

Value Homophily Benefits Cooperation but Motivates Employing Incorrect Social Information

Paul Rauwolf, Dominic Mitchell, and Joanna J. Bryson

Theoretical background:

When an individual discovers in isolation that a socially-held view is false, should they alter their view? Empirical evidence shows that humans often do not. Individuals often judge others based on third-party gossip, rather than their own experience, despite the fact that gossip is error-prone. Rather than judging others on their merits, even when such knowledge is free, we judge based on the opinions of third parties.

Research question:

The null hypothesis is that such behaviours are maladaptive exceptions to what is typically an adaptive heuristic. Social learning could be the best strategy despite a high incidence of error when the full cost of accruing accurate information, including time, is taken into account. Our research seeks to understand whether, in some social contexts, it is actually advantageous to use incorrect social information in lieu of the truth.

Method:

We begin with a model of society where cooperation is supported via reputation. Using agent-based evolutionary game theory, we employ a version of the Prisoner's Dilemma, where agents decide whether to donate to other agents. Based on their actions, reputation of agents is spread throughout the population. We compare the utility of two strategies: 1.) cooperate based on another's reputation, and 2.) cooperate based on another's historic behaviour.

We evaluate the consequences of both strategies in different social networks. Either the agents interact randomly, or based on homophily. Homophily is the tendency to interact with others who share similar beliefs and is found throughout human societies.

Results:

We show that when homophily is added to the model, the robustness of cooperation is increased against error in communication. However, as a consequence, it becomes adaptive to employ incorrect social information even when an individual agent has access to correct information. In conditions where the payoffs for group unanimity outweigh the costs of acting based on inaccurate information, there is selective pressure for norm-following at a cost to honesty.

Conclusion:

Increasing homophily facilitates cooperation. Even when information is communicated with a high probability of error, social information is better able to sustain cooperation. However, if a society employs homophily, then a social dilemma emerges between being accurate in gossip or correctly signalling group membership. It can be beneficial to cooperation overall to favour honest own-group signalling over telling the truth about others.