

# Study suggests voting may be key to cooperation with future generations

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Whatever the solutions to preserving our world's natural resources might be, it seems clear that answers won't come overnight. How, then, can we be sure the steps we take today won't jeopardize the fate of future generations?

The answer, researchers say, may lie with one of cornerstones of modern society – democracy.

Using a series of modified public goods "games," Professor of

Mathematics and of Biology, and Director of the Program for Evolutionary Dynamics Martin Nowak, Assistant Professor of Psychology and Economics at Yale David Rand, and their colleagues demonstrated that allowing people to vote on the harvesting of resources led to the preservation of these resources for future generations. The study is described in a June 26 paper published in *Nature*.

"There has been a great deal of work on how people cooperate with those they see every day – their colleagues or friends," Nowak said. "But an open question is how people cooperate with future generations. How do you make altruistic decisions today that benefit people tomorrow?"

To study cooperation across generations, Nowak and Rand worked with doctoral student Oliver Hauser and post-doctoral researcher Alexander Peysakhovich to develop a unique version of the commonly-used public good game in which five online players were tasked with dividing 100 units of a resource between them.

Each player was allowed to collect up to 20 units of the resource. As long as all players together harvested up to half of the 100 units, the resource was replenished for subsequent generations – other players who would be recruited later. If players harvested more than half, however, the resource was exhausted, and subsequent players earned nothing while being told that earlier generations hadn't acted sustainably.

Though clearly designed to encourage players to preserve resources for subsequent generations, when Nowak and Rand began recruiting players, they found a curious result – in nearly every game, players quickly exhausted the resource.

"Typically, the way it played out was four players acted generously, while one person chose maximum defection," Nowak said.

Though the test revealed many people might be willing to pay some costs to benefit future generations, it also highlighted a problem with what researchers call "conditional cooperation," which suggests people are only willing to cooperate if they believe others are doing the same. Often, Rand and Nowak said, players who chose to maximize their own benefit did so because they feared other players were taking a larger share of the resource.

"In some sense, this illustrates why the free market fails to solve problems like climate change," Nowak added. "Even if you want to cooperate with the future, you may not do so because you are afraid of being exploited by the present."

To ward off that problem, Nowak and Rand re-wrote the rules of the game to allow each player to vote on how much of the resource to extract, and giving each player the median of all five votes.

"Democracy is a powerful institution," Nowak explained. "When we implemented this system, virtually every resource was saved. The surprising observation is that while there is a minority of people who don't want to cooperate, the majority of people vote altruistically. They are not voting to maximize their own benefit, and that's what allows for cooperation with the future."

Importantly, Nowak and Rand said, for the voting system to work, the winning extraction amount had to be the median of all the votes cast.

"Another way to implement a voting system would be to extract the average of all the votes, but the problem with that system is it forces people to vote strategically," Rand explained. "You may be willing to harvest the resource sustainably, but if you think someone else is going all in, you have to vote for zero to balance out the average. If instead you use the median of the votes, then [players](#) can just vote for what they

really want."

The finding that people are willing to vote altruistically, Rand said, runs counter to the oft-cited notion that people will ultimately act in their own interests when they go to the ballot box.

"A huge amount of public policy is built around the assumption that everyone is selfish," Rand explained. "The question for policy-makers has always been how to set up an institution that encourages people to do good things even though they're selfish.

"The key take-home message of our paper is that policy makers can take advantage of the fact that many people are not actually selfish," he continued. "A lot of people are altruistic, and you can have more efficient and more effective policies if you take this into account."

Though it's impossible to predict what the future holds, Nowak believes that understanding how to cooperate across generations may open the door to ensuring the decisions we make today do more than simply leave the most challenging problems of the present for future generations to solve.

"There is a huge literature on the evolution of cooperation, but this is the first step toward asking what we can do to cooperate with future generations," he said. "The largest problems we face today are occurring on a global scale – how can we behave altruistically such that something is left for [future generations](#)?"

**More information:** Cooperating with the future, *Nature*, [dx.doi.org/10.1038/nature13530](https://doi.org/10.1038/nature13530)

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