

This songbird can keep time with the best of them

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The scaly-breasted wren. Credit: Gonzalo Nazati

When it comes to keeping time, an unassuming species of songbird is on a par with professional musicians, according to new research led by scientists at The University of Texas at Austin.

The study is the first to investigate natural [time-keeping](#) ability of an animal in the wild rather than under observation in the lab, with scientists examining the song of the scaly-breasted wren, a small brown bird in Central and South America known for its whistle-like chirps.

The song of the wild birds demonstrated better time-keeping skills than those of mammals and birds trained in captivity. The results underscore the importance of studying animals in both the lab and in nature to get an accurate view of their abilities, said lead author Carlos Antonio Rodriguez-Saltos.

"We should use the power of biodiversity to understand these things while we still can," said Saltos, who conducted the research when he was a postdoctoral researcher at the UT Jackson School of Geosciences.

The results were published in *Animal Behaviour*. Jackson School Professor Julia Clarke co-authored the study.

Birds don't have songbooks. But some species sing the same tune, chirping notes in an identifiable [pattern](#). For the scaly-breasted wren, the pattern goes like this: an opening blast of chirps followed by alternating intervals of chirps and pauses, with the pauses between each chirp getting progressively longer.



Lead Carlos Antonio Rodriguez-Saltos with birdsong recording equipment in Ecuador. Credit: Fernanda Duque

Rodriguez-Saltos became familiar with the song of the wren as an undergraduate student in Ecuador when his ecology professor taught him how to identify the distinct pattern among the din of rainforest sounds. Years later, he realized that a unique feature of the wren's song—the steadily growing pauses between the chirps—presented a unique opportunity to delve into the bird's time-tracking abilities.

"It is a really remarkable change from short intervals to long intervals in the same song," Rodriguez-Saltos said.

The pauses between each chirp grow in a predictable way—lengthening by about a half second each time. After the pause reaches about 10 seconds long, the birds then repeat their song from the top.

In laboratory experiments, most animals—including humans—have difficulty determining how much time has passed after just a second or two. In general, the longer an interval of time, the worse animals are at estimating its passage.



The cloud forest of Ecuador is one of the natural habitats of the scaly-breasted wren. Credit: Fernanda Duque

But for the wild wrens, 43% of the songs (10 out of the 23 songs that met the requirements for evaluation) consistently kept time for the duration of the song, with the [intervals](#) holding the established pattern even as the pauses increased in length.

For two of those songs, the accuracy of the wren was higher than that of the average professional musician.

However, some of the songs had different outcomes. One became less

precise over time, following the trend observed in most laboratory experiments. The less-than-perfect performances could come down to a matter of practice, with wrens learning to sing in part by mimicking more experienced birds, Rodriguez-Saltos said.

Susan Healy, a professor who studies bird behavior at the University of St Andrews and who was not part of the study, said that the paper raises questions about how timing might play into the mating displays of wrens.

"If females are especially interested in a male's ability not just to produce the right notes but also the timing of their production, then the pressure is on," she said.

The birdsong analyzed in the study came from field recordings. Some were made by Rodriguez-Saltos and co-author Fernanda Duque in Ecuador. Others came from bird aficionados who uploaded recordings of the wren's song online. The data on timing in other animals came from other studies.

Clarke, an expert on evolution of bird vocalization in both living and extinct species, said the research demonstrates the importance of turning to nature to study birds in their natural environments.

"We take wild birds for granted, and natural populations are dwindling, so this is urgent," she said. "This case shows how studying birds can provide huge new insights into cognition and timekeeping."

More information: Carlos A. Rodríguez-Saltos et al, Precise and nonscalar timing of intervals in a bird vocalization, *Animal Behaviour* (2022). [DOI: 10.1016/j.anbehav.2022.06.004](https://doi.org/10.1016/j.anbehav.2022.06.004)

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