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Threat of Punishment Is Key to Cooperation

Humans cooperate on all sorts of issues and tasks, but every so often a member of the group fails to pull his weight. If such free riding is allowed to proliferate, cooperation itself can break down. A new study suggests that the threat of penalty is the key to successful cooperation.



Image: Science/Joe Sutliff

Bettina Rockenbach of the University of Erfurt in Germany and her colleagues set up an economic test of 84 students self-selected into two groups--one in which punishment was permitted and one in which it was not. In each of 30 rounds participants chose which group to join; how much of their own money to contribute to a collective pool to be increased by a set amount and shared; and then, if they were in the punishing group, whether to punish or reward their members for their contributions. At the end of each round, all the participants saw the anonymous "winnings" of their peers in both groups.

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At first, two thirds of the participants chose membership in the nonpunishing group and contributed little of their money to the collective pool. Because each subject shared the collective pool, but also kept whatever money they had not given, it was in the members' best interest to give as little as possible. This rapidly led to a situation in which very few people contributed any money at all.

But it also led to a nearly complete defection of all the participants to the punishing group. Although it cost money to penalize free riders, the threat of punishment enforced higher overall contributions and therefore higher overall payments to individual players.

As soon as they joined the new group, the defectors immediately began punishing their noncontributing peers even though it cost money to do so. "New members of the sanctioning institution punish because it is common to do so," she says. "You can't explain this dramatic change in behavior by saying that people are just looking for the best payoff. People gave up payoff to follow the cooperative norm."

By the 20th round contributions in the punishing group approached 100 percent whereas contributions in the nonpunitive group dropped to zero a few rounds later, according to the paper presenting the findings in today's *Science*. And although rewards seemed to have little effect on the punishing group's behavior, early negative sanctions ultimately eliminated the need to impose punishments at all. The research reveals a little bit more about how humans cooperate: it is both the size of the carrot and the threat of the stick that motivates us. --*David Biello*

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