The right thing to do: Why do we follow unspoken group rules?

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How you dress, talk, eat and even what you allow yourself to feel - these often unspoken rules of a group are social norms, and many are internalized to such a degree that you probably don't even notice them. Following norms, however, can sometimes be costly for individuals if norms require sacrifice for the good of the group. How and why did humans evolve to follow such norms in the first place?

A new study from the National Institute for Mathematical and Biological Synthesis explores this question, shedding light on the origins of human cooperation.

The results, published today in the *Proceedings of the National Academy of Sciences*, show that the ability of humans to internalize social norms is expected to evolve under a wide range of conditions, helping to forge a kind of cooperation that becomes instinctive.

The researchers used computer simulations to model both individual behavior in joint group actions and underlying genetic machinery controlling behavior. The researchers worked from the premise that adherence to norms is socially reinforced by the approval of, and rewards to, individuals who follow them and by punishment of norm violators. The researchers' goal was to see whether certain norms get internalized, meaning that acting according to a norm becomes an end in itself, rather than a tool to get something or to avoid social sanctions.

In the model, individuals make choices about participating in collective actions that require cooperation, and individuals who don't cooperate, or "free riders," can face consequences.

Specifically, the authors looked at two general kinds of collective actions requiring cooperation that our ancestors might have regularly faced. The first type of group action involves "us-vs.-nature" scenarios, where groups must defend against predators and hunt and breed cooperatively. The second type of group action is "us-vs.-them," which constitutes direct conflicts or other costly competition with other groups over territory, mating, access to trade routes, and the like.

The model found that norm internalization readily evolves in both scenarios.

The model also shows that encouraging peer punishment of free-riders is much more efficient in promulgating cooperation in collective actions than promoting participation itself.

The study predicts a significant genetic variation in the ability of humans to internalize norms. In particular, under some conditions populations are expected to have a relatively small frequency of "over-socialized" individuals who are willing to make extreme sacrifices for their groups. Examples in today's society might be suicide bombers and other displays of extreme self-sacrificial behavior for the good of the group. Likewise, there are also "under-socialized" individuals—psychopaths—who

are completely immune to any social norms.

As social and physical environments vary greatly between different human groups, the model accounts for this variation and can predict how these differences will affect human social behavior and human decision-making in different regions.

In addition to answering theoretical questions about the origins of human cooperation, the study may have a variety of practical applications.

"Every day human beings make choices among multiple options in how to respond to various social situations. Those choices are affected by many interacting factors, including social norms and values. Understanding the effects of social norms could help us better understand human decision-making and better predict human actions in response to certain events or policies," said lead author Sergey Gavrilets, a professor of ecology and evolutionary biology and mathematics at the University of Tennessee, Knoxville, and NIMBioS associate director for scientific activities.

Gavrilets also said the models could be helpful in social and economic policymaking.

"Changing social institutions is a common strategy for changing human behavior," he said. "Sometimes there are attempts to borrow or transfer institutions from one country or region to another. Often such strategies fail miserably, however. Our models can help explain why. Generalizing our models can lead to the development of better tools for predicting consequences of introducing certain social policies and institutions and in identifying the most efficient strategies for changing or optimizing group behaviors."

More information: Sergey Gavrilets el al., "Collective action and the evolution of social norm internalization," *PNAS* (2017). www.pnas.org/cgi/doi/10.1073/pnas.1703857114

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