neurobiology at Duke University and a Howard Hughes Medical Institute Investigator.

Duke postdoctoral fellow Jonathan Chabout exposed adult male mice to different social contexts, and, in collaboration with David Dunson and Abhra Sarkar in Duke's Department of Statistical Science, developed a new computational approach for analyzing mouse songs.

Informed by their analyses of male songbirds' [courtship songs](#), the team studied the dynamics between the various syllables in a given mouse song, defined as a series of utterances or syllables strung together, sometimes with a tempo.

The team found that males sing more complex songs—and louder—when they smell a female's urine but don't see her. By comparison, the songs are longer and simpler when the males sing directly to the female in her presence.

"We think this has something to do with the complex song being like a calling song, and then when he sees the female, he switches to a simpler song in order to save energy to chase and try to court her at the same time," said Jarvis, who is also a member of the Duke Institute for Brain Sciences.

"It was surprising to me how much change occurs to these songs in different social contexts, when the songs are thought to be innate," Jarvis added. "It is clear that the mouse's ability to vocalize is a lot more limited than a songbird's or human's, and yet it's remarkable that we can find these differences in song complexity."

Within a given [song](#), the mice produce specific patterns rather than

random strings of syllables, Chabout said.

But what did the [female mice](#) think of this?

Most female mice prefer spending time by speakers playing the complex tunes. The fact that the females reacted differently to the different songs further strengthens the group's conclusion that these various calls carry meaning, Chabout said.

The scientists plan to investigate the role of various genes and brain areas in the songs.

The researchers aren't sure yet how much the mice can learn to modify their songs rather than choosing among fixed patterns. Jarvis said the answer will be important for the study of [autism spectrum disorders](#), characterized in part by deficits in social communication and, presumably, in brain circuits that control learned behavior.

"That's why we and other scientists from all over the globe are studying mice to test the limits of vocal learning and plasticity," Jarvis said.

The researchers uploaded their recordings to "MouseTube," a growing repository built by scientists at the Institute Pasteur in Paris that is expected to contain USVs from around the world, across different strains and in different experimental contexts. (The particular mouse that scientists used in the new study they already knew to be more vocal than others.)

"We hope to help other researchers study USVs," Chabout said. "And we bring a new way of looking at them dynamically."

More information: "Male mice song syntax depends on social contexts and influences female preferences," Jonathan Chabout, Abhra

Sarkar, David B. Dunson, Erich D. Jarvis. *Frontiers in Behavioral Neuroscience*, April 1, 2015. [DOI: 10.3389/fnbeh.2015.00076](https://doi.org/10.3389/fnbeh.2015.00076)

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