Medical Xpress

The genes in your congeniality: Researchers identify genetic influence in social networks

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Can't help being the life of the party? Maybe you were just born that way. Researchers from Harvard University and the University of California, San Diego have found that our place in a social network is influenced in part by our genes, according to new findings published in the *Proceedings of the National Academy of Sciences*.

This is the first study to examine the inherited characteristics of social networks and to establish a genetic role in the formation and configuration of these networks.

The research was conducted by Nicholas Christakis of Harvard, who is professor of sociology in the Faculty of Arts and Sciences and professor of medical sociology at Harvard Medical School, Christopher Dawes and James Fowler, both of UC San Diego.

"We were able to show that our particular location in vast social networks has a genetic basis," says Christakis. "In fact, the beautiful and complicated pattern of human connection depends on our genes to a significant measure."

While it might be expected that genes affect personality, these findings go further, and illustrate a genetic influence on the structure and formation of an individual's social group.

The researchers found that popularity, or the number of times an individual was named as a friend, and the likelihood that those friends

know one another, were both strongly heritable. Additionally, location within the network, or the tendency to be at the center or on the edges of the group, was also genetically linked. However, the researchers were surprised to learn that the number of people named as a friend by an individual did not appear to be inherited.

The study included national data (from the National Longitudinal Study of Adolescent Health) for the social networks of 1,110 adolescent twins, both fraternal and identical. The researchers compared the social networks of the identical twins to those of the fraternal twins, and found greater similarity between the identical twins' social network structure than the fraternal twins' networks.

There may be an evolutionary explanation for this genetic influence and the tendency for some people to be at the center while others are at the edges of the group, according to the researchers. If a deadly germ is spreading through a community, individuals at the edges are least likely to be exposed. However, to gain access to important information about a food source, being in the center of the group has a distinct benefit.

"One of the things that the study tells us is that social networks are likely to be a fundamental part of our genetic heritage," says Fowler, associate professor of political science at UC San Diego. "It may be that natural selection is acting on not just things like whether or not we can resist the common cold, but also who it is that we are going to come into contact with."

The findings also illuminate a previously unknown limitation of existing social network models, which had assumed that all members behave as interchangeable cogs. To address these intrinsic differences in human beings that contribute to the formation of social networks, the researchers have created a new mathematical model, called the "attract and introduce" model, which is also explained in this paper and supports

the genetic variation of members.

This model creates networks that very closely simulate actual human social networks, and using this model, they found that when someone was placed in any virtual network, they gravitated towards the same place within the network.

Because both health behaviors and germs spread through social networks, understanding how contagions flow through social networks has the potential to improve strategies for addressing public health concerns such as obesity or the flu.

"I think that going forward, we are going to find that social networks are a critical conduit between our genes and important health outcomes," says Fowler.

Fowler and Christakis have also published on other aspects of social networks, such as the spread of obesity, smoking, and happiness.

Source: Harvard University

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