

Increasing opportunities for sustainable behavior

January 24 2020



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To mitigate climate change and safeguard ecosystems, we need to make

drastic changes in our consumption and transport behaviors. A new IIASA study shows how even minor changes to available infrastructure can trigger tipping points in the collective adoption of sustainable behaviors.

Decades of research in social and ecological psychology, cognitive science, ecology, and cultural evolution has shown that [human behavior](#) is influenced by our environments, habits, skills, and attitudes. These behaviors, in turn, alter our environments and can be socially learned and transmitted. It is however less clear how all these processes work together to shape the evolution of sociocultural and socioecological systems. Understanding this is important given that we need radical, systemic change in human behaviors and cultures to reach the Sustainable Development Goals, mitigate [climate change](#), and guard the ecosystems that serve as our life-support systems.

In a new study published in the journal *One Earth*, IIASA researchers explored how collective [behavior](#) patterns emerge systemically as a product of personal, social, and [environmental factors](#). Using an agent-based model—a computational method for simulating interactions between individuals and environments—the study illustrates how personal aspects like attitudes and habits, social networks, and available infrastructure shape the way sustainable behaviors are collectively adopted. The study especially emphasizes the environmental aspect by examining how changes in opportunities to behave sustainably—such as increases in the number of bicycle lanes in a city—affect the adoption of sustainable behaviors like cycling. The researchers used Copenhagen, a city known for its well-developed cycling culture, as a [case study](#). The model was empirically validated by modeling the evolution of cycling and driving patterns in the city.

The results show that even linear increases in opportunities for pro-environmental behaviors—in Copenhagen's case, adding more bicycle

friendly infrastructure—can have much larger effects on the adoption of sustainable behaviors than often assumed. This is because when the environment makes it easier for someone to adopt a certain behavior, this not only has an effect on the individual's own habits, but the behavior can also be copied and learned by others. In Copenhagen specifically, a rapid increase in the proportion of cyclists in the city since the 1990s has been attributed not only to the emergence of a cycling culture, but also to heavy investment into cycling infrastructure.

"The drastic effect that the physical environment, for instance, cycling infrastructure, has on our collective behavior patterns is surprising. Even minor changes in the structure of the environment can trigger so-called "tipping points" or "phase transitions" in the collective adoption of sustainable behaviors like cycling. Reaching such tipping points is precisely what is needed to enact society-wide behavior change," explains study lead-author Roope Kaaronen, who worked on the study as a participant of the 2019 IIASA Young Scientists Summer Program. Kaaronen is currently a Ph.D. student at the University of Helsinki's Institute of Sustainability Science.

The authors point out that for large-scale behavior change to occur, it will simply not be enough to rely on changing people's attitudes or increasing environmental awareness.

"We need to understand how behavior patterns emerge from a systems perspective, and learn to locate the leverage points in these systems. The importance of infrastructure that make pro-environmental behaviors easy and the "path of least resistance" is crucial in this regard and must form part of governments' action plans in terms of sustainable future [urban planning](#) and development," says study supervisor and coauthor Nikita Strelkovskii—a researcher in the IIASA Advanced Systems Analysis Program.

It is clear that we have to start designing our everyday environments in ways that make sustainable behaviors the default option and as easy as possible. According to the authors, many (if not most) European cities are currently struggling with this, and city planners are instead filling cities with shopping malls and hypermarkets that encourage unsustainable consumerist behavior. This study illustrates that changes in the action opportunities of everyday environments can act as leverage points that are an important step in understanding how to instigate collective behavior change through urban policy and design.

More information: Roope Oskari Kaaronen and Nikita Strelkovskii. Cultural Evolution of Sustainable Behaviors: Pro-environmental Tipping Points in an Agent-Based Model *One Earth*. [DOI: 10.1016/j.oneear.2020.01.003](https://doi.org/10.1016/j.oneear.2020.01.003)

Provided by International Institute for Applied Systems Analysis

Citation: Increasing opportunities for sustainable behavior (2020, January 24) retrieved 1 May 2024 from <https://phys.org/news/2020-01-opportunities-sustainable-behavior.html>

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