Communication technology, study of collective behavior must be 'crisis discipline'

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Our ability to confront global crises, from pandemics to climate change, depends on how we interact and share information.

Social media and other forms of communication technology restructure these interactions in ways that have consequences. Unfortunately, we have little insight into whether these changes will bring about a healthy, sustainable and equitable world. As a result, researchers now say that the study of collective behavior must rise to a "crisis discipline," just like medicine, conservation and climate science have done, according to a new paper published June 14 in the *Proceedings of the National Academy of Sciences*.

"We have built and adopted technology that alters behavior at global scales without a theory of what will happen or a coherent strategy for reducing harm," said Joseph B. Bak-Coleman, the lead author and a post-doctoral researcher at the University of Washington's Center for an Informed Public.

Social media and other technological developments have radically reshaped the way that information flows on a global scale. These platforms are driven to maximize engagement and profitability, not to ensure sustainability or accurate information—and the vulnerability of these systems to misinformation and disinformation poses a dire threat to health, peace, global climate and more.

No one, not even the platform creators themselves, have much understanding of how their design decisions impact human collective behavior, the authors argue.

"We urgently need to understand this and move forward with focus on developing social systems that promote well-being instead of creating shareholder value by commandeering our collective attention," said co-author Carl T. Bergstrom, a UW professor of biology and faculty at the Center for an Informed Public.

Collective behavior and other complex systems are fragile. "When

perturbed, complex systems tend to exhibit finite resilience followed by catastrophic, sudden, and often irreversible changes," the authors write.

While there are studies and disciplines that focus on complex systems in the natural world, "we have a far poorer understanding of the functional consequences of recent large-scale changes to human collective behavior and decision making," the authors write.

Averting catastrophe in the medium term (e.g., coronavirus) and long term (e.g., climate change, food security) will require rapid and effective collective behavioral responses—yet it remains unknown whether human social dynamics will yield such responses.

"We have seen individual studies about how climate-change disinformation gets over-represented even in the mainstream media, and studies that show that in digital media that problem only gets worse," said co-author Jennifer Jacquet, an associate professor of environmental studies at New York University.

Lacking a developed framework, tech companies have also fumbled their way through the ongoing coronavirus pandemic, unable to stem the "infodemic" of misinformation that impedes public acceptance of pandemic control measures such as wearing masks and widespread testing for the virus.

The situation parallels challenges faced in conservation biology and climate science, where insufficiently regulated industries optimize profits while undermining the stability of ecological and Earth systems.

"If we have a decade or so to act on climate change, we have far less time to sort out our social systems," Bak-Coleman said.

Historically collective behavior has best been understood as when

animals or people exhibit coordinated action without an obvious leader. This includes how fish school to evade predators or when a crowd spontaneously breaks into applause or becomes silent.

That thinking has evolved over the past decade, the authors write, from a phenomena to a contemporary view of collective action as framework that reveals how interaction between individuals gives rise to collective action.

More information: Joseph B. Bak-Coleman el al., "Stewardship of global collective behavior," *PNAS* (2021). www.pnas.org/cgi/doi/10.1073/pnas.2025764118

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