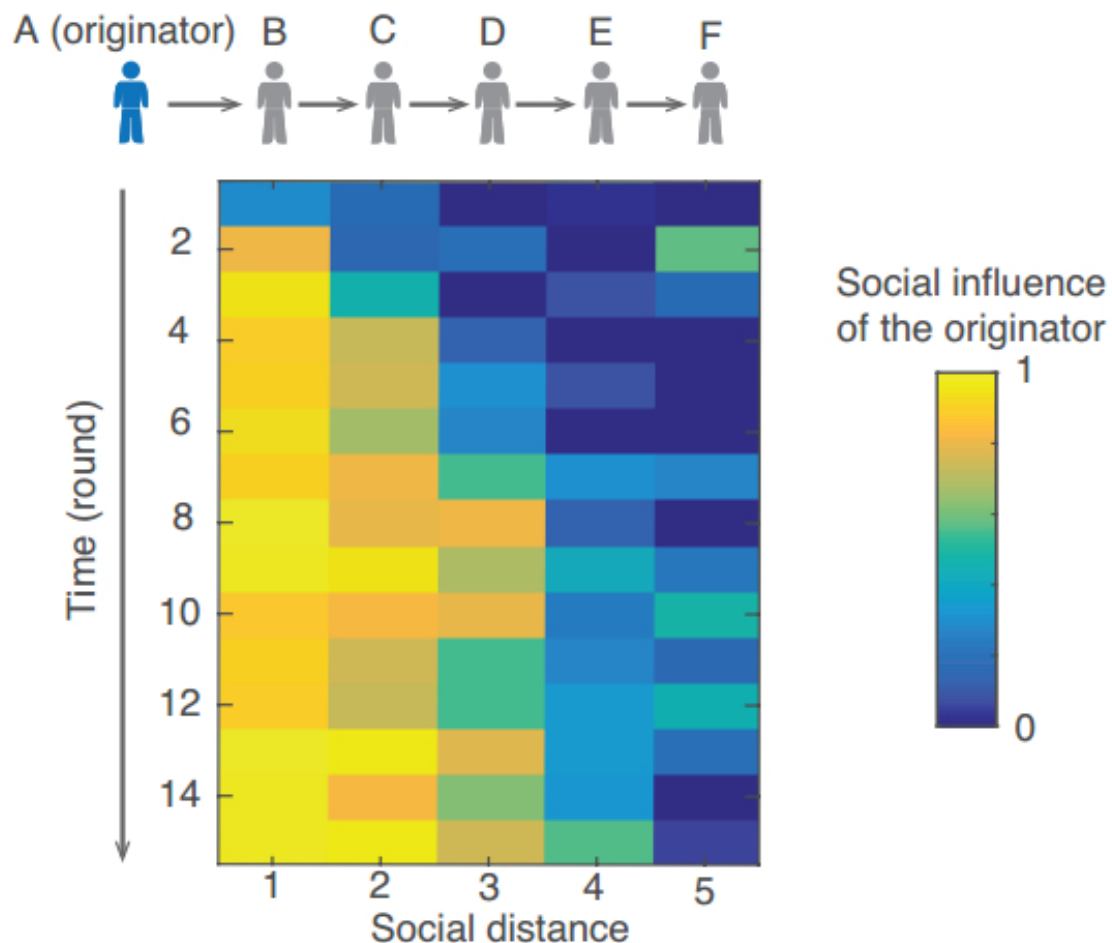


# Researchers test 'social contagion' in laboratory setting

April 14 2017, by Christopher Packham



Judgment propagation down the chain. Observed intensity of social influence averaged over 20 experimental chains. The color coding indicates the influence of the originator's judgment on the final estimates of all other individuals in the chain, as a function of their social distance from the originator (x axis) and the

number of the round (y axis). Individuals located one degree of separation from the originator (i.e., social distance = 1) rapidly adopted the originator's judgments (social influence approached 1 as early as round 2). Individuals located two degrees of separation from the originator were influenced by the originator after about 4 rounds of interaction. Participants located at a social distance greater than 3 were rarely influenced by the originator. Credit: arXiv:1704.01381 [physics.soc-ph]

(Phys.org)—Social contagion describes the propagation of beliefs, evaluations and attitudes through a network of people. It's well understood that political beliefs, emotional attitudes and opinions are contagious within a network, but the precise mechanisms and dynamics are not well understood for two reasons: the complexity of network structures, and the behavioral processes that operate within the network.

According to the three-degrees-of-influence hypothesis, judgement propagation is limited to a social distance of about three people—that is, an evaluative judgement typically will not spread beyond three degrees. Additionally, computer simulations demonstrate that the speed of judgement propagation decays exponentially with social distance from the source of the judgement. Researchers in Germany recently explored the mechanisms of evaluative judgement propagation through a social network. To determine the factors that influence or inhibit the transmission of a judgement, they designed a pair of experiments, and have reported their results in the *Proceedings of the National Academy of Sciences*.

In the first experiment, they designed a visual perception task with three levels of difficulty, in which Subject A's judgement and performance were repeatedly evaluated by Subject B. The researchers were interested in how repeated interactions between the subjects contributed to the contagion of a judgement.

In the second experiment, they examined the collective dynamics of subjects with unidirectional chains of communication that extended to subjects C, D, E and F. All six participants repeatedly interacted with their predecessor, which allowed the researchers to gather data about reputation formation within a network and its resulting effect on the propagation of judgements.

In accordance with the three-degrees hypothesis, the researchers found that judgements rarely propagated beyond three individuals; although they could spread farther, the time necessary to do so increased exponentially. Propagation over distances beyond three or four individuals required a consistently more accurate originator, absolutely error-free observation of others' performance, and a [network](#) structure that remained static over several hundred interactions. These conditions are, needless to say, not easily replicated in the real world.

The study found factors that impeded the propagation of judgements. Judgements become progressively more distorted over successive transmissions, even when individuals were able to observe the judgement and performance of another person. Judgements became less accurate, and thus less influential, the further they propagated from the source.

Secondly, overweighting other people's errors inhibited propagation. This is a common psychological phenomenon called "egocentric discounting," well-known in literature. The problem arises because each performative error must be compensated with several good performances in order to restore reputation; this slows the transmission of [judgement](#) to the next subject. And for each step in the chain, the process repeats, leading to an exponential decay in transmission speed.

The researchers suggest that further study could explore whether multiple sources of influence found in more complex networks could convey different judgements, thus contributing "noise" and impairing

[propagation](#); it is also possible that clustered networks with redundant ties could produce converging judgements along different pathways, providing social reinforcement to propagating judgements.

**More information:** Mehdi Moussaïd et al. Reach and speed of judgment propagation in the laboratory, *Proceedings of the National Academy of Sciences* (2017). DOI: [10.1073/pnas.1611998114](https://doi.org/10.1073/pnas.1611998114) , On Arxiv: [arxiv.org/abs/1704.01381](https://arxiv.org/abs/1704.01381)

## Abstract

In recent years, a large body of research has demonstrated that judgments and behaviors can propagate from person to person. Phenomena as diverse as political mobilization, health practices, altruism, and emotional states exhibit similar dynamics of social contagion. The precise mechanisms of judgment propagation are not well understood, however, because it is difficult to control for confounding factors such as homophily or dynamic network structures. We introduce an experimental design that renders possible the stringent study of judgment propagation. In this design, experimental chains of individuals can revise their initial judgment in a visual perception task after observing a predecessor's judgment. The positioning of a very good performer at the top of a chain created a performance gap, which triggered waves of judgment propagation down the chain. We evaluated the dynamics of judgment propagation experimentally. Despite strong social influence within pairs of individuals, the reach of judgment propagation across a chain rarely exceeded a social distance of three to four degrees of separation. Furthermore, computer simulations showed that the speed of judgment propagation decayed exponentially with the social distance from the source. We show that information distortion and the overweighting of other people's errors are two individual-level mechanisms hindering judgment propagation at the scale of the chain. Our results contribute to the understanding of social-contagion processes, and our experimental method offers numerous new

opportunities to study judgment propagation in the laboratory.

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