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PhD Project Description

Project Title:

Simulation Models of the Collective Consequences of Bounded Rationality in Opinion Formation in Networks: the Cases of Market Concentration and Vaccination Opinion Polarisation.

This dissertation aims to explore the collective consequence of bounded rationality in opinion formation in social networks. Specifically, how do limited-rational individuals use their individual cognitive resources and social influences from different social networks to form personal opinions and make decisions when faced with an overload of information? What are the mechanisms at work between the macro-level concentrated or polarized distribution of collective opinions and dispersed individual opinions? And what factors influence such micro-macro interactions?

We are going to address the questions of generating social consensus or social polarization by simulating the dynamic interactions of human opinion formation, changes and clustering, with various psychological and social processes. Two types of cases are analyzed to explore the implications of bounded rationality for collective behavior including market concentration and vaccination opinion polarization in online and offline networks. The first case is the consumer markets, where individuals strive to purchase the best products and the dynamics of interaction tend to reduce initial random selection to consensus. Consumer behavior itself is a complex outcome of psychological and social processes, due to a variety of interacting factors, including personal values, friends, and online communities. These factors affect individuals' purchase and evaluation of products. At the same time, both sellers and consumers are exposed to a vast amount of information through various channels, adding more complexity to the system. Within the macro market, there exists a prevailing uncertainty regarding the product that will ultimately secure the predominant market share. This uncertainty contributes to the dynamic nature of opinion formation and decision-making processes within the market. Another case relates to the recent COVID-19 vaccination. Vaccination issue goes beyond the individual risk perceptions, as the decision to vaccinate or not is heavily influenced by social norms, expert opinions and cultural background. And as the virus mutates, individual opinions may change over time, ultimately affecting the vaccination rate and opinion distribution of society as a whole.