Social Networks: Systems of Sharing Knowledge

Cheshire, UC-Berkeley
Society must be reconceptualized as a complex network of groups of interacting individuals whose membership and communication patterns are seldom confined to one such group alone.

—Diana Crane, Invisible Colleges (1972)
Why Should We Study Social Networks?

- Networks reflect relationships (good or bad), and relationships are fundamental to everything we do.
- Social networks differ as a result of culture, geography, survival demands, etc.
- Increased understanding that we are all part of a complex system, and what one does affects others via networks.
- Understanding networks can help to foster improvements in health, business, quality of life, etc.
So what?!?!

- Criminology (eg 9/11 terrorist network)
- Business (eg Supply chains to Linked In)
- Public Health (eg Comm disease & tobacco)
- Public Utilities (eg Electrical grid)
- General Public (eg 6 Degrees of Separation to Facebook and Twitter)
What is a Social Network?

“A social network is a set of people (or organizations or other social entities) connected by a set of social relationships, such as friendship, co-working, or information exchange.”
What is a Social Network?

- A set of dyadic ties among a set of actors
  - Actors can be persons, organizations, groups
  - A tie is an instance of a specific social relationship involving flow of knowledge, goods and services, etc

Cheshire, UC-Berkeley
Relationships

• Among Individuals
  – Kinship
  – Role-based (friend of)
  – Cognitive/Perceptual (knows, aware of)
  – Affiliations
  – Affective (likes, trusts)
  – Communication

• Among Organizations
  – Buy from / Sell to
  – Sharing information with
  – Partnerships
Key Perspectives in Social Network Analysis and Network Development

• Focus on *relationships* between actors rather than just the attributes of actors

• The shift from viewing actors as independent to viewing them as part of a continuously adapting ecosystem

• Increased emphasis on understanding and linking science and practice

Cheshire; Cebrowski and Garstka, 1998.
http://www.usni.org/Proceedings/Articles98/PROcebrowski.htm
Knowledge flows along existing pathways in organizations.

To understand the knowledge flow, find out what the patterns are.

Create interventions to create, reinforce, or change the patterns to improve the knowledge flow.

I frequently or very frequently receive information from this person that I need to do my job.
Common Methods for Evaluating Network Structure and Function

- Degree Centrality: the number of direct connections a node has

- Closeness Centrality: shortest path to others in the network

- Betweenness Centrality: node between other connections

http://www.orgnet.com/sna.html
What is Social Network Analysis?

– Network analysis is the study of social relations among a set of actors. It is a field of study, not just a method.

– “Social network analysis involves theorizing, model building and empirical research focused on uncovering the patterning of links among actors (agents). It is concerned also with uncovering the antecedents and consequences of recurrent patterns.” (Linton Freeman)
Social Network Analysis

• Examines connections between individuals and organizations
• Examines the absence of connections (especially important where there should be a tie)
• How does the involvement in a network affect local actions and outcomes?
• How do network structures and processes affect network-level actions and outcomes in general?
Multiple Levels of Analysis

• Individual Level
  – Example: How does individual position in a network affect various outcomes for the individual?
    • Impact of actor centrality on various outcomes.
    • What specific types of connections are best and with whom?

• Systems Level
  – Example: How does the network structure as a whole affect outcomes for various tasks?
    • Impact of high-density versus low-density networks on success or failure of group goals.
    • Impact of sub-network ties (cliques, clusters, etc.)

Cheshire, UC-Berkeley
Network Data Collection

- Common Types:
  - Survey
  - Interviews
  - Affiliation/membership records
  - Behavioral (e.g., observation of communication patterns)
  - Experiments
Networks and Network Analysis in the Tobacco Control
Networks and Smoking Behavior

Christakis & Fowler, Norsk Epidemiologi 2009; 19 (1): 5-16
Networks Depicting Contact Frequency Among Key Agencies in Four State Tobacco Control Programs

Harris et al, Social Science & Medicine 67 (2008) 1669–1678
What happens to TC networks when funding is cut, or political support changes? The case of Indiana

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$300M State Budget Deficit

$850M State Budget Deficit

$595M State Budget Deficit

$33.8M Tobacco Control Funding

$18.2M Tobacco Control Funding

$12.4M Tobacco Control Funding

Average Contact Between DHHS Tobacco Control Leaders in the Past Year

**OS**: Office of the Secretary  
**CDC**: Centers for Disease Control  
**IHS**: Indian Health Service  
**NIH**: National Institutes of Health (except NCI)  
**FDA**: Food and Drug Admin.  
**NCI**: National Cancer Institute  
**CMS**: Center for Medicare and Medicaid Services  
**AHRQ**: Agency for Healthcare Research and Quality  
**OGC**: Office of General Counsel
Average Contact Between DHHS Tobacco Control Leaders in the Past Year (collapsed across agency)

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~ KIQNIC ~
Knowledge Integration in Quitlines: Networks that Improve Cessation

A Five-Year Research Partnership with NAQC

Scott J. Leischow, Ph.D.
Principal Investigator
Goal of the Study

To assess the NAQC network in order to improve dissemination, adoption and implementation of best practices.

*The study will be conducted over five years, with opportunities for NAQC members to become involved throughout the research process.*
KIQNIC’s Objectives

1. To investigate the structure of the social network of tobacco quitlines in the US and Canada.

2. To investigate the role of social networks on the dissemination and implementation of evidence-based and newly created practices on tobacco quitlines.
Objectives, cont’d

3. To identify what moderating role decision-making practices within quitlines may have on the relationship between social networks and adoption of evidence-based practices. To evaluate the impact of information and normative influence on decision-making within quitlines.

4. To describe the task characteristics and structural features of the quitlines that affect decision-making within quitlines.
What It Means for NAQC and the Quitline Community

- Identify how evidence-based practices regarding tobacco cessation gets disseminated, adopted, and implemented by NAQC members.

- Use these findings to help NAQC members design processes and structures to facilitate dissemination, adoption, and implementation of evidence-based practices.
Three Research Components

- Social network analysis
- Decision-making
- Knowledge Integration
Learning from SNA

- How does your organization fit into the network on a variety of levels?
- What types of connections and relationships are most likely to facilitate the flow of information and ideas about best practices?
- How can your organization maximize its membership in NAQC?
How do quitlines use multiple factors in deciding whether or not, or how, to implement a practice?

- Informational influences, e.g. data and arguments presented in discussion,
- Normative influences like, e.g. status or professional position, colleagues’ behaviors and beliefs,
- Constraints like budgets and staffing.
Decision-Making, cont’d

• Will help NAQC members understand the conditions under which informational and normative influences guide decision-making, and

• Identify the relative impact of decision influences vs. network relationships on the adoption of best practices.
Knowledge Integration

• Putting evidence into action requires careful attention to how new knowledge can be integrated with local context and systems
• Knowledge exchange and uptake activities are embedded in relationships, networks and systems
Knowledge Integration, cont’d

• Reflective learning and adaptation occur throughout the knowledge-to-action process
• Provides context and foundation for our participatory research approach
• Will develop specific measures of best practices and innovations to be used as the primary “outcome” variable for this study
Timeline - Year 1

- Develop collaborative relationships between NAQC and the KIQNIC team
- Refine goals and hypotheses
- Further develop our conceptual framework and research design
- Develop data collection instruments
Timeline - Years 2-4

• Collect data
• Preliminary analyses using social network analysis to examine communication and decision-making processes
• Prepare reports on study outcomes to present to NAQC
• Provide feedback to NAQC membership
• Presentation of results at tobacco control meetings & prepare papers for publication
Timeline - Year 5

- Final analyses
- Comparison of findings across time periods
- Prepare reports on study outcomes to present to NAQC
- Provide feedback to NAQC membership
- Presentation of results at tobacco control meetings & prepare papers for publication
KIQNIC Project and NAQC

• This is a community participatory project, so NAQC member input is essential

• KIQNIC does not assess cessation outcomes, or compare quitlines on outcomes

• Updates will keep NAQC members apprised of activities, findings, and opportunities to participate
How NAQC Benefits from KIQNIC

• Provide NAQC and its members with a better and more formal understanding of how information is exchanged across the quitline network

• Understand how NAQC can work more effectively to disseminate, adopt, and implement best and promising practices

• Utilize knowledge gained to strengthen the ways NAQC and its members work to create, exchange and use information, as well as make critical quitline-related decisions

• Use information to better meet members needs, both at the community and individual quitline levels
Opportunities for NAQC Members to Participate

- Contribute to, or review conceptual models,
- Help identify dependent and independent variables to be measured,
- Provide a sounding board for methods development,
- Review and aid in the development of survey instruments,
- Provide feedback on findings to help NAQC build a stronger network.
The KIQNIC Research Team

• Scott Leischow (Principal Investigator), Professor, Department of Family and Community Medicine, University of Arizona, Deputy Director, Arizona Cancer Center

• Linda Bailey (Co-Investigator), President and CEO, North American Quitline Consortium

• Keith Provan (Co-Investigator), McClelland Professor of Public Administration & Policy, Eller College of Management, University of Arizona
KIQNIC Team, cont’d

• Allan Best (Co-Investigator), Managing Partner, InSource Research Group, Clinical Professor, School of Population and Public Health, University of British Columbia

• Joseph Bonito (Co-Investigator), Associate Professor, Department of Communication, University of Arizona

• Michele Walsh (Co-Investigator), Associate Director, Evaluation, Research and Development Unit, University of Arizona
Acknowledgement

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