



OPEN ACCESS

EDITED AND REVIEWED BY

Matjaž Perc,
University of Maribor, Slovenia

*CORRESPONDENCE

Dun Han,
✉ handunsir@163.com
Jianbo Wang,
✉ phyjbw@gmail.com
Jianrong Wang,
✉ wangjianronghappy@126.com

SPECIALTY SECTION

This article was submitted to Social
Physics, a section of the journal
Frontiers in Physics

RECEIVED 24 March 2023

ACCEPTED 29 March 2023

PUBLISHED 04 April 2023

CITATION

Han D, Wang J and Wang J (2023),
Editorial: Hidden order behind
cooperation in social systems.
Front. Phys. 11:1192856.
doi: 10.3389/fphy.2023.1192856

COPYRIGHT

© 2023 Han, Wang and Wang. This is an
open-access article distributed under the
terms of the [Creative Commons
Attribution License \(CC BY\)](#). The use,
distribution or reproduction in other
forums is permitted, provided the original
author(s) and the copyright owner(s) are
credited and that the original publication
in this journal is cited, in accordance with
accepted academic practice. No use,
distribution or reproduction is permitted
which does not comply with these terms.

Editorial: Hidden order behind cooperation in social systems

Dun Han^{1*}, Jianbo Wang^{2*} and Jianrong Wang^{3*}

¹School of Mathematical Sciences, Jiangsu University, Zhenjiang, Jiangsu, China, ²School of Computer Science, Southwest Petroleum University, Chengdu, Sichuan, China, ³School of Mathematical Sciences, Shanxi University, Taiyuan, Shanxi, China

KEYWORDS

cooperation, social systems, interaction, complex network, decision

Editorial on the Research Topic

Hidden order behind cooperation in social systems

Navigating the complexities of mobility and interaction, an agent's decision to cooperate or not can undergo evolutionary changes over time. Even though individuals are inherently selfish, cooperation behavior remains prevalent and serves as a crucial component of prosocial behavior. Quantitative analysis of cooperation behavior is of both theoretical and practical significance in modern science, with fields such as psychology, sociology, and economics emphasizing this research.

The global 2019-nCoV pandemic has once again highlighted the importance of analyzing virus transmission, prompting countries worldwide to focus on this Research Topic. To aid decision-making teams in implementing preventive measures, research into dynamic models for infectious diseases can aid in understanding transmission processes. Preventive vaccination is a fundamental and highly effective control measure for reducing transmission of infectious diseases and mortality rates. Under a voluntary vaccination scheme, the decision to vaccinate or not becomes an individual game decision, taking into account social environments, economic conditions, potential risks associated with vaccination, and other individuals' vaccination decisions. Understanding the cooperative phenomenon of egotism in disease propagation systems remains a major challenge.

As we live and cooperate within a complex and variable network of relationships, intricate interactions between individuals give rise to highly complex population dynamics. Complex network theory serves as a primary and effective tool for exploring these complex and interactive systems, offering a fresh perspective for studying evolutionary games in nature. This Research Topic in Frontiers in Physics aims to welcome contributions on cooperation behavior, encouraging papers that use network tools to provide meaningful references and insights into comprehending the rules and reasons behind social dilemmas. These findings have inspired the conception of the Research Topic, "Hidden Order Behind Cooperation in Social Systems." Within this Research Topic, [Vasiliauskaite et al.](#) investigated the impact of temporal changes at the individual and social levels on cooperation patterns in social networks. They discovered that temporal variation and synchrony can enhance or suppress cooperation in non-trivial ways, depending on parameter values. [Zhang et al.](#) employed an evolutionary game method to examine the cooperation behavior between government and banks. [Wang et al.](#) analyzed the impact of Wuhan's COVID-19 lockdown on the growth enterprise market in China, shedding light on the significance of digital inclusive finance for mitigating regional risks and financing issues. [Chang's](#) research on an SIR rumor propagation model with an interaction mechanism on WeChat networks provides significant insights for controlling the spread of rumors in WeChat

groups. [Chen et al.](#) examined the searching behavior of Sino-U.S. relations in China based on complex network analysis, offering a new perspective for analyzing the time series characteristics of Sino-U.S. relations.

Based on the contributions of these papers, it is evident that this research topic is highly valuable for understanding social systems. We hope that the theoretical models and practical applications presented in this research will encourage further exploration and development of cooperation in social systems.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.