I. Introduction to Personal Networks.
History and difference with sociocentric networks
A bit of History …

- The “Manchester School”, led first by Max Gluckman and later by Clyde Mitchell, explored the personal networks of tribal people in the new cities of the Cooperbelt (but also in the India, Malta, Norway).
- Faced with culture change, mobility and multiculturalism they used social networks as an alternative to Structural-Functionalist Theory in anthropology.
Radcliffe Brown

- A. R. Radcliffe Brown, a structural-functionalist, became disillusioned with the concept of culture and anthropological approaches using an institutional framework.

- As an alternative he suggested focusing on social relations, which, unlike culture, could be observed and measured directly.

  - “But direct observation does reveal to us that these human beings are connected by a complex network of social relations. I use the term “social structure” to denote this network of actually existing relations.” (A.R. Radcliffe-Brown, "On Social Structure," Journal of the Royal Anthropological Institute: 70 (1940): 1-12.)
Two branches in the development of social network analysis

For instance …

**Gossip network …**
*(Epstein, 1957)*

![Diagram of a gossip network with nodes including Mrs. Mutwale, Mónica, Ponde, Nicholas, and Phiri, with arrows indicating the direction of gossip. The diagram illustrates the spread of gossip within a network, with different symbols and lines representing different types of relationships such as same tribe or linguistic group, school, church, and neighbors.]
Kahn & Antonucci, 1980

- Fig. 2. Hypothetical example of a convoy.
East York ...
(Wellman, 1984, 1999)

Familia Inmediata
Familia Extendida
Vecinos
Amigos Compañeros de trabajo
Lazos íntimos activos
Lazos no íntimos activos
Persona de East York
Compañeros de trabajo
Vecinos
Two kinds of social network analysis

**Personal (Egocentric) Network Analysis**

- Effects of social context on individual attitudes, behaviors …
- Collect data from respondent (ego) about interactions with network members (alters) in all social settings.

**Whole (Complete or Sociocentric) Network Analysis**

- Interaction within a socially or geographically bounded group
- Collect data from group members about their ties to other group members in a selected social setting.
Not a Simple Dichotomy

- The world is one large (un-measurable) whole network
- Personal and whole networks are part of a spectrum of social observations
- Different objectives require different network “lenses”
Personal Networks: Unbounded Social Phenomena

Example: Predict depression among seniors using the cohesiveness of their personal network

- Social influence crosses social domains
- Network variables are treated as attributes of respondents
- These are used to predict outcomes (or as outcomes)
Whole networks: Bounded Social Phenomena

Example: Predict depression among seniors using social position in a Retirement Home
Overlapping personal networks: Bounded and Unbounded Social Phenomena

Example: Predict depression among seniors based on social position within a Retirement Home and contacts with alters outside the home.
A note on the term “Egocentric”

- Egocentric means “focused on Ego”.
- You can do an egocentric analysis **within a whole network**
  - See much of Ron Burt’s work on structural holes
  - See the Ego Networks option in UCInet
- **Personal networks are egocentric networks within the whole network of the World** (but not within a typical whole network).
Summary so far

- **When to use whole networks**
  - If the phenomenon of interest occurs within a socially or geographically bounded space.
  - If the members of the population are not independent and tend to interact.

- **When to use personal networks**
  - If the phenomena of interest affects people irrespective of a particular bounded space.
  - If the members of the population are independent of one another.

- **When to use both**
  - When the members of the population are not independent and tend to interact, but influences from outside the space may also be important.
Definition of personal networks
Personal network

- The set of social relationships surrounding an individual, **which stem from different contexts** (family, work, neighbourhood, associations, religious community, school, online community…).
  - “Ego”: the focal individual
  - “Alter”: a network member
Personal network

- The set of social relationships **surrounding** an individual, which stem from different contexts (family, work, neighbourhood, associations, religious community, school, online community...).
  - “Ego”: an informant
  - “Alter”: a network member
Personal network

- The set of social relationships **surrounding** an individual, which stem from different contexts (family, work, neighbourhood, associations, religious community, school, online community…).
  - “Ego”: an informant
  - “Alter”: a network member
Personal network

- **The set** of social relationships surrounding an individual, which stem from different contexts.
  - “Ego”: an informant
  - “Alter”: a network member
Robin Dunbar: Hierarchically inclusive levels of acquaintanceship
“Dunbar’s number”

How many people does a person know?

- **Year-long observation** of two individuals (Boissevain, 1973): ± 1750
- **Contact diaries**: Pool & Kochen’s (1978) 1 person experiment:
  - Gurevitch (1961) 18 persons: 2130
  - Fu (2007): 54 persons, 3 months: 227
- **Telephone Book Studies** (Freeman & Thompson, 1989): Estimate based on the number of names informants recognize from a random sample of surnames from a telephone book, extrapolated to match the total number of names in the phonebook. 5520
- **Reversed Small World experiment** (e.g., Killworth & Bernard, 1978/79): Informants are asked who is the most appropriate first intermediary to send a package to each of 1267 (originally) or 500 persons in the world, each equipped with a location and an occupation. Extrapolation based on distribution. 250
- **Known population method** (Bernard et al., 1991): Estimate based on the size of the population, the size of 20-30 known subpopulations, and the number of persons one knows in each of the subpopulations. Various studies. ±290
- **Summation method** (McCarty et al., 2001): Sum of respondents’ estimates of the number of people they know in each of 16 relationship categories. ±290
- **Extrapolation on the basis of the relation between neocortex size and average group size of primates** (Dunbar, 1993) 150
- **Christmas cards** (Hill & Dunbar, 2003) 125
How many people does a person know?

- Year-long **observation** of two individuals (Boissevain, 1973): ± 1750
- **Contact diaries**: Pool & Kochen’s (1978) 1 person experiment: 500-1500
  - Gurevitch (1961): 18 persons: 2130
  - Fu (2007): 54 persons, 3 months: 227
- **Telephone Book Studies** (Freeman & Thompson, 1989): Estimate based on the number of names informants recognize from a random sample of surnames from a telephone book, extrapolated to match the total number of names in the phonebook.
  - Revised by Killworth et al. at 5520
- **Reversed Small World experiment** (e.g., Killworth & Bernard, 1978/79): Informants are asked who is the most appropriate first intermediary to send a package to each of 1267 (originally) or 500 persons in the world, each equipped with a location and an occupation. Extrapolation based on distribution.
  - ±290
- **Known population method** (Bernard et al., 1991): Estimate based on the size of the population, the size of 20-30 known subpopulations, and the number of persons one knows in each of the subpopulations. Various studies.
  - Revised by McCormick et al. (2010) at 611
- **Summation method** (McCarty et al., 2001): Sum of respondents’ estimates of the number of people they know in each of 16 relationship categories ±290
- **Extrapolation on the basis of the relation between neocortex size and average group size of primates** (Dunbar, 1993) 150
- **Christmas cards** (Hill & Dunbar, 2003) 125
The set of **social relationships** surrounding an individual, which stem from different contexts.

- “Ego”: the focal individual
- “Alter”: a network member
Definition affects the network characteristics, e.g.

<table>
<thead>
<tr>
<th>Core ties</th>
<th>Peripheral ties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relatively few</td>
<td>More numerous</td>
</tr>
<tr>
<td>Kin-centered (± 50% <em>,<strong>,</strong></em>)</td>
<td>Low proportion of kin (± 20% #)</td>
</tr>
<tr>
<td>High homogeneity</td>
<td>Low homogeneity</td>
</tr>
<tr>
<td>Multistranded</td>
<td>Specialized</td>
</tr>
<tr>
<td>Low spatial dispersion</td>
<td>Spatially more dispersed</td>
</tr>
<tr>
<td>(67% at max 1 hr **)</td>
<td>(40% #)</td>
</tr>
<tr>
<td>High density</td>
<td>Lower density</td>
</tr>
<tr>
<td>(.57 for 3 ties*; .44 for 18.5 ties**, but see .33 for 5 ties*** )</td>
<td>(± .25 for 41,5 peripheral ties #)</td>
</tr>
<tr>
<td>Relatively stable over time</td>
<td>Unstable over time</td>
</tr>
</tbody>
</table>

* Marsden, 1987  
** Fischer, 1982  
*** Wellman, 1979  
# These are very rough estimates based on proportions reported by McCarty (1992) for networks of 60 ties, taking into account values for 18.5 core ties based on Fischer
This is only the strength of ties, but...

- Personal networks tend to display high clustering, particularly in relation to roles / settings of meeting
- **Contents, frequency** of relationships, ...
Types of personal network data
Personal network data

- We collect data on *relationships*...
  - The relationships that an informant has with others
  - The relationships that the others have among them

- ...in order to aggregate them to variables that characterize the *networks*
  - Number of the informant’s relationships – *Size*
  - Contents of the informant’s relationships – *Composition*
  - Existence of relationships among the others – *Structure*
Personal network data

- Some questions are analyzed at the relationship level, e.g.,
  - Are kin relationships more supportive than acquired relationships?
  - Do stronger ties persist better over time?

- Others at the network level, e.g.,
  - Do people with larger support networks cope better with [some sort of life event] than people with smaller support networks?
  - Are geographically dispersed networks less dense?
Types of aggregate personal network data

- **Composition**: Variables that summarize the attributes of alters and of ego-alter relationships in a network.
  - Average age of alters.
  - Proportion of alters who are women.
  - Proportion of alters who provide emotional support.

- **Structure**: Metrics that summarize the structure of alter-alter relationships, e.g.
  - Density.
  - Number of components.
  - Betweenness centralization.

- **Composition and Structure**: Variables that capture both.
  - E-I index.
# Ego-alter relationships and network composition

## Alter summary file

<table>
<thead>
<tr>
<th>Name</th>
<th>Closeness</th>
<th>Relation</th>
<th>Sex</th>
<th>Age</th>
<th>Ethnic gr.</th>
<th>Where Live</th>
<th>Year_Met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joydip_K</td>
<td>5</td>
<td>14</td>
<td>1</td>
<td>25</td>
<td>1</td>
<td>1</td>
<td>1994</td>
</tr>
<tr>
<td>Shikha_K</td>
<td>4</td>
<td>12</td>
<td>0</td>
<td>34</td>
<td>1</td>
<td>1</td>
<td>2001</td>
</tr>
<tr>
<td>Candice_A</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>3</td>
<td>2</td>
<td>1990</td>
</tr>
<tr>
<td>Brian_N</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>23</td>
<td>3</td>
<td>2</td>
<td>2001</td>
</tr>
<tr>
<td>Barbara_A</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>42</td>
<td>3</td>
<td>1</td>
<td>1991</td>
</tr>
<tr>
<td>Matthew_A</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>20</td>
<td>3</td>
<td>2</td>
<td>1991</td>
</tr>
<tr>
<td>Kavita_G</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>22</td>
<td>1</td>
<td>3</td>
<td>1991</td>
</tr>
<tr>
<td>Ketki_G</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>54</td>
<td>1</td>
<td>1</td>
<td>1991</td>
</tr>
<tr>
<td>Kiran_G</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>23</td>
<td>1</td>
<td>1</td>
<td>1991</td>
</tr>
<tr>
<td>Kristin_K</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>3</td>
<td>1</td>
<td>1986</td>
</tr>
<tr>
<td>Keith_K</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>26</td>
<td>3</td>
<td>1</td>
<td>1995</td>
</tr>
<tr>
<td>Gail_C</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>33</td>
<td>3</td>
<td>1</td>
<td>1992</td>
</tr>
<tr>
<td>Allison_C</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>19</td>
<td>3</td>
<td>1</td>
<td>1992</td>
</tr>
<tr>
<td>Vicki_K</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>34</td>
<td>3</td>
<td>1</td>
<td>2002</td>
</tr>
<tr>
<td>Neha_G</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>24</td>
<td>1</td>
<td>2</td>
<td>1990</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Alter-alter relationships and network **structure**

Alter adjacency matrix

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Joydip_K</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Shikha_K</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Candice_A</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>. . .</td>
</tr>
<tr>
<td>Brian_N</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>. . .</td>
</tr>
<tr>
<td>Barbara_A</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>. . .</td>
</tr>
<tr>
<td>Matthew_A</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>. . .</td>
</tr>
<tr>
<td>Kavita_G</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>. . .</td>
</tr>
<tr>
<td>Ketki_G</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>. . .</td>
</tr>
<tr>
<td></td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
<td>. . .</td>
</tr>
</tbody>
</table>
Designing a personal network study

Goals, design, sampling
Make sure you need a network study!

- Personal network data are time-consuming and difficult to collect with high respondent burden.
- Sometime network concepts can be represented with proxy questions.
  - Example: “Do most of your friends smoke?”
- By doing a network study you assume that the detailed data will explain some unique portion of variance not accounted for by proxies...
- It is difficult for proxy questions to capture structural properties of networks.
Sometimes the way we think and talk about who we know does not accurately reflect the social context.
Research methods to capture personal networks

- Observation (Boissevain)…
- **Surveys**
- Contact diaries (Fu, Lonkila, …)
- Experiments (Killworth & Bernard)
- Extraction of data from SNS (Boyd, Hogan, …) / mobile phones (Lonkila)
Steps to a personal network survey

Part of any survey
1. Identify a population.
2. Select a survey mode.
3. Select a sample of respondents.
4. Ask questions about respondent.

Unique to personal network survey
4. Elicit a list of network members (“name generator”).
5. Ask questions about each network member.
6. Ask respondent to evaluate alter-alter ties.
7. Discover with the informant new insights about her personal network (through visualization + qualitative interview).
Questions about Ego

- These are the dependent (outcome) variables you will predict using network data, or the independent (explanatory) variables you will use to explain network data and for controls
  - Outcome variables: Depression, Smoking, Income, …
  - Explanatory variables: Number of moves in lifetime, Hobbies, …
  - Controls: Age, Sex, …

- Be aware that it is common to find relationships between personal network variables and outcomes that disappear when control variables are introduced