

# New research finds promiscuousness results in genetic 'trade-up,' more offspring

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An adult female junco is pictured here defending a nest that contained three nestlings sired by an extra-pair male partner. Credit: Nicole Gerlach, Indiana University

It's all about the grandkids! That's what a team led by an Indiana University biologist has learned about promiscuous female birds and why they mate outside their social pair.

Many humans find the idea of [mating](#) for life a romantic ideal, but in the natural world, non-monogamous relationships may have their benefits. According to new research published online today (Aug. 31) in [Proceedings of the Royal Society B](#), IU postdoctoral research associate Nicole Gerlach and colleagues have uncovered one of the benefits of this promiscuity: more grandkids!

In dark-eyed juncos (*Junco hyemalis*), individuals that were sired by a male other than their mother's pair-bonded partner grew up to have higher [reproductive success](#) than did individuals whose mother stayed faithful to her partner. This study on a population of wild [songbirds](#) represents the first time that an individual's paternity has been shown to affect its reproductive success as an adult.

"There are a lot of species that form monogamous social pairs but are decidedly promiscuous when it comes to mating and having offspring, and the question of what females gain from these extra-pair matings has puzzled scientists for a long time. What we've found is that, at least in juncos, these females are doing it for their kids, and for their kids' kids," Gerlach said of the work with IU Distinguished Professor of Biology Ellen Ketterson, former doctoral student of Ketterson's Joel McGlothlin, now at the University of Virginia, and Patricia Parker of the University of Missouri, St. Louis.

"In the long run, females are likely to have twice as many grandchildren if they mate with an extra-pair male than if they remain truly monogamous."

Sons of extra-pair fathers are also more likely to become extra-pair fathers themselves, suggesting that females may be straying from their social mates based on whether the new male will produce attractive or otherwise high-quality offspring. "However, it's not just sons that are reaping the benefits of having an extra-pair dad," Gerlach added. "The daughters benefit just as much."

Scientists have long believed that females mate with extra-pair males in order to produce offspring of higher quality, either by mating with the best possible males, or with males whose genes form good combinations with the female's own. Many previous studies have tested this hypothesis by comparing offspring produced with a female's pair-bonded partner to

those sired by an extra-pair male. But the results of these studies have been equivocal, perhaps because they were focused on the first year of an offspring's life.

"What was needed to really answer the question of offspring quality were direct measures of their reproduction as adults," Gerlach noted. "But that's not something that you can get in a year or two's worth of research." In fact, their results were more than 18 years in the making; Gerlach and her colleagues conducted paternity tests on almost 2,200 nestlings that hatched between 1990 and 2007. "Because we could look at these patterns over many years and many generations, we were able to find strong support for the idea that extra-pair mating by females does produce better offspring... but that they need to grow up before that higher quality starts to show."

"This is the first case that we know of in which extra-pair [paternity](#) has been shown to increase lifetime reproductive success of adult offspring in a free-living songbird," Gerlach said.

The results -- that extra-pair offspring themselves produce more offspring than within-pair [offspring](#) -- suggest that females are using their extra-pair matings to "trade-up" to males that are superior to or more genetically compatible than their social mate.

Still to be determined are what characteristics females are using to pick their extra-pair mates. "We don't yet know whether some males are universally attractive, or if every female junco has her own ideal match," said Gerlach. Future research will determine whether the positive contributions from extra-pair males are a result of their universally favored alleles, or "good genes," or whether [females](#) are selecting extra-pair males that are a good genetic match.

**More information:** "Promiscuous mating produces offspring with

higher lifetime fitness," *Proceedings of the Royal Society B*, Aug. 31, 2011; [rspb.royalsocietypublishing.org ... .1098/rspb.2011.1547](https://rspb.royalsocietypublishing.org/doi/10.1098/rspb.2011.1547)

Provided by Indiana University

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