Owl monkeys who 'stay true' reproduce more than those with multiple partners, Penn study finds

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Breaking up is hard to do—and can be detrimental to one's reproductive fitness, according to a new University of Pennsylvania study.

Focusing on wide-eyed, nocturnal owl monkeys, considered a socially monogamous species, the research reveals that, when an owl monkey pair is severed by an intruding individual, the mate who takes up with a new partner produces fewer offspring than a monkey who sticks with its tried-and-true partner.

The findings underscore how monogamy and pair-bonds—relatively rare social formations among mammals—can benefit certain individuals, with potential implications for understanding how human relationship patterns may have evolved.

Eduardo Fernandez-Duque and Maren Huck report on the research in PLOS ONE. Fernandez-Duque is an associate professor in Penn's Department of Anthropology. Huck completed a postdoctoral fellowship in Fernandez-Duque's laboratory and is now a professor at the University of Derby in the United Kingdom.

Since 1997, Fernandez-Duque and colleagues have monitored an owl monkey population in a portion of Argentina's Chaco region. Their behavioral observations, demographic data and physiological sampling have provided a wealth of information on the animals.

"We have managed over the years to have quite significant sample sizes for a study of wild non-human primates," Fernandez-Duque said. "These findings are possible because we have a combination of intense demographic monitoring year-round that allows us to notice when a male is missing, when a female is missing or when there's a new adult in the group. We couple this with intense behavioral monitoring that allows us to document the details of fights or the whole process of mate replacement."

The current study amasses data from 16 years of observation of 18 owl monkey groups, a total of 154 animals. Owl monkeys live in monogamous groups consisting of an adult male, an adult female and their offspring. The juveniles disperse from the group around age 3 or 4.

In 2008, Fernandez-Duque and colleagues published a paper reporting, for the first time, the presence of a so-called "floater" individual, which attacked the male in a pair and essentially replaced him as a mate and infant-care provider.

The Penn team now demonstrates that this usurping of mates by both male and female floaters is a common occurrence. The researchers documented 27 female and 23 male replacements in the groups they observed.

The replacements often involved dramatic fights, some of which ended fatally for the evicted individual.

"These is high-stake competition for a reproductive position," Fernandez-Duque said.

By following pairs and observing replacements, Fernandez-Duque and Huck show that having a partner evicted harms the reproductive success of the remaining mate. Owl monkeys with one partner produced 25

percent more offspring per decade than those with two or more partners.

"What we're showing is that if you manage to stay with the same partner you produce more infants than if you're forced to change partners," Fernandez-Duque said.

The reason for this significant impact on the reproductive success of the remaining partner is not yet completely clear, but the researchers surmise that it may have to do with a delay in reproduction due to the fact that female owl monkeys in Argentina typically only conceive between March and May. It's also possible the delay occurs because the two individuals take time to assess one another before reproducing, given the significant commitment to infant care that both males and females make.

The results demonstrate that, for owl monkeys, long-term monogamy and pair-bonding improves reproductive fitness. The finding helps explain previous research by Fernandez-Duque's group, which has shown that male owl monkeys invest significantly in raising their offspring.

"Monogamy makes sense for these primates, because the male who sticks to a female is certain about the paternity of the young, and so he invests in their care," he said. "The female benefits from shared provisioning of care which may help her reduce the burden of pregnancy and lactation."

Fernandez-Duque's studies of owl monkeys in Argentina and his collaborative research on monogamous titi and saki monkeys of Ecuador are helping scientists understand the ecological and biological factors that gave rise to pair-bonds in non-human primates and in humans.

"There's some consensus among anthropologists that pairs-bonds must have played an important role in the origin of human societies,"

Fernandez-Duque said. "Call it love, call it friendship, call it marriage, there is something in our biology that leads to this enduring, emotional bond between two individuals that is widespread among human societies."

Provided by University of Pennsylvania