

## Researcher finds gender differences in seasonal auditory changes

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Auditory systems differ between sexes in sparrows depending on the season, a Georgia State University neuroscientist has found. The work adds to our knowledge of how the parts of the nervous system, including that of humans, are able to change.

Megan Gall, a post-doctoral researcher with Georgia State's Neuroscience Institute, tested the peripheral auditory systems of male and female [house sparrows](#), comparing the hearing of each gender during non-breeding seasons and breeding seasons.

Gall measured frequency selectivity – the ability to tell sounds that are close in frequency apart, and temporal resolution, the ability to tell

sounds apart that are very close together in time.

"We found that males have the same frequency selectivity and temporal resolution across breeding seasons," Gall said. "In the fall, [males and females](#) aren't different. But in the breeding season, females had better frequency selectivity, but this came at the expense of worse [temporal resolution](#)."

The study was published in the [Proceedings of the Royal Society B](#), a British scientific journal.

The difference shows "plasticity," the ability to change, she said. Plasticity is an important concept in neuroscience, as scientists have increasingly been able to show that neurological systems have the ability to change.

Gall said the work shows, for the first time, that there's seasonal plasticity in these properties in the periphery of the auditory system, the ear and the [auditory nerve](#), not just inside the [parts of the brain](#) that control auditory function.

Similar changes happen in humans, she said. Women show different auditory sensitivities during the course of a menstrual cycle.

"I always like to say that if your husband says he can't hear you, it may be that he can't. His [auditory system](#) is different than yours," Gall said.

The changes might have evolved over time for different reasons, she said, with one reason being that it is harder for the body to maintain a certain kind of tissues involved in hearing.

"In the ear, there are huge electrical gradients between the hair cells and the fluid that's bathing the hair cells in the ear, and that's expensive to

maintain," she said. "Another possible reason is that there are other stimuli that you are concerned about during the non-breeding season.

"These birds live in an environment where it gets cold, it's hard to find food and they make calls that tell other individuals where that food is. So everybody wants to hear the call in the same way so that they all respond to that signal."

Alarm calls, warnings that a predator or predators are coming, might also require different kinds of auditory processing.

**More information:** The study is "Songbird frequency selectivity and temporal resolution vary with sex and season," *Proceedings of the Royal Society B*, Gall, M.D., Salameh, T.S. and Lucas, J.R., 2003, [dx.doi.org/10.1098/rspb.2012.2296](https://doi.org/10.1098/rspb.2012.2296)

Provided by Georgia State University

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