

Complex Contagion: Competition, Dual Users and Heterogeneous Adoptability

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While compatibility of multiple contagious entities and heterogeneous adoptability of agents are omnipresent in social contagion, these factors are overlooked in traditional models of contagion processes. Here, we study, analytically and numerically, complex contagion processes in two directions. First [1], we study the competition of two spreading innovations focusing on the role of dual users. Competition with a preexisting technology effectively suppresses the spread of a new innovation, but phases of coexistence are possible. Dual users act as catalysts of extinction transitions and coexistence phases, promoting the spread of a new innovation and counterbalancing the first-mover advantage. Secondly [2], we consider heterogeneous adoptability with nodes with either single or complex adoption processes. A transmission probability for simple contagion initiates a cascading complex contagion process. We find a rich variety of phase transitions such as continuous and discontinuous phase transitions, criticality, tricriticality, and double transitions. We show that the double transition occurs with an intermediate phase in which nodes following simple contagion become adopted but nodes with complex contagion remain susceptible.

References

[1] B. Min and M. San Miguel,
Competition and dual users in complex contagion processes.
arXiv:1712.05059

[2] B. Min and M. San Miguel,
Competing simple and complex contagion processes with heterogeneous
adaptability.
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