

It's complicated: New research reveals more about the social networks of baboons and African monkeys

New database provides groundbreaking information about primate social structures

By Nicole Pomerantz, ASU News
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Like people, nonhuman primates live in groups that vary in their size and shape depending on the species. Some primate groups are small and simple, others are large and more layered.

Over the decades, primatologists have observed that baboons and other closely related monkeys, the African [papionins](#), typically live in two types of social groups: single-level and multilevel societies.

However, a new study led by Arizona State University reveals it's more complex than a simple divide — and offers fresh insight into how subgroups form.

“Single-level societies are kind of like soccer leagues,” said ASU primatologist [Jacob Feder](#). “Everyone is an exclusive member of their unambiguous team, competing against other teams to 'win' (access to good food, defend their territory). In general, people have positive feelings and relationships with those who are a part of their team, and are averse to those who aren't.”

“Multilevel societies are more like schools,” Feder said. “Everyone's divided up into their respective classrooms, but they regularly pass by each other in the hallways, cross paths during lunch breaks and mingle during recess. While relationships within classes are generally stronger, there's no ill will — and sometimes even friendships — between classes and plenty of social glue keeping everyone together.”

So Feder compiled a new database of 135 years of data from 11 species across 13 field sites to quantitatively show how these groups form and if there is a gray area. Dozens of international scientists contributed to the Comparative Analysis of Papionin Societies, or CAPS, database.

Why baboons and not chimpanzees, our closest living relative?

“This dataset focused on baboons and papionins because this group of primates has long been used as a sort of model for human evolution. Baboons, geladas and mangabeys were evolving around the same time as our early human ancestors during the Plio-Pleistocene (roughly 5.3 million to 11,700 years ago),” said Feder, a National Science Foundation Postdoctoral Fellow with the Institute of Human Origins and School of Human Evolution and Social Change at ASU.

To map out the societies, Feder used [social network analysis](#) and built networks based on grooming behavior. He mapped out how often grooming occurred, how long it lasted and who was grooming whom.

Grooming is unambiguous, and scientists note the behavior the same way. Primates groom to clean each other from lice and bugs, and they groom because it seems to be very relaxing, explained [Joan Silk](#), a research scientist at the Institute of Human Origins and Regents Professor at the School of Human Evolution and Social Change.

What did the new networks show?

“One thing that we discovered in the data, which we had not previously suspected — it turns out that not all of these single-level societies are actually the same,” Silk said. “In some ways, they are very similar, strong kin biases, etc. However, some are more cliquish and some are more cohesive.”

Another interesting find is that some of these differences in the structure of the networks are driven by females. Female primates might drive these changes by strengthening their relationship with dominant males or their preference for family and other closely ranked individuals.

“Females don’t necessarily have more coercive power, but they are creating social structures,” Silk said. “The ecological reasons of how and why you have these multilevel societies are still a big question. And now that we’ve done this work, we can go after that.”

This collaborative work between scientists incorporates new statistical methods and insights into how these primates live and their social networks.

The article, “[Disparate social structures are underpinned by distinct social rules across a primate radiation](#),” was published in the Proceedings for the National Academy of Sciences. Additional authors from ASU include [India Schneider-Crease](#), assistant professor at the School for Human Evolution and Social Change, and [Noah Snyder-Mackler](#), professor at the School of Life Sciences.

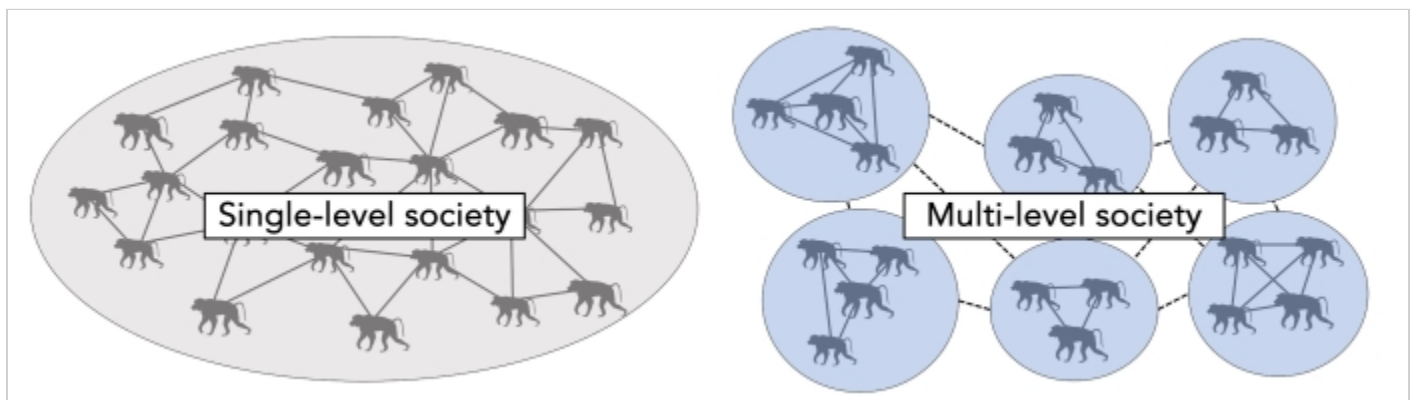
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Main image



A band of geladas graze in the Simien Mountains National Park, Ethiopia. Photo by Elizabeth Tinsley Johnson, assistant professor at Michigan State University

Text image(s)



Some papionin species form cohesive single-level societies that contain multiple males, multiple females and their dependent offspring. Males disperse from these groups when they reach the age

of sexual maturity. Three species of papionin primates form layered, multilevel societies in which one-male units (the blue circles) are aggregated into larger social herds. In these species, dispersal patterns are variable. Graphic by Jacob Feder/ASU



A female gelada sits while her groupmates peer at and groom her newborn. Photo by Jacob Feder/ASU