

Networks of Human Contact

Unpublished essay, 2021

Prologue

The term “network” is widely used to describe linkages among parallel items of any type—theories have been built for both physical and social networks. This essay draws on [Paul McLean](#) to show networks in social relations, both in person and by electronic communication. The work of [Nicholas Christakis](#) shows how friendships work to create social networks beyond families. Then the essay explores large-scale networks by applying Human-System thinking, relying on the work of [Matthew Jackson](#) to document large-scale networks in the world of today.

Related Essay: For a discussion of how networks fit into the broader category of social groups, see the “Group Behavior” essay—part of a collection of work on my website exploring the [methods for human history](#).

Essay

The term “network” has long been used informally and metaphorically, as a reference to connections of people through friendship or professional ties. More recently, the term has been expanded to the Internet, the digital connections among physical and virtual locations throughout the Earth. In between, networks have referred to grids of water and electric supply and to numerous applications in the natural sciences. Historians have begun to refer to historical networks among humans, but these references tend to remain at the metaphoric level. For the logic of networks to become useful in the study of human society, it must be expressed with precision and must account for several types of networks and networked interactions. In addition, the study of networks must include the place of networks in the wider range of human groups, a topic that I address in my essay on Groups overall.

Basic Principles of Social Networks

Paul McLean’s valuable summary shows social networks to be made up of nodes and edges, their basic elements. There are various perspectives for viewing networks. *Ego-networks* are viewed from the perspective of the focal actor. In a *dyad*, one considers the relationship of pairs of nodes—these are the fundamental building blocks of networks. For dyads, one may ask whether the two nodes share basic characteristics (homophily) or not. The next step up is sets of three nodes, or *triads*. In this case, the relationship between any two nodes is potentially influenced by the existence of other nodes and the links of those nodes.

From triads, one can move on to consider larger network structures, such as *cohesive subgroups*, for which there are varying degrees of *reachability*, and for which *hierarchy* is a possibility and *centrality* can be measured according to various criteria. Thus, networks are generally more than just vague collections of linked units, such as crowds of people. There are numerous configurations of networks, each having specific characteristics and dynamics.

Networks: Their Scales and Levels of Organization

By working with the initial steps in McLean’s description of social networks, one can see that the number of nodes, triads, and subgroups can be extended to many levels. Recognition of the potentially limitless expansion of networks opens up the task of describing major types of social networks, then exploring some of them in detail.

To begin this categorization of network types, one may identify three basic axes for network classification: the spatial axis, the topical axis, and the axis of varying network dynamics. In spatial terms, one may begin with small-scale or community-scale networks, then expand to regional networks linking multiple communities, and beyond that to continental or global-scale networks. In topical terms, networks may focus on kinship, work, or religion; networks may focus on a combination of topics, such as the various media in popular culture.

For the dynamics of networks, here are examples of some network dynamics that have already been studied in detail. Networks of friends have been analyzed by Nicholas Christakis;¹ the place of networks in the creation of niches for human existence has been analyzed by John Odling Smee²; self-organizing networks (which lead to coherent patterns even though network members are unaware of them) have been examined by Robert Goldstone et al.; the collective intentionality of institutions can be examined in the framework of networks; and Matthew Jackson³ has shown that it is possible to analyze network dynamics at a global level in the modern world. In sum, the levels of organization and the spatial, topical, and dynamic character of networks provide an opportunity for a coherent analysis of the networked nature of human society, and of the historical changes in human networks.

Groups Organized as Networks

To address the logic of individuals, groups, and networks, I propose the identification of “we-group networks”: these are networks for which the nodes are we-groups. In a parallel to the case of individual behavior, the logic of group behavior through collective intentionality may be applied to the nature and functioning of social institutions, social networks, social evolutionary theory, and the role of emotions in social groups. A network with we-groups as nodes—in which each of the we-group nodes pursues its own objectives—would have characteristics and dynamics similar to those of an I-group-network. But in cases where we-group nodes that are participating in a network choose to express collective intentionality and a common goal, the network is an institution, a we-group network. For such a we-group network, one can conduct the familiar analysis of the centrality of its various nodes.

Horizontal and Vertical Networks

A further complication one can propose, in analysis of social networks, is the addition of a third dimension to the normally two-dimensional graphs. That is, within a we-group network, one may place the nodes in a hierarchy, with certain nodes being in ruling or highly influential roles; these hierarchies are operative within the boundaries of the network. The nodes are then linked by both horizontal and vertical edges. One could imagine a we-group of slaves under the domination of a we-group of masters. On the other hand, one could imagine the slaves as an I-group, under the dominance of the masters but not accepting the legitimacy of in the hierarchical relationship. Other variations on these models show the potential of such social network analysis.

Overlaps of Networks and Institutions

Institutions are networks too, but they are complex and distinctive because of the agreements among their members on how to act together. It’s easiest for most purposes, therefore, to treat institutions as separate from networks—that is, to think about parallels among institutions and contrasts separating networks from institutions.

¹ Nicholas A. Christakis, *Blueprint: The Evolutionary Origins of a Good Society* (New York: Little Brown Spark, 2019).

² F. John Odling-Smee, Kevin Laland, and Marcus W. Feldman, *Niche Construction: The Neglected Process in Evolution* (Princeton: Princeton University Press, 2003).

³ Matthew O. Jackson, *The Human Network: How Your Social Position Determines Your Power, Beliefs, and Behaviors* (New York: Pantheon, 2019).

In that case, one can describe the varying interactions of networks and institutions with each other. Thus, there can be networks of friends within institutions containing numerous members. At a larger scale, there can be networks of institutions, such as networks of hospitals that may exchange patients, staff, and medical equipment. In academic life, a conference may be an institution, in which an organization and staff conduct annual conferences of sociologists or chemists or body-builders. These institutions provide the basis that sustains networks of conference participants. The institution of slavery, purchasing and oppressing captives as laborers, includes the slave owners as members of the institution. The slaves themselves are not members of the institution unless they formally agree to the terms of the institution; rather, they are clients who are manipulated by the owners. Nevertheless, the slaves themselves may form networks, and there may be networks including both masters and slaves for exchanges and tasks they perform together.

The Human System and its Networks

I define the Human System as the totality of the networked connections among humans. While it is a *system*, with structured relationships, interactions, and interactions, it is not an *institution*, in that there has not been a formal agreement on its task or the roles of its members. Thus, the Human System is a network of networks, including a great number of institutions. To develop a specific description of the Human System, it will be necessary to describe the main categories of networks at levels from the local to the global, with summary statements of their interactions with each other.

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INSPIRATION FOR THIS ESSAY:

Paul McLean, *Culture in Networks*

Paul McLean, *Culture in Networks* (Cambridge: Polity Press, 2017), 15–16.

The Most Basic Network Concepts: Node/Actors and Edges/Ties

A network is comprised of a set of entities and the connections existing among them. When talking of social networks in particular, we frequently refer to (and conceive of) the entities as *actors*; however, nothing requires that they be individual people. They could be collectives, like families, or companies, or organizations, or states. As we will see later, they could also be things like words, or texts, or actions, or emotions, or just about anything existing in some relational nexus that comprises (or impinges upon) social life. Especially when we think of a network in graphic terms, as a set of points with lines connecting them in a web-like pattern, we may refer to the entities as *nodes*, or *vertices*, and the ties as *edges* or *arcs*. This vocabulary can be quite useful in its abstractness. It gets us away from assuming that the entities in a network are necessarily rational actors, with the specific mental equipment to make rational, self-interested decisions—as if that were the only motive behind social network formation and growth. Refraining from making such an assumption has allowed researchers to focus on structural properties or tendencies within networks, without seeking to explain them in terms of actor rationality. Equally, though, and more important for us, moving away from explaining social network behavior narrowly in terms of rational action provokes us to think about the myriad ways that culture—norms, values, local attitudes and beliefs, cognitive frames, powerful symbols, conversation, and so on—can affect how specific social networks are formed and develop. Taking that step entails adopting a healthy sensitivity to local context and meaning in networks research.

Nodes/actors can be categorized in various different ways. One key *structural* property of nodes is *centrality*, and, for the moment, especially *degree centrality*. This is a measure of the number of connections a given node has to other nodes. More central nodes have more ties, and accordingly they are expected to exert a stronger influence on network formation and development. People with many friends are likely to account disproportionately for the spread of tastes and fashions, for example. And a word that appears frequently in a given text—say, the word “security” in a State of the Union address—probably contributes disproportionately to the text’s meaning, and influences the meaning of the words adjacent to it.

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INSPIRATION FOR THIS ESSAY:

Nicholas Christakis, *Blueprint*

Nicholas A. Christakis, *Blueprint: The Evolutionary Origins of a Good Society* (New York: Little Brown Spark, 2019), 241–242.

Humans have friends, and this ... is a crucial part of the social suite. We form long-term, nonreproductive unions with other humans. This is exceedingly rare in the animal kingdom, but it is universal in us. As a consequence of having friends, we assemble ourselves into social networks, and here, too, the particular ways we do this are universal. The mathematical patterns of friendship are the same around the world. Humans everywhere also cooperate with one another. And this cooperation is supported not only by the fact that we reliably interact with friends rather than strangers within the face-to-face networks we fashion, but also by the fact that we form groups whose boundaries we enforce by coming to like those within the group more than those outside of it. People everywhere choose their friends and prefer their own groups. . . .

We can formally define *friendship* as a typically volitional, long-term relationship, ordinarily between unrelated individuals, that involves mutual affection and support, possibly asymmetric, especially in times of need. Close friends in most societies violate many of the customs regarding exchange-based relationships (what we might call tit-for-tat behavior) between unrelated individuals. Explicitly conditional or reciprocal exchanges (“I’ll scratch your back if you scratch mine”) are the types of cooperation and kindness that are seen when trust is low and friendship relations are weak or nonexistent.

We are supposed to respond to our friends because they have a need, not because of what they have done for us in the past or what we might expect from them in the future. Moreover, real friendships are based not on what each party can do for the other (mutual aid or usefulness), but on how each party *feels* about the other (mutual goodwill or sentiment).

Relations among friends are characterized by a number of primary sentiments, including closeness, affection, and trust. A feeling of closeness to the other person is crucial to whether you deem him or her a friend and whether you will offer help, but such a feeling is not necessary when it comes to identifying kin. And people do not have sex with their friends or raise children with them in order to feel a special way about them. Feeling close to someone involves some inclusion of the other in one’s self-identification. When it comes to a friend, you perceive that things that benefit the other person also benefit yourself. You take joy in your friend’s well-being.

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INSPIRATION FOR THIS ESSAY:

Matthew Jackson, *The Human Network*

Matthew O. Jackson, *The Human Network: How Your Social Position Determines Your Power, Beliefs, and Behaviors* (New York: Pantheon, 2019). 6. 231, 233.

Describing networks for our purposes of understanding human behavior is manageable for several reasons. . . . Human activity exhibits regularities that lead to networks with special features: it is easy to distinguish a network formed by humans from one in which the links are just formed randomly without any dependence on the other links around them or which nodes they connect. . . .

If we look from the end of the Napoleonic Wars (starting with 1816) through 1950, each country averaged 2.5 alliances at a time. Moreover, those alliances were ephemeral. Any given alliance at any moment had just over a two-thirds chance of existing five years later. Most were marriages of convenience, not anchored by trade, and were easily disrupted when times got tough. After 1951, the number of alliances per country grew by a factor of more than 4 to 10.5. Even more important, these alliances were quite steady: any given alliance now had a 95 percent chance of still existing five years later. . . .

Both trade and military alliances became much denser and more stable over time, coinciding with the dramatic decrease in wars. Moreover, most wars that have occurred in the past three decades have involved low-trade countries on at least one if not both sides of the conflict. Major trade partners simply do not appear on opposite sides of a war.

Countries with an extra ten trading partners are half as likely to be at war at any given moment; and pairs of countries that had a one standard deviation higher level of trade with each other have a 17 times lower chance of being at war with each other than the average pair.

We cannot be sure that the striking correlations between trade and peace are causal. We don't have controlled experiments with parallel worlds, one with trade and another without, to see what would happen. There are also many other things that have changed over time: the international political landscape, the number of democracies, and the presence of nuclear weapons. But as I found together with Stephen Nei, the timing of conflicts and other details suggests that none of these other factors can really explain all of what we have seen, and it seems that denser trade networks are playing a major role in generating peace. . .

If one wants a recipe for lowering the incidence of wars in Africa and the Middle East, the message is clear: grow the economies and the regional trade networks, and especially promote trade between potential adversaries. It is not an easy task, but it is the obvious one. Signing repeated treaties, even with powerful third parties but without serious trade, has been tenuous at best.