Animals know when they are being treated unfairly (and they don't like it)

February 22 2017, by Claudia Wascher

Credit: Claudia Wascher, Author provided

Humans beings appear to be hardwired to have a sense of fairness. This is puzzling from an evolutionary perspective, which you would have thought would mean we were predisposed to seek advantage for ourselves and our families wherever possible. But in fact a sense of fairness is important for humans to be able to help each other. Human cooperation is based on reciprocal altruism – we help people because they've either helped us in the past or they may help us in the future.

This form of cooperation is only possible when individuals are able to keep track of other individuals' efforts and payoffs – and a sense of fairness helps with this. But what about non-human animals? Is sense of fairness unique in differentiating humans from other animals or has it evolved in other non-human animals too?

There's a way of testing for this in animals using an "inequity aversion task". One test subject receives a reward for completing a task, while an experimental partner gets a "booby prize" – something they don't particularly like. You'd imagine that individual animals that have a strong sense of fair play would either stop taking part in the experiment or refuse the treat.

One of the first species that was tested for inequity aversion were brown capuchin monkeys. In a task where the monkeys had to exchange a token for a treat, one individual was given a piece of cucumber in exchange for a token, whereas a model individual – another monkey not the focus of the experiment – in an adjacent cage got a grape for the same action. Capuchin monkeys prefer grapes to cucumbers – and the individual receiving the cucumber soon started to "protest" by throwing the unloved vegetable back at the experimenter.

Credit: Chris F from Pexels

The capuchin monkeys were also well aware of unfairness in the amount of effort they had to expend to receive a reward. When they had to "work" for a reward – and could see that their experimental partner received the reward as a "gift", they stopped participating.

A number of other primate species, including chimpanzees, rhesus macaques and long-tailed macaques, have been shown to express some form of behavioural responses to inequity. Apart from primates, two further highly social mammalian species, dogs and rats, have also been shown to be sensitive to unfairness.

Bird brains

But what about non mammalian species? In recent years, the family of corvids has become one of the prime models when it comes to studying cognition in birds. Corvids are a large family of more than 120 species – including ravens, crows, magpies and jays. Corvids are highly social and have flexible social systems. Adult ravens for example live in territorial pairs, whereas jackdaws live in large community groups. In some species, such as the carrion crow, sociability depends on the environment – they might breed in male-female pairs in some environments as well as cooperative groups in others.

Er… excuse me? Credit: Claudia Wascher, Author provided

Various forms of naturally occurring cooperation can be observed in different corvid species. They help each other in aggressive encounters and share resources such as food or information about predators. So, given the extent to which corvids have been seen to cooperate in the wild, we expected them to have a sense of fairness and unfairness.

We decided to put them to the same test as the primates. The test subjects were four common ravens and six carrion crows. The birds received a piece of cheese as their reward (they like cheese) and a piece of grape as the booby prize. In one experiment, both individuals received the same food reward for exchanging a token with a human experimenter, while in another, one bird received only grapes for exchanging, whereas the other was given cheese. We also tried what's called an "effort control" experiment in which the test subject had to exchange its token either for a piece of cheese or a piece of grape while the other bird was given the same reward, but got it as a gift and did not have to exchange for it.

In the "inequity" condition the subject crow – the bird that was being unfairly treated – stopped taking the lesser reward. In the "effort control" they stopped exchanging their token for the reward when they saw the other bird getting its reward for no effort. In both cases they could see how they were being treated unfairly and decided not to cooperate.

So in this respect, corvids are like some mammals – and a high complexity and flexibility in cooperation may have driven the evolution of this awareness of what is fair and what isn't. The fact that inequity aversion is present not only in a number of primate species but also corvids suggests that this idea of fairness and cooperation is something that cooperative species have got in common which has enabled them to evolve sociability.

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