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A complex network model for paradigm shifts

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In human society, a trendy and dominated theme or idea, a paradigm, is occasionally taken over by a new one. The new one emerges and the old one declines in a relatively short the period. S. Bornholdt et al. [1] have introduced a model which reproduces the emergence and spread of ideas under the constraining condition that each agent cannot retake any previously experienced opinion. In their model, each agent is assumed to interact with the four nearest neighbors on 2-d square lattice and changes his opinion with a probability proportional to the total number of agents who have the same particular opinion. However, in real society each agent interacts in a more complex manner which cannot be express by a regular network such as square lattices. And each agent cannot be also affected by the non-interacting agents. Thus the probability of opinion change should depend on the number of connected agents who have the same particular opinion. In this study, paradigm shifts are investigated by using a modified model, where the agents interact according to a given complex network and change their opinions with the probability proportional to the number of connected agents having the same particular opinion[2]. The dynamics of paradigm shifts are observed for several different interaction networks with different clustering coefficients and characteristics path lengths.

[1] S. Bornholdt, M. H. Jensen, and K. Sneppen, Phys. Rev. Lett. 106, 058701 (2011).
[2] D. J. Watts and S. H. Strogatz, Nature (London) 393, 440 (1998).