Week 4 summary

Bachwani, Trofimovsky, Shetty
Wasserman and Faust Chapter 2

Social Network Data: Collection and Application
2.1 What are Network Data?

**Basic Principle:** Social network data includes measurements on the relationships between social entities

Data that consists of *at least one structural variable* measured on a set of actors; where structure refers to the regular patterns in relationships. Quantities that measure such structure are called structural variables.

**Which variables to measure?** are determined by the substantive concerns and theories motivating the study, for e.g. archival records for economic transactions between countries vs interview between friends.

**Size of sample and Analytical method:** determined by the Nature of the variables.
2.1.1 Structural and Compositional Variables

**Structural variables** measure ties of a specific kind between pairs of actors; usually single set, size 2

**Compositional variables** measure actor attributes (and are of the standard social and behavioral science variety, e.g. gender, ethnicity, number of employees, after-tax profits etc.)
2.1.2 Modes

Distinct set of entities on which the structural variables are measured

**One-mode network**: One set of actors e.g. Corporations OR Non-profits.

**Two-mode networks**: Two sets of actors e.g. Corporations AND Non-profits (senders/receivers)

**Affiliation Variables**: Two mode but only one set of actors, the other mode is an event, e.g. alcoholics belonging to different AA groups.

- Defining an affiliation variable yields a sub-set of actors.
- In an informal setting (party, social gathering etc.) observation, attendance or interactions provides affiliation.
2.2.1 Defining your population and determining a boundary

Relevant actors

- Small closed sets e.g. employees at a store
- Arbitrary sets e.g. elites in a community (people come & go, “external” definition)

Often, **boundaries are based on the relative frequency of interaction or intensity of ties.**

Laumann, Marsden and Prensky (1989) describe two approaches:

- **Realist:** Boundaries and membership as perceived by the actors themselves
- **Nominalist:** based on theoretical concerns of the researcher e.g. flow of messages among researchers in a specialty

Some actors may be left out due to practical issues or unintentionally but at the outset we must be define a finite set of actors and be able to enumerate the set(s).
2.2.2 Sampling

When all actors cannot be measured, a known sampling mechanism may yield a good probability sample.

The larger theoretically interesting population must have a well defined boundary (thereby known size)

Chain methods – Trace ties from source to an end

- **Snowball sample** – 1\textsuperscript{st} order zone -> 2\textsuperscript{nd} order zone (Goodman 1961)
- **Small-world technique** - strangers being linked by a mutual acquaintance
2.3 Types of Networks
categorized by:
• nature of the sets of actors
• properties of the ties among them
<table>
<thead>
<tr>
<th><strong>Actors</strong></th>
<th><strong>One-Mode Networks</strong></th>
<th><strong>Two-Mode Networks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People</td>
<td>General type of actors as described in one-mode.</td>
</tr>
<tr>
<td></td>
<td>Subgroups (people)</td>
<td>However, the two sets may consist of different types of actors.</td>
</tr>
<tr>
<td></td>
<td>Organizations (subgroups of people)</td>
<td>When one set of actors is measured with respect to attendance or affiliation with a set of events or activities.</td>
</tr>
<tr>
<td></td>
<td>Collectives/Aggregates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Communities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Nation-states</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Relations</strong></th>
<th><strong>One-Mode Networks</strong></th>
<th><strong>Two-Mode Networks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Measure $\geq 1$ substantive connections or relational contents</td>
<td>At least one relation between the two sets of actors.</td>
</tr>
<tr>
<td></td>
<td>▪ Individual evaluations: friendship</td>
<td>Dyadic: relations measuring ties between actors in one set and actors in another.</td>
</tr>
<tr>
<td></td>
<td>▪ Transactions: lend/borrow, buy/sell</td>
<td>Non Dyadic: since affiliations are measured on a subset of actors.</td>
</tr>
<tr>
<td></td>
<td>▪ Transfer of non-material resources: communication..</td>
<td>Nature of events depend on the type of actors involved.</td>
</tr>
<tr>
<td></td>
<td>▪ Interactions: hit, hug, visit..</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Movement: physical, social</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Formal Roles: boss/empl, Dr/pt</td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Kinship: marriage, descent</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Attribute</strong></th>
<th><strong>One-Mode Networks</strong></th>
<th><strong>Two-Mode Networks</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>People: age, gender, race, schooling..</td>
<td>In multiple type of actors, a unique collection of attributes exists for each set</td>
</tr>
<tr>
<td></td>
<td>Corporation: profit, revenue, location..</td>
<td>Attributes of actors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attributes of events</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discrete events (time, place)..</td>
</tr>
</tbody>
</table>
Other Types of Networks

**Special Dyadic Networks:** e.g. counseling couples (husband/wife, father/son etc.) can interact with each other but don’t typically interact with other couples. Therefore the design of the experiment constrains interactions and sampling a large population of such pairs yields non-network relational data

**Ego-centered Networks:** Focal actor – *ego*, as set of alters who have ties to ego (**personal network data**).

**Social Support** -- social relationships that aid the health or well-being of an individual.
2.4.1 Measurement of Network Data

**Unit of Observation:** Entity on which measurements are taken by observing, interviewing or questioning individual actors about ties to other actors in the set (e.g. Dyad: pairs of aggressive children on a playground; Affiliation: Children and aggressive behavior on playground)

**Modeling Unit:** Level at which network data are studied (actor, dyad, triad, subgroup, network)
- Data often gathered at a level that is different from the level at which they are modeled
- Useful to consider the level to which a model or network property applies (actor – choices received from others in the network, set of actors – choosing friends, ties among triads, interactions among a subgroup or network as a whole)

**Relational Quantification**
- Directional (export from one country to another) vs non-directional (countries with shared borders)
- Dichotomous (send/don’t send an ambassador) Valued (indicate strength, intensity or frequency of trade)
2.4.2 Collection of Data
Questionnaire

Most common esp. when actors are people and useful when relations can be reported. For collective entities such as corporations, a representative individual can report on the collective’s ties.

- **Roster vs Free Recall**: depending on known members of a set prior to data collection (e.g. sampling a university class vs name three friends)
- **Free vs Fixed choice**: depending on constraints on number of ties (e.g. name a few friends you hang out with vs name three friends...). <20% confirm to fixed choices
- **Ratings vs Complete rankings**: Assign a value reflecting intensity of ties. Rating requires assignment of a value (dichotomous or valued rating) of a tie while complete rankings require each respondent to rank (dichotomous) their ties to all other actors (rate vs rank inter-office communication, *directional*)
 Interviews, Observation & Archives

**Interviews:** Face to Face (Glaskiewicz: CEOs prefer this over questionnaires), telephone

**Observation:** widely used in field research to study relatively small groups of people who have face to face interactions (SoCal beach surfers). Useful with people who aren’t able to respond to quest/interview
- Can be used to observe non-human behavior (primates)
- Affiliation network data (e.g. under-grad, grad & faculty attending DAPS brown-bag)
- Summaries based on researcher impressions

**Archival Records:** Examining political interactions, author citations, meeting minutes etc. can yield –
- Longitudinal relations and can reconstruct ties that existed previously.
- Study of sociology of Science e.g. who cites whom for understanding diffusion of innovation.
Other methods of Collection

**Cognitive Social Structure**: measure perceived relations by perception of other actor’s network ties. Alternatively, one can uncover tightly knit sub-groups among actors. Yields more information.

**Experimental**: At least two basic ways:
- Choose a set of actors and observe interactions in a experimentally controlled situation
- In addition to above, specify which pairs of actors may interact (e.g. Group prob solving)

**Ego-centered**: Focal ego & set of alters and interactions between alters (incl. Are alters strangers?)

**Small World**: How many actors a respondent is removed from a target based on acquaintanceship (length of chain) and attributes of intermediate actors
- Reverse Small World: ties from a specific respondent to a variety of hypothetical targets.
- Response rates are usually lower and leads to possible biases (White 1970)

**Diary**: keep continuous record of people one interacts with. Yields types of relations and characteristics of the alters
2.4.3 Longitudinal Data Collection

Study how stable ties are and whether they ever reach equilibrium.

How ties in a network change over time.

How confidently can the past predict the future
2.4.4 Measurement Accuracy, Validity, Reliability and Error

*True structure* (relatively prolonged & stable pattern of interpersonal relations) vs *observed structure*
Accuracy

Accuracy of self-reported data: half incorrect in one way or another

– Does it impact long-range/true structure?

– Another issue to consider: Reliability of representatives of collective sets
Validity

Valid to the extent that it measures what it is intended to measure

(Who are your friends – measure of friendship)
Rarely tested rigorously.

A more formal notion – construct validity: arises when measures of concepts behave as expected in theoretical predictions (i.e. over a range of theoretical propositions).
Reliability

Reliable if measure reproducible repeatedly.

• Test-retest: measure at two points in time, assuming no change (is that possible in soc. nets?)

• Compare measurements among subsets (split halves, alternate forms (questionnaires))

• In general, the following are more reliable:
  – Ratings and rank orders (higher test-restest reliability)
  – Intense or intimate relations (higher reciprocation)

Assess reliability at different levels – individual actor ties vs aggregation of a number of responses
Measurement Error

Discrepancy between true and observed value = True score + Error (noise).

– Different levels of observation (actor, subsets, whole etc) may not reflect overall value

– Fixed choice introduces error: Name three friends (but not everybody has exactly 3 friends!)
2.5 Data Sets
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Era/Location</th>
<th>Actors</th>
<th>Attributes</th>
<th>Ties Measured</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krackhardt’s High-tech Managers</td>
<td>1987 Small Manufacturing Organization (West Coast)</td>
<td>21 Managers (incidentally, there were 100 employees)</td>
<td>Age, Tenure, Level, Department</td>
<td>Questionnaire 1. Advice 2. Friends Org. Records 1. Reports to</td>
<td>Verbal interact Individ. Relation Hierarchical stru</td>
</tr>
<tr>
<td>Padgett’s Florentine Families</td>
<td>15th century Political battle for control of Govt.</td>
<td>16 Families (Medicis, Strozzi) (tot 116 families)</td>
<td>Wealth 1427 Council seats 1282-1344 # business ties #marriage ties</td>
<td>Historical records 1. Marriage 2. Business</td>
<td></td>
</tr>
</tbody>
</table>

Dichotomous. Also Transactional since business relations (credit loan, partnership, which are clearly directional) and marriage (which has been updated to reflect directionality) used to solidify economic and political alliances.

<table>
<thead>
<tr>
<th>Freeman’s EIES Network</th>
<th>NJIT (NSF) 1979 Electronic comm pre-internet era</th>
<th>32 Researchers (18 did not complete study)</th>
<th>Prim Discipline (soc, anth, math stat or other) No of citations</th>
<th>Messages Sent Acquaintances (knew, heard, met or friends)</th>
<th>One Mode Impact of newly formed computer network on acquaintanceship and friendships among researchers. Later W&amp;F used this data to demonstrate application of correspondence and canonical analysis to soc network data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does location impact the rate of industrialization and development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dichotomous, Directional To standardize imports to control for vastly different economic sizes, each value was divided by the country’s total import for that commodity (little impact). Diplomatic Exchange was measured by presence of an embassy or High Commission in another country.

<table>
<thead>
<tr>
<th>Galaskiewicz’s CEOs and club network</th>
<th>St Paul metro area Minneapolis 1978-1981</th>
<th>1st Mode: 26 CEOs &amp; their spouses 2nd Mode: 15 clubs, cultural &amp; corporate boards.</th>
<th>Nature of corporations Organizations by their nature</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Two mode affiliation network. Dichotomous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bernard et al. The problem of informant accuracy: The validity of retrospective data


Freeman et al. Cognitive structure and informant accuracy.
Bernard et al. The problem of informant accuracy: The validity of retrospective data


Freeman et al. Cognitive structure and informant accuracy.
How far do you drive to campus everyday?

- If you answer 3 miles
  - Is it more accurately 2.7 miles?
  - Is it literally every single day?
- Substantive
  - Does this impact anthropological description?
- Theoretical propositions help
Informant accuracy

- Studies on recall, generally 50/50
  1. Recall of child care behavior
  2. Recall of health seeking behavior
  3. Recall of communication and social interaction
  4. Some isolated studies
Informant accuracy cont.

- Conceptual variables
  - Beliefs and attitudes
    - “willingness to accept new technologies”
  - Well-defined theory
    - Provides context
Problems

- Omissions & telescoping
  - Memory decays over time
  - Informants underestimate
  - 5-10% increase
- “What goes with what”
  - Reporting cultural norms
  - Strong verbal associative connections
  - Reflects cognitive structure of the raters
Error bounds

- Do we know why we see the problems?
- What is acceptable?
- What if we knew more? Would the following help?
  - general rules to make a reasonable guess about efficacy? a function of the questions being used? a function of informant personality and/or socioeconomic characteristics? theory
  - people in some cultures recall more accurately? people in some cultures report environmental events or personal property ownership than people in others? limitations
  - accuracy is random?
  - accuracy can be boosted? by x amount?
  - some behaviors are easier to recall than others?
Cited research study

- Perhaps informants answer the culturally appropriate questions nearest to the ones we ask them, rather than the questions we ask them?

- Chalkboard experiment
  - Participants exposed to a blue chalkboard
  - They were asked: What color was the chalkboard?
  - Many said green and some said blue
  - Experimenter kept following-up, badgering all participants
  - Those that said blue stuck with their answers despite
  - Those that said green were uncertain about their answers
Another cited research study

- Evidence on group recall
  - Told a classroom Busmen tales
  - Asked students to tell stories back
  - Varied group sizes
  - Found the bigger the group, more accurate the tell-back
- People can tell the difference between knowing and norms
Error bounds cont.

- Subconscious decision making
  - Rather save $5 on $20 item? Or, save $5 on $100 item?

- Rewording / restaging situations
Group recall

“Group at large”

- Knows who is most communicated with
  - More similarly two people judge the communication pattern of others, more likely they interact with each other
  - More two people share accurate knowledge of others, more likely they interact with each other
  - Can we distinguish relatively accurate and inaccurate informants?

Basis for agreement

- When norms are clear, e.g., green chalkboards, “Kronenfeld’s badgering” provides the answer
Instruments might not work in different places

- Previously accurate thermostat
  - Suddenly readings not accurate
  - Figure out if it is something external to thermostat
    - Change external situation so thermostat is accurate again
    - If yes, then thermostat is reliable
    - If no, then thermostat still unreliable, try something else
    - If really no, then thermostat is useful in very controlled situations
- What level of accuracy can we achieve in the instrument we use after making empirical and/or theoretical corrections?
  - Identifying least accuracy is useful
  - Important to identify sufficiency with regard to accuracy
- Inaccuracy ought to lead to a rich, relatively unexplored area of research
- Testing accuracy means testing “error bounds”
Bernard at al. The problem of informant accuracy: The validity of retrospective data


Freeman et al. Cognitive structure and informant accuracy.
Network methodology strengths

1. Data in a relational format
   - Operationalizing the environment

2. Organizational environment as an epiphenomenon
   - More than the sum of its parts

3. Positional level attributes to organizations
   - Locate organizations within well-defined environmental positions
   - Links, ties, or exchanges amongst positions can be measured, and the structure, “is emergent and not reducible to the individual properties of the organization” (p. 379).
Network methodology cont.

- Unclear as to the most objective or precise way to obtain data
  - Proxies of actual relationships
    - Secondary & archival data
    - Larger data more manageable
  - Direct observation
    - Small group setting
  - Surveys and questionnaires
    - Define links
    - Larger networks
Some study details

- Two potential sources of reliability problems
  - Presence/absence of relationships
  - Extent of systematic errors
- Empirical study
  - Four US metropolitan cities
  - Over 30 organizations in a system
  - Interviewed key informants
- Mutual acknowledgements of relationships
  - How often reciprocated
- Three process data collection
Relational questions

- Likert scale
  - 0 signified ‘not at all’ & 4 signified ‘a lot’
- “To what extent does your agency receive information for coordination, control, planning, or evaluation purposes from this agency?”
- “How well coordinated are the activities of your agency with those of this other agency
- Considers
  - Accuracy in who they communicated with
  - Ability to recall the intensity of communication
Reliability

- Dichotomized 0s to 4s
- Density, number of ties
- Correlation and high confirmations
  - Discussion Q: How many confirmations? 50%? 75%? 100%?
  - 70% for information, 68% for coordination
Organizational respondent predisposition

- Organizations sharing strong relations might be influencing informants’ perceptions
- “Strongly related organizations will have higher numbers of confirmed relationships than those weakly linked as a function of the strength of the relationships”
- Systematic error would be apparent if there is high correlation between: (1) strong relations (3 or 4 on the 0 to 4 scale); (2) confirmed relations.
  - Systematic errors on this measure were low
- Does the confirmation rate vary at different levels of relational strength?
  - The authors found that the stronger the relationship the more likely it was to be confirmed
Bernard et al. The problem of informant accuracy: The validity of retrospective data


Freeman et al. Cognitive structure and informant accuracy.
Freeman et al. 1987

- Focus on the relationship between what people do and their recollections of what they did
  - The “main concern of social science is in relatively long-term, more or less stable patterns of repeated events” (p. 310)
  - Interested in how data correspond to long-range patterns.
- Describe a way to do long-term measurement
- Explain observed pattern of response bias
Empirical study

- Social acts over an entire school term
- Colloquium series
- Mathematical Social Science Group at the University of California Irvine
- Faculty and graduate students from various programs and other universities
- Large venue, participants sit in big circle
- Attendance for 10 sessions
- Spring 1985
- Drew maps recording the names and seating patterns and arrival and departure times
- Questioned at a computer
- 33 informants
- Asked to recall who was in attendance
52% recall

- Many people who attended were forgotten
- Some who were absent were falsely recalled
- Biased in terms of the long-term attendance pattern
- Rather than answering “What was there?”, individuals answered “In a typical setting, who is likely to be there?”
  - Bias towards norm
Cognitive structure

1. Human memory is organized
   - Not passive
   - Construct mental structures
   - Impose patterns

2. The organization embodied in a mental structure is revealed in free recall
   - Reorganization in report, grouping

3. The organization of memory is based on experience
   - Personal

4. Recall aided by
   - Elaboration
   - Typicality

5. False recall
   - Elaboration
   - Typicality
   - Cost: “Default processing”
5 general principles/ supported hypotheses

1. To the degree that our informants are in the in-group of the program, they are experienced and have developed internal mental structures to represent the experience. Consequently, they will generate more false recalls about which others attended a particular session.

2. To the degree that our informants are in the in-group of the program, they are experienced and have developed internal mental structures to represent that experience. Consequently, they will forget fewer others who attended a particular session.

3. To the degree that people have attended the colloquium series regularly, they will be seen as typical elements in that setting and consequently, if they were present at the target session, will be less likely to be forgotten by informants.

4. To the degree that people have attended the colloquium series regularly, they will be seen as typical elements in that setting and consequently, if they were absent at the target session, they will be more likely to be falsely recalled by the informants.

5. To the degree that our informants are in the in-group of the program, they are experienced and have developed internal mental structures to represent the experience. Consequently, they will display an organization reflecting that structure in the order of the items they remember.
Correlating attendance with accuracy

- The authors correlated rates from the most accurate informant with actual attendance, then they added another one, and correlated that, and did that until they had 10 most accurate informants.
  - By the third informant, 10 most active participants were identified.
  - By the fourth informant, 20 most active participants were identified. Few inactive participants were picked up at this point.
  - By the seventh informant, there was an .85 correlation with actual attendance.

- The authors did the opposite, using lowest rating informants.
  - Errors descended until the fifth individual.

- The authors note: “if you want information on long-term patterns, ask your most productive informants—those who produce the longest lists. But if you want to reconstruct the actual event, ask your least productive ones—those with the shortest lists.”
READING SUMMARY

SOCIAL COGNITION AS BASIS FOR NETWORK ANALYSIS

Madhukar Shetty
02/08/12
MAIN ISSUES

• **Why social cognition?**
  a. Exit from atomization and normative explanation
  b. Source and process of agency- structure reciprocity
  c. Provides the framework and field for a distinctive method
  d. Owns up the implicit source of much of social data
  e. Lack of fit between perception and reality assumes great theoretical fertility- constructionist logic

• **How do the papers confront this issue?**
  a. Demonstrate how the cognitive categories are filled and approximated to reality
  b. Develop a framework for the methodological and definitional strategies used to source network data.
  c. Establish the effect of perceptual manipulation on a social outcome
  d. Model and test a contentious social category in terms of cognitive variables

• The article tries to compare and converge two regularities:
  a. The regularity of cognitively structuring observed interaction;
  b. The actual patterns of interaction.
• There is a broad correspondence between these cognitive structures and actual structures of interaction. This theory provides a basis for linking individual perception with macro structures.
AFFILIATION

- “Stable interpersonal relationships that involve both frequent interaction and positive sentiment.” (p. 118).

- Two components of affiliation: Sentiment and interaction.

- Sentiment cannot be measured, the research relies on correspondence between reported affiliation and interaction.
ACCURACY OF REPORTS

a. Errors in recall but bias towards enduring patterns.
b. Correspondence between cognitive maps and observed patterns of behavior.
c. Together, these imply that accuracy of recall is loaded toward patterns and not specifics and cognitive maps developed by individuals almost reflect patterns of interaction.
PERCEPTION OF AFFILIATION

- Bartlett’s (1932): Categorical schemes as building for thought and action.
- DeSoto’s (1960): Experiments to show development of a miniature social structure in individual perception.
- Variability in types of relationships learnt.
- Freeman’s (1988): People produce hierarchies of groups with great ease pointing to the pre-existence of a taxonomic structure in their minds.
- Need to unravel categorization of intransitivity and the difficulty of a direct observation of interaction patterns—“messy data.”
MESSY DATA

- Campbell (1957) pointed to the extreme complexity of developing cognitive categories.
- Subsequent research has shown that the solution of the complexity of the perceived world is mainly through processes of reorganization and simplification.
- More specifically, in perceiving interactions people tend to avoid intransitivity and individuals are assigned to groups even when the data displays intransitive triples.
COGNITIVE CONSTRUCTION

- Individuals who interact most frequently provide the exemplars or anchors to develop the first prototypes of interaction patterns.
- The prototypes are learnt first, with the greatest ease and also form the typical case for subsequent ordering of affiliation.
- Correct, “intransitive triples” by adding, “missing” connections. The difficulties of intransitivity are not ignored but corrected by assuming that the missing links were only overlooked. This process of filling the overlooked blanks accounts for the process for cleaning up difficult data and producing viable categories of affiliation structures.
- Develop a “unique nested taxonomy of groups” in a hierarchical form.
Partition:

\[
\begin{array}{c}
\text{Is seen as} \\
\end{array}
\begin{aligned}
x & \rightarrow y \\
& \rightarrow z \\
\end{aligned}
\]

made transitive by adding an assumed relation

Taxonomy:

\[
\begin{array}{c}
\text{observed structure} \\
\end{array}
\begin{aligned}
x & \rightarrow y \\
& \rightarrow z \\
\end{aligned}
\]

Strong Tie:

transitive--no adjustment needed

Moderate Tie:

\[
\begin{array}{c}
\text{Is seen as} \\
\end{array}
\begin{aligned}
x & \rightarrow y \\
& \rightarrow z \\
\end{aligned}
\]

made transitive by assuming a moderate relation where none has been observed
DISCUSSION QUESTIONS

• Is the misperception a deliberate strategy of cognitive closure or a contingent response to insufficient information?

• Is there a single hierarchical taxonomy of groups where the primary group is typical or are there multiple taxonomies where different types of relations become typical depending on the situation and purpose of relations?

- Overview
- The issue of boundary specification is more important for an approach that focuses on network relations and owns up its constructionist basis.
- Responds to the need to mark the units of analysis, their definition and logics of closure.
- The promise of bridging the individual and structural levels of analysis requires a greater consciousness of boundary
TWO APPROACHES

- **Realist Approach:** The network is a conscious fact in the experiences of the actors who comprise it. Here, the bounded-ness of the group and rules of inclusion into the group have subjective meanings to the members.

- **Nominalist Approach:** Here the analyst carves the network boundaries for the purpose of analysis. The reality and the boundary of the network are mediated by the analyst’s construct. The boundary is therefore, contingent on the analyst’s purpose.

- **Definitional focus:**
  - a. actors
  - b. relations
  - c. activities

- The approaches for inclusion of actors-
  - Positional approach depends on occupation of a formal position in a group.
  - The reputational approach relies on the perceptions of knowledgeable informants.

- Another definitional focus - social relationships in which the actors participate. This approach uses the procedure of snowball sampling whereby networks of contacts are traced till a certain criterion of closure is met.

- A third definitional focus - terms of their participation in a particular activity.
<table>
<thead>
<tr>
<th><strong>Meta-theoretical Perspective</strong></th>
<th><strong>Definitional focus of delimitation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attributes of nodes</strong></td>
<td><strong>Relations</strong></td>
</tr>
<tr>
<td><strong>Realist</strong></td>
<td>I</td>
</tr>
<tr>
<td>Most frequently used realist strategy. The inclusion rule is a socially defined and recognized group membership. Ex. Weber (1937) Corporate group. Bank wiring Room (Rothlisberger and Dickson, 1939)</td>
<td>Complete connectedness and subjective we feeling are important determinants. This focus is used to identify cliques or sub-groups within larger networks. Cooley’s (1909) study of primary groups</td>
</tr>
<tr>
<td><strong>Nominalist</strong></td>
<td>II</td>
</tr>
<tr>
<td>Nominally defined group based on nodal attributes. This applies to larger networks where actors may be either organizations or persons. Positional and reputational approaches for inclusion are used. Ex. Doctors in small cities (Coleman, 1961)</td>
<td>Ex. Small world studies (Travers and Milgram, 1969)</td>
</tr>
</tbody>
</table>
INCLUSION RULES FOR RELATIONS

- Partial system fallacy, whereby inclusion of one type of relation presents a complete network, which is negated by the logic of the other relations.
- Approaches using the structural equivalence concepts place particular emphasis on inclusion rules for relations. Approaches, which use absence of ties as a criterion for determining structure in networks need to adopt some caution in establishing that there is an actual avoidance of contact instead of absence of opportunity for contact.
DISCUSSION QUESTIONS

- Has the assumption of a lack of fit between perception and reality become a staple in network analysis?
- Could this assumption dog the explanatory potential of the approach like the reification implicit in conventional social analysis?

• Overview

• Demonstrates the explanatory and predictive potential of psychological variables on social outcomes.

• Innovates standard statistical method to develop tests for correlations of cognitive categories
BALANCE THEORY

- The authors draw from Heider’s (1958) ‘balance theory’ to understand the determinants of reputation in organizations. The strain towards cognitive balance leads observers to perceive a person who displays friendship with an influential person more positively.

- This is conceptualized as “basking -in –reflected- glory effect” and applied to the process of performance evaluation and reputation marketing in organizations. The cognitive process whereby, members transmit signals of influence by displaying influential friendships determines the attachment of reputations in an organization. Observers are engaged in a comparison and evaluation process whereby they look for such signals to even or balance their perceptions.
HYPOTHESES

- **Hypothesis 1**
  - “The prominence of an individual’s most prominent friend will influence the individual's performance reputation in an organization, controlling for the individuals formal status and job performance”.

- **Hypothesis 2**
  - “Measures of perceived network relations will lead to better predictions of performance reputation than will measures of actual network relations.”
MEASURES

- **Friendship and Advice Network**
- Cognitive maps for friendship and advice networks: Who a person considers to be a personal friend and who he/she would go to for advice and help. Based on the answers, a “locally aggregated structures” of friendships and advice were developed.

- **Prominence Matrix**
- Four measures for the independent variables of the friend’s prominence matrix:
  - Indegree centrality of the perceived friend;
  - Indegree centrality of the actual friend;
  - Formal status of the perceived friend; and
  - Formal status of actual friend.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition of Each Cell in Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent</td>
<td>Respondent i’s perception of the job performance of person j, rated on a seven-point scale, for all j’s not supervised by i</td>
</tr>
<tr>
<td>Performance reputation matrix</td>
<td>Advice indegree centrality of person j’s most central friend, based on friendship and advice networks perceived by i</td>
</tr>
<tr>
<td>Independent</td>
<td>Advice indegree centrality of person j’s most central friend, based on aggregate (LAS) friendship and advice networks</td>
</tr>
<tr>
<td>Perceived friend’s indegree centrality matrix</td>
<td>Level in organizational hierarchy occupied by person j’s highest-level friend, based on friendship network perceived by i</td>
</tr>
<tr>
<td>Actual friend’s indegree centrality matrix</td>
<td>Level in organizational hierarchy occupied by j’s highest-level friend, based on aggregate (LAS) friendship network</td>
</tr>
<tr>
<td>Perceived friend’s formal status matrix</td>
<td>Supervisor’s evaluation of the job performance of person j on a seven-point scale</td>
</tr>
<tr>
<td>Actual friend’s formal status matrix</td>
<td>Level in the organizational hierarchy occupied by person j</td>
</tr>
</tbody>
</table>
ANALYSIS

- Developed a unique Multiple Regression Quadratic Assignment Procedure.
- OLS performed about 1000 times on the original matrix.
- The resultant coefficients are compared with the original estimates.
- A 5% correspondence is assumed to indicate significance at .05 level.
RESULTS: Centrality of Perceived Relations

- Performance reputation was significantly correlated with all four measures of the independent and control variables.
- Friendship with prominent others enhanced individuals’ performance reputation.
- With individuals’ job performance and organizational status controlled, only the perceptions of friendship status effected individuals’ performance reputation.
- Indegree centrality had a greater effect on performance reputation.
### TABLE 2
Means, Standard Deviations, and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Means</th>
<th>s.d.</th>
<th>1</th>
<th>2a</th>
<th>2b</th>
<th>2c</th>
<th>2d</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Performance reputation</td>
<td>4.93</td>
<td>1.39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Friend's prominence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Perceived friend's indegree</td>
<td>6.70</td>
<td>8.86</td>
<td>.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>centrality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Actual friend's indegree</td>
<td>7.87</td>
<td>7.00</td>
<td>.26</td>
<td>.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>centrality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Perceived friend's status</td>
<td>1.46</td>
<td>0.73</td>
<td>.28</td>
<td>.68</td>
<td>.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Actual friend's status</td>
<td>1.55</td>
<td>0.83</td>
<td>.28</td>
<td>.15</td>
<td>.83</td>
<td>.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Job performance</td>
<td>4.91</td>
<td>1.15</td>
<td>.33</td>
<td>.14</td>
<td>.31</td>
<td>.28</td>
<td>.49</td>
<td></td>
</tr>
<tr>
<td>4. Formal status</td>
<td>1.31</td>
<td>0.62</td>
<td>.30</td>
<td>.17</td>
<td>.54</td>
<td>.38</td>
<td>.65</td>
<td>.47</td>
</tr>
</tbody>
</table>

\[a\] All correlations are significant at \( p < .01 \), except for those with an asterisk.

\[*\] \( p < .05 \)
DISCUSSION QUESTIONS

• The propensity to carry-over friendship signals to performance reputation could be due to the absence of consensual standards for evaluation of performance in that context.

• The study does not specify whether the’ basking- in –reflected- glory’ effect is a consequence of the manipulation of perception or a generalization bias exhibited by the perceiver.

- Overview:
- Power is a typical structural construct.
- Recent theorization has emphasized its cognitive-ideological dimensions.
- The paper tests a subjective model of power.
MODEL OF POWER

a. The ability to get things done in spite of resistance (potency);

b. And the ability to influence through personal appeals (charisma).

- Cognitive accuracy is the independent variable
- Rijk.- a three-dimensional framework with sender, receiver, and perceiver accounts for variation in perception of relations.
- Multi-dimensional network structure to match the multi-dimensional nature of power.
- Contextual and structural factors: Centrality and formal position.
network. This should be particularly true in a small, entrepreneurial firm, where the owners/managers are known to be heavily involved in the details and day-to-day workings of the entire organization.

Those higher in the formal organization are forced to relate to a wider base of people. A first-line supervisor must coordinate the activities of a limited number of people, all of whom are likely to interact informally with each other and be doing similar work. A top-level manager must coordinate the activities of supervisors and managers from different functions and sectors of the organization. This responsibility gives higher-
METHOD AND MEASURES

- Silicon Systems.
- Brass (1984) reputational measure of 36 respondents rated each other on a 7-point Likert scale for both charisma and potency.
- A 3-level formal position of power was developed and given a score of 3, 2, and 1.
- Cognitive social structure: Questionnaire to assess friendship and advice relations in organizations. Two different aggregations:
  - Actual network.
  - Perceived network.
- Freeman’s (1979) ‘betweenness index’ to measure centrality.
RESULTS

- The study found that formal position explains significant variation in overall power.
- Centrality in friendship and advice networks and cognitive accuracy about the networks also account for variance in power.
- The network analysis shows that an accurate picture of an informal network significantly correlates with power.
- The study confirmed that reputational powers of the members were significantly related to cognitive accuracy of the advice network and not the friendship network.
DISCUSSION QUESTIONS

- Can this theory of the salience of perceptions be a viable basis for mapping power relations in different types of groups?
- Does the absence of correlation between the different dimensions of power endanger the very concept of power?
- Is the minor variation in power attributed to cognitive accuracy a complement of the formal power structure?