Apes only provide food to conspecifics that have previously assisted them

June 27 2017

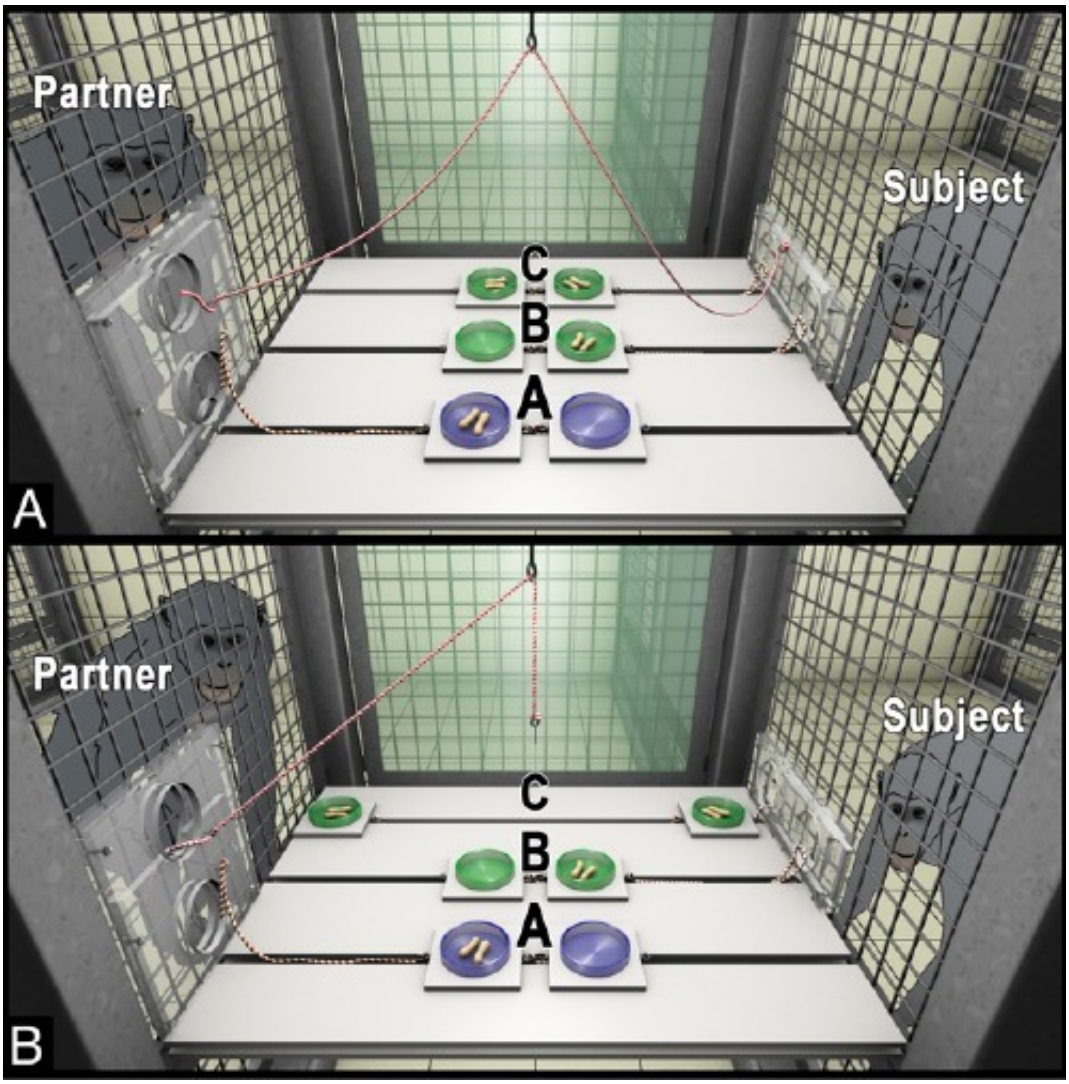
Chimpanzees provide food to conspecifics – but only if those previously proved to be cooperative themselves. Credit: MPI f. Evolutionary Anthropology

For us humans, it goes without saying that we reward others as an

indication of the gratitude we feel towards them. Scientists from the Max Planck Institutes for Evolutionary Anthropology and for Mathematics in the Sciences in Leipzig have now demonstrated that similar social behaviours exist among chimpanzees. In a behavioural experiment, one animal rewarded another with food if the latter had previously come to its assistance. This suggests that some main motivations for human cooperation might have been present in our common ancestor already while supporting findings from game theory.

Chimpanzees cooperate with each other in various ways but the underlying motivation of these behaviours is not always clear. For this reason, the Max Planck researchers focused on the psychological factors that might explain cooperation in chimpanzees. In a series of behavioural studies the chimpanzee subjects' access to food was blocked and had to be released – either by the assistance of a conspecific partner or without the partners help. The chimpanzees could then choose between two options: one that provided food to both the subject and their partner and one that only provided food to the subject.

The results were very clear: chimpanzees preferably chose to provide food to both themselves and their partner – but only if it was the partner that had made this choice possible. The animals were particularly generous if their partners had risked obtaining no food for themselves at all by providing their assistance. This behaviour confirms game theory models on social cooperation previously researched at the Max Planck Institute for Mathematics in the Sciences that had provided the impetus for this behavioural study collaboration.



Study set-up: (A) Starting point: From the perspective of the subject, the partner can decide between option A, in which the partner alone obtains food, and option B/C, in which the partner leaves the distribution of the food up to the subject and risks not getting anything. (B) End point: The partner chose option B/C. The subject rewards this favour by choosing option C, in which both animals obtain food. Credit: MPI f. Evolutionary Anthropology

Material rewards are considered a key component of human cooperation. The results of the current study show that, under certain conditions, chimpanzees are as willing as humans to show their gratitude to their

conspecifics even when costs are involved. "What surprised us most was that the chimpanzees even gave up extra food to reward a conspecific's support. This contradicts the common assumption that chimpanzees only care for themselves as soon as a chance for more food is involved," says Martin Schmelz, one of the study's authors. It appears that the animals can even assess the magnitude of the reward their partner has earned: the more the latter has risked, the greater the willingness to offer a commensurate reward.

Rewarding prosocial behaviour

"The findings suggest that the chimpanzees take into account not only the actions of their test partners but also their cooperative intentions, and that they can differentiate truly prosocial behaviour from potentially self-serving acts," says Sebastian Grüneisen, another of the study's authors. "They also show that the animals integrate recent single events into decisions, even if this puts them initially at a material disadvantage."

Hence, chimpanzees might engage in a kind of "emotional bookkeeping" and make emotionally-based social decisions. It is possible that they want to reciprocate their partner's willingness to cooperate and to signal their desire to establish social ties. This assumption is consistent with the finding that chimpanzees have higher levels of oxytocin – a hormone involved in the formation of social ties – in their blood when they cooperate with conspecifics. Further studies on chimpanzees and on the potentially even more social bonobos could confirm these findings.

More information: Chimpanzees return favors at a personal cost. *PNAS* 2017 ; published ahead of print June 19, 2017, DOI: 10.1073/pnas.1700351114

Provided by Max Planck Society

Citation: Apes only provide food to conspecifics that have previously assisted them (2017, June 27) retrieved 4 May 2024 from https://phys.org/news/2017-06-apes-food-conspecifics-previously.html

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