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Challenges in Collecting Personal Network Data: The Nature of Personal Network Analysis

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Personal network analysis views a social network as one person's (or one organization's or one country's) set of connections with others. Personal network analysis thus differs from the more common whole network analysis that views relationships among all network members in a bounded population. In personal network analysis, scholars are standing in the center of a person's world and analyzing who he or she is connected to and with what consequences. It is Osama bin Laden's relations of cash flow and emotional support that is being studied, rather than the overall network of Al-Qaeda cash flow and emotional support. Where whole network analysts typically concentrate on uncovering the structure and composition of one big network, personal network analysts almost always study a sample of many smaller personal networks: the worlds according to Osama, Dick, and Harriet. This view from the standpoint of an individual is one reason why the people at the centers of these networks are often called egos, with their relationships called alters.

Of course, every whole network can be analyzed as a series of personal networks, just by viewing the network from the standpoint of specific persons in it (see Haythornthwaite and Wellman, 1996, for a computational procedure). However, this approach would be constrained to stay within the boundary of the original whole network: a study of the members of an organization could not trace personal networks beyond the organization.

Personal network analysts have been interested in community, social support, social capital, and access to knowledge. Personal network analysts trade off the comprehensiveness of whole network analysis for a relative lack of boundedness in the networks they can study. For example, when they trace egos' networks of friendship and social support, they are not

necessarily limited to a certain geographical or organizational boundary. They can ask first about supportive relationships and only later ask egos about the characteristics of their alters, ego-alter ties, and perhaps alter-alter ties. Personal network analysts are also well positioned to study the fundamental sociological question of the relative effects of ties and networks on behavior. Is it the relationships themselves that are the keys to support or the networks in which they are embedded?

Personal network analysts usually want to know which types of people are in an ego's network (is it composed mostly of kin or friends?) and what kinds of resources flow through different kinds of networks (do kin provide more emotional support than friends?). Such research interests affect how analysts define populations, approach gathering data, and obtain information about egos, alters, and their relationships. Although there is sometimes interest in a single person's network (such as Osama bin Laden's), analysts almost always study a sample of egos' networks. They make the assumption that the network of each ego is independent from each other ego's network—an assumption justifiable if the sample of egos is chosen from a large population.

Although it is possible to obtain information directly from alters as well as from egos, practical matters of cost and time lead researchers to ask egos to report about their relations with alters. Four of the articles in this issue report on sample survey techniques, while the fifth (by Fu) reports on the closely-related technique of ego-reported contact diaries. The articles report on research conducted in Canada, Spain, Taiwan, and the United States.

There are at least two issues with ego-reporting techniques. First, egos may not accurately report on their relationships: we know, for example, that they overestimate their frequency of contact with alters (Bernard et al. 1984). Second, the characteristics of alters and ties in each ego's network are inherently not independent. For many decades, this clustering feature was ignored, with OLS regression used to analyze tie characteristics. Nowadays, multilevel analysis not only takes into account within-network clustering but also teases out the effects of the networks (e.g., density), the ties within these networks (e.g., immediate kinship), and cross-level effects (e.g., immediate kin in densely knit networks) (see Snijders and Bosker 1999; Wellman and Frank 2001; McCarty et al. 2007 [this issue]).

BASIC ISSUES

How Large are Egos' Networks?

The average North American has almost 300 meaningful ties with others (McCarty et al. 2001), but it is difficult to collect information about all

of them. Therefore, the great majority of personal network analyses obtain information about a subset of alters, such as those with whom they have frequent contact or are socially close (see Marin and Hampton's article in this issue).

Some studies estimate the size of personal networks. Yet Hogan, Carrasco, and Wellman's article (this issue) show that such summary estimates yield network sizes 1.5 times larger than provided by asking about specific alters. One strategy in studying specific alters is to learn a good deal about the role relationships of a small set of egos: Jeremy Boissevain (1974) spent a year observing a few residents of the Maltese Islands, discovering that one had 1,750 ties with whom he had met or had dealings with in the recent or distant past. Fu's contact diary study (in this issue) reports that egos contacted a mean of 227 alters in three months. At the other extreme, time constraints have led the U.S. General Social Survey to ask egos only about those alters with whom they discuss important matters, yielding a mean of 2.1 alters (McPherson, Smith-Lovin, and Brashears 2006).

Most personal network researchers use surveys to ask egos about their alters. Their approaches range from quick summary estimates to the indepth, multi-hour interviews described by the authors in this issue. Asking about all of an ego's ties would be time consuming and unreliable (because of fatigue and forgetfulness), so researchers place boundaries on which relationships they study: for example, asking only about close ties.

Why Are Specific Alters Present in an Ego's Network?

The average person has a variety of role relationships with each alter, such as smiling neighboring, Dilbertian rancor with officemates, sociable hanging out, and exchanging social support. Two distinct strategies appear in this issue. Hogan, Carrasco, and Wellman ask egos to list the alters with whom they are close, and then go on to learn how egos connect and what supportive resources they exchange. By contrast, Marin and Hampton ask "Who gives you X?" where $X_1 \ldots X_n$ are specific kinds of support, and only then do they ask about the characteristics of these alters and their ties to egos.

How Do Egos and Alters Connect?

Historically, this has been a question of how often they have been in contact. More recently, there has also been interest in what communication media they use to connect: in-person, wired/mobile phone, e-mail, etc. (Wellman and Hogan 2006).

What Is the Content of Ego-Alter Ties?

The motivating core of most personal network studies has been to find out if people can obtain support and social capital through their networks. Therefore, many studies provide a list of supportive resources as a "*name generator*" and ask if each alter gives or gets that from ego (see, for example, Marin and Hampton's article). In some cases, they also ask how much support there is, how often it is provided, or how reciprocally it is exchanged. Other studies obtain information on supportive exchanges more simply by providing a list of supportive resources and asking if the ego has access to each of them through their networks.

What Is the Structure of Egos' Networks?

Many network analysts skip this step because it is time consuming. Moreover, there are reliability problems in asking egos about alter-alter relations. When analysts do this, they limit themselves to either just ascertaining the existence of a tie or obtaining crude estimates of role relationships (kin, neighbor, etc.) or tie strength. The articles by McCarty et al. and Hogan, Carrasco, and Wellman in this issue describe innovative network visualization techniques to help egos describe the structure of their networks.

Until now, it has been difficult to analyze the structure of personal networks because standard social network software, such as UCINet and Pajek are optimized to analyze one whole network, and they cannot be easily used for the analysis of a large sample of personal networks. The situation is better for analyzing the size, composition, and supportiveness of personal networks because SPSS and SAS can be used, albeit with some tricks (Müller, Wellman, and Marin 1999).

How Do Personal Networks Change?

The great majority of social network analyses investigate networks at one time. Yet the composition and contents of networks often change in systematic ways, as Feld, Suitor, and Hoegh's article (this issue) shows. Like the other articles in this issue, their article shows exciting new developments in studying personal networks.

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