

Diversity improves problem-solving success: Just ask songbirds

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Eastern Yellow Robin. Credit: Wikipedia.

Humans seeking to improve their problem-solving and survival skills can learn a thing or two from an unlikely source—songbirds.

A new study from the University of Tennessee, Knoxville, shows that



diversity within a wild <u>songbird</u> community can enhance its members' access to food.

The research was published recently in *Scientific Reports*, a division of the journal Nature. The study's lead author is Todd Freeberg, a UT professor of psychology and expert in birds' vocal communication.

Collaborators include researchers from the University of Florida and Purdue University.

Mixed-species groups among wild songbirds are common and are thought to benefit group members by allowing them to protect one another from predators, increasing their ability to find food sources in unsafe environments.

The new study demonstrates that those benefits increase the larger the group size and the more diverse the species composition. The study also shows that diversity results in a broader set of effective problem-solving skills available to the group.

"We now have added what is, to our knowledge, the first evidence in a natural setting that diversity can benefit individuals in mixed-species groups in biologically meaningful contexts such as finding food in novel places," the study states.

Research concerning humans has shown similar results, according to the songbird study authors. For example, ethnically diverse groups of people were more accurate in their pricing estimates than ethnically homogenous groups in marketplace trading decisions.

"There is a large and growing amount of scientific literature on the benefits of diversity in human groups for human problem solving," Freeberg said. "When we are working in groups, we can solve problems



more efficiently and effectively if the individual composition of our groups is diverse and if there is good communication among all group members."

For their study, Freeberg and his collaborators used a novel feeder test in a wild songbird community, which included three species that varied in their roles as the dominant or subordinate ones in groups: Carolina chickadees (Poecile carolinensis), tufted titmice (Baeolophus bicolor) and white-breasted nuthatches (Sitta carolinensis). Although these birds are common to the Southeast and are found together in winter months, they occasionally stick to their specific groups—like cliques in a middle school cafeteria.

The researchers built feeders different from the ones birds find in human backyards. They placed them in four locations—the UT Forest Resources Research and Education Center, Norris Dam State Park, Ijams Nature Center and a private residence. The sites represented an unpredictable food source for the birds in the study.

The researchers wanted to see if the birds would overcome their fear of the unknown to get seeds, an important winter resource for them. They found that when just one species ate at the feeders, they didn't take as much seed. But when multiple species that included chickadees, titmice and nuthatches were present together, they were more likely to get seed from the novel feeder at a much faster rate because they figured out how to work together to get more out of the feeder.

Freeberg, who has studied the calls of chickadees and titmice for 20 years, said a next step would be to assess the signaling and communication that occur in the bird groups to determine how they play into technical problem-solving tasks. He also would like to examine how the signals and cues of individuals in diverse mixed-species flocks differ from those of individuals in single-species flocks.



More information: Todd M. Freeberg et al. Diversity in mixed species groups improves success in a novel feeder test in a wild songbird community, *Scientific Reports* (2017). DOI: 10.1038/srep43014

Provided by University of Tennessee at Knoxville

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