

What information is coded in bird alarm calls—a new study from Korea

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(A) - A snake (the steppe rat snake, *Elaphe dione*) found inside of a nest box on top of the nest of the Oriental tit after it ate the nestlings that were in the nest; (B) - a model of a snake on top of a nest box was moved in a naturalistic manner using fishing line from a distance in order to trigger alarm calls in the birds. These tests lasted just a few minutes, they did not cause any harm to the birds, and the recordings of bird responses showed that alarm calls to snakes have special acoustic properties (Audio recording of response to a snake.mp3) different from calls to chipmunks (Audio recording of response to a chipmunk.mp3), who also can enter the nest boxes and eat broods. This suggests that the calls do not carry information about predator's ability to enter the nest cavity. Credit: Jungmoon Ha, Keesan Lee, Eunjeong Yang, Woojoo Kim, Ho?kyung Song, Injae Hwang, Larisa Lee?Cruz, Sang?im Lee, Piotr Jablonski

Have you seen small birds nervously jumping up and down the branches and calling at a cat in a park? For a long time, scientists have been interested in what type of information about predators is coded in alarm calls; is it predator's species identity? Or their size? Or how dangerous it is? A recent study published in *Ethology* provides new discoveries in this field.

The study carried out by researchers of the Laboratory of Behavioral Ecology and Evolution at the Seoul National University (SNU, Korea) and the Laboratory of Integrative Animal Ecology at DGIST (Korea) with a collaboration of the Museum and Institute of Zoology, Polish Academy of Sciences, has focused on the Oriental tit (*Parus minor*). Oriental tits breed in tree cavities or [nest boxes](#). Therefore, they are protected from predators that cannot squeeze into the nest. However, some predators like snakes can do that. It has already been known that Oriental tits give a special alarm call that sounds like rattling (Audio recording of response to a snake.mp3) when a snake approaches their nest. When nestlings in the nest hear this call, they jump out of the nest. This call is different from a call to a bird predator, like crows, magpies or jays, that cannot enter the nest and tries to capture young [birds](#) outside of their nests.

"As snakes belong to the type of predators that enter nests, we thought that the rattling call carries information about the predator's ability to enter the nest," says Ph.D. candidate Jungmoon Ha. If the rattling call says "be aware of a predator that can enter the nest," then this call should be also given to other predators who can enter the nest, such as chipmunks. In the study area, chipmunks are quite common and are known to destroy the nests of tits just like the snakes do. Researchers recorded the alarm calls of Oriental tit parents to a snake and to a chipmunk put on top of the nest box, and compared them to the alarm calls toward a Eurasian jay model put next to the nest box. They found that the calls are different from each other; the [alarm calls](#) were

different even though both the snake and chipmunk can enter the nest (Audio recording of response to a chipmunk.mp3). "This means that the rattling call does not signal the [predator](#)'s ability to enter the nest, but rather has a very specific meaning like 'be aware of a snake,'" concludes Prof. Piotr Jablonski (Laboratory of Behavioral Ecology and Evolution, SNU), who has studied anti-predatory adaptations in animals for years. It also suggests that the calls towards a chipmunk may mean 'be aware of a chipmunk' or 'be aware of a small mammal,' but certainly it is different from the calls towards a jay that may mean 'be aware of a bird.'"

"Then we checked if nestlings jump out of the nest only in response to the playback of 'snake call' or also in response to the playback of 'chipmunk call,'" comments Mr. Ha. The nestlings jumped out only in response to '[snake](#) call,' as has already been known. Why didn't they jump out in [response](#) to 'chipmunk call' even though a [chipmunk](#) may enter the nest and eat them? "We suspect that snakes eat young birds in the [nest](#) cavities much more often than chipmunks do, and therefore natural selection has produced this specific call against snakes and the specific reaction of [young birds](#) to it," explains Prof Sang-im Lee (Laboratory of integrative Animal Ecology, DGIST), who has been studying the family life of birds. The researchers suggested that, like in humans and primates, there is something special about the fear of snakes that results in the special 'be aware of snakes' calls in birds.

More information: Jungmoon Ha et al, Experimental study of alarm calls of the oriental tit (*Parus minor*) toward different predators and reactions they induce in nestlings, *Ethology* (2020). [DOI: 10.1111/eth.13012](https://doi.org/10.1111/eth.13012)

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