

Monkeys are less cuddly with each other when dealing with an infection, study finds

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Social grooming plays an important role in vervet monkey society, helping concrete social bonds and increase an animal's chances of reproduction. However, anthropologist Brandi Wren's research reveals that monkeys suffering from certain gastrointestinal parasites may not participate in grooming as much as infection-free monkeys. Credit: Purdue University /Brandi Wren

Brandi Wren was studying social distancing and infections before masking tape marks appeared on the grocery store floor and plastic barriers went up in the post office.

Wren, a visiting scholar in the Department of Anthropology at Purdue University, spent a year studying wild vervet monkey troops in South Africa, tracking both their social grooming [behavior](#) and their [parasite load](#). Her results, some of which were published Wednesday (April 21) in *PLOS ONE* showed evidence that monkeys carrying certain gastrointestinal [parasites](#) do not groom others as much as those without the parasite, and that routes of transmission may not be as clear cut as biologists think.

With implications for both animal behavior and [human health](#), Wren's results open new avenues for research and new ways to consider old research. Vervet monkeys share surprising similarities with humans. In addition to sharing more than 90% of human DNA—something that is true of all [primate species](#)—[vervet monkeys](#) have also been known to exhibit conditions more familiar in humans than in other animals, including anxiety and hypertension. Biologists have found that studying vervet monkey physiology, genetics and behavior can shed light on some aspects of human biology.

"We have so many behavioral similarities; the roots and nuances of social behavior tend to be similar across all of the primates, especially from monkeys to humans," Wren said. "This study shows some of those similarities down to, when we feel sick, we don't want to talk to anybody. 'You can rub my back, whatever, but I really want to be left alone.' We see a lot of similarities in how humans and monkeys interact within their own groups."



Brandi Wren, a visiting scholar at Purdue University, spent a year following vervet monkey troops through Loskop Dam Nature Preserve in South Africa to better understand interactions between social grooming and gastrointestinal parasites. Credit: Purdue University /Brandi Wren

Wild animals typically carry a nominal load of parasites. Biologists have long assumed that these infections are innocuous—that they are asymptomatic and don't significantly affect either the animal's health or prospects. Even more interesting is that the parasites Wren was studying—whipworm, or *Trichuris*—are not parasites that are typically spread through social contact. These are gastrointestinal parasites that are usually spread through contaminated soil or substances in the

environments. But Wren's research shows that they may be spread through social contact and that they can significantly affect an individual's social behavior.

"Infected individuals show a little bit of lethargy, but the interesting thing is that they still let other individuals groom them; they just don't groom others," Wren said. "They also don't cuddle with the other monkeys as much. It appears they just don't feel well."

Wren and her team followed three troops of vervet monkeys, *Chlorocebus pygerythrus*, throughout their range in the Loskop Dam Nature Preserve in South Africa. By exhaustively cataloging individual monkeys' interactions and grooming habits and by cross-referencing that with infection information from fecal samples, Wren and her team were able to disentangle that monkeys infected with whipworm spent less time grooming other monkeys. They accepted grooming—when it was offered—but did not offer to groom their troop-mates back.

Wren notes that this difference in behavior is not so stark that it is noticeable just by observing the monkeys. Only by rigorously observing grooming behavior, exhaustively studying fecal samples and analyzing those results in relation to each other, was Wren able to decode this relationship.



Studying vervet monkeys can help scientists understand human biology. Vervet monkeys share more than 90% of their DNA with humans, and display conditions more familiar in humans than in other animals, including anxiety and hypertension. Credit: Purdue University /Brandi Wren

"There's no way we would have been able to tell which monkeys were infected just from observation," Wren said. "There are no other signs of the infection, other than the social behavior. And the change is often so hard to detect. It takes following one individual for a substantial time and collecting the data to see it. The effect is hidden in this complex web of interactions."

Wren posits that her discovery is important for animal researchers to bear in mind. As studies of animal personalities begin to gain popularity,

she stressed the importance of incorporating information like parasite load and hormone profiles into those studies. Otherwise, biologists might misattribute behaviors to personality traits when really the culprit is an active infection.

"There are some individuals you watch and you think, 'Gosh, this guy is such a jerk! He always lets everybody groom him, but he doesn't groom anybody else!'" Wren said. "What we're attributing to personality or attitude could just be because he has a gut full of parasites."

Wren draws parallels between the troop's behavior and human behavior during the pandemic. Like the monkeys, humans crave social contact, though more in the form of handshakes, high-fives and hugs. Like the monkeys, humans can spread diseases through social contact and tend to withdraw a bit during an illness. Unlike the [monkeys](#), however, humans understand about contagion, about hygiene and about the importance of reducing contact or increasing cleanliness.

"All these social behaviors affect health on a practical level," Wren said. "We know COVID-19 is spread through close [social contact](#). A fascinating thing about studying other species, and one reason to observe and understand them, is that we are always learning new things. There is always more to learn. Even when we're looking at previous research, even when we thought we understood the results, we still may not know the whole picture."

More information: *PLOS ONE* (2021). [DOI: 10.1371/journal.pone.0240872](https://doi.org/10.1371/journal.pone.0240872)

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