Opinions spread faster when social networks change slower

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In today's fast-paced and interconnected world, opinion dynamics have a significant impact on human life. By understanding how individuals and groups form beliefs and make decisions, we can fundamentally contribute to social challenges such as social stability, conflict resolution, and urban growth. A critical part of opinion dynamics is the ability of society to adapt to new information (i.e., opinions and choices). If individuals and groups are not able to adapt, they become entrenched in their existing beliefs and perspectives. This can lead to group polarization, failure in recognizing new opportunities, and lack of innovation and progress. The spread of new opinions occurs mostly through social influence, where individuals are influenced by the opinions of those around them.

Several studies[1234] confirmed that the more connected individuals are, the easier new opinions spread throughout the population. This helps the formation of consensus and the adaptation to new opinions with superior quality to the old population belief. Nevertheless, most studies did not account for the impact of individual *"deliberation time"*, that is, the amount of time that individuals take to process and adopt new information or opinions. Recent studies[56] have shown that when there is a long deliberation time, the population is only able to adapt to new better opinions when the individuals are sparsely connected.

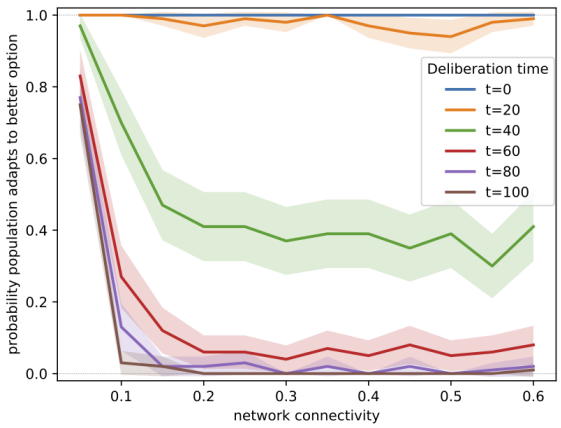

Figure 1: The probability that the population adapts to new better options decreases with the network connectivity when the individuals need time to adopt new information (deliberation time). Shades are the 95% confidence interval.

In this study, we show that fast network rewiring can also have a negative impact on the ability of the population to adapt to new better opinions. Through network rewiring, individuals change their connections with other individuals in the network, including forming new connections, strengthening existing connections, or removing connections. In our study, we consider different network topologies and investigate different rewiring mechanisms. While slow network rewiring helps the spreading of opinions, fast rewiring prevents the population from collectively processing new information and adapting to better opinions. Understanding the opinion dynamics in populations composed of individuals that change their social connection fast (or slowly) can have an important role in understanding why collective behavior differs between real-world and online social networks.

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