

How humans and chimpanzees travel towards a goal in rainforests

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Mbendjele woman inspecting a tree during a foraging trip with other women in the tropical rainforest of the Republic of Congo. Credit: Karline Janmaat

How do human-unique ranging styles, like large home range and trail use, influence the way we travel to our goals? Researchers from the Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany, investigated spatial movement patterns of the Mbendjele BaYaka people and Tai chimpanzees. Human foragers and chimpanzees traveled in similarly straight lines towards goals, but they showed clearly different patterns in how they change linearity and speed depending on group size and familiarity with an area.

The human ranging style is unique among hominoids. The Mbendjele BaYaka people move from camp to camp every few months, and thus have a large lifetime range of approximately 800 square meters. Human foragers collect food and take it back to their camp to process and share. Furthermore, the Mbendjele BaYaka have created a trail system and walk mostly on trails. In contrast, one of our closest living relatives, chimpanzees, live in a relatively smaller area (25 square meters) and spend most of their adult lives within the same home range.

Chimpanzees consume food as they encounter it and make sleeping nests at variable locations within their home range. In addition, chimpanzees (especially, the chimpanzees living in the Tai National Park, Ivory Coast, where this research was conducted) rarely use the same paths when traveling on the ground. These different ranging styles between humans and chimpanzees might shape their different spatial experience and thus the way they travel through the forest to find food in their natural habitats.

Haneul Jang and her colleagues from the Max Planck Institute for Evolutionary Anthropology set out to study how human foragers and chimpanzees compare in their spatial movement patterns in similar rainforest environments. To this aim, the researchers measured travel linearity and speed of five Mbendjele BaYaka women from the Republic of Congo and five female chimpanzees from Tai forest when they

traveled off-trail areas to out-of-sight food locations during their daily search for food in the rainforest.

Jang and her colleagues found that both the Mbendjele BaYaka people and Taï chimpanzees had, on average, similarly high levels of linearity when they traveled towards out-of-sight locations. However, the Mbendjele BaYaka and Taï chimpanzees clearly differed in the manner in which their travel linearity and speed changed with [group size](#) and familiarity with a foraging area. The Mbendjele BaYaka traveled with higher linearity in familiar areas compared to less familiar areas. This pattern was reversed in Taï chimpanzees—they moved with higher linearity and speed in less familiar areas compared to familiar areas.



Chimpanzee inspecting a tree during a foraging trip on her own in the tropical rainforest of Taï National Park, Ivory Coast. Credit: Karline Janmaat

"One possible explanation of these differences can be their different ranging style. The Mbendjele BaYaka people stay in several seasonal camps in their lifetime range, and walk 90 percent of their travel distance on human-made trails during their foraging trips in the forest. They may therefore have less experience in less familiar off-trail areas. Hence, when the Mbendjele BaYaka people forage in these areas, their travel linearity decreases due to their searching effort," says Haneul Jang, lead author of the study. On the contrary, chimpanzees decreased travel linearity and speed in more familiar areas. "Since chimpanzee groups can be highly hostile towards each other, they might need to travel more efficiently and faster in less familiar areas, where they are more likely to encounter other chimpanzee groups," says Jang.

In addition, Jang and her colleagues found that travel linearity increased in the Mbendjele BaYaka people and decreased in Taï chimpanzees when they traveled in a larger as compared to a smaller foraging group. "When I followed the [chimpanzees](#), I often saw them wait for each other and have apparent disagreements about where to go," says Karline Janmaat, the main supervisor of the study. "With more individuals joining the group, disagreement seemed to increase. It is therefore perhaps not surprising that when group size increased, their travel became less linear. For the Mbendjele BaYaka people we found the opposite pattern. This can have many reasons, but I like to think that it is because humans can discuss, evaluate and eventually agree about where the best food sources are, by using language, and that this helped them to travel more efficiently."

According to the authors, this study is the first necessary step needed to

compare long-range spatial movement patterns of human and chimpanzee populations in their natural habitats. "Our study provides insights into how two closely related species living in similar environments can differ in their spatial movement patterns, which possibly results from their different ranging styles," says Jang. "We hope our study can contribute to expanding comparative research on spatial movement patterns to a wide range of primate species and populations, including humans, in natural environments."

The study is published in *Scientific Reports*.

More information: Haneul Jang et al. Travel linearity and speed of human foragers and chimpanzees during their daily search for food in tropical rainforests, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-47247-9](https://doi.org/10.1038/s41598-019-47247-9)

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