New study reveals the evolutionary nature of animal friendships

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Biologists from Stockholm University and University of Neuchâtel present groundbreaking research shedding new light on the evolution of social bonds and cooperation among group-living animals. The study was

published in the journal *PNAS*.

Animals living in stable groups often exhibit interesting social behaviors, including cooperation and mutual aid. Biologists have long observed that individuals within these groups form social bonds or friendships, characterized by prosocial actions such as food sharing. However, the evolutionary explanations of these friendships have remained a subject of debate.

For more than 50 years, biologists have attempted to explain these behaviors using game theory, with a particular focus on reciprocity where individuals return help if they have received it previously. However, traditional models of strict and immediate reciprocity fail to fully capture the complexity of real relationships.

In their new study, researchers from Stockholm University and the University of Neuchâtel provide a new explanation for the evolution of helping behavior with social bonds that more closely aligns with observed phenomena. According to their analysis, social bonds develop gradually over time within friendships. Strong bonds are characterized by a history of mutual aid and recently shared activities between individuals.

This gradual buildup of bonds can occur in small or larger groups, provided that individuals have opportunities to interact with bonded partners in smaller subgroups. Interestingly, the study shows that existing group members actively initiate social bonds with new recruits, expanding the social network within the group. This dual action of maintaining existing friendships while forming new ones underscores the importance of social cohesion in group-living animals.

"How group members interact with new individuals is much discussed, and recently the idea that friendships with new individuals will develop

only very slowly has been emphasized. Our analysis suggests that this need not be the case," says Olof Leimar, Professor Emeritus at the Department of Zoology at Stockholm University. "In fact, in the original discussions of the evolution of helping, the possibility that group members actively attempt to develop new friendships was put forward, and our analysis agrees with this."

The study draws inspiration from the mutual nature of the relationship between mother and offspring, where help primarily flows in one direction. Much publicized observations of food sharing in groups of vampire bats further support the theoretical framework proposed by the researchers.

"We hope that our results will inspire biologists to further investigate the dynamics of social bonds in different group-living species, including studies on how new bonds are formed," says Leimar.

This collaborative effort between researchers from Stockholm University and University of Neuchâtel sheds new light on the evolutionary origins of friendship and cooperation among group-living animals.

More information: Olof Leimar et al, Social bond dynamics and the evolution of helping, *Proceedings of the National Academy of Sciences* (2024). DOI: 10.1073/pnas.2317736121

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