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Survey Methods for Network Data

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Peter V.Marsden

Introduction

Surveys and questionnaires are widely used to assemble data on connections among persons or other social actors. Such methods have a long heritage: researchers used them to study interpersonal relationships among children as early as the 1920s (Freeman, 2004). In the twenty-first century, archival measures of linkages and transactions based on administrative records or computer-mediated communication systems have become much more abundant and accessible. Surveys nonetheless remain a vital source of network data for the many situations in which such records do not exist or do not include information about the relationships of interest, or in which direct observation, diaries, and other methods of collecting network data are impractical.

This chapter reviews basic issues in conducting network surveys, beginning with the common forms that survey network data take, approaches to defining the boundaries of the study population, and methods of selecting subjects/respondents. It then discusses instruments for data collection in both whole-network and egocentric designs, illustrating different approaches with empirical studies. Next, it reviews some cognitive considerations to keep in mind when developing and administering network surveys. The chapter closes by reviewing some research into the quality of network data obtained using survey methods and by highlighting special issues of human subject protection that can arise in the course of conducting network surveys.

Templates for Network Data

Two principal types of network surveys focus on different, though related, objects of measurement: “whole” and “egocentric” networks. *Whole-network* studies seek to measure the structure of some bounded social group by collecting data on one or more types of relationships that link the units or actors within the group. *Egocentric network* studies have the more limited objective of describing local social environments by measuring the relationships in the vicinity of one or more focal units or actors. Whole-network studies subsume egocentric ones, in a sense: whole-network data include an egocentric network for each actor.[1]

Most often, surveys to measure whole networks collect *one-mode* network data on relationships among elements of a single set of units or actors – such as friendships among students in a school, or collaborative ties linking employees in an organization. Sometimes, however, they measure *two-mode* networks based on relationships among elements in two distinct sets; examples include school networks consisting of student memberships in groups such as extracurricular clubs or athletic teams, and organizational networks defined by employee assignments to committees or project teams.

Many design variations arise within these broad study templates. The minimal design measures only a single type of relationship, such as friendship or advising, on a single occasion. Extensions include designs that measure relationships among a set of actors on multiple occasions and designs that measure multiple types of ties (e.g., friendship, advising, and collaboration) at a single time point. Most studies supplement network data with information on attributes of units/actors, attributes of dyadic ties, or both. Studies that measure networks for two or more groups may also include group-level attributes.

Defining and Sampling the Study Population

Defining the target population to be described and constructing a sampling frame that enumerates (or otherwise provides access to) it are early decisions in conducting social surveys. For network studies, these decisions about the population of elements and linkages to be measured are known as the "boundary specification problem" (Laumann et al., 1989).

Whole-Network Studies

For some whole-network studies, formal or positional criteria offer relatively self-evident definitions of inclusion within the group of interest. Examples include employment by a physician practice (Keating et al., 2007), assignment to a school classroom (Hansell, 1984), and residence in a district (Kirke, 1996).

Delineating boundaries can be more challenging for groups that are not formally defined, such as "regulars" at a beach (Freeman and Webster, 1994), policy domains (Laumann and Knoke, 1987), or social services delivery systems (Doriean and Woodard, 1992). Positional criteria can help to identify some actors in such populations. Observing (or referring to records documenting) participation in some set of relevant events also can be useful. For example, Laumann and Knoke's (1987) study identified some organizational participants in the U.S. health and energy policy domains based on appearances before relevant congressional committees, filing of *amicus curiae* briefs with appellate courts, and registration of lobbyists, among other criteria. Asking knowledgeable informants to nominate participants on a reputational basis (prior to data collection) can supplement positional and event-based approaches to boundary specification.

Social relationships themselves can also indicate inclusion in a population, while their absence can signal group boundaries; Laumann et al. (1989) term this a "relational" strategy for boundary specification. For example, a Colorado Springs study of persons engaged in high-risk behaviors (Klovdahl et al., 1994) enrolled partners of prostitutes and injecting drug users in its study population. Studies of service delivery systems could begin with some core agencies, later adding others to which they refer clients (Doreian and Woodard, 1992). Relational criteria are often used to add actors to the study population during the course of fieldwork, on the basis of ties to or nominations made by early respondents. Positional, event-based, reputational and relational criteria can be used together to identify populations for network studies; a study might begin with a list of actors included on a positional basis, and then supplement it using event-based or reputational criteria before fieldwork begins.

The process of boundary specification often results in a complete listing or roster of the study population. This can be an important aid to whole-network data collection.

Egocentric Network Studies

When egocentric network studies are conducted as part of representative sample surveys (e.g., Marsden, 1987), boundary specification follows the definition of the target population for those surveys. A second boundary-determination problem for egocentric studies has to do with delimiting the set of "alter" actors within any given respondent's egocentric network. In practice, "name generators" used in eliciting egocentric network data (see below) often serve this purpose.

Network Sampling

In contrast to many social science surveys, network surveys only sometimes draw samples. Whole-network studies very often attempt to collect data on relationships among all actors in a population, for example, because they seek measures of relational properties (Lazarsfeld and Menzel, 1980) for all elements. When data collection uses survey methods, this is realistic only for populations of small to moderate size. Egocentric

network data are often obtained within sample surveys, relying on their sampling methods to select a representative set of focal actors.

Some structural properties of whole networks may be estimated by sampling from networks. Samples may be drawn by selecting units or actors, or by selecting relationships. Sampling actors is usually a practical choice for surveys, since they assemble data by contacting actors. Frank (1981) describes several network sampling schemes. One approach draws a probability sample of actors (e.g., by using a simple-random or Bernoulli scheme), and then observes only those relationships within the subset of sampled actors. Another draws a probability sample of actors and then observes all relationships incident to those actors.[2] Networks may also be sampled by link-tracing methods that begin with a probability sample of actors, elicit their contacts, and subsequently sample the contacts (e.g., Liebow et al., 1995). Such link-tracing may then be repeated one or more times to yield sampled "random walks" containing three or more linked actors.[3]

Different inferences about network properties are available from different sampling designs, so one must consider carefully what properties of a network are to be estimated when designing a network sampling scheme. The literature on network sampling (Frank, this volume) should be consulted at this stage.

Instruments for Measuring Networks

This section introduces approaches commonly used in standardized questionnaires and interviews to obtain data on social relationships, beginning with methods for measuring whole networks. It then turns to techniques for measuring egocentric networks, concentrating on "name generator" instruments that yield the most extensive network data. Last, the section introduces some shorter instruments: global survey items and multiple-item instruments that measure one or more specific egocentric network properties but do not elicit reports about specific actor-to-actor relationships.

Instruments for Whole-Network Data

Measuring whole networks requires information sufficient to assign a value to the relationship a_{ij} between each (ordered) pair of actors i and j, $i \neq j$, within a network. We concentrate here on instruments for one-mode networks.

The Sociometric Test

Surveys to assess whole networks usually administer some variant of the sociometric test developed by Moreno (1953). The basic technique asks each person i within a network to identify the "alters" (j) with whom he or she has – or would like to have – a given type of relationship, yielding a value of a_{ij} based on i's "choice" or "non-choice" of j. Originally developed to measure preferences to associate with (or to avoid) others, the sociometric test generalizes to measuring "actually existing" relationships (e.g., communication, friendship, support). Likewise, it can be readily adapted to measuring two-mode networks by asking respondents to report group memberships or other affiliations of interest. Sociometric items have been administered in most survey modes, especially in-person interviews and self-administered questionnaires. Many contemporary applications use computer-assisted modes, which can simplify presentation of questions and data processing.

Studies use varying criteria – guided by the substantive questions they pose – to elicit sociometric choices. Some examples of such questions appear in Table 25.1. Keating et al. (2007) surveyed primary care physi-

cians about their influential conversations about women's health issues. Singleton and Asher (1977) questioned third-grade students about who they like to play with and (separately) who they like to work with. Espelage et al. (2007) asked seventh-graders to name others whom they “hang out with most often” at school. Laumann and Knoke (1987) asked informants representing organizations in the U.S. energy policy domain to indicate other organizations in the domain with which their organization “regularly and routinely discusses national energy policy matters.” Many studies elicit two or more types of contact; Brass (1985), for example, asked employees at a newspaper publishing company about workflow ties, work-related communication, and close friendships.

Table 25.1 Examples of whole-network measurement tasks

A. Single-criterion recognition question (Keating et al., 2007)
    - Please circle the number of conversations that you have had with each of the following [clinic name] primary care physicians in the last six months that have influenced your thinking about women's health issues.
    - [followed by alphabetized list of physicians and response categories ‘0’, ‘1–3’ and ‘≥4’]
B. Multiple-criterion recognition questions (Singleton and Asher, 1977)
    - How much do you like to play with this person at school?
    - How much do you like to work with this person at school?
    - [presented within roster listing students in a class alphabetically; responses were numbers 1–5 accompanied by faces ranging from frowning to smiling]
C. Free-recall question (Coleman, 1961)
    - What fellows here in school do you go around with most often? (*Give both first and last names*)
    - [from boys’ version of questionnaire; girls received a questionnaire with slightly different wording]
D. Cognitive social structure task (Casciaro et al., 1999)
    - By putting an X in the cells of the following matrix, please indicate whether you think the people listed in each row consider the people listed in each column as personal friends. For example, if you think that Ms. J (row 9) considers Mr. N (column N) as a friend, place an ‘X’ in the corresponding cell ‘9N.’
    - [followed by square matrix listing persons, with solid shading in diagonal (self-relation) cells]
E. Social-cognitive mapping task [free recall] (Cairns et al., 1985)
    - Now tell me about your class: Are there some people who hang around together a lot? Who are they?
    - Are there some people who don't hang around with a particular group? Who are they?

Many surveys that administer sociometric items supply a roster of possible alters in the network for respondents to consult when naming associates. Examples of studies that use such recognition techniques include Hansell's (1984) study of fifth- and sixth-grade classrooms, Lazega's (2001) study of attorneys in a law firm, and Provan et al.'s (2009) study of agencies serving the severely mentally ill in an Arizona county. Other versions ask respondents to freely recall their ties from memory, as in Coleman's (1961) study of networks within high schools, Brass's (1985) study of a newspaper publishing company, or Burt's (2004) study of supply chain

managers.

Rosters simplify the reporting task by reminding respondents of the eligible alters within the network. Using rosters limits measurement error due to the forgetting of associates documented by Brewer (2000). Sudman's (1985) experiments demonstrated that recognition methods yield larger networks (see also Hlebec and Ferligoj, 2002). Reviewing and considering all names on a large roster can be a cumbersome, tedious task for respondents, however. Care with names of alters is warranted, using either approach: recall methods must ensure that citations of alters known by different names (e.g., nicknames, titles, spelling variations) are correctly matched, while rosters used to aid recognition must use the names by which persons are actually known.

Some early guidelines for sociometric measurement recommended that respondents be permitted to make an unlimited number of choices (Lindzey and Borgatta, 1954), but others suggested a limit of three or four citations (Northway, 1952). Network surveys using such limits include Coleman et al.'s (1966) study of physicians and Laumann and Pappi's (1976) study of community leaders. Limits have practical advantages in survey administration: they simplify and specify a sociometric task for respondents, thereby reducing burden. Measurement error considerations also arise, however. Imposing limits can induce both false negatives (if a respondent's actual number of associates exceeds the limit) and false positives (if respondents are encouraged to cite additional alters in order to reach the limit). Bias is thereby produced in many basic network structure statistics including the degree distribution(s), network summaries such as the dyad and triad censuses (Holland and Leinhardt, 1973), and others.

Sociometric items measure relationships using diverse sets of response categories and formats. Binary measurement is very common: respondents may indicate those alters with whom they have a given type of contact by listing them, marking them on a roster or checklist, or making a separate “yes/no” response about each one. The latter “forced-choice” format is more time-consuming but may encourage deeper processing and more thoughtful answers (Smyth et al., 2006). Many studies request ordinal assessments: Keating et al.'s (2007) study of physicians used a three-category frequency scale (0, 1–3, or 4+ conversations); Fernandez (1991) measured respect relationships in a public finance agency using a five-point scale (“very little” to “very much”); and Johnson and Orbach (2002) asked political actors to rate their interactions with one another on an 11-point scale. In some studies of elementary school students or adolescents (Singleton and Asher, 1977; Hansell, 1984), icons supplement ordinal response categories: a face with a broad smile indicates that the respondent likes an alter “a lot,” for example.

Cognitive Social Structure Task

Typical sociometric items ask respondents to report only on relationships in which they are directly involved. A cognitive social structure (CSS) design (Krackhardt, 1987) measures respondent perceptions of a whole network, by using respondents as informants about social ties between alters as well as their own relationships. Such data may be collected via separate questions about the outgoing ties of each actor (e.g., “Who would X go to for advice at work?”) as in Krackhardt (1987), or by asking informant actors to fill out a matrix grid (Casciaro et al., 1999; see Table 25.1D). Either way, a CSS task poses substantial demands on respondent time and memory, especially for networks of even moderate size.

A CSS task yields multiple assessments $\{a_{ij}^{(k)}\}$ of each directed tie, where $a_{ij}^{(k)}$ is the perception of ordered pair (i, j) by the kth informant. Krackhardt (1987) suggests several ways of combining these assessments

to obtain a single measure for each relationship a_{ij} in a whole network. Setting $a_{ij} = a_{ij}^{(i)}$ – that is, treating each informant as the authority on her or his outgoing ties – yields a "locally aggregated structure" essentially equivalent to the data obtained via a typical sociometric item. An alternative "consensus structure" uses the average assessment $\frac{1}{K}\sum_{k} a_{ij}^{(k)}$ (where K is the total number of assessments), or a binary measure of a_{ij} based on whether the average assessment exceeds some threshold.

Socio-Cognitive Mapping and Pile Sorts

A procedure known as socio-cognitive mapping (SCM; Cairns et al., 1985) produces a form of cognitive social structure data that entails much lower respondent burden. It elicits respondent perceptions of cliques or clusters. Primarily used in measuring networks among children and adolescents, the SCM task asks respondents to report sets of people who "hang around together a lot" via free recall (see Table 25.1E). The pile-sort task used by Freeman and Webster (1994) to measure perceived networks resembles the SCM procedure but uses recognition methods. It provides each respondent with a randomized deck of cards containing the names of the actors in a network, asking that the respondent sort them into mutually exclusive piles including subsets of actors who are close to one another or who interact frequently.

Using either the SCM instrument or the pile-sort method, each respondent's reports yield a binary matrix with entries indicating whether the informant placed a given person in a certain subgroup. These matrices may be combined into a consensus perception of relationships in the whole network. Values can then be assigned to a_{ij} as a function of the number of informants who placed two actors together in a subgroup.

Name Generator Instruments for Egocentric Networks

Suites of survey questions called "name generator" instruments elicit data on the individual dyadic relationships and "alter" actors in a focal actor's neighborhood. They are so-called because such instruments begin by administering one or more *name generator* questions that elicit a roster of the alters within a respondent's egocentric network, thereby establishing its boundaries. Name generators are much like sociometric items, but they almost always depend on respondent recall, because rosters of eligible alters are typically not available in egocentric network studies. Surveys that use name generator instruments ordinarily treat respondents as informants who provide data about the entire egocentric network surrounding them; they generally do not survey or interview the alters themselves. *Name interpreter* questions follow the name generator(s), asking about attributes of particular alters or relationships. Such instruments can require considerable administration time when alters or name interpreters are numerous. Analysts later combine responses to name generators and name interpreters to measure a wide variety of egocentric network properties.

Like sociometric items, name generator questions must specify a particular type of relationship. Common criteria are role relations (e.g., friends, neighbors), aspects of relational form (e.g., closeness or frequency of contact), or specific types of resource transfer or exchange. Criteria of the latter type, which elicit alters using a specific relational content, are especially common. Among these is the widely used "discuss important matters" name generator (Panel A, Table 25.2) first administered in the 1985 General Social Survey (GSS) to elicit alters in a respondent's "core" network (Marsden, 1987). Other studies use name generators tailored to their topical content; for example, Huckfeldt and Sprague (1995) asked respondents for names of alters whom they "talked with most about the events of the past election year."

Table 25.2 Examples of name generators

A Single Name Generator (from 1985 and 2004 General Social Surveys [GSSs]; Davis et al., 2007)
- From time to time, most people discuss important matters with other people. Looking back over the last six months, who are the people with whom you discussed matters important to you? Just tell me their first names or initials.
- IF LESS THAN FIVE NAMES MENTIONED, PROBE: Anyone else?

B Multiple Name Generator (Kogovšek et al., 2002: 14)
1. From time to time, people borrow something from other people, for instance, a piece of equipment, or ask for help with small jobs in or around the house. Who are the people you usually ask for this kind of help?
2. From time to time, people ask other people for advice when a major change occurs in their life, for instance, a job change or a serious accident. Who are the people you usually ask for advice when such a major change occurs in your life?
3. From time to time, people socialize with other people, for instance, they visit each other, go together on a trip or to a dinner. Who are the people with whom you usually do these things?
4. From time to time, people discuss important personal matters with other people, for instance if they quarrel with someone close to them, when they have problems at work, or other similar situations. Who are the people with whom you discuss personal matters that are important to you?
5. Suppose you find yourself in a situation, when you would need a large sum of money, but do not have it yourself at the moment, for instance, five average monthly wages (approximately 500,000 tolars). Whom would you ask to lend you the money (a person, not an institution such as a bank)?

To facilitate the subsequent administration of name interpreters, name generators usually ask respondents to identify alters by first name only; egocentric designs do not need to match alter and respondent names. A name generator may be followed by one or more probes that prompt a respondent for additional alters. Marin (2004) demonstrates that using several such probes can increase egocentric network size substantially, as respondents add previously forgotten alters. Probes should be used judiciously, however, especially with behaviorally nonspecific name generators that respondents must define for themselves. Respondents may understand extensive probing as an indication that they are expected to cite more alters than they have already named, leading them to alter their definition of the name generator's relational content.

Some name generator instruments incorporate visual interfaces to assist respondents. Kahn and Antonucci (1980), for example, elicited social support networks by asking respondents to place alters within concentric circles surrounding them. McCarty and Govindaramanujam (2006) propose a dynamic visual interface in which respondents place alters in relation to one another, thereby simplifying the collection of name interpreter data.

Two or more name generators may be used to delimit an egocentric network. Fischer (1982a), for example, elicited social support networks using nine name generators; van der Poel (1993) recommends sets of three and five name generators for measuring personal support networks. The multiple-generator social support in-

strument in section B of Table 25.2 includes name generators for minor instrumental aid, advice, socializing, confiding about personal matters and major instrumental aid. Studies using multiple name generators should be mindful of possible order effects on the number of alters given in response to particular questions (Pustejovsky and Spillane, 2009).

As in whole-network measurement, some name generator instruments ask respondents to name a specific number of alters. Laumann (1973) asked for three "best friends," for example, while Huckfeldt and Sprague (1995) asked for three political discussants, and Wellman (1979) elicited six persons to whom a respondent felt closest. The "important matters" name generator (Table 25.2) does not limit the number of alters but probes for more only when a respondent names fewer than five. Many other studies (e.g., Fischer, 1982a) impose no limitations on the number of alters.

After name generators ascertain the boundaries of a respondent's egocentric network, follow-up name interpreter questions ask for information about its form and content. Because of the name interpreters, egocentric network data collection poses more demands on respondents than do whole-network instruments.

Three common types of name interpreter items are exemplified in Table 25.3. The first section contains questions requesting proxy reports about attributes of the alters in a network, such as race/ethnicity or age. The second section has questions about properties of ego-alter ties such as emotional closeness, conflict/discomfort, duration of acquaintance, or frequency of contact. Such name interpreters may ask whether a tie includes a particular strand of content of special interest to a study. For example, the National Social Life, Health and Aging Project (NSHAP) asked about the likelihood that respondents would discuss health with each alter (Cornwell et al., 2009), while a 1984 South Bend, Indiana, election study asked about the frequency of discussing politics with alters (Huckfeldt and Sprague, 1995). Finally, name interpreters may ask about relationships among the alters themselves (the third section of Table 25.3), in order to measure egocentric network density and other aspects of egocentric network structure.

Table 25.3 Examples of name interpreters

A Name Interpreters for Alter Characteristics (from 1985 and 2004 GSSs; Davis et al., 2007)
- 1 Is (NAME) Asian, Black, Hispanic, White, or something else?
  - ASK FOR EACH NAME
- 2 How old is (NAME)?
  - PROBE: Your best guess.
  - ASK FOR EACH NAME

B Name Interpreters for Properties of Ego-Alter Ties (Kogovšek et al., 2002: 14–15)
- 1 How close do you feel to this person? Please describe how close you feel on a scale from 1 to 5, where 1 means not close and 5 means very close.
- 2 How often does this person upset you?
  - [Responses are often, sometimes, rarely, never]

C Name Interpreters for Egocentric Network Structure (from 1985 and 2004 GSSs; Davis et al., 2007)
- Please think about the relations between the people you just mentioned. Some of them may be total strangers in that they wouldn't recognize one another if they bumped into each other on the street. Others may be especially close, as close or closer to each other as they are to you.
- First, think about (NAME 1) and (NAME 2).

A Are (NAME 1) and (NAME 2) total strangers? ◦ IF YES, PROCEED TO NEXT PAIR B Are they especially close? ◦ PROBE: As close or closer to each other as they are to you
REPEAT FOR EACH PAIR OF NAMES

Instruments may organize name interpreter questions in “alter-wise” blocks consisting of all questions about each alter, or “question-wise” blocks that ask a given item about all alters (Vehovar et al., 2008). Question-wise blocking (e.g., the first section of Table 25.3) asks respondents to answer several consecutive questions having identical response alternatives, a “battery” format shown to elicit less reliable survey data (Alwin, 2007). Vehovar et al. (2008), however, found question-wise presentation to be superior on several data-quality grounds, with notably lower dropout and item nonresponse rates. Because respondents know the number of alters they cited but not the number of name interpreters in a questionnaire, the alter-wise format allows them to better anticipate the length of the name-interpreter task. Alter-wise presentation (e.g., the second section of Table 25.3) took less administration time in the Vehovar et al. (2008) study, perhaps because respondents can access different pieces of information about a given alter more rapidly in this format (Kogovšek et al., 2002).

Whether administered alter-wise or question-wise, answering name interpreter items is repetitive and time-consuming, especially if respondents have large egocentric networks. Some studies therefore ask name interpreters about subsets of the alters elicited. Data for a subset of alters may be sufficient if a study seeks to measure properties of a respondent's egocentric network, as opposed to individual respondent-alter dyads. For example, White and Watkins (2000) elicited only up to four alters with whom respondents “chatted” because their respondents found the name interpreters tedious. The GSS name generator instrument (Burt, 1984) asks name interpreters about only the first five alters cited (few respondents name more than five, however). Fischer (1982a) asked some name interpreter questions about a subset of alters, those named first in response to five different name generators. Because respondents tend to name their closer ties sooner (Burt, 1986), selecting alters based on citation order is apt to measure name interpreter data for stronger ties. McCarty et al. (2007) and Marin and Hampton (2007) suggest sampling alters at random. The number of alters required to measure a given egocentric network property with adequate reliability depends on the homogeneity of alter characteristics within respondents (Marsden, 1993; McCarty et al., 2007).

Name generator instruments have been administered as part of face-to-face interviews as in the GSS (Marsden, 1987), telephone interviews (e.g., Kogovšek, 2006), mail questionnaires (e.g., Marin and Hampton, 2007), and Web-based instruments (e.g., Vehovar et al., 2008). Name generator instruments entail some complexity: at a minimum, names of alters must be inventoried and organized appropriately for the administration of name interpreters. Instruments that use more than one name generator must eliminate redundant names before presenting name interpreters, and those that administer name interpreters for a subset of alters must use a consistent protocol to select the subset. Well-trained interviewers can assist respondents in avoiding organizational and navigation errors in these processes, but computer-assisted instruments – either self- or interviewer-administered – have special appeal in this setting (Gerich and Lehner, 2006).

To the extent that respondents view the survey content as sensitive, self-administration of name generator instruments can enhance data quality, if it promotes higher levels of disclosure (Gerich and Lerner, 2006). Self-administration also avoids the interviewer differences in responses to name generators documented by van Tilburg (1998) and Marsden (2003). Respondents may, however, err when answering self-administered instruments, for example, by entering references to plural alters or groups (e.g., “my parents”) or other replies that do not name specific alters (e.g., “don't want to respond”) in response to name generators (Lozar Man-

freda et al., 2004). Moreover, interviewer presence may provide motivation and encourage respondents to be attentive. Matzat and Snijders (2010) report mode comparisons that raise concern that respondents may be prone to satisficing when answering Web-based name generator instruments in private. In any event, the visual design of self-administered instruments warrants care: respondents may take the amount of space left after a name generator question as an indication of the number of alters they are expected to name, for example (Lozar Manfreda et al., 2004; Vehovar et al., 2008).

Analysts use data from name generator instruments to construct indices that measure many different egocentric network properties (e.g., Marsden, 1987). For respondent *i*, the most basic of these is egocentric network size (n_i), the number of alters elicited by the name generator(s). Name interpreter data on relationships among alters can be used to construct measures of local density, for example, $d_i = \frac{2\sum_{j=2}^{n_i}\sum_{k=1}^{j-1} r_{jk}^{(i)}}{n_i(n_i-1)}$, where r^{i}_{jk} measures the strength of the tie between alters *j* and *k* in respondent *i*'s egocentric network. Measures of network composition can be based on name interpreter data about alters, for example, the mean level of an attribute $c_i = \frac{\sum_{j=1}^{n_i} x_j^{(i)}}{n_i}$ (where x^{i}_{j} is an attribute value for alter *j* in *i*'s network) or the proportion of alters in *i*'s network who have a given value of an attribute. Likewise, network heterogeneity measures can be based on the variability of alter characteristics, for example, the standard deviation $s_i = \sqrt{\frac{\sum_{j=1}^{n_i}(x_j^{(i)} - c_i)^2}{n_i - 1}}$ or alternatives suitable for categorical measurements. Versions of indices in Burt's (1992) “structural hole” suite and many other egocentric network measures also can be constructed using data from name generator instruments.

Global Questions About Egocentric Network Properties

Numerous single-item survey measures ask respondents to provide summary assessments of some egocentric network property – most often their level or volume of informal social contact. They do not yield data on specific actor-to-actor ties. Table 25.4 provides some examples. The first item there asks about the frequency with which a respondent socializes with a particular type of alter (friends outside the neighborhood), while the second asks about the size of the respondent's network of “close friends.” The third item asks that a respondent estimate his or her total daily number of direct social contacts, while the fourth asks for an ordinal assessment of friendship network density. The fifth item measures the presence of a confidant.

Table 25.4 Examples of single-item measures of egocentric social network properties

A. Frequency of Socializing with Friends (from 1974–2008 GSSs; Davis et al., 2007)
   - Would you use this card and tell me which answer comes closest to how often you do the following things …
   - Spend a social evening with friends who live outside the neighborhood
   - [Responses on card: Almost every day, Once or twice a week, Several times

a month, About once a month, Several times a year, About once a year, Never]

B. Friendship Network Size (from 1998 GSS; Davis et al., 2007)
   - Do you have any good friends that you feel close to?
   - IF YES: About how many good friends do you have?

C. Typical Daily Social Contact (Fu, 2005: 173)
   - On an average, about how many people do you have contact with in a typical day, including all those who you say hello, chat, talk, or discuss matters with, whether you do it face-to-face, by telephone, by mail or on the internet and whether you personally know the person or not? Please give your estimate and select one from the following categories that best matches your estimate: (1) 0–4 persons, (2) 5–9 persons, (3) 10–19 persons, (4) 20–49 persons, (5) 50–99 persons, (6) over 100 persons

D. Friendship Network Density (from 1985 GSS; Davis et al., 2007)
   - Some people have friends who mostly know one another. Other people have friends who don't know one another. Would you say that all of your friends know one another, most of your friends know one another, only a few of your friends know one another, or none of your friends know one another?

F. Availability of a Confidant (Lowenthal and Haven, 1968)
   - Is there anyone in particular you confide in or talk to about yourself or your problems?

Global items like these are simple to administer within sample surveys. Their formats resemble those of other common survey questions. They are efficient, requiring comparatively little interview time. Some display construct validity in that they have robust statistical associations with measures of other phenomena of interest, such as individual well-being.

Multiple-Item Instruments

Position Generator

A position generator instrument (Lin et al., 2001) measures a respondent's relationships to particular *types* of alters. It does not elicit ties to particular individuals. Developed within a social capital framework, this instrument usually assesses ties to occupational positions that vary in socioeconomic standing, presuming that alters that have more prestigious occupations offer access to more valuable social resources. This measurement strategy also could be used to assess ties to other types of social locations, such as ethnic or religious groups.

The position generator illustrated in Table 25.5 asks respondents to indicate whether or not they have a specified type of contact (here, kinship, friendship, or acquaintance) with anyone in a particular socioeconomic location. Follow-up questions ask respondents who have contact with particular locations to indicate whether the relationship is strong (kinship, friendship) or weak (acquaintanceship). Other follow-ups can be added.

Table 25.5 Example of position generator

Among your relatives, friends, or acquaintances, are there people who have the following jobs?

a. High school teacher b. Electrician c. Owner of small factory/firm d. Nurse (etc.)
FOR EACH JOB FOR WHICH RESPONDENT ANSWERS ‘YES’, ASK:
What is his/her relationship to you? 1. Relative 2. Friend 3. Acquaintance
[IF RESPONDENT KNOWS MORE THAN ONE CONTACT WHO HOLDS A GIVEN JOB, ASK ABOUT THE FIRST CONTACT WHO COMES TO MIND]

Source: Lin et al. (2001: 77)

Responses to a position generator are usually combined into summary measures of the composition and range of the respondent's egocentric network. Three widely used summary measures are *extensity*, *upper reachability*, and *range* (Lin et al., 2001). Let x_{ij} be an indicator variable telling whether respondent i has contact with position j, and p_j be the prestige of position j. Then the extensity of respondent i's network – the number of locations contacted – can be measured as $\sum_{j=1}^{J} x_{ij}$, where J is the total number of positions included in the instrument. The upper reachability of i's network is defined as the highest-prestige location accessed, $\max_j(x_{ij}p_j)$. Finally, the range of a respondent's network is the difference between the highest-prestige and lowest-prestige positions found in the respondent's network, $\max_j(x_{ij}p_j) - \min_{j|x_{ij}=1}(x_{ij}p_j)$. Other summary measures for position-generator data can be developed via sophisticated multivariate methods (van der Gaag et al., 2008).

The position generator is a relatively efficient instrument, requiring less interview time than the name generator instruments described above. A major decision in developing a position generator concerns the set of positions presented to respondents. Positions presented should cover the range of variation along dimensions underlying the locations of interest in a study (e.g., prestige or socioeconomic standing, in the case of occupational locations) and should be relatively common positions within the population of interest. Position generator instruments require that respondents be able to inventory their contacts of a given type, to assess whether one or more of them is with someone who occupies a specific position (e.g., bank teller). Such instruments become more demanding of respondents as the number of positions and the number of follow-up questions per position increase. In 19 surveys including position generators reported in Lin and Erickson (2008), the number of positions ranged from 6 to 40 with a median of 17. These applications involved face-to-face, telephone, and mail administration.

Resource Generator

The resource generator (Van der Gaag and Snijders, 2005) assesses access to social resources directly by asking respondents if they have personal contact with anyone who possesses certain assets or capabilities. Like position generators, resource generators do not measure individual ties. Table 25.6 presents some example resource generator items. If a respondent has at least one contact who controls a given resource, the instrument probes for the strength of the strongest linkage to it.

Table 25.6 Example of resource generator

Do you know anyone who … a. Can repair a car, bike, etc.? b. Is handy repairing household equipment? c. Knows a lot about governmental regulations? d. Can give a good reference when you are applying for a job? (etc.)
[Note: the definition of 'knowing' a person is that the respondent would know the person's name if he or she were to encounter the person by accident on the street and that both parties could initiate conversation with the other.]
FOR EACH ITEM TO WHICH RESPONDENT ANSWERS 'YES', ASK:
What is his/her relationship to you? 1. Family member 2. Friend 3. Acquaintance
[IF RESPONDENT KNOWS MORE THAN ONE CONTACT FOR A GIVEN ITEM, CODE STRONGEST RELATIONSHIP ONLY, I.E., FAMILY MEMBER IN PREFERENCE TO FRIEND, FRIEND IN PREFERENCE TO ACQUAINTANCE]

Source: Van der Gaag and Snijders (2005: 12)

Like the position generator, the resource generator does not enumerate alters individually or measure network structure: it focuses on resource-related network composition. It requires less administration time than a typical name generator instrument. Van der Gaag and Snijders (2005) use latent trait analysis to develop measures of aspects of social capital based on resource generator data.

Social Support Scales

A vast literature on social support includes numerous instruments that elicit reports about the support perceived to be available or the support actually received (Wills and Shinar, 2000). Some measures take the form of name generator instruments that associate support with individual alters (e.g., the second section of Table 25.2). Others ask about whether a respondent has access to anyone who could provide a given type of support, a format like that of the resource generator; see, for example, Cohen and Hoberman's (1983) Interpersonal Support Evaluation List. Still other social support instruments pose separate questions about forms of support available from classes of alters, such as family, friends, and coworkers (e.g., Turner and Marino, 1994).

Cognitive Considerations for Network Surveys

Recent thinking about how respondents answer survey questions stresses a four-stage cognitive model: comprehending a question, retrieving relevant information from memory, integrating the information retrieved (perhaps adding other considerations) to develop a judgment about an answer, and providing a response within the format given in the survey instrument (Tourangeau et al., 2000). This section discusses some research that bears on these processes for questions about other persons and a respondent's relationships to them.

Sociometric questions may be misunderstood – or understood in varying ways – when they ask about diffuse, behaviorally nonspecific relationships. One ground cited by advocates of using "specific exchanges" (e.g., confiding, socializing) rather than affective (e.g., closeness) or role-relation (e.g., friends, neighbors) criteria to word name generators is that respondents are apt to answer exchange questions more consistently (McAllister and Fischer, 1978). Some research nonetheless examines variations in interpretation assigned to the widely used "important matters" name generator. Bailey and Marsden (1999) debriefed respondents using cognitive interviewing, finding that some took it to be asking for close or frequent contacts and that most regarded "important matters" as those having to do with family or personal life. They suggested that interview context might influence a respondent's definition of important matters: politics was more apt to be part of this when a series of survey items with political content preceded the name generator; see also Bearman and Parigi (2004). Cornwell et al. (2009) placed their name generator instrument at the beginning of the NSHAP interview to avoid such context effects. Bearman and Parigi (2004) asked respondents to report the important matter they had most recently discussed, finding that matters involving money and household finance were mentioned most frequently. A fifth of their respondents were "silent," claiming that they had not discussed anything important with anyone during the preceding six months.

"Friend" is among the more common role-relation criteria used in sociometric questions. Studies using a variety of methods document wide contextual variability – notably by gender and class – in definitions and behaviors associated with "friendship," however (Adams and Allan, 1998). Fischer (1982b) explored how a sample of Californians identified "friends," finding considerable ambiguity: they used it rather unspecifically to cover ties having no other label – often long-duration, same-age, nonfamily contacts with whom they socialize.

Sociometric questions relying on free recall call attention to the way in which respondents organize their memories for persons, which shapes the accessibility of information at the retrieval stage. Studies of person memory may also suggest ways of wording questions or probing answers to encourage accurate reporting of associates. Brewer (1995) conducted several studies revealing that social structural factors organize memories for persons. Subjects recalling those enrolled in their graduate program, for example, tended to give names in clusters corresponding to entering cohorts. More generally, recall of persons corresponds to their perceived social proximity (Brewer et al., 2005): alters perceived to interact frequently tend to be remembered close together.

Other research by Brewer (2000) documents pervasive forgetting of associates in free recall tasks; this appears to be more severe for weaker ties. Bell et al. (2007) reported greater forgetting for less specific relationships ("friends" compared with sex or drug use partners), for less salient ties (drug use versus sexual partners), and longer reference periods. The above-mentioned research on memory organization suggests that administering probes and reminders to call a respondent's attention to relevant contexts, or to contacts proximate to those already named, may reduce forgetting. Brewer (2000) also suggests that instruments should include several name generators to provide respondents with additional opportunities to name alters.

When developing name interpreter items that ask respondents to make proxy reports about characteristics of alters, researchers should be mindful of differences between memories for self and others (Sudman et al., 1994). People learn data about others via observation or communication rather than experience. Memories about others may be less elaborate and accessible and less organized into summary judgments than those about oneself. Respondents may need to estimate rather than retrieve data about others, and they often do so by anchoring a proxy report on their own attitude or behavior (Sudman et al., 1996). An advantage of proxy

reports is that social desirability pressures may be weaker for reports about others than those about respondents themselves.

Apart from memory structures for persons are memories for relationships among them. Freeman (1992) shows that people tend to impose transitivity on relationships, recalling that others are connected when in fact they are not. This is consistent with Brewer's conclusion that group affiliations organize person memories; nuances of within-group dyadic relationships may not be encoded precisely, however.

It is not difficult to develop social network items that make considerable demands on respondent cognitive capacity. Consider global items like those shown in Table 25.4. The second item on “close friends” requires that respondents first define both “friend” and “close,” and then enumerate or estimate their number of such contacts. Perhaps as a result, some comparisons between responses to global items and network data assembled using other instruments suggest that global questions have limited reliability. Sudman (1985) showed that global estimates of network size exhibit considerable response variance by comparison to more time-consuming network measurements based on recognition or free recall. The “ersatz” network density item (section D in Table 25.4) makes, if anything, even stronger demands on memory and judgment. Burt (1987) shows that answers to it are only weakly associated with a local density measure constructed using data from a name generator instrument.

The judgment tasks involved in answering name interpreter questions about individual alters and relationships are simpler than those posed by global items, though much more numerous. Judgment tasks involved in answering items like those posed in position generator or resource generator instruments can be simplified by asking – as the examples in Tables 25.5 and 25.6 do – whether *anyone* in an egocentric network has the attribute or resource in question, rather than *how many* alters have it.

Once a respondent reaches a judgment, she or he must format it to conform with the response categories offered by a survey question. When possible, instruments should avoid presenting response categories involving “vague quantifiers” (Bradburn and Miles, 1979), such as “rarely,” “often,” or “some,” in favor of numerical reports or responses that involve widely understood units of measurement (e.g., “daily” or “at least monthly”). While respondents may experience difficulty in reaching precise judgments within the latter frameworks, using such categories reduces measurement errors stemming from variation across respondents in classifying judgments into vaguely quantified categories. Alwin (2007) concludes that the reliability of reports about past behavior is lower when items use vague quantifiers.

Data Quality

Numerous sources can produce errors of measurement in survey data about social networks. For example, errors in self-reported data about relationships can arise because of respondent memory limitations, or because respondents seek to present themselves favorably when answering – incorrectly claiming ties to certain alters, while omitting contacts with others. Researchers may pose questions that correspond imperfectly with the concepts they seek to measure, or respondents may interpret them differently than intended. Different interviewers may administer survey items (such as name generators) in varying ways that contribute errors.

Some therefore view survey network data with skepticism. Survey designs lend themselves, however, to obtaining the repeated measures that systematic investigations of measurement quality require. Numerous studies examine aspects of data quality for survey-based social network measures. Many of these offer convincing evidence that survey responses can reliably and validly reflect underlying social network phenomena. Such studies, however, assess quality using different standards (e.g., validity, reliability, item nonresponse), focus on different objects of measurement (e.g., dyadic ties, characteristics of alters, egocentric network properties), examine substantively different network ties, and measure quality using different indices and metrics. As for survey data more generally (Alwin, 2007), quality assessments for network data are population-specific,

and the findings of any given investigation are therefore suggestive rather than definitive.

Available data quality studies do not yield a single or unambiguous verdict about the quality of survey measures of networks. Some measurements appear highly valid and reliable, while others are less so. We call attention here to some influential lines of work in this area but do not attempt either to exhaustively cover or to synthesize all relevant methodological research; for further discussion, see Marsden (1990, 2005). We first discuss studies that assess data quality for measures of respondent-alter relationships (sociometric items and name generators). Subsequently, we cover research that examines name interpreter items and measures of network composition.

Accuracy and Validity Studies for Relational Items

Important and influential "informant accuracy" studies summarized in Bernard et al. (BKS; 1981) examined the accuracy or validity of reported communication ties in whole networks. These studies compared reports about relationships based on sociometric items with "gold standard" measurements of behavior obtained using diaries or logs or systematic observation. Across several small populations surveyed using varying measurement methods (e.g., rankings versus ratings), the survey reports and the "behavioral" measurements of communication exhibited moderate agreement, at most. These findings posed serious questions about the quality of "cognitive" reports on social ties obtained using surveys, although we note in passing that diaries and observations of behavior also may include measurement errors. A similarly designed classroom study (Gest et al., 2003) drew more encouraging conclusions about the quality of survey data obtained using the SCM.

The BKS studies stimulated numerous reanalyses and follow-up studies. Kashy and Kenny (1990) dissected the overall correspondence between survey reports and behavioral data into two "individual" components involving actor-level tendencies to communicate with others and a "dyadic" component involving their tendencies to communicate with *particular* others. Their data analyses revealed a relatively close actor-level correspondence between survey citations received and overall observed interaction levels, and moderate dyadic-level correlations. Survey citations made and observed interaction levels corresponded quite poorly, however, a conclusion later echoed by Feld and Carter's (2002) finding of "expansiveness bias" – wide actor-level variation in reports about outgoing relationships – in survey network data. These studies indicate that survey data may measure some network properties more validly than others.

A separate line of work by Freeman and Romney (1987; see also Freeman et al., 1987) argued that measurement errors in survey reports of past social interactions are not random but instead tend to be biased toward long-term patterns. These studies obtained two-mode survey data in which respondents reported whether others had been present at a recent meeting. Analyses then compared those reports to attendance records – both for the particular meeting in question and for a series of meetings held over a longer period of time. They found that persons falsely reported as being present at the meeting in question were apt to attend most meetings; those incorrectly reported as missing the recent meeting tended to be infrequent attenders over the longer run. These findings suggest that survey respondents can report stable patterns of social interaction validly, but are less capable of recalling time-specific episodes with precision. This resonates with more general findings about the cognitive challenges respondents face when answering survey questions asking them to report event dates (Tourangeau et al., 2000: Chapter 4).

Reliability of Relational Items

Many other studies compare two or more survey measurements of the same datum, thereby assessing the reliability of instruments. One approach examines the reciprocation of citations, reasoning that a conceptually undirected relationship should be reported by both actors involved in it. Marsden (1990) inventoried sev-

eral studies of reciprocation, finding rates that ranged widely, with some indication that reciprocity is higher for closer ties. In some more recent studies, Feld and Carter (2002) reported a reciprocation rate of about 58 percent for college students who were questioned about who they spent time with, while White and Watkins (2000) reported reciprocation of only 20 percent for reports about informal family planning discussions (“chats”) by rural Kenyan women. For a high-risk population (sex workers, intravenous drug users, and their sexual partners) adams and Moody (2007) reported much higher reciprocation levels: 85 percent for sexual relationships, 72 percent for drug-sharing, and 79 percent for “social” ties. These rates fell only slightly when calculations took timing into account, counting reported citations as reciprocated only when they referred to overlapping time intervals. Gest et al. (2003) indicate that observed interaction is higher in reciprocated dyads, thereby offering some evidence that reciprocated citations may have higher validity.

In the data studied by adams and Moody (2007), respondents also made CSS-like reports about contacts of their contacts. Reports about relationships among contacts of contacts were corroborated relatively often by self-reports from participants in those relationships, though at rates lower than the above-cited reciprocation levels. In particular, observer reports were less often consistent with self-reports about sexual relationships, which ordinarily take place in settings not open to observation by others.

Test-retest studies compare two or more measurements made using the same instrument on different occasions. Test-retest correlations reflect some combination of stability in the phenomenon under study and reliability in a measuring instrument, so they are not unambiguous indicators of data quality. For survey network data, test-retest assessments can be made at different levels. Some studies examine the percentage of stability/turnover in citations of individual alters. For example, Morgan et al. (1997) showed that about 55 percent of the alters elicited by a name generator were named again after two-month periods. In White and Watkins's (2000) study covering a two-year interval, respondents re-named only 18 percent of the partners with whom they first reported “chatting” about family planning. Bignami-Van Assche (2005) gives an even lower figure (about 10 percent) for similar reports in Malawi that were separated by a three-year interval. Less than 30 percent of alters were elicited on both of two occasions separated by a much shorter period (about 10 days). Alters having close ties to a respondent appear much more apt to be reported repeatedly across occasions than those having weaker relationships. For reviews of other evidence on the repeated citation of alters across waves of panel studies, see Marsden (1990) and Brewer (2000).

Instruments may measure properties of respondents’ egocentric net works reliably across occasions of measurement despite substantial turnover in the individual alters that respondents name, if actor-level measures of network form and composition remain stable. In one study, Morgan et al. (1997) obtained repeated measures of egocentric network size and the percent of family members in a respondent's egocentric network over two-month intervals, reporting between-wave correlations above 0.6. In another, Bignami-Van Assche's (2005) name generators elicited similar numbers of alters when readministered after a short time interval, though respondents often did not name the same specific alters.

Several data quality studies estimate the reliability of survey network measures using a multitrait-multimethod (MTMM) approach. Such studies repeatedly measure several relationships using different methods and are thereby able to assess both the reliability of measurements and the extent to which reliable variance is attributable to differences in methods. For eight whole-network classroom studies, Ferligoj and Hlebec (1999) reported relatively high reliability levels (above 0.85) for four social support measures. Their measures of emotional and informational support were somewhat more reliable than those of informational support and companionship. While measures using binary response scales appeared somewhat less reliable than those involving ordinal scales, method-related variance in true scores was only modest (see also Hlebec and Ferligoj, 2002).

Name Interpreter Data: Proxy Reporting and Network Composition Measures

Responses to name interpreters provide the content for most egocentric network measures constructed using data elicited by name generator instruments. Relevant data quality studies examine responses to name interpreters at the alter level, and they assess indices and scales based on those data.

Proxy Reporting

When they answer name interpreters about alter characteristics, survey respondents make "proxy" reports about alters. The survey research literature includes numerous studies examining the quality of such reports (e.g., Moore, 1988), mostly for respondents reporting about their spouses or other household members. Alwin (2007) assessed the reliability of spousal proxy reports about socioeconomic status, finding them to be relatively reliable – though less so than self-reports. Sudman et al. (1994) reason that the quality of proxy reports should rise with respondent-alter interaction.

Many studies of proxy reports obtain self-reports directly from alters, and then compare them with an original respondent's proxy report. If we regard the alter as the authority on his or her characteristics, such a design estimates the validity of the proxy measure. Some social network studies use such designs to assess the quality of proxy reports about friends or other nonhousehold alters. A common finding is that respondents can report observable data about alters – age, sex, household possessions, number of children – reasonably well; proxy answers about less observable features such as political party affiliation or contraceptive use are of lower quality (Laumann, 1969; White and Watkins, 2000), and often biased toward the proxy respondent's own value on such measures. See Marsden (1990) for further discussion.

Reliability of Network Composition Measures

As noted earlier, many measures that describe egocentric networks are within-respondent means of data obtained via name interpreter items; for example, egocentric network density can be expressed as the mean strength of tie between pairs of alters in a respondent's network. Marsden (1993) assesses the reliability of such measures using methods from generalizability theory. Their reliability rises with the number and homogeneity of measures on different alters. Many – but not all – such properties can be reliably measured using name generator instruments that elicit five or fewer alters.

Some other studies estimate the reliability of such measures using MTMM designs. Kogovšek and Ferligoj (2005), for example, report reliability coefficients above 0.8 for average frequency of contact with, and average closeness to, alters in an egocentric network. They found that measures with behavioral rather than emotional content are more reliable. In interviewer-administered modes, "alter-wise" presentation of name interpreters yielded more reliable measures than did "question-wise" presentation (Kogovšek et al., 2002; Kogovšek and Ferligoj, 2005). The question-wise approach appears to be more reliable in the Internet mode, however (Coromina and Coenders, 2006; Vehovar et al., 2008). Kogovšek and Ferligoj (2002) find that the reliability of composition measures is higher for "core" networks composed of strong ties than for "extended" ones that also include weaker relationships.

Another set of MTMM studies exploits the hierarchical structure of data from name generator instruments, in which observations on alters are nested within respondents. This allows estimation of reliability coefficients for alters within respondents and for between-respondent differences. Coromina and Coenders (2006) report reliability coefficients above 0.8 at both levels for advice, collaboration, information exchange, and socializing among members of research groups. Reports about collaboration were most reliable, those about socializing least so. Coromina et al. (2004) report similar findings for common measures of tie strength, such as closeness and frequency of contact.

Human Subject Protections and Network Surveys

Surveys that collect data on social networks must comply with all laws, regulations, and norms that govern the conduct of survey research. Among these are obtaining voluntary, informed consent from respondents, minimizing risks to them, and protecting their confidentiality after data are assembled (see Citro, 2010) when disseminating research reports or archiving data sets. Special vigilance is warranted when such surveys ask respondents for information about their relationships involving sensitive behaviors such as sexual activity or drug use. See Klovdahl (2005) and Woodhouse et al. (1995) for discussion of steps that may be taken under such circumstances.

Network surveys often collect information about third parties – the alters or associates connected to respondents. Some regard such third parties as research participants, contending that researchers must locate and seek informed consent from them as "secondary subjects," though this view is debated (see Klovdahl, 2005; Morris, 2004: 3). Without question, however, researchers are obligated to protect secondary subjects against harms arising from disclosure of research data and to ensure that any risks to them are minimal and outweighed by potential research benefits. Woodhouse et al. (1995) suggest that investigators may have more extensive responsibilities to such third parties, should the research discover that they are at risk because of the behavior of primary subjects.

Conclusion

Survey methods are, and seem apt to remain, a leading approach to collecting social network data. Like other research methods, they have drawbacks. Assembling survey data can be both expensive and time-consuming, especially for large samples or populations. Much methodological research examines possible measurement errors in survey network data, but they can also include error attributable to factors such as nonresponse or interviewer differences.

All research data include errors, however, and such legitimate concerns about the survey approach should not blind us to its strengths, many of which have to do with its flexibility. Researchers control the definition of network boundaries when they conduct surveys. Survey methods can elicit all strands of relationships, not only those recorded within a specific medium such as electronic mail. Survey researchers can measure the aspects of relationships that are of conceptual interest in a study – rather than (for example) relying on those tracked by a record-keeping system – thereby improving validity. Survey data are collected under relatively standardized conditions. Surveys often require only modest time commitments from participants, by comparison with the demands made by some alternative methods such as diaries.

Looking forward, we can anticipate continued attention to assessing and reducing different forms of error in survey data. As well, investigations that seek to develop more efficient instruments and innovations in modes of collecting survey data seem likely. Internet surveys offer many prospective gains – including substantial cost and time savings, respondent convenience, and the possibility of using new and different visual interfaces. These innovative methods may, however, hold consequences for data quality, investigation of which has only begun for survey data about social networks.

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Notes

1 This view of the relationship between whole-network and egocentric data assumes, however, that the egocentric networks for all focal actors of interest lie within whatever boundary is established for the corresponding whole network. In practice, many egocentric studies are conducted in large, open populations where this assumption may be untenable.

2 Obtaining egocentric network data on respondents in conventional sample surveys resembles this design.

3 We omit discussion of network sampling methods such as respondent-driven sampling (Heckathorn, 1997), which use social connections among elements of rare or hidden populations to draw samples of actors in those populations, rather than to sample whole or partial networks per se.

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- egocentric networks

- egocentrism
- interpreters
- networks and networking
- networking
- data quality
- instruments

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