Social Network Analysis in Nursing Research

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Social Networks – Common Understanding
Social Network Analysis

- A set of elements and the links among them
- Complexity science
- Focus on *relational* variables
- Assumptions
  - Interactions and context are important
  - Structure matters
Social Network Analysis

• Nodes / Actors
  – People
  – Nursing units
  – Organizations

• Links
  – Communication
  – Medication reconciliation
  – Transfer of information, goods or services
Social Network Analysis

• Data
  – Descriptive
  – Associations with other variables of interest
  – Structural

• Examples
  – *Antecedents* to relationships
    • What will lead to a particular tie?
    • What determines the structure of a network?
  – *Consequences* of relationships
    • What do the ties predict will happen?
Social Network Analysis

• Key Differences from Traditional Research
  – Relational approach
    • Unit of analysis is typically a *pair*
  – Study design
  – Data collection & analysis

• Study purpose and research questions dictate
  – Actors
  – Links
  – Type of network
  – Statistical analyses
Types of Networks

Complete Network

• All members within preset boundaries are included
• Links of interest are examined
• Members of network are called alters
• Networks that are pre-defined by an existing boundary
Complete Network Study Recruitment

• Maximize participation
• Strategies
  – Gain cooperation for group as a whole
  – Gatekeepers
  – Influential group members
  – Individual contact
Types of Networks

**Ego-Centered Network**
- Respondents of interest list members of their personal networks
- Questions about to whom they have particular links
- People you talk to are called egos
  - Their network members are called alters
Ego-Centered Network Study Recruitment

• Identify respondents of interest
• Network of interest defined by researcher
• Boundary of network defined by ego
• Recruitment Challenges
  – Identification of egos with particular characteristics
    • Hidden populations
    • Confidentiality
  – Institutional Review Board concerns
    • Identification of egos
    • Alters have not consented to participate
    • Respondents provide information about others
Defining the Network of Interest

• Network Generator
  – Question that prompts egos to list members of the network of interest

• Different network generators lead to different networks
  – Who do you think of as family?
  – Who contributes to your organization?
Defining the Links of Interest

• Research questions guide selection of links
• Links provide data for analysis
• Examples
  – Communication
  – Social support
  – Donations
Social Network Data Analysis

• Describe and compare
  – Characteristics of the network
    • Proportion of network members who are biological vs. social kin
  – Characteristics of network members
    • Length of employment
  – Characteristics of relationships
    • How does information flow in the network?
Social Network Data Analysis

- Examine social network structure
  - Are there friendship cliques in the classrooms of children who have mobility impairment?
  - Who are the important people in the network?
Social Network Data Analysis

• Examine determinants of ties among network members
  – Are children with mobility impairment more likely to develop a tie to friends of friends?
  – Do attributes of the participants (age or gender) predict ties?
Social Network Data Analysis

- Account for interdependence among network members
Social Network Data Analysis

- Examine change over time

Time 1: Who have you talked to about your diagnosis?

- Mother
- Father
- Best Friend
- Son
- Daughter
- Husband
- Friend
- Uncle
- Brother
- Best Friend’s husband
Social Network Data Analysis

- Examine change over time

Time 2: Who have you talked to about your diagnosis?
Social Network Data Analysis

• Examine associations among individual level and relational data
  – Is type of relationship between an ego and alter associated with communication about a cancer diagnosis?

• Examine associations among relational data and outcomes of interest
  – Is communication about cancer associated with participation in cancer screening?
Social Network Analysis in Health-Related Research

• Individual and family response to health information
• Diffusion of innovations
• Within organizations
• Epidemiology
Individual and Family Response to Health Information

• Outcome variables
  – Colonoscopy screening (individual)
  – Patterns of communication (relational)

• Independent variables
  – Type of relationship
  – Gender
  – Age

Individual and Family Response to Health Information

• Social Network Structure
  – Number & proportion of network members involved in communication about a diagnosis

• Social network composition
  – Number and proportion of network members who are biological relatives

• Associations between independent and dependent variables
  – Is type of relationship associated with communication about a diagnosis?

Ersig et al, 2009, Genetics in Medicine; Ersig et al, 2011, Health Communication
Diffusion of Innovations

• Implementation of evidence-based practice
  – Where do practitioners get information on an evidence-based practice?
  – Who is implementing the evidence-based practice in their clinics?

• Examining diffusion of innovations
  – Change over time
  – Identify people central to diffusion and implementation
Within Organizations

• Multidisciplinary care team function in the ICU
• Identified care team members and key family member
  – Frequency of interaction
• Differences in team structure
  – Team 1 – Long-Term Patient
    • Attending physician central to team interactions
  – Team 2 – Recent Admission
    • Bedside nurse central to team interactions

Lurie et al 2009
Epidemiology

• Tuberculosis outbreak
• Social Network Analysis
  – Who was affected?
  – Which network members were exposed?
  – Where had the cases been?
• Genomic analysis of TB strains
• Identification of index cases

Gardy et al 2011
Conclusions

• Much of what we know about the world is relational
• Useful for studying different types of data
• Respondents embedded in their social context
  – Understanding respondents’ worldviews
  – Intervention development
• Collaboration with a social network researcher
Resources

• International Network for Social Network Analysis: [http://www.insna.org](http://www.insna.org)

• Books:
  – Wasserman & Faust (1994) – Classic, but very in-depth
  – Degenne & Forse – Introducing Social Networks (1999)
  – Knoke & Yang – Social Network Analysis (2008) – part of Sage Quantitative Applications in the Social Sciences
References

• Ersig et al (2009) Genetics in Medicine, 11:10, 728-734. DOI: 10.1097/GIM.0b013e3181b3f42d
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Questions?
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