

Social Network Theories: An Overview



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Overview

- Networks are located at the meso-level. They are located between the individual (micro-level) and the institutions (macro-level).
- The theories assume an interaction between individual and their networks, with the focus on relationships and their structures.
- There is not a single network theory. Instead, there are lots of different theories or theoretical concepts.
- “Grand Theories” have an all-embracing claim to explain the connection between networks, society, and agency of individuals.
- “Middle-range theories” are research-oriented theories. They focus, e.g., on networks and their effects in specific areas like health, migration, or religion.
- “Middle-range theories” such as strong/weak tie theory are particularly important in network analysis and form the basis for hypotheses or used to interpret data.

1 Network Theories and an Attempt of Classification

Regarding network theory, John Scott argues: “[...] [T]heoretical work has long been underdeveloped in social network analysis. While the methods themselves do not require or imply any particular sociological theory, they do require theoretical contextualisation in wider debates” (Scott, 2011, p. 24). Although the theorization

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of networks has long been neglected, there has been intensive theoretical debate on the concept of social relations and their structures since the early twentieth century. It is generally assumed that people are embedded in relationships and cannot be viewed in isolation from their social environment. Individual dyads, relationships between two actors, are connected to larger units, so-called networks. Networks are located at the meso-level. They are thus a link between the micro-level, or the individual action (agency), and the macro-level, or the institutions (Weyer, 2012, p. 241). Accordingly, networks consist of actors who build relationships with one another and those relationships create overall social structures. The theoretical interest is not based on so-called classical attributes of individuals, like gender, race, or age, or characteristics of institutions, but on relationships and their structures and the embedding of the actors within a network. The starting point of research questions includes relations, the embeddedness of the individuals within a network, and the interaction between social structure and individual attributes.

Network theories can include “grand theories” and “middle-range theories.” Grand theories involve general statements and wide-ranging evidence. Those are relatively separate from real concerns of everyday life (Mills, 1968). Middle-range theories are located between global theories and research-oriented working theories. They are also restricted to a specific field of research (Merton, 1968). According, three ideal-typical forms of network research can be distinguished (Emirbayer & Goodwin, 1994). The first is structuralist determinism, which uses exclusively relational characteristics to describe the actions of actors, but it neglects cultural discourses. The actions are predestined by the structure of the networks and the embedding of the individual in these structures. Structuralist instrumentalism emphasizes the individual’s options for action, which result from his or her network position. The social actors use these options instrumentally, in the sense of structural individualism, for their own advantage (*homo oeconomicus*). Theoretical interests lie more strongly on social actors than in structural determinism. In structuralist constructivism, social structures, culture, and action are treated as separate aspects, which are linked with each other. Networks and individuals are part of culture and influence it, in turn. They stand side by side on equal footing. Relationships are understood as a component constructed by the actors themselves, which means that the perception of the participating actors is even more prominent (Emirbayer & Goodwin, 1994).

Although these three ideal types differ, they all assume that relations and the embedding of individuals influence their actions and identity. The theories also show that the actors create networks and they can be transferred to institutions and consolidated. The focus of the analysis may differ, but they all start from the human being as a social actor that is connected to others in networks. Networks can therefore be defined as “[...] a set of relevant nodes connected by one or more relations” (Marin & Wellman, 2011, p. 11).

In the next section, both examples of “grand theories” and “middle-range theories” will be presented in order to concretize the relational thinking described above. However, the focus is on “middle-range theories,” since these are of greater importance in empirical research. Furthermore, these theories are resumed in the chapter

“[Network Analysis and Health Inequalities: A Methodological Introduction](#)”. Because the theories of social capital and social support are discussed separately (see chapter “[Social Relations, Social Capital, and Social Networks](#)”) in this book, I will not examine both theories in this chapter.

1.1 Grand Theory of Network Research

Probably, one of the first theoretical discussions on networks can be found in Georg Simmel’s works (Simmel, 1950 [1908]). Although Simmel speaks of social circles, he means the relational integration into social networks. Primary social circles are social forms into which the individual is born (e.g., family and tribes). These circles are characterized by strong emotional closeness, short path distances, and high trust. On the other hand, rational circles (e.g., partnership or business contacts) are based on similar interest and on “homophily.” Actors enter into relationships which in turn affect the actions of the individuals themselves and open up or limit their possibilities. The individuality of every single person is created through affiliation with different circles. Simmel has already identified the first simple structural features that can be used in network analysis (Hollstein, 2001).

Austrian ethnologist Sigfried Nadel is another important relational thinker. He differentiates between role, relationship, and social structure. Roles are seen as network results. They are created through the interaction between actors. Roles are not exclusive characteristics of the actors themselves. Because the role templates are related to cultural norms and rules, they are more or less stable (e.g., friendships). The values of a role are described and defined, which in turn create expectations among the actors in a network. “*Thus we take ‘friendship’ to be evidenced by a variety of mutual ways of acting, perhaps visible on different occasions, such as help in economic or emotional re-responses*” (Nadel, 1957, p. 9). Role expectations must therefore always be seen in relation to other actors, as behavior is adapted by so-called role maps. “[H]e carries a role map of his society in his head, indicating the way in which his role fits in amongst others” (Nadel, 1957:58).

For the sociologist Nibert Elias (2014 [1970]), networks play an essential role in his social analysis. He speaks of figurations, meaning that individuals are dependent on one another and influence social interaction, and thus the actors themselves, too. According to him, people are, because of their basic dispositions and inclinations, “[...] directed towards and linked with each other in the most diverse way. These people make up webs of interdependence or figurations [networks] of many kinds, characterized by power balance of many sorts [...]” (Elias, 2014 [1970], p. 15). Here, the actors are relatively autonomous (*homines aperti*), but from birth they are networked with others in constellations of power and dependencies (Elias, 2014 [1970], p. 169).

An important researcher in the current theoretical debate is the physicist and sociologist Harrison White (1992, 2012). With the help of relational thinking, he tries to explain how actors develop their own individual identity. According to

White, social identities are not given as irrevocable facts, but they are constructed in social networks and formed from control. They are not given; rather, they are negotiated in relation to other actors in a certain network. Identities can only be stable if others recognize them. Therefore, actors put themselves in relation to others and try to construct and stabilize their identities. These structures are dynamic and consist of so-called stories—shared pasts or exchanged experiences that actors tell about and share with each other (White, 1992).

This brief introduction of grand theories is intended to be an overview, but it shows different ways of thinking and gives insight into how networks and society can be considered. But they have the idea in common that relations are the origin of action or are influenced by action, and networks have a universal claim to explanation. For those who are interested in this kind of theories like “Relational Science” or “Relational Sociology,” I recommend the works of Crossley (2010), Dépelteau (2018), or Emirbayer (1997). These provide a broad overview of the debate.

1.2 *Middle-Range Network Theories*

Besides the grand theories, there are also middle-range theories, which put the focus on relations and social networks. These explanatory theories are more empirical-based, and in some cases, they can be subsumed under grand theories. Middle-range theories can be helpful for the development of hypotheses, but also for the interpretation and description of research results. I would like to present some of those theories in this chapter. I have chosen concepts that are empirically implemented in many studies and therefore, in my opinion, are very important for empirical procedures. This is not an exhaustive list of concepts, but it provides an insightful look into conceptual approaches of network research. This chapter takes account of theoretical approaches such as strong and weak ties, structural holes, homophily, popularity, reciprocity, balance theory, and cliques.

1.2.1 **Strong/Weak Ties**

A very important relational concept goes back to Granovetter (1973). In his approach, the sociologist distinguishes between two types of relationships by their intensity: *strong* and *weak* relationships (*ties*). The differentiation between strong and weak relationships is therefore “(probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding) and the reciprocal services [...]” (Granovetter, 1973, p. 1361). Strong relations are characterized by, for example, reciprocity, high contact intensity, high intimacy and emotion, and trust. This includes, for example, family members or even good friends. On the other hand, weak ties are loose relationships with, for example, low contact frequency and low intimacy. Examples are holiday acquaintances, colleagues, and loose acquaintances. While strong relationships are important for aspects such as emotional support,

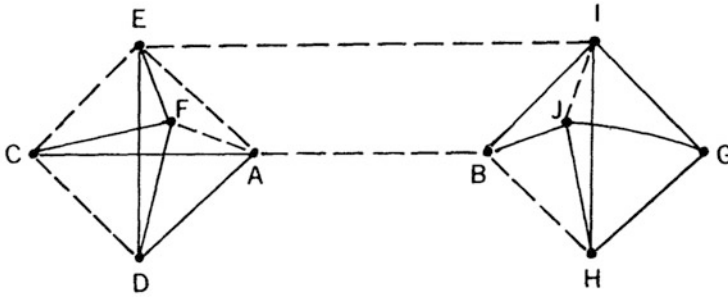


Fig. 1 Importance of weak ties according to Granovetter. Source: Strong relations are the black solid lines. Weak ties are dashed lines. These connect the subgraphs with each other (Granovetter, 1973, p. 1365)

Granovetter was able to show that weak relationships have their very own benefits. They provide access to new information and resources that are not part of the tight social environment, because, different to strong ties, weak relationships build bridges to other subgraphs with, e.g., different social or political orientations (see Fig. 1). Weak relationships reduce path distances and enable us to get in contact with actors who have information that our close environment does not provide. In his study “Getting a Job,” Granovetter (1974) was able to prove by looking for a job in the engineering sector that weak relationships promise success. These are even more important than traditional application procedures, he argued. Granovetter’s idea of strong and weak relationships also finds its way into health research, where it is assumed that different types of relationships have different consequences on health behavior or even subjective well-being. To consider differences in relationship strengths in research, empirically (qualitatively as well as quantitatively), the concept and the distinction have to be considered and defined from the very beginning. Examples include studies on the impact of weak relationships and the diffusion of suicidal thoughts (Baller & Richardson, 2009) or the mediating role of strong or weak relationships between poverty, health, and well-being (Cattell, 2001). A precise distinction between the two types of relationships is often ambiguous and may also differ from context to context. Therefore, it is important to clearly identify and justify parameters for the distinction.

1.2.2 Structural Holes

Burt (1992) also deals with types of relationships and their various effects. While Granovetter focuses more on the intensity of the relationship, Burt (2004) considers the structure and thus the position of an actor in the network to be of essential importance: “[...] people have an advantage because of their location in a social structure” (Burt, 2004, p. 351). He thus addresses the structural embedding of the actors and the resulting possibilities and restrictions for action. Structural holes are missing relationships that separate two or more subgraphs (see Fig. 2). These holes

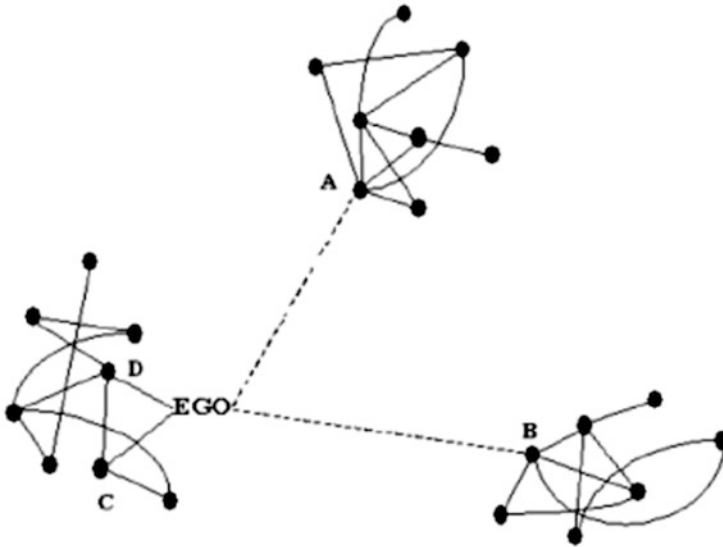


Fig. 2 Structural holes and bridging. Source: Ego sits between three subgraphs and connects them. It can take advantage due to its network position (Burt, 1992, p. 27)

prevent the transfer of information or other resources, for example. Actors who bridge such holes by connecting subgraphs and acting as a bridge can have advantages because of their structural location within a network. For example, the actor has insight views into very different subgraphs, which allows them to generate non-redundant information or to merge knowledge from different social groups. In their so-called broker position, they can control the flow of information between different subgraphs (e.g., *tertius gaudens*¹). For example, they can decide which information they want to pass on, when, and how.

This theory is rarely found in health research. One example is the egocentric study by Cornwell (2009). The author explores the extent to which the state of health affects the bridging of such structural holes. Cornwell argues that the existence and use of bridges in personal networks also depend on an individuals' health. Poor health makes it more difficult to withstand the pressures and to execute some of the common tasks associated with bridging structural holes. Cognitive health and functional health are quite positively associated with bridging structural holes. The study by Schafer (2013), "Structural advantages of good health in old age," addresses a similar question and supports Cornwell's results (2009). The study of Goldman and Cornwell (2015) examined the possibility that complementary alternative medicine (CAM) usage in later life is correlated to social network structure. The authors emphasize the importance of structural holes: "*Specifically, we find support for the argument that individuals who function as bridges between their*

¹This refers to the laughing third party.

social network members are significantly more likely to use alternative medicine, net of a number of other predictors of CAM usage and network bridging. This result suggests that bridging potential may be an important structural feature of networks that shapes alternative medicine use.” (Goldman & Cornwell, 2015, p. 76).

1.2.3 Homophily (Influence/Selection)

Homophily is an important concept in network research. The term as we know it today was coined by Lazarsfeld and Merton (1954), who combined observations of classical network studies with ethnological research on marriage formation. In simple terms, this means “birds of a feather flock together.” Here, the two authors distinguish between “status homophily” and “value homophily.” The former refers to attributed characteristics such as ethnicity, gender, religion, and education. “Value homophily” also refers to persons who have similar attitudes or ways of thinking, irrespective of the status of the respective person. In terms of networks, this means that people build relationships with others who are similar to them (Lazarsfeld & Merton, 1954). McPherson et al. (2001) note that ethnicity, age, religious affiliation, education, gender, and occupation are particularly important factors within networks: “*Homophily in race and ethnicity creates the strongest divides in our personal environments, with age, religion, education, occupation, and gender following in roughly that order*” (McPherson et al., 2001, p. 415). Two different processes can explain how homophily is produced in networks. On the one hand, this occurs through selection processes. Here, the actors, who are similar to each other, select each other because they share the same attributes. On the other hand, actors who differ in one or more attributes adapt to the behavior of each other. In other words, they influence each other over time (Knecht, 2008). Even if the results are similar, the processes are different. In order to be able to distinguish between these two effects empirically, two measuring time slots are needed. In health research, for example, the extent to which young people (see chapter “[Social Networks, Health, and Health Inequalities in Youth](#)”) influence their smoking, drinking, or cannabis consumption behavior or join different social networks selectively is being investigated (Knecht, 2008; Mercken et al., 2009; Pearson et al., 2006). On the other hand, there are studies, most of them being non-longitudinal studies, which examine the health behavior of older people (Flatt et al., 2012) or depressive people (Schaefer et al., 2011). Compared to theories that were already presented, this concept seems to already have found its way into health research, especially research on young people, teenagers, and adolescents.

1.2.4 Popularity: Attributes Popularity and Preferential Attachment

There is also the concept of “popularity.” In this middle-range theory, some actors “own” more relationships than others and are therefore more popular than other actors within the network. Here, I would like to distinguish two approaches. One

concept assumes that certain attributes (e.g., age, gender, and health) affect the popularity of actors. People are popular because they are, for example, rich or considered beautiful. Another idea based on degrees of relation assumes that actors who already “own” many relationships may receive even more relationship requests because of them. Popular persons are those with whom many actors want to build a relationship. Initial research has shown that intelligent, extroverted, and capable students are more famous or popular than others (Bonney, 1946; Young & Cooper, 1944). Against the background of health, questions such as how popularity influences health (e.g., health-related behavior such as smoking) or how certain diseases influence popularity arise. Valente et al. (2005), for example, point out that particularly popular students start smoking. “*Popular middle school students were more likely to become smokers compared to their less popular peers*” (Valente et al., 2005, p. 323). These concepts can especially be found in research on pupils or students and their health behavior. *Preferential attachment* also assumes that relationships within a network are unequally distributed. The focus is based on relationships, that is, actors who already unite many relationships can get relationships even more easily. Merton (1968) describes this as the “Matthew effect.” De Solla Price (1976), for example, was able to point out this phenomenon on the basis of citations in articles (“cumulative advantage”) and Barabási and Albert (1999) for social and social–technological networks (film actors, electricity network, Internet) (“scale-free”). While popularity based on attributes has found its way into health research, preferential attachment does not yet play an important role.

1.2.5 Reciprocity

An important principle in network research is reciprocity. Reciprocity assumes that people expect a gift or action to be returned or balanced. This is where the principle of gift and gift in return (Mauss, 1954) as well as the networks that arise from this process come into play. The different expectations of gifts and gifts in return make many forms of social interaction and networks possible. For Simmel (1950 [1908]), it is generally a basic principle of societies, in general. Transactions between the actors are not always linked to an official price, calculated in money, or to formal (e.g., law) rules. A service or gift in return does not have to be exactly the same or paid in the same form as the received service or gift, but it should be at least perceived as adequate and similar. For example, if you help friends move to another home, you can expect to receive a similar service at a later point in time. If the giver’s expectations are not fulfilled, then the reciprocity norm is violated and social exchange in the future becomes less likely. Reciprocity norms depend on culture, historical aspects, and the role of the actors involved (e.g., friend and acquaintance). For example, within the family in so-called Western countries, close friends or relatives are more willing to provide a service without expecting a direct temporal consideration (Sahlins, 1974). As a rule, a right (e.g., contract law) does not exist. The structure of an exchange network can be illustrated by quantitative network research very well. Obligation norms and exchange practices are rather open to

qualitative research (see chapter “[Network Analysis and Health Inequalities: A Methodological Introduction](#)”). For example, the qualitative study by Wentowski (1981), “Reciprocity and the Coping Strategies of Older People: Cultural Dimensions of Network Building,” explores (1) how cultural rules govern the exchange of support within networks and (2) how differences, in the way older people experience these rules in creating support over time, are interpreted. The research also shows the great personal importance of reciprocity for maintaining the psychological self-esteem of older people. Nevertheless, Abbott and Freeth (2008) point out that the theoretical model of reciprocity is hardly taken into account in health research.

1.2.6 Balance Theory

Heider’s balance theory has had a great impact on social network theory. The psychological theory goes back to the equilibrium theory mainly, which can be attributed to the consistency theory.² According to this theory, actors try to shape attitudes and convictions without contradictions (Witten, 1989). Against this background, the theory of equilibrium deals with contradictions of relationship structures between actors or between actors and other elements (Heider, 1958). It is assumed that actors strive for a balance. The state of equilibrium is a situation in which the relations between the variables fit harmoniously; there is no urge for change. Statements on effects on relationships can be derived from the Balance Theory developed by Heider (1958). The psychologist assumed the following constellation:

1. There are a person P, a person O, and a situation, an event, an idea, or a thing (X).
2. There are positive and negative relationships.
3. Individuals strive to achieve a state of balance.

While Heider focuses on the cognitive structures between the three units, Cartwright and Harary (1956) extend the balance theory to the level of socio-structural characteristics. This step made it possible to extend the concept of balance to networks and groups. When is a triad balanced, in the sense of a network? It is balanced when all relationships are positive or when two relationships are negative and one is positive. For example, let us assume that person A has a friendship with person B. At the same time, person B is in a negative relationship with person C. The triad would be balanced if person A is also in conflict with person C. In other words, the enemy of my friend is my enemy. An imbalance exists when one relationship is negative and two relationships are positive. The different constellations are shown again in Fig. 3.

The study by Cornwell (2009) points out that poor health can have an impact on the ego–age–age relationship system. However, which relationships can and cannot be bridged in triads still need to be further researched.

²Consistency Theory assumes that harmonies in cognitive processes—such as perception, attitudes—have a positive effect on the individual.

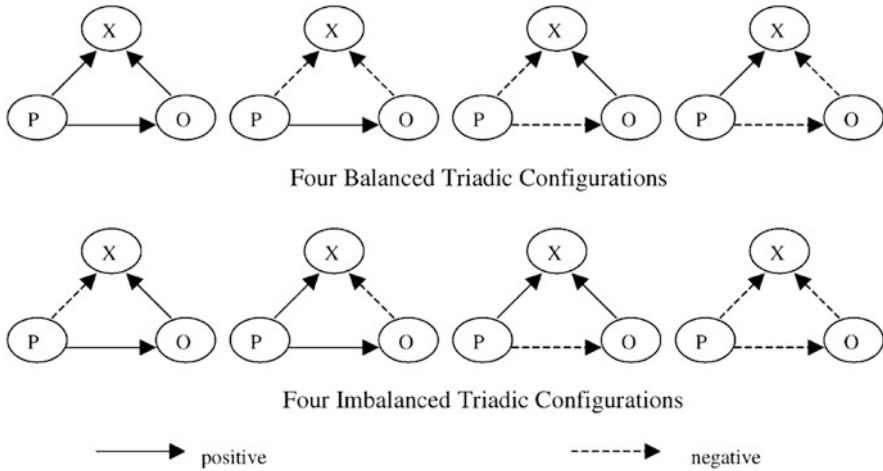


Fig. 3 Unbalanced and balanced triads. Source: Unbalanced and balanced triads. P is a focal person, O is another actor, and X is an object or a person. (Hummon & Doreian, 2003, p. 19)

1.2.7 Small Groups: The Clique Theory

Small group research has an established and important position in network research. A small group can be described as a small number of actors who can get in contact with each other (Homans, 1950). Within these small groups, social mechanisms can be explored more easily. The clique is one of these small group concepts. In everyday language, the term clique generally refers to a group of individuals who are in relatively close, direct, and reciprocal relationships. The common purpose that the group members of a clique pursue can be very different: a street gang, friends in school, or a coffee party (Täube, 2010, p. 397).

In network research, cliques are an aggregation of actors in a large network. They are densely connected actors who form a small group. These subgroups are not only highly connected but show other characteristics, like high activity, solidarity, and group identification (see chapter “[Network Analysis and Health Inequalities: A Methodological Introduction](#)”). Against this background, a clique can be defined as a complete subgraph of at least three actors in which every possible pair of points is directly connected by a relation and the clique is not contained in any other clique (Wasserman & Faust, 1997, p. 254). With regard to involvement in a clique and health, the study by Ennett and Bauman (1993) shows that students who are involved in cliques do not smoke as often as isolated participants. As far as mental health is concerned, Provan and Sebastian (1998) point out that involvement in entire networks tends to have a negative effect, while involvement in cliques, which also overlap, can have a more positive effect.

This chapter aims to show that there are network theories, besides the so-called grand theories, that have a strong empirical connection and can be very useful for network analysis. In my opinion, it is important to consider theories that help answer

the research question before the data is collected. The theories can help to concretize research questions or operationalizations. In the absence of theoretical references, empirical analysis can often be difficult. Since many theories do not arise from health research, theories must be transferred (e.g., strong/weak ties).

2 Social Networks and Theory: A Conclusion

In this chapter, I differ between “grand theory” and “middle-range theory” of network research. What all theories have in common is that, in addition to attributes such as age and gender, they focus on the embeddedness of individuals in their social environment. Networks are located between individual action (micro-level) and structuralism of institution (macro-level), at the so-called meso-level. However, there is not one sole network theory. In general, three different orientations can be distinguished: structuralist determinism, structuralist instrumentalism, and structuralist constructivism (Emirbayer & Goodwin, 1994). Emirbayer and Goodwin distinguish between how relations are used to understand social phenomena.

While the “grand theories” claim to have wide-ranging evidence with a universal claim to explanation, nowadays they move more into the sociological spotlight, but they play a subordinate role in the empirical implementation. Middle-range theories are limited to a specific field of research and are more research-oriented. These include, for example, strong/weak tie theory, the theory of structural holes, triad theory, balance theory, the theory of homophily, clique theory, or even reciprocity. These theories help to better explain or understand the formation of networks, their effects, or their significance for the actors. They also serve as a basis for forming hypotheses. Exactly which theories could be relevant for one’s own research cannot be clarified here; however, this list is intended to help you gain an overview so that you can select theories for your own research.

Reading Recommendations

- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual review of sociology*, 27(1), 415–444. *An English article on homophily that gives a good overview of the topic.*
- White, H. C. (2008). *Identity and control: How social formations emerge (second edition)*. Princeton University Press. *Probably one of the most current and exciting theoretical works on networks.*
- Emirbayer, M. (1997). Manifesto for a relational sociology. *American journal of sociology*, 103(2), 281–317. *An English article that explores the significance of relational thinking and ideas in sociology.*

(continued)

- Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology*, 110, 349–399. *An article that uses data from organizational sociology to describe the idea of structural holes with good ideas explained very well with an empirical example.*
- Granovetter, M. S. (1973). The strength of weak ties. *The American Journal of Sociology*, 78, 1360–1380. *Probably the most famous article on weak relations and their value.*

References

- Abbott, S., & Freeth, D. (2008). Social capital and health: Starting to make sense of the role of generalized trust and reciprocity. *Journal of Health Psychology*, 13(7), 874–883.
- Baller, R. D., & Richardson, K. K. (2009). The ‘dark side’ of the strength of weak ties: The diffusion of suicidal thoughts. *Journal of Health and Social Behavior*, 50(3), 261–276.
- Barabasi, A., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, 286(5439), 509–512.
- Bonney, M. E. (1946). A sociometric study of the relationship of some factors to mutual friendships on the elementary, secondary, and college levels. *Sociometry*, 9(1), 21–47.
- Burt, R. S. (1992). *Structural holes: The social structure of competition*. Harvard University Press.
- Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology*, 110(2), 349–399.
- Cartwright, D., & Harary, F. (1956). A generalization of Heider’s theory. *Psychological Review*, 63, 277–292.
- Cattell, V. (2001). Poor people, poor places, and poor health: The mediating role of social networks and social capital. *Social Science & Medicine*, 52(10), 1501–1516.
- Cornwell, B. (2009). Good health and the bridging of structural holes. *Social Networks*, 31(1), 92–103.
- Crossley, N. (2010). *Towards relational sociology*. Taylor & Francis Group.
- Dépelteau, F. (Ed.). (2018). *The Palgrave handbook of relational sociology*. Springer.
- Elias, N. (2014 [1970]). *The collected works of Norbert Elias*. University College Dublin Press.
- Emirbayer, M. (1997). Manifesto for a relational sociology. *American Journal of Sociology*, 103(2), 281–317.
- Emirbayer, M., & Goodwin, J. (1994). Network analysis, culture, and the problem of agency. *American Journal of Sociology*, 99(6), 1411–1454.
- Ennett, S. T., & Bauman, K. E. (1993). Peer group structure and adolescent cigarette smoking: A social network analysis. *Journal of Health and Social Behavior*, 226–236.
- Flatt, J. D., Agimi, Y., & Albert, S. M. (2012). Homophily and health behavior in social networks of older adults. *Family & Community Health*, 35(4), 312.
- Goldman, A. W., & Cornwell, B. (2015). Social network bridging potential and the use of complementary and alternative medicine in later life. *Social Science & Medicine*, 140, 69–80.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.
- Granovetter, M. S. (1974). *Getting a job. A study of contacts and careers*. Harvard University Press.
- Heider, F. (1958). *The psychology of interpersonal relations*. Hillsdale, LEA.
- Hollstein, B. (2001). *Grenzen sozialer Integration: Zur Konzeption informeller Beziehungen und Netzwerke [=Limits of social integration: On the conception of informal relationships and networks]*. Leske+Budrich.
- Homans, G. C. (1950). *The human group*. Harcourt, Brace & World.

- Hummon, N. P., & Doreian, P. (2003). Some dynamics of social balance processes: Bringing Heider back into balance theory. *Social Networks*, 25(1), 17–49.
- Knecht, A. B. (2008). *Friendship selection and friends' influence. Dynamics of networks and actor attributes in early adolescence* [Dissertation]. .
- Lazarsfeld, P. F., & Merton, R. K. (1954). Friendship as a social process: A substantive and methodological analysis. In M. Berger, T. Abel, & C. H. Page (Eds.), *Freedom and control in modern society* (pp. 18–66). D. Van Nostrand Company.
- Marin, A., & Wellman, B. (2011). Social network analysis: An introduction. In J. Scott & P. J. Carrington (Eds.), *The SAGE handbook of social network analysis* (pp. 11–25). SAGE.
- Mauss, M. (1954). *The Gift: Forms and functions of exchange in archaic societies*. Free Press.
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology*, 27(1), 415–444.
- Mercken, L., Snijders, T. A. B., Steglich, C., & de Vries, H. (2009). Dynamics of adolescent friendship networks and smoking behavior: Social network analyses in six European countries. *Social Science & Medicine*, 69(10), 1506–1514.
- Merton, R. K. (1968). The Matthew effect in science: The reward and communication systems of science are considered. *Science*, 159(3810), 56–63.
- Mills, C. W. (1968). *The sociological imagination*. Oxford University Press.
- Nadel, S. F. (1957). *The theory of social structure*. Routledge.
- Pearson, M., Steglich, C., & Snijders, T. (2006). Homophily and assimilation among sport-active adolescent substance users. *Connect*, 27(1), 47–63.
- Price, D. D. S. (1976). A general theory of bibliometric and other cumulative advantage processes. *Journal of the American Society for Information Science*, 27(5), 292–306.
- Provan, K. G., & Sebastian, J. G. (1998). Networks within networks: Service link overlap, organizational cliques, and network effectiveness. *Academy of Management Journal*, 41(4), 453–463.
- Sahlins, M. D. (1974). On the sociology of primitive exchange. In M. D. Sahlins (Ed.), *Stone age economics* (pp. 168–258). Tavistock Publications.
- Schaefer, D. R., Kornienko, O., & Fox, A. M. (2011). Misery does not love company: Network selection mechanisms and depression homophily. *American Sociological Review*, 76(5), 764–785.
- Schafer, M. H. (2013). Structural advantages of good health in old age: Investigating the health-begets-position hypothesis with a full social network. *Research on Aging*, 35(3), 348–370.
- Scott, J. (2011). Social network analysis: Developments, advances, and prospects. *Social Network Analysis and Mining*, 1(1), 21–26.
- Simmel, G. (1950 [1908]). *The Sociology of Georg Simmel* [translated, edited and with an introduction by Kurt H Wolff]. The Free Press.
- Täube, V. G. (2010). Cliques und andere Teilgruppen sozialer Netzwerke [=Cliques and other sub-groups in social networks]. In C. Stegbauer & R. Häußling (Eds.), *Handbuch Netzwerkforschung* (pp. 397–406). VS Verlag für Sozialwissenschaften.
- Valente, T. W., Unger, J. B., & Johnson, C. A. (2005). Do popular students smoke? The association between popularity and smoking among middle school students. *Journal of Adolescent Health*, 37(4), 323–329.
- Wasserman, S., & Faust, K. (1997). *Social network analysis: Methods and applications*, 8. Cambridge University Press.
- Wentowski, G. J. (1981). Reciprocity and the coping strategies of older people: Cultural dimensions of network building. *The Gerontologist*, 21(6), 600–609.
- Weyer, J. (2012). *Soziale Netzwerke: Konzepte und Methoden der sozialwissenschaftlichen Netzwerkforschung* [=Social networks: Concepts and methods of network research in the social sciences]. Oldenbourg Verlag.

- White, H. C. (1992). *Identity and control: A structural theory of social action*. Princeton University Press.
- White, H. C. (2012). *Identity and control: How social formations emerge*. Princeton University Press.
- Witten, E. (1989). Quantum field theory and the Jones polynomial. *Communications in Mathematical Physics*, 121(3), 351–399.
- Young, L. L., & Cooper, D. H. (1944). Some factors associated with popularity. *Journal of Educational Psychology*, 35(9), 513.

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