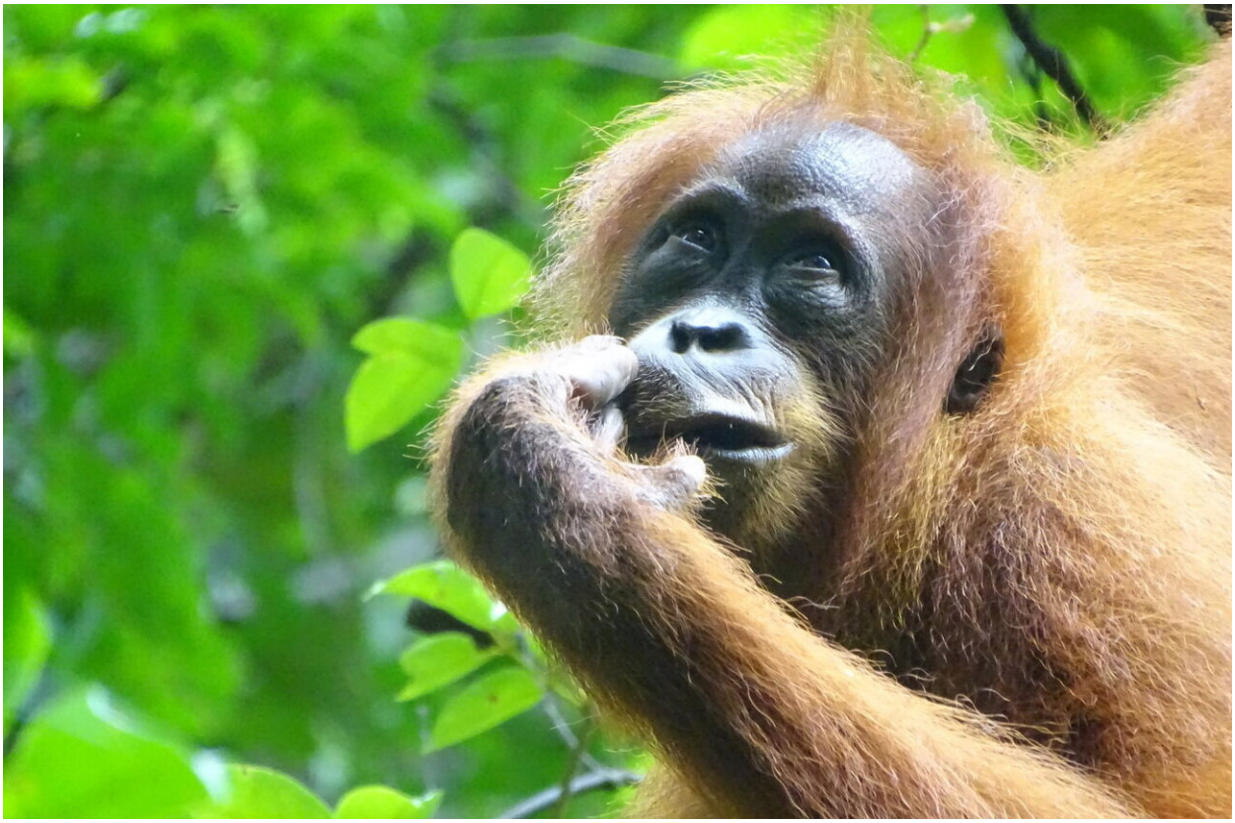
Examining the factors that affect curiosity across species

August 15 2023



A sumatran orangutan in its natural habitat in Indonesia. Credit: Suaq Project

Humans like to discover. Presented with something we've never seen before, most of us will be compelled to explore and learn more about it. The same can't exactly be said for our closest living relatives—the great

apes. Although decades of studies have shown that captive chimpanzees, gorillas, and orangutans will eagerly explore unfamiliar objects in a laboratory, great apes have rarely been observed in these encounters in the wild.

As such, almost nothing is known about how great apes respond to novelty in the natural habitats in which they evolved. Now, a team from the Max Planck Institute of Animal Behavior (MPI-AB) has succeeded in measuring the behavior of wild orangutans in their first encounter with an unfamiliar object.

The experiments, conducted in an Indonesian rainforest, uncovered a mix of social, environmental, and age factors that made orangutans more likely to explore. Published in *Scientific Reports*, the study reveals the conditions that spark curiosity in orangutans, and sheds light on how our own curious natures might have evolved.

The team studied orangutans at a long-term monitoring site, Suaq Balimbing, in Sumatra. Orangutans at the site have been habituated over decades to the presence of humans, thus offering scientists a rare opportunity to observe wild great apes at close range. Caroline Schuppli, director of the Suaq Project and the study's first author, became interested in how wild orangutans would react when presented with something unfamiliar.

"Curiosity is a trait that has driven the exceptional ability of humans to learn and innovate," says Schuppli, a group leader at MPI-AB. "If we want to know how the trait evolved in us, we have to study it in our closest living relatives."

Curiosity, which describes an individual's motivation to learn about the unknown, has been studied before in great apes; however, due to the logistical difficulties of studying wild animals, almost all tests have

occurred in captivity. "We know that apes are very curious to explore when they are in the safe and controlled conditions of a zoo," says Schuppli. "But these results tell us little about what really triggered or suppressed curiosity over our evolutionary history."

About ten years ago, Schuppli and collaborators first attempted to assess curiosity in wild orangutans with an experiment inspired by captive studies. They roamed Suaq, peppering the forest with foreign objects for the orangutans to find: a bright red flag; plastic flowers and fruits; a stuffed toy. The results were stark. "They hardly ever came near any of the items," she remembers. "You could see them making huge circles in the forest to avoid the experiment."

Schuppli realized that testing orangutans' reaction to novelty in nature would require reimagining the past paradigm. "The challenge was figuring out how to entice them with something that was novel, but also familiar enough not to scare them off," she says. Over the years Schuppli perfected just such an object: a piece of tree trunk with a natural hole filled with local forest honey.

The tree hole and food were familiar, but deploying these in an unusual way represented a novel foraging situation. With a team of local and international scientists, Schuppli hoisted the experimental log into trees about 10 meters from orangutans—and watched what happened.

During the trials, the orangutans spent on average 30 minutes in the vicinity of the novel log. During this time, they explored the novel log by intensively observing it over extended periods of time and approaching it closely. Overall, however, orangutans rarely touched the branch directly; and when they did, they often used a tool, such as a stick to do so.

"The orangutans were pretty cautious," says Tri Rahmaeti, a team member from Universitas Nasional in Indonesia and co-author on the

study. "The honey reward could have easily been scooped out of the log using a finger, but they still preferred to use a tool so they didn't have to make physical contact."

But there were significant differences in the behaviors. Using statistical techniques, the team uncovered traits of individuals and features in the environment that amplified exploration. Young orangutans were far more likely than adults to observe and approach. And, orangutans were more likely to approach the log if they saw another individual heading that way too. The habitat also seemed to play a role: in areas with abundant food, orangutans observed more but approached less.

Says Schuppli, "On the one hand, the results confirmed our hunch that orangutans in the wild are not that keen to explore new objects. This could be because in nature, orangutans live very long lives in stable habitats where novelty is rare. So, the potential risk of approaching something unknown doesn't outweigh the potential reward."

"On the other hand, the experiment showed that there is flexibility in the behavior. Orangutans have the potential to be curious about novelty in nature, but only under certain conditions. And by experimentally testing this in a wild population, we pinned down the conditions."

Of these conditions, Schuppli finds the social factor most illuminating. "Orangutans are the least social of all great apes, and yet we find that the presence of association partners increases their curiosity," she says.

This has fascinating implications for understanding learning and innovation—the products of curiosity that fueled the success of our species. "We often think of learning and innovation as solo acts, but this might not have been the case in our early history," says Schuppli. "If novelty was the spark, then our social lives might have provided the accelerant."

More information: Caroline Schuppli et al, Ecological, social, and intrinsic factors affecting wild orangutans' curiosity, assessed using a field experiment, *Scientific Reports* (2023). DOI: 10.1038/s41598-023-39214-2

Provided by Max Planck Society