

Fairy wren embryos found able to discern between adult calls

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Malurus cyaneus. Credit: Please credit Dr. Rebecca Kilner

(Phys.org) —A trio of researchers with Flinders University in Australia has found that a species of bird, the superb fairy wren, is able to distinguish between adult calls while still inside its egg. In their paper published in *Proceedings of the Royal Society B: Biological Sciences*, Diane Colombelli-Négrel, Mark Hauber and Sonia Kleindorfer describe their study of the little birds and how what they found appears to explain the means by which newly hatched offspring outwit cuckoo birds.

Prior research has found that an adult superb fairy wren is able to somehow convey special call information to its young so that it won't be fooled by interloping [cuckoo birds](#). In this new effort, the researchers

appear to have found the mechanism behind that ability—the adults give the embryos special calls while still in the egg that serve as a form of password.

To find out if the wren embryos really were listening and responding to adult calls, the researchers went out into the field and collected 60 eggs from nests (9 to 13 days into their two week incubation). They then placed sound monitors on the eggs to listen to the heartbeats of embryos inside. In human embryos, changes in heart-beat rate have been associated with responses to stimuli from the outside world. The researchers wondered if the same might be true for the birds.

The researchers played white noise, prerecorded contact calls from a different wren [species](#), and calls from females of the same species giving incubation calls to their eggs. They found that the heart rates of the embryos slowed during the calls from the same species female, but not when subjected to the other sounds. Going further, the researchers played the adult same-species call until the embryos grew accustomed to them, as indicated by a return to a normal heart rate when the calls were played. Next, the researchers played sounds from a different adult female of the same species, and noted that the embryos once again lowered their heart rates, responding to the change. This, the team members claim, shows that the [embryos](#) were able to discern between adult calls, a skill that until now, has only been found in [human embryos](#).

The researchers suggest that the adults convey a sort of password to the birds still inside the egg, so that when they hatch, they'll only get fed if they can repeat the password back to the adult, outfoxing any cuckoo birds chicks that might have been deposited in the same nest.

More information: Prenatal learning in an Australian songbird: habituation and individual discrimination in superb fairy-wren embryos, *Proceedings of the Royal Society B*, Published 29 October 2014

[rspb.royalsocietypublishing.org ... nt/281/1797/20141154](https://rspb.royalsocietypublishing.org/doi/10.1098/rspb.2014.1154)

Abstract

Embryos were traditionally considered to possess limited learning abilities because of the immaturity of their developing brains. By contrast, neonates from diverse species show behaviours dependent on prior embryonic experience. Stimulus discrimination is a key component of learning and has been shown by a handful of studies in non-human embryos. Superb fairy-wren embryos (*Malurus cyaneus*) learn a vocal password that has been taught to them by the attending female during incubation. The fairy-wren embryos use the learned element as their begging call after hatching to solicit more parental feeding. In this study, we test whether superb fairy-wren embryos have the capacity to discriminate between acoustical stimuli and whether they show non-associative learning. We measured embryonic heart rate response using a habituation/dishabituation paradigm with eggs sourced from nests in the wild. Fairy-wren embryos lowered their heart rate in response to the broadcasts of conspecific versus heterospecific calls, and in response to the calls of novel conspecific individuals. Thus, fairy-wrens join humans as vocal-learning species with known prenatal learning and individual discrimination.

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