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How lemurs win 'friends' and influence other lemurs

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IMAGE: THIS IMAGE SHOWS RING-TAILED LEMURS (*LEMUR CATTA*), WHICH LIVE IN FEMALE DOMINATED GROUPS OF UP TO 25 INDIVIDUALS AND FREQUENTLY FORM STRONG SOCIAL RELATIONSHIPS WITH THEIR GROUP MEMBERS. THESE RELATIONSHIPS...
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CREDIT: IPEK G. KULAHCI

In human social networks, it stands to reason that people might find it useful to spend time with others who are successful and well informed. Now researchers reporting in *Current Biology* on April 5 have found that the same is true in lemur society. Regardless of age or sex, the study shows that lemurs who are more likely to learn to solve a new task and retrieve a food reward after watching how it's done also had more social connections.

"We found that lemurs who were frequently observed by others while solving the task to retrieve the food received more affiliative behaviors than they did before they learned," says Ipek Kulahci, formerly of Princeton University and now a postdoctoral researcher at University College Cork in Ireland. "As a result, they became more socially central than they were before the experiment."

The findings are the first to show that the relationship between learning and social network position are feedback based, the researchers say, such that learning influences network connections and position in addition to being influenced by it.

To be successful, animals have to learn about their environment and apply this knowledge to key behaviors such as finding food and avoiding predators. While many studies had examined such cognitive abilities in lemurs and other animals, researchers hadn't examined the connection between cognitive abilities and social interactions. In the new study, the researchers set up a food reward task in which lemurs learned to retrieve a food reward--a grape--by pulling open a drawer in a Plexiglas box.

The Princeton team, including Asif Ghazanfar and Daniel Rubenstein, observed two free-ranging groups of ring-tailed lemurs at St. Catherines Island, Georgia, while they interacted with one another and the novel food-containing box. Each of the groups included about 20 individuals.

The study found that lemurs who were more centrally positioned were more likely to solve the task. The opposite was also true: lemurs who solved the task while others were watching became more popular amongst their peers after the fact.

"I was quite impressed that the frequently observed lemurs received more affiliative behaviors, such as grooming, without adjusting their own social behavior," Kulahci says. In most primate species, grooming is a mutually beneficial activity, she explains, relying on reciprocity between the groomer and the individual being groomed. Dominant individuals, however, often receive more grooming attention without returning the favor.

"So it's a pretty striking pattern that the frequently observed lemurs received lots of grooming without providing more grooming to others," Kulahci says.

The findings show that learning, and becoming knowledgeable and successful as result of learning, influences the position that animals occupy in a social network. Earlier studies had shown that social connections influence the way information spreads in a group. But none had considered the flipside: how learning and information alters the structure of the network itself.

Kulahci says that studies will need to take these dynamics into account. They are also a reminder that animals' behavior and social interactions is much richer and more flexible than people often think.

"Animals learn not only about their physical environment, such as how to obtain food in a situation that they had never encountered before, but they also learn about each other and use this information to make flexible social decisions when forming social relationships," Kulahci says. "They are learning about who is successful and who is not and adjusting their social responses based on this information. Being socially connected to successful individuals increases opportunities to learn from and copy them and improves future success. The diversity and the strength of their social relationships, in turn, influence if and when they learn from their group members. So, animals' cognitive abilities and social behavior are intertwined with each other and, together, influence animals' decisions in many behavioral contexts such as where and how to forage, with whom to associate, and how to avoid predators or find safety."

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Current Biology, Kulahci et al.: "Knowledgeable lemurs become more central in social networks" http://www.cell.com/current-biology/fulltext/S0960-9822(18)30301-4

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