The difference with social network research

In: Doing Social Network Research: Network-based Research Design for Social Scientists

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The difference with social network research

Why have you decided to do social network research?

You are a social science researcher and you decide that your next empirical research project will include social networks. Ask yourself, very carefully, why. In ways that will be explained in this book, the precise answer to this question will drive the theory, the empirical measures and the analytic methods for your project.

You study social networks because your research requires you to examine a social system, a social environment, or a social context in quite specific ways. Perhaps your theoretical arguments are akin to those in Box 1.1.

Over the years, I have heard many other reasons why a researcher might want to take up a social network study. Here are a few.

- ‘I need to get into this networks thing: it is a hot research area.’
- ‘My theory and data are already good, but I need to explain more variance and networks might just do it.’
- ‘I want to produce a fancy network diagram that will show the network patterns in my data.’
- ‘I want to employ sophisticated, cutting edge analytic methods in my research.’
- ‘Once I include networks in my research, I won’t need to bother with other effects.’
- ‘I’ve got access to a big dataset that may be suitable for network analysis.’
- ‘I know a good networks researcher who can help out.’

These reasons are all fine motivators to start social network research. But unless you also have a theoretical imperative, they are not sufficient. In Box 1.2, I explain why I do not think these reasons are quite good enough by themselves.

In short, you do networks research because you *must* and because you *will*. Your theoretical understanding of the research question suggests that social processes or structure may be crucial elements in explanation. Even though a network approach may present a new learning curve, you cannot ignore possible network explanations. Either you eliminate networks as an explanation, or you produce evidence for their importance. In either case, you must and you will do network research.

In this book, I describe how and why social networks can add to theory and interpretation, and how to design and conduct research that tests network conceptualizations. In this first chapter, I want to explain why social network research is distinctive within the social sciences.

Box 1.1

Some good reasons to incorporate networks into social science research

- You want to study *whether the social environment affects individual outcomes*. Social partners might affect individuals, through contagion or influence or other social processes. Perhaps some property (disease, money, health, opinions, information) 'flows' across the network from one individual to another.
- You want to study *whether individuals in certain social positions have different individual outcomes*. Popular individuals may have different outcomes from isolates or peripheral individuals; or network entrepreneurs might reap benefits from bridging between distinct groups.
- You want to study *how individuals affect social structure*. Are there individual factors that affect why individuals choose their social partners, or why they seek certain positions in the social system?
- You want to study *the social processes that underpin and sustain the social system*. How best can you describe and understand the social structure?
- You want to study *how individual outcomes and the social system are intertwined*. What causal processes might be present: are individual or social factors (or both) the best explanation of the issue you are studying?
- You want to study the *global outcomes of the social system*. Is the system effective or responsive for some purpose? Is it possible to intervene to improve either individual or system outcomes?

Box 1.2

You need more to incorporate networks into social science research

1. ***It is a hot research area.*** Hot or cold, networks will contribute to a research project only when the theorization matches a network conceptualization.
2. ***Explaining more variance***. Sadly – and disappointingly for social science researchers coming to networks for the first time – network methods do not usually explain more variance, because variance explained is a concept *contradictory* to most network conceptualizations. Your new network perspective is not just an add-on: it may fundamentally reshape how you

construe the research.

3. ***Fancy pictures***. Good network visualization can provide insight, but is seldom enough to produce confident conclusions. If you only plan to draw a picture, think again.
4. ***Fancy analysis***. Your new network data may indeed require different methods, but – of course – complex analysis may be difficult to report and interpret. Sometimes, simple network methods might be better. Irrespective of the sophistication of the analysis, you can never be sure beforehand how your results will turn out. With bad data, the results will still be meaningless.
5. ***Networks explain everything***. Despite claims to the contrary, network topology alone is hardly ever sufficient for good social science research. Social science involves social entities (or *actors* as I will call them from now on) involved in social action. These entities have a range of individual characteristics that may be crucial. And the range of other possible factors in a networked social system is potentially very wide: geographical space, time, social settings and so on. Do not be fooled into thinking that network structure alone is sufficient, or kid yourself that the messy empirical business of researching real people may be downplayed.
6. ***Big Data***. Big datasets can be very helpful, are increasingly common and are often collected digitally (and so perhaps relatively easily). But a big dataset amenable to a network analysis is not going to answer a research question if the data does not match the imperatives of existing knowledge or current theory.
7. ***Network experts***. It is not enough to have a collaborator with network skills. Your reason for working with this fine person has to be clear beforehand. You need to explain to your collaborator why you think networks are important to this particular research. Then your collaborator can indeed help with, but not run, your networks research project.

What is network science?

Network science is the term popularized by burgeoning interest in network research across many disciplines (not just social network research). In part, a new focus on networks from physicists, computer scientists and others this century has encouraged the usage. Some have also recently coined the term ‘social physics’, perhaps without realizing that Comte used this in the 1830s before deciding that he preferred *sociology* as the title for his new discipline. If we claim a new science, we had best make sure we have not simply reinvented someone else’s wheel.

So when a new journal entitled *Network Science* appeared in 2013, some of the co-editors set out to define what this new science could be (Brandes et al., 2013b). They pointed out that network research crossed many disciplinary boundaries, so network science was not the domain of one discipline; they noted various long historical antecedents, so it was not the creature of a particular time and place.

They concluded that network science was unified through a common conceptualization: an assumption of complex structure among the entities being studied. For social networks, these entities are most often people, although they may be other social actors such as organizations. Complex structure among the objects of study is in striking contrast to other research that assumes independent observations. So network science, as it applies to social network research, rests on the theoretical claim that outcomes are affected by a structure of relations among people: dependence among individuals. Once we adopt a network perspective, we suppose that individuals are connected and individual outcomes are related. This makes perfect sense in some domains (e.g., transmission of contagious diseases), but less so in others (e.g., intelligence is hardly contagious). So network science is not the right science for all research. But it may be right for some or much of social science research.

Brandes et al. went on to argue that dependence is not just between individuals: the social relationships themselves may depend on one another. What does this mean? Simply, for instance, that your friendship with one person can depend on your friendships with others. In this way, social network connections can organize themselves into certain patterns. Before we know it, we are in the world of self-organizing, complex systems.

No, we do not need to be physicists, understanding complexity theory, to do social network research. Yet we do need to realize the implications of the seemingly simple step to include a network approach. A network perspective is not just a methodological decision; it carries quite explicit theoretical commitments about structure and dependence.

There are myths about networks. Not all networks are the same. The unity in network science arises from a conceptualization, not because of common empirical results about universal theories. Be cautious about claims for a Grand Unified Network Theory intended to traverse the whole of network science. After you read through the range of social network research in Chapter 6, you can ask yourself: how could there be one theory that generalizes to all these different social science domains?

Within network science itself, *social* networks are importantly distinctive in one major regard: the actors in the network have intentionality. Researchers who ignore that obvious fact will not be doing *social* science. So, a social network ontology includes both network relationships and social actors. We need to observe *both* in as much detail as necessary to understand the social processes we study. In that way, many of the measurement and observation techniques commonly used in social science still apply; many of theories about individuals remain relevant even in a networked world.

Thinking about networks

Let us contemplate some actual network data. Consider Figure 1.1, which depicts a network of collaboration among 40 organizations involved in management of a water resource. Later, I will describe how this data was collected and show how such a figure can be produced. (The figure actually depicts what is known as a *graph* – more in Chapter 2). The circles in the figure (the *nodes*) represent the actors in this study, the organizations. A line between a pair of nodes represents a collaboration between two actors. In social network terminology, a social relationship such as collaboration is generally referred to as a *network tie*. Do not read anything into the position of the nodes in the figure: they are simply laid out in a way that hopefully enables the figure to be clearer.

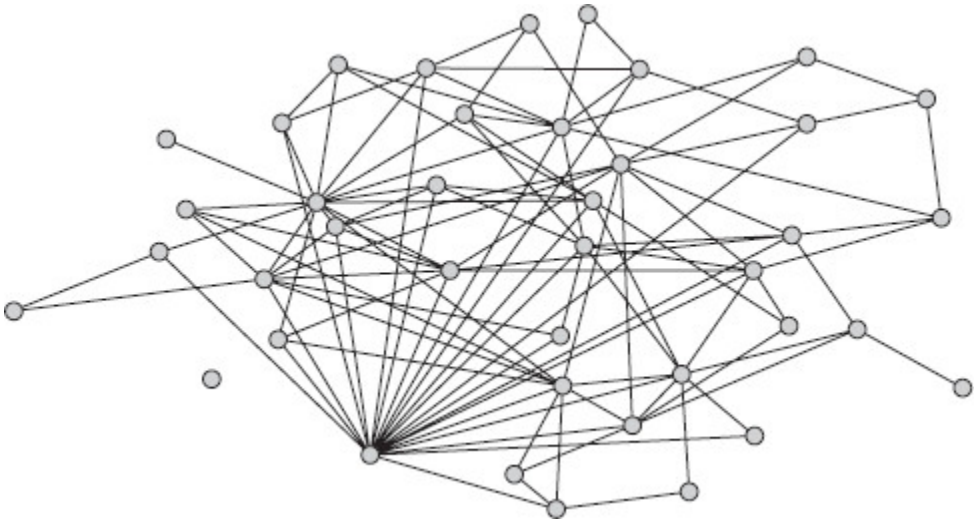
What can we say by inspecting this visualization? You will see readily that there is one organization – one node – with many collaboration partners; one node with no ties (an *isolate*); and most other nodes have a small number of partners (mainly, 2 to 5). In network parlance, the number of network partners is the *degree* of the node, and each of the lines in the figure is termed an *edge.* (My apologies here for the mixed terminology: e*dge* and *node* are from graph theory; *tie* and *actor* are social network terms. You will need to be familiar with both usages, and I will use them interchangeably. More in Chapter 2.)

So the degree of a node is simply the number of edges adjacent to it. The *degree distribution* is a count of the numbers of nodes with each possible degree: so, for instance, in the degree distribution for this network, the number of nodes with degree 0 is one. We could draw the degree distribution as a histogram (Chapter 2), but even without that step we can say that at least one node has high and most of the others low degrees – in other words, there is variation among the nodes in terms of network popularity and activity (hardly surprising!).

The network in Figure 1.1 seems quite *centralized.* The high-degree node is said to be *central* in this network. It is interesting to think about why this particular organization became so popular. (Is it a case that *the rich get richer*, where popular actors become more popular, or is it some other factor?) Presumably, through its high degree, that organization has a much greater chance to influence how this system works. The organization occupies a prominent *network position.* It is in the *core* of the network, whereas some organizations are more *peripheral* (e.g., the isolated node).

What can we say about how well this networked system of organizations manages the water resource? *Very little*, from the figure. Sometimes researchers new to networks think they will be able to draw conclusions about the performance of the system simply by inspection of a network diagram. They anticipate spotting bottlenecks or gaps or other features that might be thought of as structural weaknesses. Sometimes you might be lucky and such may be apparent. But is the high-degree node in Figure 1.1 effective in influencing this system towards good outcomes, whatever they might be; or is that organization rather a problem for the system, accumulating resources at the expense of others? It is impossible to say just from Figure 1.1.

Figure 1.1 The network of collaboration among 40 organizations



Outcomes can be complicated. Different types of outcomes, both individual and network-wide, may not be consistent: what could be good for individual organizations may militate against system effectiveness. If the central organization is grabbing resources for itself, the whole system may not work well.

So networks automatically bring with them multiple levels of analysis (individuals, ties, the whole system). Some of these levels may be *emergent* rather than pre-established. For instance, do the patterns of network ties in Figure 1.1 suggest *cohesive subgroups* of organizations in the system (i.e. groups of organizations collaborating more closely within their own group)? It does not seem apparent from the figure, but further analysis might reveal that to be the case. Apart from the one highly central node, there may be other *network positions* that can be identified. By investigating such patterns in the network, we begin to understand the *network structure*. Perhaps the network structure has implications for the operation of the system as a whole, or for the individual organizations that collaborate in the network. Perhaps individual responses are in part determined by the position occupied in the network, or the type of network partners an organization has.

These are typical network research questions. And they can be different – sometimes subtly, sometimes dramatically so – from other more standard social science hypotheses.

Figure 1.1 depicts a network of organizations. But of course we can also have a network of individual people. Figure 1.2(a) shows a network of an elite sporting team of professional athletes. Here each node represents a player in the team and the network tie is one of *socializing after hours.* (I describe these two datasets in more detail in Box 1.3.) In Figure 1.1, the edges were collaborations between two organizations, and hence *undirected*. Here they are *directed* from one athlete to another, indicated by arrows. A directed edge is termed an *arc.* So, if an athlete nominated a team-mate as someone with whom they spent time after hours, there is an *arc* present from the athlete to the team-mate. Notice there is no requirement for the athletes to agree with whom they socialize, although many do, represented here by arrows at both ends of the line (*reciprocation*). Strictly speaking, there are two possible arcs between two team-mates – from the first to the second and from

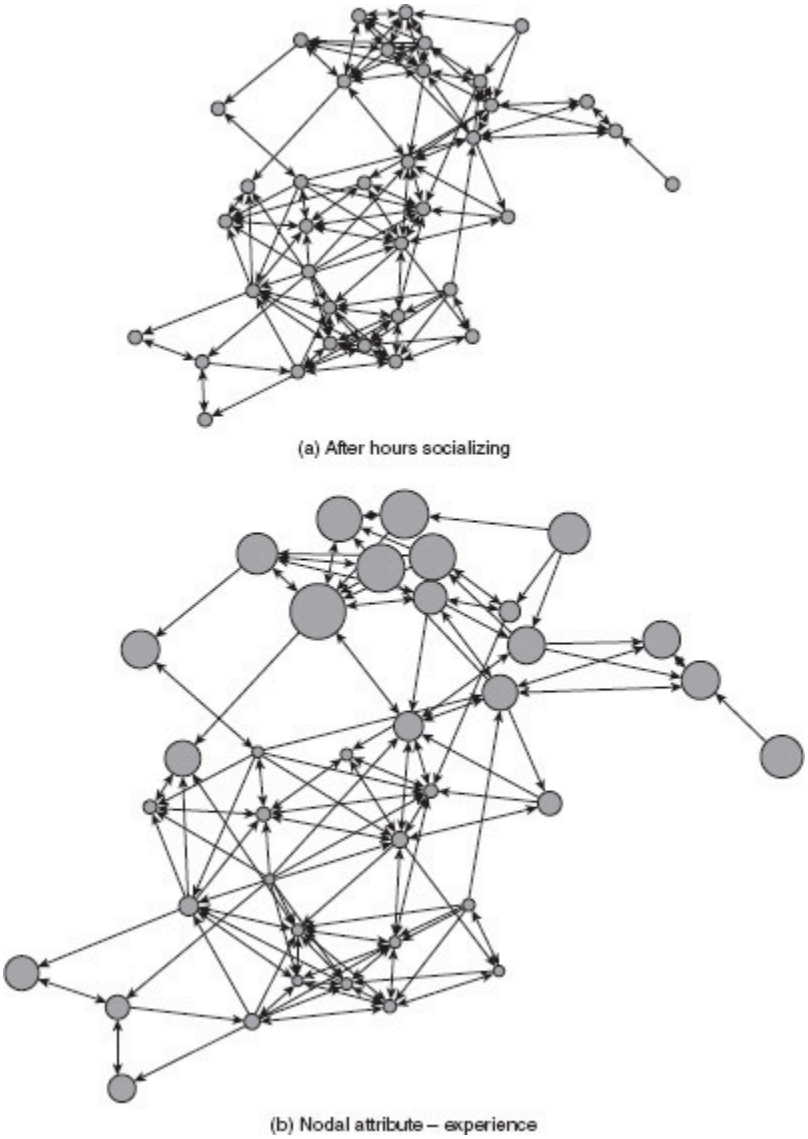
the second to the first. But notice that the athlete at the extreme right of the diagram nominates one other person but in turn is not nominated by anyone else. It is an interesting question whether in this network there are high levels of reciprocation (*you scratch my back and I'll scratch yours*) and what that means for the team culture.

The athletes do seem to socialize together in smaller groups. In general, the smallest group with a majority and a minority has three actors (a *triad*), and if they are all connected they form a *triangle*. In Figure 1.2(a) we see plenty of triangles, often stacked together in larger collections, suggesting larger groups. The presence of many triangles is often an indication of what is termed *network closure*, where the paths in the network turn back on themselves to create these triangular and cyclic sub-structures (*the friends of your friends become your friends*). These triangles and denser regions of the network may be indications of group-like cooperation and collaboration.

In Figure 1.2(b) the nodes have different sizes. The size of a node here indicates the playing experience of an individual in terms of number of games played at elite level. One of the goals of the research was to study whether athletes socialized with team-mates of similar experience. Experience was only one of several *actor attributes* that were investigated, with the ultimate aim of understanding whether individual demographics and opinions combined with social structure to determine aspects of team culture.

So in this example we have both an individual-level attribute, *experience*, together with a network, *socializes with*. Notice that the network structure as depicted in Figure 1.2(a) is not very revealing. But the addition of the nodal information in Figure 1.2(b) enables us to spot a grouping at the top of the figure, suggesting a tendency for experienced athletes to socialize together (*birds of a feather flock together*). Of course, we might want to do further detailed analysis to confirm this. We can also see from the figure that there are a small number of medium-experienced athletes who appear to link the group at the top to the generally less-experienced players at the bottom. It is conceivable that they play an important role in team cohesion in this way: they *bridge* or *broker* between two other groups of athletes.

Figure 1.2 The sporting team



This brief review of Figures 1.1 and 1.2 has introduced some basic network ideas that may become theoretical elements for your social network research question. Many of these are quite intuitive. In discussing these two quick examples we have met:

- Social activity and popularity (degrees, centrality of individuals)
- Structural position (e.g., being on the periphery of the network, or in the core)
- Subgroups of actors
- Global network structure (e.g., centralization)
- Reciprocation
- Triangulation (network closure)
- Network brokerage
- Outcomes for the system as a whole, as against outcomes for individuals

- The interplay of ties and attributes.

Of course, these are not the only network features, nor do they have to be present in all network studies. But this list gives a flavor of network theorizing, even though the way each element plays out in a particular research study depends on the specific context. Some elements may be indicative of different types of social processes, so the details of the network structure can provide information about the processes that underpin and sustain it.

In Chapter 2, I provide more precise terminology that will enable us to review these and other network ideas. In Chapter 3, I discuss how we can bring such network thinking into designing social science research. This will lead naturally on to chapters on how to collect and analyze data for these network research designs.

At this point I want to focus on the association between network ties and individual attributes, illustrated in Figure 1.2, often powerful in understanding process and structure in networked social systems. A network analysis in the social sciences usually cannot afford to leave out the characteristics of the individual actors that constitute the system (hence my earlier comment about intentionality of the actors in *social* network research). So it is worthwhile reflecting on this interplay between networks and individuals by considering how individuals are researched in classic social science studies.

Individual-based social science research

There are many ways in which good social science research can be designed. Let me describe what I call an *individualized* or *individual-based* research design. In this research design, the research question typically relates to individual outcomes. Perhaps we want to investigate the factors that contribute to unemployment, or the variables that explain student performance in school or job satisfaction in workplaces, or examine the prevalence of a disease in a community. One standard way to proceed is to define the population of interest (e.g., school students, workers, community members); decide on a sampling frame that will determine where the sample comes from; select the actual sample, ideally drawn randomly but in practice often with some constraints; collect data from the sample by measuring relevant variables; perform an analysis, typically using a method derived from the General Linear Model (e.g., a regression); and make an inference from the sample to the population to permit general conclusions about the research question.

Social science experimentation is a variation. We bring our sample into the laboratory and perform manipulations on some but not other groups to investigate the outcomes on the participants under different conditions. Randomized control studies in medicine are often held up as a gold standard for this type of research, where participants are randomly assigned to treatment or control groups, with the treatment group given an intervention, for instance, a new drug. We look for differences between the groups to understand the effect of the drug. Again, we often rely on the General Linear Model and null hypothesis significance testing for our analysis, perhaps in this case an Analysis of Variance. Sometimes we might conduct experiments in the field, giving one intervention to certain individuals in the community (e.g., a weight loss program) and compare

with a non-intervention community-based control group. Or we may study change over time, performing a before-and-after analysis of our weight loss program.

These are all different research designs, and it is important to understand their differences to conduct such research well. But each reflects major themes in individualized research: samples, inferences to populations through randomization, use of the General Linear Model for analyses, and, importantly, research questions that pertain primarily to individuals one at a time. For instance, the outcome of the weight loss program occurs for an individual who undertakes it, not for anyone else. The implied causal process is at the individual level: 'If an individual undertakes this weight loss program, the individual is likely to experience effect X.' Here the crucial process happens *within* the individual, irrespective of others: 'my weight loss behavior affects my weight loss'. This may be the case even when a social environment is implicated, such as in some studies of social cognition: 'I perceive person *i* as a member of group *j*, so I respond with action *k*.' The causal process still occurs within the individual. My perception of person *i* may be a complete misperception (perhaps person *i* does not even exist, or is not a member of group *j* at all), but the cognitive process still occurs within me and that is what is studied.

Of course, although the individualized research paradigm is common, not all social science research is exactly like this. There are some particularly important differences, for instance, with qualitative research, which emphasizes understanding of phenomena through a rich detail of individual perceptions and descriptions. Inference arises from supposition based on good interview data, not on quantitative analyses using the statistical apparatus of the central limit theorem and the like. Nevertheless, there is still often a sample from a relevant population, there is still often intent to infer to a population, and a focus on individual outcomes one at a time.

I am not for one minute suggesting that there is anything wrong with these various research designs. Each is telling and powerful in its own way, with its own advantages and disadvantages.

Network-based social systems

But what are we to make of the networks in Figures 1.1 and 1.2? Let us suppose that for the organizations in Figure 1.1, the collaborations matter in important ways, so that we cannot ignore the network ties between them. Begin by asking some very basic questions. What is the population here? For this particular water system, these are the 40 key actors, so do they constitute the population? Or is it, rather, all organizations involved in all water management systems, in which case these 40 constitute a sample (but then it is not a random sample, because they all come from the one system)? Or is the system itself the sample, from a population of all such water management systems? Or are the network ties the topic of investigation if we are studying collaboration? But then what counts as the 'population' of network ties?

If we cannot make the notion of population coherent here, how can we make sense of the idea of sample? Moreover, the thought that we want a random sample of organizations from this system is silly. If we took a

random sample of 10 out of 40 organizations, there is a 75% chance that our sample would not contain the prominent node, and that would surely distort inferences about network structure.

We have additional considerations as well, once we shift to a network perspective. We have to consider the *network boundary* for our study. This is essentially the definition that determines the actors that are to be included in our network. In Figure 1.1 we have a boundary that is defined rather loosely as *major organizations involved in management of this water resource*. So 'minor' organizations are excluded; but this is not to say they do not exist and do not collaborate. We focus on major organizations believing that this strategy will capture the most important effects. In Figure 1.2, the boundary is quite natural: being a contracted athlete in this professional sporting team. However, this is not to say that the team is an isolated entity. Doubtless, the athlete at the right of the figure has many social ties outside the club; but only one nomination within the club. So we expect there will be network ties that cross the boundary. Our natural assumption here – and it is one that we must accept could be wrong – is that to investigate team structure and club culture it is the ties within the team that count.

There is a further complication arising from a network approach. We cannot suppose that the observations here are independent, because obviously they are not; otherwise, the network would be irrelevant, contrary to what we have supposed. But once we take our observations to be dependent, we have just ditched the General Linear Model, regressions and analyses of variance, all of which assume independent observations. Those of us social scientists well trained in standard statistics may be somewhat at a loss.

Of course, we can always calculate an average for our actor attribute variables, just as we would do with a normal sample. But it is not clear what sense to give to a mean value when the observations depend on one another. The average mark in an exam is meaningless when all the students are cheating by exchanging answers. So we are rather stripped of the usual means and hence standard deviations. If we do not have sensible standard deviations, we do not have meaningful variance, so we do not have variance explained. Our *R*-squared values, or equivalents in this context, may be quite ambiguous.

This is not dire, just different. Networks are based on connectivity, not atomization. Networks are structured and patterned, not summed and averaged. Yet, this is more than a methodological nuisance denying us the comfort of standard statistics and classic research designs. It is the heart of a network theorization and we need to adapt to its demands, rather than try to contort network research back into a more familiar shape.

Individuals and systems

The contrast between individualized and system-based research in the social sciences goes back at least to the famous Hawthorne studies (Roethlisberger and Dickson, 1939). They were at the very beginnings of organizational studies and of organizational psychology. The research team examined lighting in the Hawthorne Electric Works in Chicago in the 1920s. The goal was to determine an optimal lighting level to enable workers to best connect the wiring in the electrical machinery they were producing. Using classical

experimental design, the research team increased and decreased lighting levels to examine how productivity was affected. This turned out to be a small preliminary study but is often given the most attention in organizational psychology texts (sometimes to the point where the description suggests that this was the only study in the Hawthorne research, rather than just the first).

In fact, due to equivocal results the research team won an additional contract to study productivity, using five selected women workers who were separated from the rest of the workforce and placed in the Relay Assembly Test Room where they performed their regular assembly tasks. Over the next two years (1927–1929), the research team conducted a large number of studies and experiments to investigate whether and how productivity increased: from examining standard measures of intelligence and digital dexterity to changing methods of payment and other incentives. They also conducted qualitative interviews with the women to investigate personality factors and to get a sense of their social environments outside the workplace. The bottom line was simple: whatever the research team did, productivity for the women continued to increase across the two years.

The researchers were forced to conclude that placing the women in the study was the principal factor that led to the increase. The women were responding to being studied and observed: the so-called ‘Hawthorne effect’, much discussed and warned against in undergraduate textbooks on research design.

What these texts often ignore, however, are the further studies in the series, culminating in the Bank Wiring Room study (1931–1932) involving a small group of male workers undertaking normal working activities in their regular workplace. This time there were no experimental interventions, simply observations of the social system as the workers went about their daily tasks. The research conclusion was that the informal social structure of the workers enforced norms of performance, particularly so that workers who tried to work too hard were punished socially (and sometimes even physically, albeit mildly). Consequently, individual productivity hardly varied across workers, sustained at a very similar level week after week. Of course, the Depression was in full play, so the workers may have sought not to over-achieve with the goal of preserving jobs.

The Bank Wiring Room was one of the very first empirical social network studies where multiple types of network tie (friendships, antagonisms and others) were explicitly observed. Social network analysts and sociologists often focus on the Bank Wiring Room studies without mentioning the Hawthorne effect; and organizational psychologists often refer to the Hawthorne effect without noticing the Bank Wiring Room. From nearly a decade of studies, each discipline takes that small portion that suits its purpose.

To my mind, the overall message from the Hawthorne studies rests on the contrast between individualized and social systemic research, a tension that can be observed across the entire spectrum of studies. There is a clear shift from experimental design and intervention to network-based observation over the decade. This shift was forced on the researchers as they realized their early studies were insufficient to capture the processes at work, that an individualized conceptualization was inadequate in this case. But before network analysts feel too smug, the series of studies also point to the many individual factors that could be important. In particular,

even in the Bank Wiring Room, the network topology is not enough in itself for a proper understanding. The interesting conclusions are about the motivations of the workers – individual characteristics, even if possibly shared – and their individual behaviors to achieve these aims, even if those behaviors were similar and coordinated. Certainly, individual variables may be affected by the social environment, often substantially: in the Bank Wiring Room, the social system sustained norms that could reinforce individual motivations and so influence individual actions. But the explanation needs simultaneously to reach down to the individual and up to the network-based social system.

In short, the best of network research in social sciences captures this fine balance between the individual and the system: it is a strength, not a tension. It conceptualizes social relationships as central to both individual and systemic outcomes, and measures (observes) those social relationships systematically. It construes the structure of the system as built up of these social relationships. It takes into account the individual factors and outcomes that relate to this system. It is ready to cross multiple levels of explanation simultaneously: individual, dyadic, local social environments, global network structures. And it has a theoretical argument for why this conceptualization is necessary to explain the phenomenon of interest.

If your research is of this nature, then this is a good reason to do social network research. Much better than the reasons in Box 1.2!

Box 1.3

Pulling back the curtain: What goes on in real network studies

Social science research is never easy. The descriptions of empirical studies in journals often make it seem that they were deeply conceived and expertly implemented. As we all know, this is seldom so. There is always choice in research, and the rationale for particular decisions (and sometimes for compromises) is often glossed over. A bland statement in a journal – 'We decided to do X to handle aspect Y of the research' – may mask weeks of uncertainty and several false starts. At various points in this book, I will describe decision points in two studies in which I have been involved, and how we decided to proceed. The data and descriptions about the two studies, however, are based only on parts of the real empirical research, and are adapted and changed so as to ensure anonymity requirements. Nevertheless, there is enough veracity remaining to describe issues, decisions and difficulties in a real research project.

In short, do not take the data in Figures 1.1 and 1.2 as the gospel truth. Nevertheless, Figure 1.1 comes from a study of 40 organizations involved in the management of water resources. In Figure 1.1, the network relationship is collaboration between organizations.

As described in later chapters, a number of different types of network ties were measured on the organizations. There is a growing interest in the study of such systems of organizations managing a collective resource. Such networked organizational systems are often referred to as *network governance*. I will say a little about that field in Chapter 6.

Figure 1.2 comes from a study of elite professional sporting teams. A number of different teams/clubs were studied, but the example in this book relates to only one team. Several types of network tie were examined. The goal was to study whether important aspects of club culture could be inferred from network structures and athlete attitudes (and other attributes).

At the end of most of the following chapters, I will show how the content of the chapter played out in decisions relating to these two studies.

In conclusion: The key point

A network perspective is not just a methodological extension to standard social science research, but carries quite explicit theoretical commitments. At the heart of a network perspective lies dependence and connectivity, for which standard theories and methods may not be well equipped. Good social network research will balance between the individual and the social system, conceptualizing the system as the structure of social relationships among the individuals. Ultimately you adopt such a perspective because it is theoretically compelling for your research, not because it is popular or appealing.

Hot topics and further reading

What is network science? This chapter provides my perspective. Read the Brandes et al. editorial and decide whether you agree with it.

Brandes, U., Robins, G., McCranie, A. and Wasserman, S. (2013b) What is network science? Network Science, 1, 1–15.

Reductionism is expired and complexity is tired – now it is all networks. Read the manifesto by the well-known network physicist, Albert-László Barabási. How do we find a balance between parsimony and complexity in social science?

Barabási, A. (2012) The network takeover. Nature Physics, 8, 14–16.

How do we balance individual-level and system-level effects in social science? Read Robins and Kashima (2008) about the tensions between social psychological and social network research traditions.

Robins, G. and Kashima, Y. (2008) Social psychology and social networks: Individuals and social systems. Asian Journal of Social Psychology, 11, 1–12.

Further reading

Throughout this book, I will give plenty of examples for further reading. Often network research design and data collection are given individual chapters in more general texts that cover network methods and analysis. My intent in this book is to focus on design and data, and give less attention to analysis. There are not that many books of similar ilk; but let me suggest Henning et al. (2012).

Henning, M., Brandes, U., Pfeffer, J. and Mergel, I. (2012) *Studying Social Networks: A Guide to Empirical Research*. Frankfurt am Main: Campus Verlag.

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