

Apes can tell when you've been duped

Humans might not be the only ones that understand when others harbour mistaken beliefs.

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Michael Nichols/NGS

There's a lot more going on behind those eyes than researchers previously thought.

The delight of slapstick comedy lies in watching the mistakes of unwitting players, and new research shows that apes just might get the joke, too. A study published on 6 October in *Science* suggests that, like humans, chimpanzees and [other apes](#) can infer the beliefs of others — even when those beliefs contradict reality — and anticipate their errors¹.

The findings, which counter many previous studies, could fuel the debate over [whether humans are unique](#) in their ability to recognize the desires, beliefs and internal thoughts of others — a concept known as theory of mind.

In previous studies, chimpanzees (*Pan troglodytes*) have seemed to grasp some aspects of the goals, knowledge and perceptions of others². But chimps, monkeys and other primates have consistently failed to demonstrate an understanding of others' false beliefs — a key component of theory of mind^{2,3}. Children younger than age four had also historically failed many of these tests⁴, supporting the idea that understanding false beliefs requires sophisticated thinking that develops later in childhood.

But in 2007, a study of infants challenged this concept⁴. Researchers found that babies as young as 25 months, looked first at where an actor would search (incorrectly) for an object after it had been moved without the actor's knowledge. Inspired by these results, a team of comparative psychologists borrowed the method to revisit the question in chimpanzees, bonobos (*Pan paniscus*) and orangutans (*Pongo abelii*).

The study's results were definitely a surprise, says Christopher Krupenye, now at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, who co-led the work with Fumihiro Kano at Kyoto University's Kumamoto Sanctuary in Kumamoto, Japan. This was especially intriguing because apes had done so poorly in previous experiments designed to examine this question. "To some extent, I saw this as a last-ditch effort," he says.

Putting on a show

To tailor their task for apes, the researchers went for entertainment value to ensure that the animals paid attention to various scenarios. In two separate experiments, the team created and starred in a series of short films depicting combative interactions

between a human and a person dressed in a 'King Kong' suit.



Each series began by introducing the story's premise: a human searching for either a stone or King Kong. In one series, the human whacked a stick against one of two haystacks where they had watched King Kong hide; in the other, the person would lift one of two boxes under which they had seen [King Kong tuck a stolen stone](#). These scenes showed the apes that the person would pursue the object in its last known location.

"For humans, these scenes look silly, almost like Charlie Chaplin scenes. But for apes, it's a novel social conflict," says Krupenye. The slightly bizarre quality of the scenarios was intentional to keep the animals from drawing on knowledge of familiar situations.

In the films, the object (King Kong or the stone) was eventually moved from its initial location (haystack or box) to the other — sometimes while the human observed, and other times while the human was absent. Then, the object was removed from the scene altogether while the human was away, in part to prevent the apes from expressing their own beliefs about the object's location. The videos ended with the person returning to the arena, approaching both empty locations and preparing to search without giving any indication of where they would look.

The eyes have it

At the deciding moment, about 20–30 apes responded by looking at one of the two locations. Of those animals, about two-thirds to three-quarters, depending on the experiment, looked first to where the human would have thought their target was hiding. This predictive ability suggests that apes understand the incorrect beliefs of others, says Kano.

"It's a pretty shocking result," says cognitive psychologist Laurie Santos at Yale University in New Haven, Connecticut — citing many primate studies, including her own³, which suggest that the animals lack this skill. The effect reported in this study is small, she notes. But "if these results hold up, they'll be a game changer for the way that people think about primate social cognition", Santos adds.

Valerie Kuhlmeier, a developmental psychologist at Queen's University in Kingston, Canada, commends the group for executing a difficult and carefully crafted experiment. But she offers a competing explanation for the results, one in which the apes used knowledge of abstract rules — specifically, that people tend to look for objects in the place they last saw them. Genuine false-belief understanding still seems to be uniquely human, contends Kuhlmeier.

Although the authors acknowledge that the apes could have followed learnt rules, Krupenye says, "they're still able to accurately predict others' actions in more sophisticated contexts than we have thought before". He plans to strengthen their case by demonstrating other forms of false-belief understanding in apes. "This is a first study that will hopefully energize interest in the topic,"

says Krupenye.

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