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Social Network Analysis: Concepts, Methodology, and Directions for the 1990s

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Network analysis has been used extensively in sociology over the last twenty years. This special issue of Sociological Methods & Research reviews the substantive contributions that network analysis has made to five areas: political sociology, interorganizational relations, social support, social influence, and epidemiology. To introduce the novice to current developments in the field, this introductory article presents an overview of the key concepts and methods which are popular among sociologists and which have been used to advance knowledge in these substantive areas. Remaining articles are also discussed briefly, with speculations offered on some of the more promising avenues of inquiry recently under exploration.

Social Network Analysis

Concepts, Methodology, and Directions for the 1990s

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*T*his special issue of *Sociological Methods & Research* glances back at the recent history of social network analysis in the field of sociology and highlights the contribution that the network paradigm has made to different substantive areas within sociology. We are fortunate to be able to introduce five papers, written by very prominent theorists and methodologists, which help us in our task. The papers describe "cutting edge" research in the following areas: political sociology, interorganizational relations, social support, epidemiology, and social influence. They also give us a look at what the future holds for sociology and portend good things for the decade ahead.

This opening article will recount briefly the major methodological and conceptual breakthroughs in social network analysis over the last 20 years. In sociology, the methodology and the conceptual framework for doing network analysis came of age in the 1970s, and by the 1980s and 1990s, sociologists in many different substantive areas were using network analysis routinely to help them understand human behavior and social institutions. Obviously we cannot review all the research that has been done, but there are certain works that have impacted the field of sociology profoundly and influenced the way sociology will be done in the next 10 or 20 years. Many of the methods and concepts described in this introductory article will come up again in the five articles that follow. The following discussion is intended for those who are not as familiar with social network analysis and want a quick overview of developments within the field before they read the more detailed reviews.[1]

FROM FOCUSING ON ACTORS TO
FOCUSING ON RELATIONAL SYSTEMS

Although sociology purports to study social organization, social systems, social structure, and the like, since World War II, much of the empirical work in the field has focused on individual behaviors, attitudes, and beliefs (Coleman 1986). No doubt this was due to the introduction of the social survey in the post-war era, the demystification and proletarianization of social science statistics, and the real possibility of moving beyond the small work group, family, youth gang, classroom, and the neighborhood, to the study of populations within entire organizations, metropolitan areas, nation-states, and even multinational communities. It had become abundantly clear that the scale of social organization had expanded rapidly, and sociology had to move into larger arenas if it was to remain relevant.

However, these developments produced a sociology that decontextualized the individual. While much of the early work on communities, work groups, and peer groups was rich in qualitative detail, attentive to relational patterns (both cooperative and conflictual), and sensitive to roles and norms, research that relied heavily on survey methods and "canned" statistical programs painted a much too simplistic picture of

contemporary man and the institutions in which he lived. The social survey, general linear models, and contingency tables were the methods of choice, but unfortunately, these methodologies stripped the individual of the social relationships, which were both constraints and opportunities for action—and an important source of meaning.

Contemporary theorists readily went along. At the risk of oversimplifying, both rational choice theory as well as structural functionalism portrayed social actors as autonomous, independent, and solitary. The only difference was that the former saw individuals as active, strategic, self-serving, and "undersocialized"; while the latter portrayed individuals as passive, adaptive, manipulated, and "oversocialized" (Granovetter 1985). Individuals' relationships with others (e.g., friends, neighbors, family, workmates, superiors, subordinates, advisers, social control agents, health care providers, and acquaintances) were incidental and supposedly inconsequential.

These developments also changed the way sociologists conceptualized social structures. Much of contemporary sociology tended to think in terms of categories of social actors who shared similar characteristics instead of actors having relationships with one another (Wellman and Berkowitz 1988). Society was viewed as a set of social positions (occupational roles, family roles, political roles) that not only constrained individual behavior, but also conferred upon incumbents certain privileges. As people aged and were sorted into different positions, they would internalize their respective roles, recognize their interests as incumbents of these roles, and behave in predictable ways.

Those doing social network analysis were uncomfortable with this approach. Although this research produced valuable information on social mobility, life course histories, political behavior and attitudes, and the like, it ignored the social relationships among actors and, more importantly, the social relationships among positions within society. Looking all around them, sociologists observed how economic elites negotiated mergers and acquisitions that made them millionaires, political elites secretly conspired to sell arms and then send cash to Third World countries, religious fundamentalists organized demonstrations at abortion clinics, neighborhood residents were forming worker and consumer cooperatives, and gay men were infecting one another with HIV. At the level of social roles, managers were begin-

ning to share decision making with workers, consumers were boycott-
ing products of multinational corporations, disgruntled patients were
suing doctors and therapists, wives were gaining more power vis-à-vis
husbands, and tensions between policemen and black teenagers got
worse. Thus any research agenda—no matter how sophisticated
methodologically—falls short if it does not take relationships among
actors and relationships among structural positions into account.

INTELLECTUAL INFLUENCES ON SOCIOLOGICAL
APPLICATIONS OF SOCIAL NETWORK ANALYSIS

Although there is debate about how social network analysis worked
its way into sociology, most would agree that the pioneering work of
Moreno (1934), Heider (1944), Bavelas (1948), Festinger (1954),
Cartwright (1959), and Newcomb (1961) had a significant impact on
the field. These social psychologists were doing important work on
small groups, drawing heavily on graph-theoretical models to decipher
the social structure of these groups and to identify how group structure
affected individual performance and group behavior. The importance
of graph theory to the development of the social network paradigm
cannot be understated. Mathematicians such as Harary, Luce, Norman,
and Bock pioneered the use of sociograms (or graphs and directed
graphs) and sociomatrices (the adjacency matrices of these graphs) in
order to study social structure, and later quantified tendencies toward
reciprocity. The classic history and text by Harary, Norman, and
Cartwright (1965) is used even today. Sociologists later borrowed
several concepts from this tradition, including centrality, clique struc-
ture, social distance, reciprocity, structural balance, transitivity, and
the like.

The social network perspective also had a rich history in the field
of cultural anthropology. In the mid-1950s, anthropologists studying
urbanization, particularly Barnes (1954) and Mitchell (1969), found
that the traditional anthropological approaches to social organizations
were not sufficiently rich enough for complex societies. New concepts
were needed to quantify the social relationships found during field
work, and terms such as span, connectedness, social circle, and density
were applied to the anthropological situations under study.

From 1950 to 1970, few sociologists worked within a social net-work framework, and even fewer took the concepts and methods of social network analysis into the field. However, those that did proved to be role models for subsequent work. Prominent among these were studies by Hunter (1953), Blau (1955), Coleman, Katz, and Menzel (1957, 1966), Coleman (1961), and Laumann (1966). Although each was heralded in its time, the social network approach was still not seen as "orthodox" sociology.

Yet, unbeknownst to many, there was important progress on the methodological front. Early work on graph-theoretic approaches to network analysis gave way to important pioneering work on centrality (coming from a variety of directions—see Freeman 1977 for a review) and mathematical conceptualizations of balance theory and clusterability (particularly Cartwright and Harary 1956; Davis 1963, 1967). This important body of work set the stage for the tremendous growth in network methodology of the 1970s, arising primarily from statistical approaches to triadic analyses, generalizations of the graph-theoretic notion of clique to find cohesive subgroups of actors, and algebraic models of actor positions based on structural equivalence.

COMING OF AGE IN THE 1970s

In retrospect, the 1970s were an extremely important period in the development of social network analysis in sociology. During this period, important methodological innovations ensured that social researchers could study not only the relationships among social actors in large scale systems but the relationships among social positions as well. The first elements of a set of core techniques for the statistical analysis of network data were put into place. Furthermore, important conceptual breakthroughs took place during the 1970s that have influenced research even to the present day.

As often happens in sociology, research split off into two different directions: one focusing on the "micro" social order and the other on the "macro" social order. At the micro level, the emphasis was on subgraphs—ordered pairs, dyads, and triads. At the macro level, the focus was on describing global social structures. We continue our discussion by using this split.

MACRO STRUCTURES

Researchers needed techniques to study and describe the global or overall structure of a network. Cohesive subgroup techniques were developed in the graph-theory tradition and used in a number of studies to describe clustering of actors into relational "subsets" (Alba 1973, 1974; Lawler 1973; Seidman and Foster 1978; Mokken 1979). Cliques were generalized to n-cliques, then to k-plexes, to LS-sets, and so on. Multidimensional scaling was used, as well, to describe the social distance among actors and clustering in networks (Levine 1972; Laumann and Pappi 1976; Galaskiewicz 1979). Other analysts used matrix permutations (Hubert and Schultz 1976), peak analysis (Mariolis 1983), and factor analysis (Bonacich 1972). The purpose of this research was to identify subgroups of actors within the network that were at a minimal social distance from one another, and then to identify what they had in common; that is, to learn why a subset of actors were in the same subgroup (or cohesive).

Sampling methods were also used to describe the global structure of a social system. The focus here was on how densely connected the system was, on the degree to which ties were reciprocated, and to study the complex system by sampling actors and/or their relational ties. Work on network sampling by Frank (1971, 1978, 1979, 1981) and Granovetter (1977) has attempted to address these questions, but the results from the field are few and far between. More work needs to be done to learn about large systems, particularly those containing relational ties of social support or of epidemiologic nature (such as viral contagion).

Killworth and Bernard (1978) offered an alternative approach for capturing global structure using Milgram's (1967) small world problem, which attempts to determine how many relational ties respondents are from a target individual. Along with their associates, they also began some very important studies of the accuracy of informants in a network (Killworth and Bernard 1976, 1979; Bernard and Killworth 1977).

A more important line of research began in the early 1970s with the definition of the concept of structural equivalence. Lorrain and White (1971) introduced this idea, and it became the intellectual forerunner of many researchers of algebraic approaches to relational analysis.

This research, as continued by White and his students and colleagues at Harvard (White, Boorman, and Breiger 1976; Boorman and White 1976), gave rise to formal algebraic techniques, including the very important notion of a blockmodel. Relational techniques were also studied independently by Burt (1976, 1977a, 1977b) at the University of Chicago. Instead of looking at the direct ties between actors, Burt, White, and their many associates attempted to identify actors who occupied structurally equivalent positions in the network. Such techniques are based on the degree to which pairs of actors have the same profile of relationships to and from the other actors in the network. While Burt's algorithm for finding structural positions depended heavily on the concept of social distance and used hierarchical cluster analysis, White and colleagues' CONCOR procedure was more novel and relied on correlation coefficients and partitions of actors into distinct subsets during the steps of an iterative procedure. Yet both were aiming to capture the same thing: place actors in distinct categories, depending upon the degree to which they had similar/dissimilar social relationships with others in the network.

At first, it appeared that these authors had just given us two more clustering algorithms, but it soon became clear that structural equivalence was a major conceptual breakthrough. Researchers, early on, were able to link the concept of structural equivalence to social structural position. They rationalized that, by examining the relational profiles of actors in the network, they could discover different role sets within that social system—an idea developed in the work of Merton (1957) and articulated by the anthropologist Nadel (1957). Actors' memberships in different social positions would then be defined by whom they interact with and whom they ignore. In fact, in large social systems, the latter is more important than the former in defining actors' position in the social system. More importantly, positions are not some kind of social construct existing in the cultural order, but rather are grounded in the day-to-day interactions of actors within different social arenas. Studying relationships between and within positions also allows researchers to study the social structure of the system as a whole. One can tell which positions receive a disproportionate share of ties and the positions from which these ties come. One can study not only structural differentiation within a system, but the hierarchy of positions as well.

This work was significant for two reasons. First, it provided a link to mainstream macro-sociological research. Survey researchers had focused on social categories and structural positions within society. Critics had long complained that network analysis was only able to study small groups, ego-centered networks, or elites. Now network analysts could study macro structural problems as well. Second, network analysis gave sociologists a tool to work with in situations where there were no clearly identified formal positions or roles; for example, in elite populations, voluntary associations, national policy domains, deviant subcultures, and organizational fields. Prior to network analysis, analysts assumed that there either was no structure in these arenas or that the structures were quite primitive. Yet, as we will see in the articles that follow, time and again network analysis showed that there was indeed structure, and that it was very important in explaining individual behaviors and group outcomes.

MICRO STRUCTURES

Many studies in the early 1970s focused on the dyad, a pair of actors and all possible ties between them, as the unit of analysis. The typical practice was to measure some attribute of a pair of actors; for example, were both parties friends of one another or did they work together, were they also both European-American or Democrats or did they think the same way about social issues (value homophily). The object was, then, to correlate the characteristics of the ordered pair or to build regression models with some shared characteristic or some social relationships as the response variable. Examples of this approach can be found in the community power (Laumann and Pappi 1976; Laumann, Marsden, and Galaskiewicz 1977), the friendship and social support (Wellman 1979; Fischer 1982), the organizational (Aldrich 1976; Galaskiewicz and Shatin 1981; Van De Ven and Walker 1984), and social-mobility literatures (Granovetter 1974).

Much has changed in micro-structural analysis since the early 1970s. The early work on dyadic modeling (cited above) led to important statistical approaches to the study of triads. Davis, Holland, and Leinhardt (see Holland and Leinhardt 1975; Davis 1979) led the way out of the "statistical darkness," and used random graph distributions to study structural tendencies toward transitivity,

clusterability, clique formation, and the like. For the first time since the work of Leo Katz in the 1940s and 1950s, the new statistical models of the early 1970s allowed one to test hypotheses about the extent of various structural tendencies in a network; such techniques were the first in an important 20-year period of statistical network modeling.

The work of Davis (1968) and Holland and Leinhardt (1977) also focused attention on the micro social order, but they looked at the dyad as a stochastic process and desired to build statistical models for its distribution. These new models were based on the probability of dyads taking on different states, with particular attention given to the age-old question of mutuality (or reciprocity). The most interesting feature of these models was that they allowed the dyad process to change over time. Later this work was generalized to log linear models for dyadic probabilities by Holland and Leinhardt (1981) and by Fienberg and Wasserman (1981) to include popularity and expansiveness effects. Adapting log linear models to the study of dyads was a unique idea that allowed one to build a family of models, which not only analyzed the presence/absence/strength of relationships but also the effects of nodal characteristics (for example, race, gender, occupation of respondents) on the presence/absence/strength of relationships.

Another strategy to study the micro order was the use of sample survey methodology to study ego-centered social networks. This was, indeed, a major breakthrough. Most network research up until 1970 was done on small populations (school classrooms, monasteries, army barracks, etc.), where researchers could survey each and every actor about his/her relationships to other actors. However, if it was necessary to conduct a complete census, that is, to survey each and every actor in the system to do network analysis, then clearly, network analysis had only limited utility. Thus novel sampling strategies would help not only macro studies, as mentioned previously, but micro studies as well.

Laumann's (1969) survey of ego-centered networks in the Detroit area was one of the first to use survey data to study networks. This was followed by Laumann and Pappi's (1976) survey of citizens in Altneustadt, Wellman's (1979) survey of East York residents, and Fischer's (1982) survey of San Francisco Bay area residents. This strategy reached its zenith with the inclusion of social network items

on the NORC General Social Survey in 1985 (Marsden 1987, 1988; Burt 1984, 1985). The strategy in each of these surveys was to draw a random sample of individuals from some population. Respondents were then asked detailed questions about those who were in their "local" networks and, particularly, about the ties among these alters. Most surveys of this kind limit their discussion to descriptions of the characteristics of the alters and the effect of primary network structure on individual behaviors and attitudes.

BUILDING TOWARD A THEORY OF ACTION

In addition to developing new methods to study social networks and large-scale social systems and social structures, there have been important advances in developing a theory of action incorporating social network ideas. On the one hand, Burt's (1982, 1983) work on structural autonomy focused on the ways in which network position constrains social action. On the other hand, Coleman (1988) and Granovetter (1985) have focused on how social networks can be viewed as "social capital" that actors can use so as to pursue their own goals or interests. A third development is how social networks can help actors influence others in their action system (Burt 1987).

Although Burt (1982, 1983) is most closely associated with the concept of structural autonomy, sociologists had been pursuing a related concept—power dependency—for several years. It is found in Blau (1964), in Emerson (1962), and in the interorganizational litera-ture on resource dependency (Cook 1977; Pfeffer and Leong 1977). Yet, Burt was able to take the concept of resource dependency, translate it into network terms, and shift attention to its complement—structural autonomy.

Burt begins with the assumption that actors are purposive and rational. At the same time, they occupy structural positions within a larger relational context. As incumbents of these positions, they are both dependent upon, and have advantage over, actors in other struc-tural positions. The degree to which they are "free" or "autonomous" to pursue their own goals is a function of other structural positions being dependent upon their position while remaining independent of other positions—particularly those where power is concentrated in the

hands of a few actors. In his applications, Burt (1983) focused on how actors' structural positions affect not only individual goal attainment (e.g., profits) but also interorganizational strategies (e.g., creation of interlocking directorates).

Like Burt, Coleman (1988) and Granovetter (1985) focus on purposive action and argue that individual behavior and institutions are constrained by ongoing social relations. That is, actors are embedded in their social relationships. However, Coleman and Granovetter see ego's social relations as a kind of social capital or resource that he can use to further his own interests. They also do not restrict themselves to relations based on power. Any number of different kinds of relations can be useful to ego.

For example, an actor's "weak ties" (i.e., casual acquaintances) can be an important source of information on possible jobs (Granovetter 1974). The thesis is simple but elegant. An individual's chances of securing a more attractive job depended upon the information that his contacts had on the job market. While ego's strong ties were likely to have the same information as ego on the environment, his weak ties should have information that ego typically does not have access to. Thus the more weak ties in ego's personal network, the more information ego has; and the more information ego has, the more likely ego will achieve his goals.

Family ties and strong ties can also be useful in finding out who is trustworthy. Coleman (1988) and Granovetter (1985) talk a great deal about how social networks can be important in helping to overcome the problem of opportunism in market settings (see also Powell 1990). Social networks provide detailed, rich information on others. Not only does recurring interaction provide information on your friends, workmates, neighbors, and family, and some idea about how they will behave in the future, but your friends, workmates, neighbors, and family can testify on behalf of others in your network, as well as others outside your network. They can tell you who to trust and who to distrust. Granovetter argues that networks give information on how some alter might treat a particular ego; he is less interested in information on alter's general reputation. Still, to the extent that alter's prospective "partners" are in close social proximity, ego can have confidence that alter will continue to behave as it has in the past, so as

to insure the integrity of its reputation as a trustworthy player (see Raub and Weesie 1990, for further discussion of this point).

While Coleman and Granovetter focus on network ties and their utility in market situations, other network analysts have used similar language in describing the utility of social networks. The social support literature, for example, has clearly identified family, friends, and neighbors as important resources that can be called upon for a loan, household work, solace in time of tragedy, and companionship— necessities of life that one is not as likely to buy in the marketplace but which are very important to ego's wellbeing.

A more dynamic approach to social networks sees them as avenues through which actors influence the behavior of others. An actor's attitudes are often influenced by other actors in a network. The proximity of two actors in a social network should be a strong predictor of whether the two have any interpersonal influence on the attitudes of each other. Influence is viewed as a type of causality; hence it is important to study which relations (authority, identification, expertise, competition, etc.) are the best predictors of social influence. Influence need not be face-to-face or even deliberate. Once again, structural equivalence and cohesion are the two standard approaches to the measurement of influence; models then allow one to study how the attitudes of one actor are predicted by the attitudes of those alters proximate to ego, using actual network ties as model-weighting factors. Clearly, such theories and models can be quite dynamic, realizing that attitudes at one point in time may be caused by alter's attitudes at earlier time points.

One could argue that Granovetter's (1985) concept of embeddedness encompasses all of the above examples. Action is embedded in ego's social relations. These relations, in turn, can both limit ego's options and influence his choice of strategy, as well as provide ego with opportunities to further his interests and influence others. Yet, the concept of embeddedness has greater potential than that. Being broad in scope, embeddedness provides us with the opportunity to incorporate in our analysis much more than the skeleton of social relations that surround ego. The focus is on context. This opens the door to analyze not only the formal properties of ego's network position but the norms governing relations with others and the meanings attached to interactions as well.

APPLICATIONS TO SUBSTANTIVE SOCIOLOGY

Most of the research reviewed in this issue was done during the 1980s and 1990s, and much of it uses the methods and concepts described above. This is particularly the case with the social support, interorganizational, and political elite literatures.

The issue begins with an article by David Knoke. To help initiate the student, Knoke discusses several issues that all social network studies must address: specifying the network contents to be studied, delineating the boundaries of the system to be studied, identifying key actors, and selecting the method for representing network structures. He illustrates these points, drawing on the elite structure and decision-making literatures. He then goes on to show how network analysis has been used to uncover the cleavages and coalitions among state managers, political parties, corporations, interest groups, social movements, mass publics, class segments, and other social formations. For the most part, analysts have focused on communication ties and resource exchanges that shape collective responses and influence the outcomes of political debates. Two generic forms have emerged: integrative centrality, where key actors mediated relations among different parties in the network, and sectoral differentiation, where different outlying regions of the network were occupied by actors with common interests or similar specialties. Knoke also finds that network centrality is critical in explaining activation and political influence; however, this does not hold true for every policy domain. Finally, he discusses efforts to take Coleman's (1973) collective action model and use network data to predict event outcomes.

Mark Mizruchi and Joseph Galaskiewicz describe how social network analysis has been used to study interorganizational relations. Their article is organized around three theoretical traditions: the resource dependence model, the social class framework, and the institutional model. Within each tradition, they show how network analysts have used both dyadic as well as macro structural analysis to test hypotheses from each of these traditions. For the most part, analysts have focused on communication among organizational agents, interorganizational resource exchange, and interlocking directorates. Both for-profits and nonprofits are studied. The results from this literature are wide-ranging, and are as follows:

1. Firms' structural autonomy (or lack thereof) is an important predictor of the creation of interlocking directorates.
2. Companies will use their personal networks to find out information on potential business partners.
3. Central actors in a resource or information network have enhanced reputations as powerful players.
4. Network position in an interindustry matrix affects firms' profits but, being heavily interlocked, had no effects on profits in the United States.
5. Interlocks had a significant effect on a number of corporate strategies.
6. Direct and indirect network ties among firms influenced their contributions to political candidates and charitable causes.
7. Industries that concentrate their contributions to the same political candidates are more likely to be successful in securing the passage of relevant legislation in Congress.

The third article is by Michael Walker, Stanley Wasserman, and Barry Wellman and reviews a very large (and growing) literature on social support—social relationships that benefit health and well-being. Since the early 1980s, networks have played an increasingly important role in such studies. By using the network paradigm, social support researchers have been able to extend their studies far beyond just the ego in an ego-centered, personal network. Recent research has demonstrated that social support is quite complicated and cannot easily be characterized, much less quantified. A variety of kinds of support exist. Important aspects of specific support relational ties are their strength, whether the tie links ego with a kin, proximity of alters to ego, and similarity of ego and alters. Characteristics of the entire set of personal networks are easily studied using standard network methodology (size, density, centrality, prestige, and so on). But, several important methodological problems remain, particularly, quantification of the validity and reliability of support network data. Walker, Wasserman, and Wellman end their article with some thoughts on these problems and some directions for the future (including a charge to methodologists to consider more global statistical approaches to social support).

Martina Morris has written the fourth article in this special issue, on the importance of social networks to epidemiology. As she states, the role of networks in the spread of infectious disease has largely been

ignored by biologists and mathematicians; however, social factors, particularly interpersonal contact, must be considered in transmission of some diseases. Morris reviews the history of modeling structured diffusion in epidemiology and argues for the need in models for a "contact matrix," specifying the chances that various segments of a population come into contact with each other, and possibly, pass along an infectious disease. Social factors should determine the size and nature of this contact matrix, and statistical models should be used to parameterize it. She presents such a modeling framework, based on log linear models designed to incorporate the effects of network factors on infectious disease diffusion into mathematical epidemiology. The promise of such an approach is great; mathematicians, epidemiologists, and social scientists have come to realize the importance of network factors. A merger of epidemiology and social networks is a very recent development, but one that should be very important in the future.

The last article is by Peter Marsden and Noah Friedkin. It presents an overview of social influence, and reviews two common network theories, cohesion and structural equivalence, which are often assumed to account for it. Such theorizing is empirically based, and leads one to consider actor proximity in network relations such as identification, competition, and authority, as causal factors of actor attitudes. The actual influence process is modeled in a number of ways and has been verified in a large number of empirical studies. The models presented by Marsden and Friedkin are more mathematical than others presented in this issue and are similar to spatial autocorrelation models arising in geography. One particular model, the "network effects" model, can be generalized in a number of ways to include exogenous attributes of alters, and can be posited longitudinally so that current attitudes can be modeled as a function of those held previously. These models are new, and are not yet well-known; however, they should become quite important in the 1990s, as researchers begin to integrate more substantive factors into network studies. There is no question that attitudes and behaviors have network predictors—this research should help us study the effect of social structure on current and changing actor responses.

CONCLUSION

In addition to research we have reviewed, there are several other avenues of research in the network tradition that are very promising. For example, there have been several other sociologists who have studied power dependency within a network framework besides Burt (see, for example, Marsden 1983; Yamagishi, Gillmore, and Cook 1988; and Molm 1991). Also, scholars have examined how social networks facilitate collective action (Galaskiewicz 1985; Marwell, Oliver, and Prahl 1988). McPherson, Popielarz, and Drobnic (1992) examine the social networks among members of voluntary associations, and with those outside the group, and study the effects of these network ties on membership turnover and recruitment to new voluntary associations.

We are limited in the number of research ideas that can be presented in these pages. However, we feel that the authors we have invited, and the articles they have written, very accurately summarize the state of network analysis within sociology and point the way toward the future. We are pleased to bring them to you.

NOTES

1. A more complete history and description of the network paradigm can be found in the forthcoming volume by Wasserman and Faust (1993). See also Wellman (1988) for a further substantive discussion and Marsden (1990) for a review of measurement issues. One purpose of this issue is to let the "experts" comment on their own view of network analysis and on their own contributions, as a complement to the history given by Wasserman and Faust.

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