Baboons watch neighbours for clues about food, but can end up in queues

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Baboon troop. Credit: Alecia Carter

Baboons learn about food locations socially through monitoring the behaviour of those around them. While proximity to others is the key to acquiring information, research shows that accessing food depends on the complex hierarchies of a baboon troop, and those lower down the pecking order can end up queuing for leftovers.

Latest research on social networks in wild baboon troops has revealed

how the animals get information from each other on the whereabouts of food. However, once information reaches a high status baboon, subordinates often end up in a queue for scraps.

A new study, by researchers from the University of Cambridge and the Zoological Society of London, shows how baboons monitor each other for changes in behaviour that indicate food has been found, such as hunching over to scoop it up.

This 'socially learned' information gets transmitted through proximity: those with more neighbours are more likely to spot when someone starts feeding. Once they do, baboons will head towards the food.

Information then starts to spread through the troop, as more baboons observe feeding behaviour or notice their neighbours moving in the direction of food. However, troop hierarchy ultimately kicks in – with the most dominant member in the vicinity, usually a male, wading in to claim the spoils.

At this point, surrounding baboons will often form what can appear to be a queue, to determine who gets to explore that patch of ground next.

These queues reflect the complex interactions within a baboon troop. The sequence of baboons in a queue depends on status – sometimes through birth-right – as well as social and familial relationships to the particular baboon occupying the food patch.

The new research, published in the open access journal eLife, breaks down the transmission of social information through a baboon troop into three stages:

- Acquiring information: observing behaviour that suggests food.
- Applying information: exploring the food patch (even if no food

is left).
- Finally, exploiting information: actually getting to eat.

The researchers used social networking models to show how being close enough to spot behaviour change is the only driver for acquiring knowledge.

When it comes to applying and exploiting social knowledge, however, the characteristics of individual baboons – whether its sex, status, boldness, or social ties in grooming networks – determine who gets to eat, or where they are in any queue that forms.

Baboon troops can be sizable, sometimes as many as 100 members, with the troops in the latest study numbering around 70. On average, less than 25% of a troop – around 10 individuals – acquired information of a food patch, with less than 5% of the troop actually exploiting it.

"Who actually gets to eat is only half the story," says Dr Alecia Carter, from Cambridge's Department of Zoology, who led the research.

"Just looking at the animals that capture the benefits of information, in this case food, doesn't reflect the real pattern of how information transmits through groups. Many more animals acquire information, but are limited in their use of it for a variety of reasons."

To conduct the study, researchers snuck handfuls of maize corn kernels, a high-energy baboon favourite ("like finding a stash of chocolate bars") into the path of two foraging troops of wild chacma baboons in Tsaobis Nature Park, Namibia.

Once a troop member found the food, the researchers recorded the identities of baboons that spotted the animal eating, accessed the food patch, and got anything to eat.

Carter says that the best place for low-ranking baboons is often the peripheries, in the hopes of finding food and grabbing a few kernels before information spreads, and they are supplanted by the local dominant.

"The more dominant a baboon is, the more spatially central in the troop they tend to be – as they can afford to be there. This provides more opportunities to gain information through the wider network," says Carter.

Low-rankers that discover food will sometimes try to eat as stealthily or as quickly as they can, but, once a dominant has taken control of the food patch, a queue will often form. Grooming relationships to the feeding dominant can help a subordinate jump up a queue, although much of it is dictated by status.

For females, status is a birth-right that remains fixed throughout a baboon's life. While human societies historically privilege the firstborn, in baboon troops maternal lineage is ranked by lastborn – with each new female baby replacing the last in terms of hierarchy.

Young males hold the same rank as their mother until they reach adolescence, usually around the age of six, and start asserting dominance through their bigger size, leading to shifts in status.

"It is relatively easy to collect dominance data, as baboons are constantly asserting dominance," explains Carter. "Low-cost assertions of dominance, such as pushing an individual out of small patches of food, help to mitigate high-cost assertions, such as fights, and maintain the order."

"However, baboons can mediate their status to a minor extent by having good grooming relationships, and low-ranking individuals have a slightly

higher chance of applying and exploiting information if they are central in a grooming network. Over a lifetime of food opportunities, this may prove important for fitness."

While baboons acquire information about food locations from watching others, they can also use social learning to see when that food is likely to be gone. Interestingly, the researchers found that males and females will often use this information in different ways.

"Baboons are highly vigilant, and constantly pay attention to what their neighbours are up to. When those in a food patch are sifting through dirt and clearly coming up empty-handed, most females will walk off, and won't waste their time," says Carter.

"Males on the other hand, particularly young males, are amazingly persistent, and will stay in a patch shifting sand around for a very long time in the hopes of finding a stray kernel.

"We hypothesise that, while males can afford to expend the energy, adult females are lactating or pregnant most of the time, so need to conserve their strength, and often end up using the information in a more practical way as a result."

More information: Alecia J Carter et al. Sequential phenotypic constraints on social information use in wild baboons, *eLife* (2016). DOI: 10.7554/eLife.13125

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