Teaching about Social Networks

A Collection of Syllabi, Assignments, and Other Resources

Compiled and Edited by

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ASA Resource Materials For Teaching

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INTRODUCTION[1]

Since its earliest inception, social network analysis has evolved from a relatively simple yet novel method (e.g. through graph theory and related initial measures of structural properties such as centrality and density) to a complex set of methodologies, substantive research areas, and theoretical orientations. *Social network analysis*, or alternatively, structural analysis, is the study of how patterns of relations affect the distribution of various "things" throughout a system. While in sociology these "things" tend to be resources such as information, wealth, status, or influence, the "things" in *network analysis* conceptualized more broadly have also been diseases in medicine, or even electrical pulses in engineering. Indeed, as an avenue of inquiry, the area of social networks is broader than being simply a methodology – it is also a "paradigm", and a set of substantive areas of inquiry.[2]

Although people often view the world in terms of groups, they function in networks. In network societies: boundaries are more permeable, interactions are with diverse others, linkages switch between multiple networks, and hierarchies (when they exist) are flatter and more recursive. Social networks have always existed, but many scholars believe that they are increasingly supplanting traditional groups. The change from groups to networks can be seen at many levels. Trading and political blocs have lost their monolithic character in the world system. Organizations form complex networks of alliance and exchange rather than cartels, and workers (especially professionals, technical workers, and managers) report to multiple peers and superiors. Management by network is replacing management by (two-way) matrix as well as management by hierarchal trees. In recent years dramatic conflict (e.g. such as international terrorism, or international protests against globalization as two distinct examples) has increasingly taken on a network character. The increasing interface between computer networks and social networks (e.g. through social networking sites such as MySpace and Facebook, various telecommunication technologies such as Skype, diverse tele-working platforms, and through the myriad of other Internet resources) has profound implications for the social world. The social network paradigm provides theoretical and methodological tools for comprehending the nature of contemporary societies.

Social network analysis is the study of social structure and its effects. It conceives of social structure as a social network, that is, a set of actors (nodes) and a set of relationships

[1] The editors would like to thank the Faculty of Arts at the University of British Columbia for support for this project through a Faculty of Arts Instructional Support and Information Technology Fund award, and also the anonymous referees for their helpful feedback on the first draft of this manuscript. Also, David Tindall would like to thank the Faculty of Sociology at the University of Trento for hosting his study leave, and providing facilities while he worked on this and other projects.

[2] Parts of this introduction have been drawn (in modified form) from an earlier publication by Tindall and Wellman (2001): Tindall, D.B. and Barry Wellman 2001. "Canada As Social Structure: Social Networks and Canadian Sociology." Canadian Journal of Sociology, 26:265-308.

connecting pairs of these actors. The actors can be groups, organizations or even nation-states as well as persons, and the relationships are flows of resources that reflect relations of control, dependence, and cooperation. Network analysis's core concern is to understand how social structures facilitate and constrain opportunities, behaviours, and cognitions. Network analysts investigate patterns of relationships that connect members of social systems, and how these patterns channel resources to specific locations in social structures. Their basic premise is that knowledge about the structure of social relationships enriches explanations based only on knowledge about the attributes of actors.

The social network paradigm provides ways for analysts to think about social relationships that do not occur in groups or in isolated two-person ties (dyads). A group is really a special form of a social network that is densely-knit (most nodes are directly connected) and tightly-bounded (most relations stay within the same subset of nodes). Instead of an either/or distinction between group membership and social isolation, researchers can bring to bear in their analysis a set of structural variables. Network analysts asks questions such as how dense, bounded, or clustered a network is; whether it is diversified or constricted in its size and heterogeneity; how narrowly specialized or broadly-based are its relationships; how do indirect connections and positions in networks affect behaviour; and what are the structural contexts within which relationships operate? Once this perspective is adopted, then it is clear that communities, organizations, and world-systems are social networks.

Social network analysis contrasts with psychologistic explanations that treat individuals as independent units-of-analysis and analyze behavior in terms of psychological attributes such as values and attitudes. Social network data sets often include information about attributes, such as age, gender, ethnicity, and beliefs. However, network analysis does not treat social systems as the sum of individual attributes, but links attribute data with relational and structural data. Values, attitudes and norms develop and are embedded within a structural context – and it is the interplay between structure and culture that explains behavioral outcomes. Network analysts use ethnographic and statistical methods to investigate patterned differences in how people are linked to different kinds and amounts of resources. Clustering techniques find patterns of connectivity and cleavage, diffusion analyses trace and model the spread of information, block models identify actors in similar structural positions, and simulations model structural dynamics. Although social structures have powerful influences on people's lives, network analysts have also focused upon individuals as social agents: how people actively work to construct and maintain relationships and structures that help to sustain themselves in times of need and facilitate the creation of new opportunities.

Many network analysts study "whole networks", describing the overall structure of one or a few specified kinds of relations linking all of the members of a population. Yet the open nature of developed Western societies preclude studying entire, bounded populations. Hence many network analysts study samples of "ego-centred networks" whose composition, structure and contents are defined from the standpoint of the individuals at their centres.

The interdisciplinary enterprise of social network analysis has developed out of several research traditions, including:

• The birth of sociometry in the 1930s.

• Ethnographic efforts in the 1950s and 1960s to describe the nature of personal communities, social support, and social mobilization.

• Archival analysis to understand the structure of interorganizational and international ties.

• Political economic analyses using a range of techniques to analyze social movements and world systems.

Since the 1960s, social network analysis has developed from a metaphor into a paradigm, with a common set of research questions, specialized ways of collecting data, and powerful methods for analyzing these data. Social network analysts have an international organization (INSNA, the International Network for Social Network Analysis), and several journals (including *Social Networks*, *the Journal of Social Structure*, and *Connections*). Research papers involving network analysis are commonly presented at the annual meetings of the American Sociological Association, and are regularly published in the *American Sociological Review* as well as other ASA journals.

Today, universities world-wide offer courses aimed at introducing students to this complicated methodology. But, because of the variety of coverage between specializations within sociology, across disciplines, and geographically, a concise compendium of useful teaching resources did not previously exist. Hence, the objective of this manuscript is to provide a teaching resource for the relatively diverse populations of instructors who cover social network analysis in their courses.

This collection contains material submitted by a number of the leading scholars and teachers of social networks. Most of the syllabi are for general social network courses, but several have a somewhat more substantive focus (e.g. information science, health, communication). The syllabi vary from introductory courses, to more advanced graduate level courses. The present collection is organized into four main sections: 1) a collection of undergraduate course syllabi; 2) a collection of graduate course syllabi; 3) a set of selected assignments, exercise, and labs; 4) a set of lecture outlines from a course on social network analysis. In addition, a listing of key web resources is provided, a listing of social network analysis software programs is described, and a bibliography of key general introductory and methodological textbooks is included. At the end of the collection is a listing of the contributors, their affiliation, and their e-mail contact.

It is expected that instructors will review the syllabi for readings and organizational alternatives for developing their own courses, and also draw upon some of the example assignments. Those interested in studying social networks for their own interest will also find the collection of value.

Most of the courses listed in the syllabi are relatively general in focus (whether they are undergraduate level and introductory or graduate level and more advanced). We received more

syllabi than we were able to include in this collection, and in selecting syllabi have endeavored to provide some variety (between undergraduate and graduate, between those which are more substantively oriented and those with more of a methodological focus, and between those with a more general focus and those with a more specialized focus). Further, we received many more example exercises and assignments than we could include in the collection. In most cases we have only included "a sample" of those provided by the instructor (and associated with a particular class). Again, we tried to provide some variations in the exercises and assignments we included. One thing that will become apparent, is that social network courses tend to differ from many "traditional university courses" in that student learning takes place through "doing". Thus many of the assignments require students to do social network analysis. If you would like more information about additional assignments associated with a particular class, we would suggest that you contact the instructor in question. Also, in some cases the assignments involved analyzing data sets that are not included in this collection. In some cases you may be able to obtain these by contacting the respective author, or going to their website.

While many of the courses included in this syllabi set are relatively general, if you are in the beginning stages of developing your own course, there are a number of different ways in which you could organize it. Some courses in social networks could be organized to focus primarily on methodology, while others might focus more on substantive concerns. Introductory courses might be organized to cover topics like: 1. Theory, 2. Ego-centric networks, 3. Whole Networks, 4. Relational Approaches, 5. Positional Approaches. More methodological courses might be organized in terms of topics such as: 1. Statistics, 2. Measures, 3. Sampling, 4. Visualization, 5. Qualitative Analysis.

Some substantive foci include: 1. Social Capital, 2. Formal Organizations, 3. Political Sociology and Social Movements, 4. Social Psychology, 5. Communities, 6. Computer-mediated Social Networks, 7. Health, 8. Diffusion and Social Influence, 9. Policy Networks, 10. Crime, Deviance, and Dark Networks, 11.Youth and Networks, 12. Social Support, 13. Sexual Networks, 14. Cognitive Networks, 15. Communication Networks. (These are just a few possibilities.)

You should be able to find material within this ASA TRC collection to support any of these orientations. We hope you find this collection to be useful to your teaching endeavors.

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Department of Sociology
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Undergraduate Course Syllabi

Daniel McFarland
School of Education
Stanford University

Network Analysis

Education 316x, Sociology 369m, Winter Quarter (5 Units)
Class Times: M/W 9-10:50am, Ceras 509b, four labs in Big-Tree on Mondays 6-9pm
Professor: Dan McFarland, mcfarland@stanford.edu
Office Hours: Mondays 1:30-3pm, Cubberly 321 (phone 723-1761)

This course explores the applications of social network analysis to formal and informal organizations. Students are introduced to social network theory, methods, and research applications in sociology. Network concepts of both interactionist (e.g. balance, cohesion, centrality, cliques) and structuralist (e.g. structural equivalence, roles) traditions are defined and applied to topics in small groups, social movements, organizations, education, and communities, to name but a few. Students are asked to apply these techniques to data on schools and classrooms (i.e. provided by instructor), or data that participants wish to utilize from other organizational settings (upon consent of instructor). The literature on networks is approached with two goals in mind: (1) to understand the foundations of social network theory; (2) and to apply network analysis so as to better understand the social processes within organizations.

Course Requirements:
Participants must complete five requirements: (a) Participate in class discussions, (b) lead class through the assigned readings of one class day (15 minute informal talk), (c) complete lab assignments in teacher assigned small groups, (d) complete a 20-25 page project of your choice (approved by instructor), and (e) present your project to the class at the end of quarter. The instructor will provide data when participants lack data suitable for the methods studied.

NOTE: Due to holidays we will miss two class days: January 15 and February 19. There will be one makeup day early in the quarter – Friday January 19th from 9-10:50am in Ceras 509b.

Primary Course Readings:
The following texts will be placed on 2-hr reserve. **References preceded by an * are required readings that will be used extensively**, all others are presented for the student's perusal:

*Two course packets (at Copy Source in Mountain View, 108 N. Rengstorff Ave, 968-6351).
*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.
*Scott, John. 2000. *Social Network Analysis: A Handbook*. London: Sage Publications.
Nadel, Siegfried. F. 1957. *The Theory of Social Structure*. London: Cohen and West. (Search for used copy on bibliofind.com)
Knoke, David and James Kuklinski. 1982. *Network Analysis*. Beverly Hills, CA: Sage Publication.
White, Harrison. 1992. *Identity and Control*. Princeton: Princeton University Press.

Wellman, Barry and S.D. Berkowitz (Eds.). 1988. *Social Structures: A Network Approach*. Cambridge: Cambridge University Press.
Leinhardt, Samuel (Ed.). 1977. *Social Networks: A Developing Paradigm*. New York: Academic Press.
Nohria, Nitin, and Robert Eccles. 1992. *Networks and Organizations: Structure, Form, and Action*. Harvard: Harvard Business School Press.

Computer Labs and Software:

Labs: Students are to attend six evening lab sessions where network methods will be discussed and demonstrated. Most of these scheduled labs are on Monday evenings from 6-9pm in Big-Tree (January 22, February 5, 12, March 5, 12). However, there will be *one Thursday evening computer lab on February 22nd*, from 6-9pm in Big-Tree. Students are asked to read the required readings on methods and to discuss them in class. During the lab, the instructor will demonstrate how these methods are applied. Then students are asked to work in groups and produce output demonstrating their ability to perform the various methods the instructor demonstrated. Output is due at the start of the next class (labs are graded pass-fail).

These labs are informal and a great deal of time will be left for students to work on their own projects afterwards. If students need hands-on assistance with their projects, this is the best time to get it.

Students are allowed to work in Big-Tree and Little-Tree when other classes are not in session. Big-Tree is reserved for students of this class every Monday evening between 6-9pm. The instructor can be present in Big-Tree computer lab for assistance on other occasions if students ask ahead of time (Just to forewarn - I will be unavailable the evening of February 26th).

Software: You will not need to purchase any network software as it will be made available by the school of education. Pajek can be obtained via the web. A '*' indicates the software that will be used in the labs by the instructor.

*Borgatti, Everett and Lin Freeman. 2000. UCINET 5.51 for Windows. Columbia: Analytic Technologies. See also http://www.analytictech.com. Installed on 36 computers in Big-Tree and Little-Tree.
*PAJEK -- http://vlado.fmf.uni-lj.si/pub/networks/pajek/default.html -- Between the on-line manual and the new pdf primer you can probably figure out how to use this program. It is what many analysts use for large data sets (3000+).
Frank, Kenneth A. 2000. *KliqueFinder*. program accessed via server at MSU.
Krackhardt, D., J. Blythe, and C. McGrath. 1994. ``KrackPlot 3.0: An Improved Network Drawing Program." *Connections* 17(2): 53--55. Installed on 36 computers in Big-Tree and Little-Tree.
Borgatti, Everett and Lin Freeman. 1992. UCINET IV Version 1.0. Columbia: Analytic Technologies.
Borgatti, Everett and Lin Freeman. 1992. UCINET IV Version 1.0. Reference Manual. Columbia: Analytic Technologies.

A. Overview and Introduction (**no class January 15)

Introduction to Network Theory – Wednesdays January 10 & 17

*Nadel, Siegfried. F. 1957. *The Theory of Social Structure*. London: Cohen and West. Chapters 1 and 6, or pages 1-19, 125-152.

*Hinde, R.A. 1976. "Interactions, Relationships and Social Structure." *Man* 11, 1: 1-17. reader

*Wellman, Barry and S.D. Berkowitz (Eds.). 1988. "Structural Analysis: From Method and Metaphor to Theory and Substance." Chapter 2 (pp. 19-61) in *Social Structures: A Network Approach*. Cambridge: Cambridge University Press. reader

Georg Simmel. [1908] 1971. "The Problem of Sociology." Pp. 23-35 in *Georg Simmel on Individuality and Social Forms,* edited by Donald N. Levine. Chicago: University of Chicago Press.

White, Harrison. 1992. *Identity and Control*. Princeton: Princeton University Press.

Emirbayer, Mustafa. 1997. "Manifesto for a Relational Sociology." *American Journal of Sociology*, Vol. 103, No. 2: 281-317.

Introduction to Formal and Informal Organizational Networks – Wednesdays January 10 & 17

*Krackhardt, David. 1992. "The Strength of Strong Ties: The Importance of Philos in Organizations." In chapter 8 of *Networks and Organizations: Structure, Form, and Action*. Eds. Nitin Nohria and Robert Eccles. Boston: Harvard Business School Press. reader

*Nohria, Nitin. 1992. "Structural Alignments, Individual Strategies, and Managerial Action: Elements Toward a Network Theory of Getting Things Done." Chapter 6 in *Networks and Organizations: Structure, Form, and Action*. Harvard: Harvard Business School Press. reader

Krackhardt, David. 1993. "Informal Networks: The Company Behind the Chart." *Harvard Business Review* (July): 105-111.

Powell, Walter W. 1990. "Neither Market Nor Hierarchy: Network Forms of Organization." *Research in Organizational Behavior*, Vol. 12, pages 295-336.

B. Interactionism

Sociometry (graphs, lines, matrices, paths) - ***Friday*, January 19

*Scott, John. 2000. "Networks and Relations," "The Development of Social Network Analysis," "Handling Relational Data," "Lines, Direction and Density." Chapters 1-4 (pp. 1-81) in *Social Network Analysis: A Handbook*. London: Sage Publications.

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 2-5 (skim chapters 3-4, pp. 67-166). Cambridge: Cambridge University Press.

Moreno, J. L. 1953 [1934]. *Who Shall Survive? Foundations of Sociometry, Group Psychotheraphy and Sociodrama*. Beacon, New York: Beacon House Inc.

Moreno, J. L., Helen Jennings and Richard Stockton. 1943. "Sociometry in the Classroom." *Sociometry* 6, 4: 425-428.

Hallworth, H.J. 1953. "Sociometric Relationships Among Grammar Schools Boys and Girls Between the Ages of Eleven and Sixteen Years." *Sociometry* 16, 1: 39-70.

Dahlke, H. Otto. 1953. "Determinants of Sociometric Relations Among Children in the Elementary School." *Sociometry* 16, 4: 327-338.
Milgram, Stanley. "The Small World Problem." *Psychology Today* 1: 62-67.
Travers, Jeffrey and Stanley Milgram. 1969. "An Experimental Study of the Small World Problem." Sociometry 32: 425-443. Also in *Social Networks*, ed. Leinhardt. Pp. 179-198.
Pool, Ithiel de Sola and Manfred K. 1978. "Contacts and Influence." *Social Networks* 1:5-51.

Balance Theory – Monday, January 22

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 6 (pp. 220-248) and skim chapter 14 (pp. 556-602). Cambridge: Cambridge University Press.
*Taylor, Howard. 1970. *Balance in Small Groups*. Chapter 2, pp. 11-49. New York: Von Nostrand Reinhold Company. reader
Heider, Fritz. "Attitudes and Cognitive Orientation." In *Social Networks*, S. Leinhardt Ed.
Cartwright, D. and F. Harary. "Structural balance: A Generalization of Heider's Theory." In *Social Networks*, S. Leinhardt Ed.
Davis, James A. "Clustering and Structural Balance in Graphs." In *Social Networks*, S. Leinhardt Editor.
Holland, Paul and Samuel Leinhardt. "Transitivity in Structural Models of Small Groups." In *Social Networks*, S. Leinhardt Ed.
Davis, James A. and Samuel Leinhardt. 1972. "The Structure of Positive Interpersonal Relations in Small Groups." In *Sociological Theories in Progress,* vol. 2, eds. Joseph Berger, Morris Zelditch, and Bo Anderson (pp. 218-251).
Hallinan, Maureen. 1974. *The Structure of Positive Sentiment*.

LAB INTERLUDE 1 – Monday, January 22nd

Data Collection Issues

*Laumann, Edward O., Peter Marsden and David Prensky. 1983. "The Boundary Specification Problem in Network Analysis." In Ron S. Burt and M.J. Minor (Eds.), *Applied Network Analysis: A Methodological Introduction*. London: Sage Publications. reader
Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 2 (pp. 28-66). Cambridge: Cambridge University Press.
Marsden, Peter V. 1990. "Network Data and Measurement." *Annual Review of Sociology* 16: 435-463.
Granovetter, Mark. 1976. "Network Sampling: Some First Steps." *American Journal of Sociology* 83: 1287-1303.
Killworth, Peter D. and H. Russell Bernard. 1976. "Informant Accuracy in Social Network Data." *Human Organization* 35: 269-286.
----- 1979. "Informant Accuracy in Social Network Data III: A Comparison of Triadic Structure in Behavioral and Cognitive Data." *Social Networks* 2: 10-46.
Freeman, Linton C., A.K. Romney and S.C. Freeman. 1987. "Cognitive Structure and Informant Accuracy." *American Anthropologist* 89: 310-325.
McPherson, J. Miller. 1982. "Hypernetwork Sampling: Duality and Differentiation Among Voluntary Organizations." *Social Networks* 3: 225-249.
Krackhardt, David. 1987. "Cognitive Social Structures." *Social Networks* 9: 109-134.

Kathleen Carley and Michael Palmquist. 1992. "Extracting, Representing, and Analyzing Mental Models." *Social Forces* 70:601-636.

Kumbasser, Ece, Kimball Romner, and William Batchelder. 1994. "Systematic Biases in Social Perception." *American Journal of Sociology* 100, 2: 477-505.

Scott L. Feld. 1991. "Why Your Friends Have More Friends than You Do." *American Journal of Sociology* 96:1464-1477.

Multidimensional Scaling and Density

Scott, John. 2000. "Points, Lines, and Density." Chapter 4 in *Social Network Analysis: A Handbook*. London: Sage Publications.

Schiffman, Susan. *Introduction to Multidimensional Scaling*.

Green, Paul. *Multidimensional Scaling: Concepts and Applications*.

Lab Assignment 1 – Loading data into UCINET, Using MDS, and Density

Forming Ties of Positive Sentiment – Wednesday, January 24

*Hallinan, Maureen. 1980. "Patterns of Cliquing Among Youth." Chapter 12 in *Friendship and Social Relations in Children*. Eds. H.C. Foot, A.J. Chapman, and J.R. Smith. New York: John Wiley and Sons. reader

*Cohen, Jere. 1977. "Sources of Peer Group Homogeneity." *Sociology of Education* 50: 227-241. reader

*Kandel, Denise. 1978. "Homophily, Selection, and Socialization in Adolescent Friendships." *American Journal of Sociology* 84, 2: 427-436. reader

Festinger, Leon, Stanley Schachter and Kurt Back. 1967 (1950). *Social Pressures in Informal Groups: A Study of Human Factors in Housing*. Stanford: Stanford University Press.

Newcomb, Theodore M. 1961. *The Acquaintance Process*. New York: Holt, Rinehart, Winston.

Clique Structures – Monday, January 29

*Baker, Wayne E. 1984. "The Social Structure of a National Securities Market." *American Journal of Sociology* 89, 4: 775-811. reader

*Kadushin, Charles. 1995. Friendship Among the French Financial Elite." *American Sociological Review* 60: 202-221. reader

Frank, Kenneth and Jeff Yasumoto. 1998. "Social Capital Within and Between Subgroups." *American Journal of Sociology* 104, 3: 642-86. (highly recommended)

Lankford, Philip. 1974. "Comparative Analysis of Clique Identification Methods." *Sociometry* 37, 2: 287-305.

Roethlisberger, F.J. and William J. Dickson. 1942 (1939). *Management and the Worker*. Part IV "Social Organization of Employees," Chapters 17-23 (pp. 379-548). Harvard: Harvard University Press.

Homans, George. 1950. *The Human Group*. Chapters 2-6. New Brunswick: Transaction Publishers.

Coleman, James S. 1961. *The Adolescent Society*. Chapter 7. New York: Free Press of Glencoe.

Cottrell, John. 1996. *Social Networks and Social Influences in Adolescence*. London: Routledge.

Reitz, Karl P. 1988. "Social Groups in a Monastery." *Social Networks* 10: 343-357.

Weak Ties – Wednesday, January 31

Granovetter, Mark S. 1995 (1974). *Getting a Job: A Study of Contacts and Careers*. Chicago: University of Chicago Press.

*----- 1977. "The Strength of Weak Ties." *American Journal of Sociology* 78: 1360-1380. Also in Lienhardt's *Social Networks*, pp 347-367. reader

*----- 1983. "The Strength of Weak Ties: A Network Theory Revisited." *Sociological Theory* (pp. 201-233). reader

----- 1986. "Labor Mobility, Internal Markets and Job Matching: A Comparison of the Sociological and Economic Approaches." In *Research in Social Stratification and Mobility* 5: 3-39, Robert Robinson (ed.). or better yet, see pp. 187-216 in *Industries, Firms and Jobs: Sociological and Economic Approaches*. New York: Plenum Press. George Farkas and Paula England eds.

*Hansell, Stephen. 1984. "Cooperative Groups, Weak Ties, and the Integration of Peer Friendships." *Social Psychology Quarterly* 47, 4: 316-328. reader

*Giordano, Peggy. 1995. "The Wider Circle of Friends in Adolescence." *American Journal of Sociology* 101, 3: 661-697.

Lin, Nan, Walter Ensel, and John Vaughn. 1981. "Social Resources and Strength of Ties: Structural Factors in Occupational Attainment." *American Sociological Review* 46: 393-405.

Friedkin, Noah. "A Test of Structural Features of Granovetter's Strength of Weak Ties Theory." *Social Networks* 2: 411-422.

LAB INTERLUDE 2 – Monday, February 5th

Cliques & Cohesive Subgroups

*Scott, John. 2000. "Components, Cores and Cliques." Chapter 6 in *Social Network Analysis: A Handbook*. London: Sage Publications.

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Skim chapter 7 (pp. 249-290). Cambridge: Cambridge University Press.

*Frank, Kenneth A. 2000. *Introduction to KliqueFinder*. Unpublished Manuscript. reader

*Frank, Kenneth A. 2000. *Kliquefinder: User's Guide*. Unpublished Manuscript. reader

Frank, Kenneth A. 1995. "Identifying Cohesive Subgroups." *Social Networks* 17: 27-56.

----- 1996. "Mapping Interactions Within and Between Cohesive Subgroups." *Social Networks* 18: 93-119.

Frank, Kenneth and Jeff Yasumoto. 1998. "Social Capital Within and Between Subgroups." *American Journal of Sociology* 104, 3: 642-86.

Lab-Assignment 2 – Using UCINET for overlapping subgroups, and using KliqueFinder for discrete, cohesive, subgroups.

Hierarchy Formation – Wednesday, February 7

*Ridgeway, Cecila, and David Diekema. 1989. "Dominance and Collective Hierarchy Formation in Male and Female Task Groups." *American Sociological Review* 54: 79-93. reader

*Strayer, F.F. 1980. "Child Ethology and the Study of Preschool Social Relations." Chapter 9 in *Friendship and Social Relations in Children*. Eds. H.C. Foot, A.J. Chapman, and J.R. Smith. New York: John Wiley and Sons. reader

Chase, Ivan. 1974. "Models of Hierarchy Formation in Animal Societies." *Behavioral Sciences* 19: 374-382. highly recommended

*----- 1980. "Social Process and Hierarchy Formation in Small Groups: A Comparative Perspective." *American Sociological Review* 45: 905-924.

Lloyd, Paulette and Elizabeth Cohen. 1999. "Peer Status in the Middle School: A Natural Treatment for Unequal Participation." *Social Psychology of Education* 3: 193-216.

De Waal, Frans. 1982. *Chimpanzee Politics*. Baltimore: Johns Hopkins University Press.

Omark, Donald, F.F. Strayer, and Daniel Freedman. 1980. *Dominance Relations: An Ethological View of Human Conflict in Social Interaction*. New York: Garland press. Especially chapters 7-12, 21-23, 26.

LAB INTERLUDE 3 – Monday, February 12th

Centrality – Prestige, Status, Influence – February 12

*Scott, John. 2000. "Centrality and Centralization." Chapter 5 in *Social Network Analysis: A Handbook*. London: Sage Publications.

*Gould, Roger. 1989. "Power and Social Structure in Community Elites." *Social Forces* 68: 531-552. reader

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 5 (pp. 169-219). Cambridge: Cambridge University Press.

Freeman, Linton. 1979. "Centrality in Social Networks: Conceptual Clarifications." *Social Networks* 1: 125-139.

Bonacich, Phillip. "Power and Centrality: A Family of Measures." *American Journal of Sociology* 92: 1170-1182.

Friedkin, Noah. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology* 96: 1478-504.

Lab Assignment 3 - Use UCINET to identify various central players – use at least three definitions of centrality.

Affiliation Networks – Wednesday, February 14

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 8 (pp. 291-344). Cambridge: Cambridge University Press.

*Breiger, Ronald L. 1974. "The Duality of Persons and Groups." Social Forces 53: 181-190. Reprinted in B. Wellman and S. Berkowitz, *Social Structures*, chapter 4 (pp. 83-98). reader

----- 1990. "Social Control and Social Networks: A Model From Georg Simmel." In *Structures of Power and Constraint: Papers in Honor of Peter M. Blau*. Eds. Craig Calhoun, Marshall Meyer, and W. Richard Scott. Cambridge: Cambridge University Press.

*Friedkin, Noah and Scott Thomas. 1997. "Social Positions in Schooling." *Sociology of Education* 70: 239-256.

Simmel, Georg. 1955. *Conflict and the Web of Group Affiliations*. Pp. 125-195. New York: Free Press.

Pescosolido, Bernice and Beth Rubin. 2000. "The Web of Group Affiliations Revisited: Social Life, Postmodernism, and Sociology." *American Sociological Review* 65, 1: 52-76.

Borgatti, Stephen P. and Martin Everett. 1997. "Network Analysis of 2-Mode Data." *Social Networks* 19: 243-269. Highly recommended.

Faust, Katherine. 1997. "Centrality in Affiliation Networks" *Social Networks* 19: 157-191.

Ennis, James G. 1992. "The Social Organization of Sociological Knowledge: Modeling the Intersection of Specialties." *American Sociological Review* 57: 259-265.

McFarland, Daniel A. 1999. *Organized Behavior in Social Systems: A Study of Student Engagement and Resistance in High Schools*. Chapters 5-7 in Ph.D. manuscript, University of Chicago, department of Sociology. Chicago, Ill.

Rytina, Steve and David Morgan. 1982. "The Arithmetic of Social Relations: The Interplay of Category and Network." *American Journal of Sociology* 83, 1: 88-113.

Mintz, Beth and Michael Schwartz. 1981. "Interlocking Directorates and Interest Group Formation." *American Sociological Review* 46: 851-869.

Foci of Activity, Voluntary Associations – Wednesday, February 21 (*no class February 19th)

*Feld, Scott L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86, 5: 1015-1035. reader

*Rytina, Steve and David L. Morgan. 1982. "The Arithmetic of Social Relations: The Interplay of Category and Network." *American Journal of Sociology* 88, 1: 88-113. reader.

McPherson, J. Miller. 1981. "Voluntary Affiliation: A Structural Approach." Chapter 11 (pp. 325-351) in *Continuities in Structural Inquiry*, edited by Peter Blau and Robert Merton. London: Sage Publications.

----- 1982. "Hypernetwork Sampling: Duality and Differentiation Among Voluntary Organizations." *Social Networks* 3: 225-249.

Pamela A. Popielarz and J. Miller McPherson. 1995. "On the Edge or In Between: Niche Position, Niche Overlap, and the Duration of Voluntary Association Memberships." *American Journal of Sociology* 101.

J. Miller McPherson and James R. Ranger-Moore. 1991. "Evolution on a Dancing Landscape: Organizations and Networks in Dynamic Blau Space." *Social Forces* 70:19-42.

J. Miller McPherson, Pamela A. Popielarz, and Sonja Drobnic. 1992. "Social Networks and Organizations Dynamics." *American Sociological Review* 57:153-170.

J. Miller McPherson and Thomas Rotolo. 1996. "Testing a Dynamic Model of Social Composition: Diversity and Change in Voluntary Groups." *American Sociological Review* 61:179-202.

Bidwell, Charles and Jeffrey Yasumoto. 1999. "The Collegial Focus: Teaching Fields, Collegial Relationships, and Instructional Practice in American High Schools." *Sociology of Education* 72, 4: 234-256.

Siskin, Leslie. 1994. *Realms of Knowledge: Academic Departments in Secondary Schools*. Washington, D.C.: Falmer Press.

Festinger, Leon, Stanley Schachter and Kurt Back. 1967 (1950). *Social Pressures in Informal Groups: A Study of Human Factors in Housing*. Stanford: Stanford University Press.

C. Structuralism

LAB INTERLUDE 4 – Monday, February 26th

Structural Equivalence Classes – Monday, February 26th

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Chapter 9 (pp. 345-393), Chapter 10 (pp. 394-424). Cambridge: Cambridge University Press.

*Scott, John. 1991. "Positions, Roles and Clusters." Chapter 7-8 (pp. 123-174) in *Social Network Analysis: A Handbook*. London: Sage Publications.

*Borgatti, Stephen and Martin Everett. 1992. "Notions of Position in Social Network Analysis," *Sociological Methodology*, pp. 1-35. reader

Lorrain, Francois, Harrison C. White. 1971. "Structural Equivalence of Individuals in Social Networks." *Journal of Mathematical Sociology* 1: 49-80.

Burt, Ronald S. 1980. "Models of Network Structure." *Annual Review of Sociology* 6: 79-141.

Knoke, David and James Kuklinski. 1982. *Network Analysis*. Chapter 4.

Faust, Katherine. 1988. "Comparison of Methods for Positional Analysis: Structural and General Equivalences." *Social Networks* 10: 313-341.

Freeman, Linton C. 2000. "Visualizing Social Networks." *Journal of Social Structure*, Volume 1(1). See http://www.heinz.cmu.edu/project/INSNA/joss/vsn.html for electronic copy.

Breiger, Ronald L., Scott Boorman, and Phipps Arabie. 1975. "An Algorithm for Clustering Relational Data With Applications to Social Network Analysis and Comparison with Multidimensional Scaling." *Mathematical Psychology* 12, 3: 328-383.

Faust, K. and A.K. Romney. 1985. "Does STRUCTURE find Structure? A Critique of Burt's Use of Distance as a Measure of Structural Equivalence." *Social Networks* 7: 77-103.

Panning, W.H. 1982. Fitting Blockmodels to Data." *Social Networks* 4: 81-101.

SAS Institute. 1990. "Introduction to Clustering Procedures." Chapter 6 in *SAS/STAT User's Guide, Volume 1* (pp. 53-101). Cary, NC: SAS Institute Inc.

Contagion Models – Monday, February 26th

*Burt, Ronald S. 1987. "Social Contagion and Innovation: Cohesion Versus Structural Equivalence." *American Journal of Sociology* 92: 1287-1335. reader

----- 1983. "Cohesion Versus Structural Equivalence as a Basis for Network Subgroups," in *Applied Network Analysis: A Methodological Introduction*, Ron Burt and Michael Minor Eds. London: Sage Publications.

Mayhew, Bruce H. 1980. "Structuralism Versus Individualism: Part I, Shadow Boxing in the Dark." *Social Forces* 59:335-375.

Mayhew, Bruce H. 1981. "Structualism Versus Individualism: Part II, Ideological and Other Obfuscations." *Social Forces* 59:627-648.

Coleman, James S., Elihu Katz, and H. Menzel. 1957. "The Diffusion of an Innovation Among Physicians." *Sociometry* 20: 253-270. Also in Leinhardt's *Social Networks* pp. 107-124.

Lab Assignment 4 – develop structural equivalence measures, test contagion effects, identify positions using divisive clustering (CONCOR), and present initial block-models.

Blockmodeling and Cluster Goodness of Fit – Wednesday, February 28th

*White, Harrison C., Scott Boorman, Ronald Breiger. 1976. "Social Structure from Multiple Networks. I. Blockmodels of Roles and Positions." *American Journal of Sociology* 81: 730-780. reader

*Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Skim both chapter 12.2-12.4 (pp. 468-481) and Chapter 16 (pp. 675-724). Cambridge: Cambridge University Press.

Boorman, Scott A. and Harrison White. 1976. "Social Structure for Multiple Networks. II. Role Structures." *American Journal of Sociology* 81, 6:1384-1446.

Breiger, Ronald L. and James G. E. 1979. "Personae and Social Roles: The Network Structure of Personality Types in Small Groups." *Social Psychology Quarterly* 42, 3: 262-270.

Breiger, Ronald L. 1976. "Career Attributes and Network Structure: A Blockmodel Study of Biomedical Research Specialty." *American Sociological Review* 41: 117-135.

-----. 1981. "Structures of Economic Interdependence Among Nations." Chapter 12 in *Continuities in Structural Inquiry*, edited by Peter Blau and Robert Merton.

Bearman, Peter S. 1993. *Relations into Rhetorics : Local Elite Social Structure in Norfolk, England, 1540-1640*. New Brunswick, N.J.: Rutgers University Press.

Milligan, Glenn and Martha Cooper. 1985. "An Examination of Procedures for Determining the Number of Clusters in a Data Set." *Psychometrika* 50, 2: 159-179.

LAB-INTERLUDE 5 – Monday, March 5th

Multiple Networks, Robust Action, and Culture – Monday, March 5th

*Padgett, John F. and Christopher Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." *American Journal of Sociology* 93, 6: 1259-1319. reader

Burt, Ronald. 1992. *Structural Holes: The Social Structure of Competition*. Harvard Press.

----- 1980. "Autonomy in a Social Topology." *American Journal of Sociology* 85: 892-925.

Simmel, Georg. "Group Expansion and the Development of Individuality." In *Georg Simmel: On Individuality and Social Forms*, Donald N. Levine Ed.

----- 1955. *Conflict and the Web of Group Affiliations*. See pp. 125-195 again for individuality and freedom. New York: Free Press.

----- 1950. "Metropolis and the Mental Life." Part 5, chapter 4 (pp. 409-426) in *The Sociology of Georg Simmel*. New York: Free Press.

Coser, Rose. "The Complexity of Roles as a Seedbed of Individual Autonomy." In *The Idea of Social Structure*, Lewis Coser, Ed.

Leifer, Eric. 1988. "Interaction Preludes to Role Setting: Exploratory Local Action." *American Sociological Review* 53: 865-878.

Lab Assignment 5 – Using multiple networks, develop block-models using hierarchical clustering and illustrate the goodness of fit for the clusters you select.

Mobility, Vacancy Chains, and Event Structures – Wednesday, March 7th

*Padgett, John F. 1990. "Mobility as Control: Congressmen Through Committees." Chapter 2 (pp. 27-58) in *Social Mobility and Social Structure*, edited by Ronald L. Breiger. Cambridge: Cambridge University Press. reader

*Chase, Ivan D. 1991. "Vacancy Chains." *Annual Review of Sociology* 17: 133-154. reader

Abbott, Andrew. 1990. "Vacancy Models of Historical Data." Chapter 4 (PP. 80-102) in *Social Mobility and Social Structure*, edited by Ronald L. Breiger. Cambridge: Cambridge University Press.
Marsden, Peter and Karen Campbell. 1990. "Recruitment and Selection in Processes: The Organization Side of Job Searches." Chapter 3 (pp. 59-79) in *Social Mobility and Social Structure*, edited by Ronald L. Breiger. Cambridge: Cambridge University Press.
White, Harrison C. 1970. "The Logic of Opportunity." Chapter 1 in *Chains of Opportunity: System Models of Mobility in Organizations*. Harvard: Harvard University Press.
Smith, D. Randoll, and Andrew Abbott. 1983. "A Labor Market Perspective on the Mobility of College Football Coaches." *Social Forces* 61, 4: 1147-1167.

LAB-INTERLUDE 6 – Monday, March 12th

Regression (Mean of Friends, Network Effects, and Multi-Level Models)

*Gould, Roger B. "Multiple Networks and Mobilization in the Paris Commune." *American Sociological Review* 56: 716-729. reader
*Frank, Kenneth A. 1998. "Quantitative Methods for Studying Social Context in Multilevels and Through Interpersonal Relations." *Review of Research in Education* 23: 171-216. reader
Erbing, Lutz and Alice Young. 1979. "Individuals and Social Structure: Contextual Effects as Endogenous Feedback." *Sociological Methods and Research* 7: 396-430.
Doreian, Patrick. 1981. "Estimating Linear Models With Spatially Distributed Data." *Sociological Methodology* (1981): 359-388.
Friedkin, Noah E. 1990. "Social Networks in Structural Equation Models." *Social Psychology Quarterly* 53: 316-328.
Friedkin, Noah E. 1998. *A Structural Theory of Social Influence*. Cambridge: Cambridge University Press.
Krackhardt, David. 1987. "QAP Partialling as a Test of Spuriousness." *Social Networks* 9: 171-86.
----- 1988. "Predictions With Networks: Nonparametric Multiple Regression Analysis of Dyadic Data." *Social Networks* 10: 359-381.

Lab-Assignment 6 – Using network variables in predictive models (QAP Regression and Network Effects)

History and Culture – Wednesday, March 14th

*Baker, Wayne and Robert Faulkner. 1991. "Role as Resource in the Hollywood Film Industry." *American Journal of Sociology* 97: 279-309. reader
*Emirbayer, Mustafa and Jeff Goodwin. 1994. "Network Analysis, Culture, and the Problem of Agency." *American Journal of Sociology* 99: 1411-1154. reader
Giuffre, Katherine. 1999. "Sandpiles of Opportunity: Success in the Art World." *Social Forces* 77:815-32.
Bearman, Peter, Robert Faris and James Moody. "Blocking the Future." *Social Science History* 23, 4: 501-533.
Ansell, Chrisopher. 1997. "Symbolic Networks: The Realignment of the French Working Class, 1887-1894." *American Journal of Sociology* 103, 2: 359-90.

Mohr, John. 1994. "Soldiers, Mothers, Tramps and Others: Discourse Roles in the 1907 New York City Charity Directory." *Poetics* 22: 327-357.
Carley, Kathleen. 1994. "Extracting Culture Through textual Analysis." *Poetics* 22: 291-312.
McLean, Paul. 1998. "A Frame Analysis of Favor Seeking in the Renaissance: Agency, Networks, and Political Culture." *American Journal of Sociology* 104, 1: 51-91.

***Student Presentations of Projects

Reading and Finals Week March 14, 19 & 23

Structural Holes

Burt, Ron. 1992. Structural Holes: The Social Structure of Competition. Cambridge, Mass: Harvard University Press.
Podolny, Joel and James Baron. 1997. "Resources and Relationships: Social Networks and Mobility in the Workplace." *American Sociological Review* 62: 673-693.

Nonlinear / Dynamic Network Modeling

Schelling, Thomas. *Micromotives and Macrobehavior*. Chapter 4.
Granovetter, Mark. 1978. "Threshold Models of Collective Behavior." *American Journal of Sociology* 83, 6: 1420-1443.
Macy, Michael. 1991. "Chains of Cooperation: Threshold Effects in Collective Action." *American Sociological Review* 56: 730-747.
Smith, Thomas and Gregory Stevens. 1999. "The Architecture of Small Networks: Strong Interaction and Dynamic Organization in Small Social Systems." *American Sociological Review* 64: 403-420.
Mark, Noah. 1998. "Beyond Individual Differences: Social Differentiation from First Principles." *American Sociological Review* 63, 3: 309-330.
Kathleen Carley. 1991. "A Theory of Group Stability." *American Sociological Review* 56:331-354.
Kim, Hyojoung and Peter S. Bearman. 1997. "The Structure and Dynamics of Movement Participation." *American Sociological Review* 62, 1: 70-93.
Watts, Duncan J. and Steven H. Strogatz. 1998. "Collective Dynamics of 'small-world' networks." *Nature* 393:440-442.
Watts, Duncan J. 1999. *Small Worlds: The Dynamics of Networks Between Order and Randomness*. Princeton: Princeton University Press.
Krempel, Lothar and Michael Schnegg. 2000. "Exposure, Networks, and Mobilization: The Petition Movement During the 1848/49 Revolution in a German Town." http://www/mpi-fg-koeln.mpg.de/~lk/netvis/exposure/

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University of South Maine

Sociology 380: Social Network Analysis

INTRODUCTION

Social networks is one of the fastest growing sub-areas within the discipline of Sociology. Literature reviews indicate that social network publications are growing exponentially (an abstract and title search of "social network" in Sociological Abstracts identified over 500 published journal articles in the year 2000 alone). In this course, students will learn new theory, new methods, and have the opportunity to conduct original sociological research.

Students will be provided with the opportunity to master the major concepts of social network theory and to become competent in social network analysis. This is one of the only sub-areas of Sociology that has a body of theory accompanied by a distinct methodology. Social network theory concerns the ways in which individuals, groups, and organizations are tied together by interaction patterns, common members, and resource flows.

Social network analysis differs from conventional Sociology where the individual is the primary unit of analysis (survey researchers, for example, are often interested in the impact that one's educational attainment, gender, race, etc. have upon one's attitudes and behaviors). When studying social networks, the unit of analysis is the relationship between actors. Relations are not the properties of individual actors, but of systems of actors. Network analysts study the quality and quantity of ties of key individuals (ego networks) or populations (complete networks).

Course Objectives

This course is designed to provide students with the opportunity to master the major concepts within the field of social networks. Social network theory should be of interest since it explains how our connections to other individuals, to organizations, and to major social institutions influence our actions and attitudes.

I intend for students to acquire knowledge of the sociological research process, become proficient with social network analysis software packages, and gain competence in reporting and interpreting network data. The network analysis portion of the course will increase students' general computer literacy, data analysis, data reporting, and data interpretation skills.

Through our readings, class discussions, writing assignments, and lab exercises, students will enhance their sociological imaginations, sharpen and gain critical thinking skills, increase their ability to comprehend research publications, and execute an original research project from start to finish.

COURSE REQUIREMENTS

Prerequisites: SOC 100J, SOC 210EW, and SOC 307D or permission of instructor.

Format
This course has been designed as a seminar, not a lecture class. All members of the class share responsibility for being active participants. Occasionally, I may deliver a traditional lecture. For the most part however, we will be discussing the readings as a class. As we get to the end of the course, each student will present aspects of their research projects to the class for our feedback. This is an advanced course—there are no quizzes or exams.

Readings
There are two required books for this course that are available at the bookstore. Additional readings will
be available only via Internet download (in .pdf format) from the Blackboard course site (Note that the
Scott book is also available from Blackboard if you prefer not to purchase it). The books are:
· Albert-Laszlo Barabasi Linked (2002) Plume.
· John Scott Social Network Analysis: A Handbook 2nd Edition (2000) Sage.

The readings are the core of this course and on-time completion of this material is critical to having a successful experience here. Students will be using aspects of each of the readings in their final research project. I encourage you to take notes and study these readings holistically. You want to make sure that you are able to summarize the chapters and to engage the key concepts. Throughout the semester students will be required to submit Analytical Summary and Question (ASQ) assignments that pertain to the readings (see below).

The reading schedule is provided below. You need to have read and be prepared to discuss and engage the readings in class on the day in which they appear in the schedule. Snow Day Policy: In the event that class is canceled, you are still responsible for having completed the scheduled readings by the date indicated in the schedule. Any revisions to this schedule will be announced via the Blackboard web site and/or by email.

Other Required Materials
In addition to the books, there are three other requirements: 1) a functioning USM login name and password, 2) a USM Card with at least $2 of value added on it, and 3) some file storage method (a USB flash drive or Zip disk is highly recommended).

1) If you are not a regular user of USM computer resources, you must request a USM login name and activation key in person at the help desk in the computer lab (144 Luther Bonney Hall). You will be required to have photo identification with you. Those of you who do regularly use your USM email or the Blackboard system should be able to login to the laboratory computers without a problem. You will be required to use your login name and password repeatedly throughout the semester, beginning with the first class. If you do not take care of this immediately you will not be able to participate in our lab sessions.

2) All USM computer laboratories are now charging a fee of 4 cents per page to print. You must have an official USM Card with a few dollars of value added on it. You will be required to print data output as part of your lab exercises.

3) We will be working with Windows-based PC computers regularly in this course. The Portland computer lab has machines equipped with the necessary software: SPSS and UCINET VI. This lab has very accommodating hours of operations. We will be working as a class in a USM classroom computer lab during most of our class meetings. Please respect USM's computer facilities and their regulations. When you work in any lab you will need to save your files to a disk. As always, save regularly when you are working in a lab! You will not be able to store any files on the hard drives of the laboratory computers. You are required to bring a disk with you to every class in which we meet in the Luther Bonney Hall 202 classroom lab.

Analytical Summary and Question (ASQ) Assignments

Students will be required to submit typewritten ASQ assignments seven times throughout the semester (see Schedule below). For each of the assigned readings for the day, students need to provide a summary. This should be an overview of each reading that includes definitions of key terms and the author's major arguments. All of these readings concern the form or impact of networks. Many hypotheses and research findings will be presented. You will be using this material to help guide your own research project. Pay particular attention to key terms and any explicit or implicit hypotheses about the form or impact of networks. Your assignment should provide a summary and conclude with a question. Students will present their questions to the class and they will serve as a basis for discussion. These assignments are not about your reaction or opinion of the readings, but are intended to help you digest the major contributions from each author. I anticipate that these assignments will be a minimum of 2-3 typewritten pages each.

ASQ assignments comprise 28% of your final course grade (seven ASQs @ 4% each). The assignments will be graded on a 10 point scale. You must turn in your typewritten ASQs to me in person during class. Attendance is mandatory and no late assignments will be accepted.

Lab Exercises
Seven lab exercises will be given throughout the semester. These assignments are intended to familiarize you with the software packages we will be employing throughout the course of the semester: SPSS, UCINET VI, and NetDraw. We will be analyzing a variety of data sources and ultimately you will be analyzing your own original network data.

Lab exercises comprise 21% of your final course grade (seven exercises @ 3% each). The assignments will be graded on a 10 point scale. You must turn in your typewritten lab exercises to me in person at the beginning of class. Attendance is mandatory and no late assignments will be accepted.

Research Project
This course will culminate with an original research project that is to be conducted over the last six weeks of the semester. I have broken up the research project into five stages. For each of these five stages you will turn in that portion of the project and present it to the class as a whole. Class presentations will provide you with valuable feedback for your final, completed research project. These will be "roundtable" presentations, you will not be addressing the class from the front of the room. You will need to provide each member of the class with photocopies of the material you are presenting, so plan accordingly.

The topic of your project is open, you must choose something that is of interest to you. This project should be on your mind throughout the course of the semester. As we complete our readings, think about whether you would like to test particular hypotheses or replicate previous studies. You will be collecting your own original network data, so be pragmatic about what is feasible. At a minimum, the data you collect must contain at least ten nodes and fifteen ties. Nodes may be anything from people to organizations to nations. The topic should be broadly "social" however. The network you study can be a complete network or an ego network(s). As you will learn, networks are everywhere, so use your imagination in this project and be certain to keep in mind the data collection implications. Feel free to consult with me throughout semester about any aspect of this project.

Each of the five stages of the research project is worth 5% of your final course grade. Your completed research project is worth an additional 26% of your final course grade. Due dates are provided in the schedule below. You are responsible for conducting your own literature review corresponding with your topic. I encourage you to use citations from our course readings. There are several journals dedicated to social network analysis. The best place to begin is with the International Network for Social Network Analysis at: http://www.insna.org/. They have several links to journals including two that are online: Connections and the Journal of Social Structure. Social Networks is the premier network journal. USM has a partial electronic subscription: from campus machines you can access the past year's worth of articles. Plan accordingly, you may need to interlibrary loan readings for this assignment.

Your research topic is due first. This will serve as the introduction to your research project. Here you want to introduce to the reader the phenomenon that you are planning to study. Provide the reader with some background information about the subject (previous research, the extent or importance of the subject, etc.). You need to cite and engage a minimum of three scholarly references for this portion of the assignment. You may not use any of our course readings, you must locate your own. Most importantly, you are describing your research topic to the reader. You may wish to phrase a research question.

Your literature review is due next. Here, you need to cite and engage a minimum of four scholarly references (and again you cannot use our course readings). A literature review does two things: it reviews the previous research on the topic and it introduces the theoretical foundations for the hypothesis or hypotheses that you will be testing. If you want to study men and women's interaction patterns, then cite some literature on gender that supports your notion that men and women should have different interaction patterns. Also, review any previous research on this subject. Previous research will not always exist. In many cases you will have to rely on studies that are "close" to what you plan on studying.

Your data collection instrument is due next. How are you going to collect your data? Reference methodological literature as necessary. If you are administering a survey, you must create the questionnaire. If you are using unobtrusive observation as a technique, then create a coding sheet. If you are using archival or published evidence, then describe your sampling procedure and data collection strategy (a coding sheet may also need to be created). Given the great variety of network data, there is a great variety of data collection strategies. In your presentation, we need enough of the details of your data collection strategy to assess its potentiality.

Your raw data is due next. Come to class with copies of your surveys, coding sheets, etc. We want to see the raw data that was collected. Suggestions about how to organize your data for analysis will be provided.

Your research findings are due next. You are required to bring a sociogram of your network(s) as well as univariate statistics and other network measurements that are pertinent to your study. Make copies of your computer output so we can go through it as a class and assist you in making sense of your findings.

Finally, the completed research project is due. You will be combining the five stages of your project into a single paper and adding findings, interpretations, implications, and conclusion sections to your project. Details regarding the formatting and organization of the project will be provided later in the semester.

Grading
Incomplete grades will not be granted unless there are exceptional circumstances. Your final course grade will be comprised as follows:

Seven ASQs @ 4% each	28%
Seven Lab Exercises @ 3% each	21%
Research Topic and Presentation	5%
Literature Review and Presentation	5%
Data Collection Instrument and Presentation	5%
Raw Data and Presentation	5%
Research Findings and Presentation	5%
Completed Research Project	26%

Blackboard
An online Blackboard course web page exists at: http://www.courses.maine.edu/. Many of your course readings will be distributed here. Please note that .pdf files usually take quite some time to print and that the campus computer laboratories charge 4 cents per page, so plan accordingly. At this web page you will also be able to check your grades and send messages to your fellow classmates. Course announcements and any supplemental materials will also be posted at this site. There is a toll-free assistance line and online tutorials to provide help should you experience any difficulties with the system.

Accommodation Needs
If you need course adaptations or accommodations because of a disability, please make an appointment with me as soon as possible. At any point in the semester, if you encounter difficulty with the course or feel you could be performing at a higher level, please meet with me. There are a number of academic support services available on campus including Academic Support Center (242 Luther Bonney, 780-4470, for help with writing, time management, or general study skills), Office of Academic Support for Students with Disabilities (237 Luther Bonney, 780-4706) and the Counseling Center (106 Payson Smith, Portland, 780-4050 or 110 Upton Hall, Gorham, 780-5411).

SCHEDULE (readings are underlined and due on the date on which they appear)

Day	**Readings** B = Barabasi, S = Scott, * See Below	**Activities**
1/24	E* and B pgs 1-40	Introductory exercise; Discussion of Readings; SPSS Lab Session – Exercise 1 Ego Network Characteristics
1/31	S pgs1-62 and B pgs 41-64	**ASQ 1 Due; Lab Exercise 1 Due**; Discussion of Readings; SPSS Lab Session – Exercise 2 Ego Network Outcomes
2/7	S pgs 63-81 and B pgs 65-122	**ASQ 2 Due; Lab Exercise 2 Due**; Discussion of Readings; UCINET Lab Session – Exercise 3 Univariate Statistics and Network Density
2/14	S pgs 82-99 and B pgs 123-178	**ASQ 3 Due; Lab Exercise 3 Due**; Discussion of Readings; UCINET Lab Session – Exercise 4 Measures of Centrality
2/28	S pgs 100-122 and B pgs 179-238	**ASQ 4 Due; Lab Exercise 4 Due**; Discussion of Readings; UCINET Lab Session – Exercise 5 Paths and Cliques
3/7	BF* and C*	**ASQ 5 Due; Lab Exercise 5 Due**; Discussion of Readings; UCINET & NetDraw Lab Session – Exercise 6 Sociograms
3/14	G* and Bu*	**ASQ 6 Due; Lab Exercise 6 Due**; Discussion of Readings; UCINET & NetDraw Lab Session – Exercise 7 Sociograms with Attributes
3/21	L1* and L2*	**ASQ 7 Due; Lab Exercise 7 Due**; Discussion of Readings; UCINET & NetDraw Lab Session – Software Review and Skills Building
4/4	Literature on your topic	**Research Topics Due – Class Presentations**
4/11	Literature on your topic	**Literature Reviews Due – Class Presentations**
4/18	Methodological Literature	**Data Collection Instrument Due – Class Presentations**
4/25	None	**Raw Data Due – Class Presentations**
5/2	None	**Research Findings Due – Class Presentations**
5/9	-	**Research Project Due in Sociology Office (120 Bedford) by 4pm**

* Many of the course readings will be distributed as PDF files via Blackboard only: E* = Erickson's "Social Networks: The Value of Variety"; BF* = Borgatti and Foster's "The Network Paradigm in Organizational Research"; C* = Collins' "Network Analysis"; G* = Granovetter's "The Strength of Weak Ties"; Bu* = Burt's "Structural Holes versus Network Closure as Social Capital"; L1* = Lin's "Building a Network Theory of Social Capital"; L2* = Lin's "The Theory and Theoretical Propositions"

Robert Hanneman
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Social network analysis: Sociology 157
Syllabus

Prerequisites

Students enrolling in Sociology 157 are required to have taken an Introduction to Sociology; this is not necessarily essential in all cases, but those who have not should see the instructor. I will assume that students are familiar with basic sociological terminology and methodology.

Throughout the course we will look at some of the formal methodology used by social network researchers. Many of the methods used by SNA are based on the mathematical study of graphs; and most SNA involves the statistical and mathematical analysis of quantitative data. No advanced training in mathematics or statistics, however, are pre-requisite for this course.

Class Meetings

The class meets in Sproul 1102 each Tuesday and Thursday from 11:10 until 12:30 (see the calendar, below). You are expected to be there. Class meetings are important. At most class meetings, we will do interactive quizzes and exercises that count toward your course grade.

Books and Materials

Books:

Duncan J. Watts. 2003. Six Degrees: The Science of a Connected Age. New York: W.W. Norton and Company. Available at campus and other bookstores in paperback, and through web bookstores.

Hanneman, Robert and Mark Riddle. 2005. Introduction to Social Network Methods. Free to read on-line or to download. Go to: http://faculty.ucr.edu/~hanneman look for links at the bottom of my home page.

Software:

Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies. Download free software from: http://www.analytictech.com/ucinet.htm
The free download is good for 30 days. You may then purchase the software ($40), or download another free copy.

Other resources:

From time-to-time, articles may be placed in the electronic reserve room. These will be

announced in class, and you can download or read them by visiting:

http://library.ucr.edu/?view=services/reserves/ereserves.html

You should also visit the web-site of the International Network of Social Network Analysts, and just look around for cool and interesting stuff (other software, other courses on network analysis, etc.)

http://www.insna.org/

There is also a wealth of information on social network topics on the Internet. Google (or your favorite search engine) will usually find interesting supplemental materials on any topic we discuss in class.

Instructor

Your instructor is Robert A. Hanneman. My office is 1144 Watkins Hall. My office hours will be announced in class, and posted to the class web site. I am also frequently in my office, and can make appointments to meet with you. My office phone is (951) 827-3638. Written messages may be left for me at my mailbox in the Department of Sociology. Better is to leave e-mail. I can be reached as Robert.Hanneman@UCR.EDU.

At the top of this page, and elsewhere in this web site, you will find links to my home page. I invite you to visit if you want to find out more about my interests and background.

Grades

Grades in the class will be based total points earned on five components, weighted as:

First mid-term 20%

Second mid-term 20%

Final exam 20%

In-class quizzes 20%

Term paper 20%

The exams will be non-cumulative (i.e. each will cover a different part of the course material). In-class quizzes will be taken using the audience response "clicker" system. More information about the term paper is provided on a separate page.

Schedule of topics and readings

The table below contains a tentative schedule of lecture topics, required readings, and other course events. All of this is subject to change with adequate advance notice. You should be sure to check the news and announcements page for updates.

0	R Sept. 29	Introduction: Networks everywhere	First data collection
1	T Oct. 4	The social networks perspective I	Watts 1.
1	R Oct. 6	The social networks perspective II	Watts 2.
2	T Oct. 11	Social network data and methods	Hanneman and Riddle 1, 2, 6.
2	R Oct. 13	Graphs and Matrices	Hanneman and Riddle 3, 4, 5.
3	T Oct. 18	Basic measures for individuals and networks	Hanneman and Riddle 7.
3	R Oct. 20	Midterm 1	Second data collection
4	T Oct. 25	Making connections: Random graphs and network evolution	Watts 3.
4	R Oct. 27	Making connections: Social contexts: Affiliation and identity	Watts 4.
5	T Nov. 1	Connection: Search, collapse, robustness	Watts 5, 6.
5	R Nov. 3	Connection: Social movements and diffusion of innovation	Watts 7, 8.
6	T Nov. 8	Connection: Ego neighborhoods	Hanneman and Riddle 8 (except section on Krackhardt, 9.
6	R Nov. 10	Connection: Ego neighborhoods (cont.)	
7	T Nov. 15	Midterm 2	Third data collection
7	R Nov. 17	Centrality, centralization, and power	Hanneman and Riddle 10.
8	T Nov. 22	Hierarchy, efficiency, and robustness	Hanneman and Riddle 8, section on Krackhardt; Watts 9.
8	R Nov. 24	HOLIDAY	NONE
9	T Nov. 29	Cliques and groups	Hanneman and Riddle 11.
9	R Dec. 1	Homophily and social segregation	
10	T Dec. 6	Equivalence: Positions	Hanneman and Riddle 12, 13.
10	R Dec. 8	Equivalence: Social Roles	Hanneman and Riddle, 15. Term paper is due at lecture
Exam	T Dec. 13 8:00-	Final exam	

Duncan Watts
Department of Sociology
Columbia University

Six Degrees: The New Science of Networks

Tuesday / Thursday 1100-1215
Classroom TBA

Instructor: Duncan Watts
815 International Affairs Building
djw24@columbia.edu
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TA: Roby Muhamad
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Office Hours: **Tuesday 3-5pm, 270 International Affairs Building**

Recommended Text:
D. J. Watts. *Six Degrees: The Science of a Connected Age* (W. W. Norton, 2003)

Assessment

30% Mid-term exam (March 9, 2006, in class)
30% Final exam (Date TBA)
30% "Scrap-book" (Due May 4, 2006; Progress-clippings due March 9 in class)
10% Class discussions

Exams (30%+30% = 60%)

Both mid-term and final exams will be open-book, in-class exams. The questions will be drawn both from the readings and the lectures, and will generally require short written responses of a few sentences, or at most a paragraph or two. The questions are not designed to be hard: they will concern the core concepts of the course, not marginal topics, and can be answered using only the materials outlined in the syllabus. As such, they should be straightforward for anyone who has attended the lectures and carefully read the relevant material. In addition, you will be allowed to bring your readings and lecture notes to the exam, and refer to them if you need to refresh your memory. Therefore anyone who has worked consistently throughout the semester should do well. However, anyone who has not attended classes consistently or read the corresponding materials will have difficulty completing the exam in the allotted time, open-book

policy notwithstanding. (Any students with registered learning disabilities that require extra time for exams should contact the instructor to make the appropriate arrangements.)

Mid-term exam will be held during class, Thursday March 9.
Final exam will be held during the exam week May 5—12 (day/time/location TBA).

"Scrap book" (30%)

Purpose: A central objective of this course is to help you to think about real-world social, cultural, economic, organizational, ecological, and technological problems in a different way. To this end, instead of a term paper, you will be required to submit at the end of the semester, a "scrap book" of annotated clippings from the media. This project is not meant to be arduous—in fact, it is intended to be fun—and you can approach it in many different ways. The main objectives are (a) to encourage you to keep abreast of current events, as well as contemporary ideas and trends; and (b) to help you take the concepts of the course out of the classroom and use them to interpret the world around you.

Sources: You may draw on whatever sources you choose, including newspapers, magazines, TV, Radio, and the web. News stories, science reports, business analysis, feature articles, book reviews, commentary, editorials, advertising, web-logs, discussion groups, and even email threads are all eligible for inclusion—the only constraints are (a) they must have appeared/occurred during the semester (i.e. between Jan 18 and May 5 2005); and (b) they can be compiled and rendered as a single paper document (although if you have creative ideas about digital or audio presentations, I'm prepared to consider them).

Topics: While some of the topics in the syllabus seem a little abstract on first inspection, you may be surprised at how often they come up in newspaper articles, talking with friends, or simply walking around town. You can include anything that seems relevant to you (as long as you can explain why). However, here are some suggestions to get you started.

1. Networks and connectivity. Networks are everywhere, including:

    a. Social Sciences
        - Acquaintanceship networks
        - Friendship, kinship, advice-seeking
        - Affiliation networks
            - Affiliation by artifact (e.g. Amazon.com)
            - Affiliation by activity (e.g. boards, publications)
            - Affiliation by identity (e.g. beliefs, ethnicity)
        - Economic exchange networks
        - Organizational networks (both between and within organizations)

    b. Biological Sciences
        - Disease networks
            - Human-to-human (HIV, Influenza, TB)

Vector-borne (Malaria)
Environmentally borne (Cholera, Foot-and-Mouth)
Food webs
Physiological networks
Neural
Circulatory
Immunological
Biochemical networks
Protein-protein interactions
Gene regulation
Metabolic reactions

c. Engineering / Technology
Power transmission grids
The Internet
Distribution Infrastructures
Postal service
Transportation Networks
Road, Rail, Shipping, Air
Electronic Circuits

d. "Information" Networks
Software
World Wide Web
Word nets

2. Businesses or web-sites that exploit ideas about networks. For example, Friendster, Orkut, and Face book all invoke ideas about friendship networks; Epinions and Amazon make use of referral networks (aka "collaborative filtering); Spoke and Visible Path mine email network data; and MeetUp is designed to create affiliation networks. There are probably lots of others as well.

3. Examples of people influencing each other's behavior, either directly (peer-to-peer influence, word-of-mouth marketing) or indirectly (via social norms, organizational culture, etc.). Voting behavior, consumer behavior, TV watching, etc. are some examples.

4. Examples of surprising social or cultural change, in the sense that the change was unexpected, or previously unnoticed, or otherwise difficult to account for. Fads, fashions, revolutions, and changing social norms or attitudes (towards, for example, gay marriage, national security, corporate malfeasance, foreign aid, obesity, online dating) all fall into this category. Alternatively, prolonged persistence of social norms in the face of concerted efforts to effect change can also be puzzling.

5. Epidemics of disease, both novel (e.g. Avian influenza and SARS), and chronic (e.g. HIV, TB, Malaria).

6. Examples of complex problem solving activities, in which many people and even agencies must collaborate to solve an urgent problem (for example intelligence gathering and assessment, distribution of aid to Tsunami victims, etc.)

Commentary. Each piece, or set of related pieces, that you present in your scrap book should be accompanied by a short (or long) discussion of how and why you think the piece is (a) interesting; (b) relevant; and (c) illuminated by something you have learned in the course. For example, some network concept might help you see that two apparently unrelated news stories, possibly being reported in different sections of the newspaper, actually are different manifestations of the same thing. Or based on what you have learned, you might start to think that the standard policy response to some occurrence is misguided, or informed by faulty intuition. There is no need to restate concepts verbatim, or to apply them narrowly—feel free to use your imagination. Even technical correctness (while encouraged) is less important than the exercise of thinking through familiar problems in new ways, or becoming aware of new questions to be considered.

Length is less important than the discrimination and imagination you display in choosing pieces, and the quality of your own insights, but five pieces is too few, and fifty is probably too many. Overall length should be in the vicinity of 20-30 pages, of which at least 5-10 pages should be your own writing.

Note: you will be required to submit an "in-progress" collection of your clippings the last class before spring break (March 9). These clippings do not need to be annotated, nor should they represent a complete collection—the requirement is solely to prevent you from leaving the collection exercise to the last minute. The collections will be returned to you.

Class Discussions (10%)

In order to facilitate your collection of news stories, etc., you will be encouraged to bring them to class, or else discuss your recollection of them. There will not be any specified format for these discussions, except the general question: "What did you read/see/hear in the last few days (not including assigned readings) that you think is relevant to this class, and why do you think it's relevant?" The emphasis is on what you think, not on what you think I want you to think.

In addition to discussion news materials, you should also feel free to raise questions about the lecture material as well as assigned and optional readings.

Syllabus

All readings listed under topic headings are mandatory; references listed under "Additional Reading" are optional.

Note: Some sections will require more time than others; thus the number of readings per topic is not constant. The length and difficulty of the readings also varies. In general, you should expect to devote at least a few hours to reading every week.

Part I: Why are social networks interesting?

Reaching out to Each Other

- Who are your friends, and why?
- Who do you want to meet? (And do they want to meet you?)
- Who pays attention to whom?

D. Boyd. Friendster and publicly articulate social networking. Conference on Human Factors and Computing Systems, Vienna: ACM, April 24-29 (2004). Available online at http://www.danah.org/papers/
D. Watts. Online dating (with a little help from your friends). Unpublished manuscript, available on course website.
G. J. Hitsch, A. Hortacsu, and D. Ariely. What Makes You Click: An Empirical Analysis of Online Dating. Working paper (2005). Available online at http://www.aeaweb.org/annual_mtg_papers/2006/0106_0800_0502.pdf.
J. Peretti. My Nike media adventure. *The Nation*, April 9 (2001)
http://www.thenation.com/docprint.mhtml?i=20010409&s=peretti
JuiceeNewsDaily. The history of blogs
http://www.juiceenewsdaily.com/0505/news/history_blogs.html?1133412833296
Anonymous. Measuring the influence of bloggers on corporate reputation. Available on course website.
C. Shirky. Weblogs and the Mass Amateurization of Publishing
http://shirky.com/writings/weblogs_publishing.html

Working and Playing Together

- Distributed computing
- Open source software
- Wikis and clickworkers
- MMOG's
- Peer-to-peer file sharing

Benkler. The Wealth of Networks; How Social Production Transforms Markets and Freedom (Yale University Press, 2006), Chapter 3. Available on the course website.
H. Rheingold. *Smart Mobs: The Next Social Revolution* (Basic Books, 2002), Chapters 3-5.

L. Erlanger. Distributed computing: An introduction.
http://www.extremetech.com/print_article2/0,1217,a=25002,00.asp
J. Giles. Internet encyclopedias go head to head. Nature online, 14 Dec, 2005
http://www.nature.com/news/2005/051212/full/438900a.html.
The Economist. Worlds without ends
http://www.economist.com/diversions/displayStory.cfm?story_id=5300059
E. Castronova. On Virtual Economies. CESifo Working Paper Series No. 752. (2002). Available online http://ssrn.com/abstract=338500 (login required).

Part II: What do we know about social networks?

Networks as a way of looking at society

- Basic network concepts and terminology
- Real-world social networks

D. J. Watts. *Six Degrees*, Chapters 1-2.
S. Wasserman and K. Faust. Social Network Analysis, Chapters 1-2.
C. McCarty, H.R. Bernard, P.D. Killworth, G.A. Shelley, and E.C. Johnsen. Eliciting representative samples of personal networks. *Social Networks*, 19, 303-323 (1997).
G. Kossinets and D. J. Watts. Empirical Analysis of Evolving Social Networks. *Science*, 311, 88-90 (2006).

The Small World Problem

- The Small-World Experiment
- Why is it surprising?
- Random Graphs
- Small-world networks

J. Travers and S. Milgram. An experimental study of the small world problem. Sociometry, 32(4), 425-443 (1969)
P. S. Dodds, R. Muhamad, D. J. Watts. An experimental study of search in global social networks. *Science*, 301, 827-829 (2003).
M. . Granovetter. The strength of weak ties. *American Journal of Sociology*. 81, 1287-1303 (1973).
D. J. Watts. Networks, dynamics, and the small-world phenomenon. *American Journal of Sociology*, (1999).
D. J. Watts and S. H. Strogatz. Collective dynamics of 'small-world' networks. *Nature* 393, 440-442 (1998).

How to Search a Social Network

- The Search Problem
- Identity and Social Search
- Is 6 a big or small number?

M. Buchanan. Know thy neighbour. *New Scientist* (Jan 17, 2004)
D. J. Watts, P. S. Dodds, and M. E. J. Newman. Identity and search in social networks. Science, 296, 1302-1305 (2002).
J. Kleinfeld. The Small World Problem. *Society*, 39(2), 61-66 (2002).
L. A. Adamic and E. Adar. How to search a social network Available online at. http://arxiv.org/abs/cond-mat/0310120 (2005)

Scale-free networks

- Cumulative Advantage
- Power Laws and Scale Free Networks
- Classes of networks

R. Merton. The Matthew effect in science. *Science*, 159, 56-63 (1968)
A. Barabasi and R. Albert, Emergence of scaling in random networks. *Science* 286, 509-512 (1999)
L. A. N. Amaral, A. Scala, M. Barthelemy, and H. E. Stanley. Classes of small-world networks. *Proceedings of the National Academy of Sciences*, 97(21), 11149-11152 (2000)

Part III: How do networks affect social processes?

Disease Spreading, Outbreaks, and Epidemics

- Modeling the spread of disease
- The epidemic threshold
- Concurrency in sexually-transmitted diseases
- Why are epidemics so unpredictable?

D. J. Watts. Outbreak: In epidemics, is fear a good thing? *Slate Magazine*, April 30, (2003) http://www.slate.com/id/2082308/
D. Watts. Pandemic preparedness and predictability. Unpublished manuscript (2005) Available on course website.
M. Keeling The Mathematics of Disease: One parameter (almost) does it all . Plus online http://plus.maths.org.uk/issue14/features/diseases/index.html (2001).
M. Morris and M. Kretzschmar. Concurrent partnerships and the spread of HIV. AIDS 11, pp. 651-648 (1997).

F. Liljeros, C. R. Edling, L. A. N. Amaral, H. E. Stanley, Y. Åberg. The web of human sexual contacts. *Nature* 411, 907-908 (2001).
A. L. Lloyd and R. M. May. Epidemiology - How viruses spread among computers and people. *Science*, 292, 1316-1317 (2001)
D. J. Watts, P. S. Dodds, R. Muhamad, and D. Medina. Multiscale, recurrent epidemics in a hierarchical compartment model, *Proceedings of the National Academy of Sciences*, 102(32), 11157-11162 (2005)

Social Contagion and Information Cascades

- Social Influence and Decision Externalities
- Threshold rules for decision making
- Social Contagion versus Biological Contagion

S. E. Asch. Effects of group pressure upon the modification and distortion of judgments, Chapter 12 in D. Cartwright and A. Zander, Group Dynamics: Research and Theory (Row, Peterson and Co., 1953),
D. J. Watts. The Kerry Cascade: How a '50s psychology experiment can explain the Democratic primaries. *Slate Magazine*, Feb. 24 (2004)
http://www.slate.com/id/2095993/
D. Lopez-Pintado and D. J. Watts. Social influence, binary decisions, and collective dynamics. Working paper (2006), section 3.
M. Granovetter. Threshold models of collective behavior. *American Journal of Sociology* 83(6), 1420-1443 (1978).
Bass, F. M. A New Product Growth for Model Consumer Durables. *Management Science* 15(5): 215-227 (1969).
P. S. Dodds and D. J. Watts. Universal behavior in a generalized model of contagion. *Physical Review Letters*, 92(21), 218701 (2004).

Information Cascades and Unpredictability

- The Activation Game
- Threshold rules and cascades on networks
- Social influence and unpredictability
- Accidental influentials

http://files.deviantart.com/f/2004/188/8/7/gridgame.swf
C. Mackay. *Extraordinary Popular Delusions and the Madness of Crowds* (Harmony Books, 1980), Chapter 3.
D. MacKenzie. Fear in the markets. London Review of Books, 22(8), 31-32 (2000).
D. J. Watts. A simple model of global cascades on random networks. *Proceedings of the National Academy of Sciences*, 99, 5766-5771 (2002).
D. J. Watts and P. S. Dodds. The Accidental Influentials. Working paper (2006). Available from TA.

M. J. Salganik, P. S. Dodds, and D. J. Watts. An experimental study of inequality and unpredictability in an artificial cultural market. *Science*, in press (2006).

Networks, Emergence, and Causality in Social Processes

- Emergence: "the whole is different from the sum of its parts"
- Networks as a way to solve the micro-macro problem
- Hindsight Bias and Creeping Determinism
- Cause and effect in complex systems

T. Kuran. Now out of never: The element of surprise in the East European revolution of 1989. World Politics, 44, 7—48 (1991).
P. Anderson. More is different. *Science*. 177, 393-396 (1972)
D. Watts. The collective dynamics of belief. To appear in V. Nee and R. Swedberg. *The Spirit of Capitalism* (Stanford University Press, 2007).

Organizations, Problem Solving, and Robustness

- The Toyota-Aisin crisis
- Markets versus Hierarchies
- Hubs and Robustness
- The firm as an information-processing network
- Ultra-robust networks

R. H. Coase. The nature of the firm. *Economica* (1937).
Reprinted in Coase, R. H. The Firm, the Market, and the Law (University of Chicago Press, 1988), Chapter 2.
W. Powell. Neither market nor hierarchy: Network forms of organization. In
R. Albert and A. L. Barabasi. Error and attack tolerance of complex networks. *Nature* 406, 387-482 (2000).
P. S. Dodds, D. J. Watts, and C. F. Sabel. Information exchange and the robustness of organizational networks. *Proceedings of the National Academy of Sciences* 100, 12516-12521 (2003).
C. F. Sabel. A Real Time Revolution in Routines. *Organizational Studies*, forthcoming (2006). Working paper available from TA.

Additional Readings

<u>Books</u>
A-L Barabasi. Linked: The New Science of Networks (Perseus, 2002)
M. Buchanan. Nexus: Small Worlds and the Groundbreaking Science of Networks (W. W. Norton, 2002)
S. H. Strogatz. Sync: The Emerging Science of Spontaneous Order (Hyperion, 2003)
D. J. Watts. Small Worlds: The Dynamics of Networks Between Order and Randomness (Princeton, 1999)

D. J. Watts. *Six Degrees: The Science of a Connected Age* (W. W. Norton, 2003)

Review Papers

R. Albert and A-L Barabasi. Statistical mechanics of complex networks, *Review of Modern Physics* 74, 47-97 (2002)
M. E. J. Newman. *SIAM Review* 45, 167-256 (2003).
S. H. Strogatz. Exploring complex networks. *Nature* 410: 268-276 (2001)
D. J. Watts. The "New" Science of Networks. *Annual Review of Sociology,* 30, 243-270 (2004)

Peer-to-Peer Networks

Y. Benkler. Coase's Penguin, or, Linux and The Nature of the Firm. *The Yale Law Journal.* Vol. 112 (3), 369—447 (2002).
E. Castronova. *Synthetic Worlds: The Business and Culture of Online Games* (University of Chicago Press, 2005).

Complexity, Phase Transitions and Universality

M. Newman and G. Barkema. Monte Carlo Methods in Statistical Physics (Oxford, Clarendon Press, 1999), Chapter 1.
R. Palmer. Broken ergodicity. In D. Stein (Ed.) Lectures in the Science of Complexity, SFI Studies in the Sciences of Complexity, Volume 1, 275-300 (Addison Wesley Longman, 1989).
D. Stein. Disordered systems: mostly spin glasses. In D. Stein (Ed.) Lectures in the Science of Complexity, SFI Studies in the Sciences of Complexity, Volume 1, 301-353 (Addison Wesley Longman, 1989).

Random graphs

D. J. Watts. *Small Worlds: The Dynamics of Networks Between Order and Randomness* (Princeton, Princeton University Press, 1999), Chapter 2.
M. E. J. Newman, S. H. Strogatz, and D. J. Watts. Random graphs with arbitrary degree distributions and their applications. Physical Review E, 64, 026118 (2001).

M. E. J. Newman, D. J. Watts, and S. H. Strogatz. Random graph models of social networks. *Proceedings of the National Academy of Sciences,* 99, 2566-2572 (2002).
A. Rapoport.. A contribution to the theory of random and biased nets. *Bulletin of Mathematical Biophysics* 19, 257-271 (1957). Also in S. Leinhardt (ed.) *Social Networks: A Developing Paradigm*, 389-409 (New York, Academic Press, 1977).
A. Rapoport. Mathematical Models of Social Interaction. In R. D. Luce, R. R. Bush, and E. Galanter (Eds.) Handbook of Mathematical Psychology, Vol. 2, 493-579 (New York, Wiley, 1963).

Social Network Analysis

Berkowitz, S. D., 1982. An Introduction to Structural Analysis: The Network Approach to Social Research. Toronto: Butterworth's.
R. Burt. *Structural Holes. The Social Structure of competition*. Chapter 1 (Harvard University Press, 1992).

Degenne, Alain and Michel Forse, 1999. Introducing Social Networks. Thousand Oaks, CA: Sage Publications.
Freeman, Linton C., 2004. The Development of Social Network Analysis: A Study in the Sociology of Science. Vancouver, Canada: Empirical Press. Available for purchase online at http://www.booksurge.com/product.php3?bookID=GPUB01133-00001
S. Milgram, The small world problem. *Psychology Today* 2, 60-67 (1967).
Monge, Peter R. and Noshir S. Contractor, 2003. Theories of Communication Networks. New York: Oxford University Press.
M. E. J. Newman. The structure of scientific collaboration networks. *Proceedings of the National Academy of Sciences,* 98(2), 404-409 (2001).
M. E. J. Newman Scientific collaboration networks: I and II. Physical Review E, 64, 016131 and 016132 (2001).

Scott, John, 2000. Social Network Analysis: A Handbook. London: Sage Publications.
Wasserman, S., and K. Faust, 1994. Social Network Analysis: methods and applications. CUP.
Wellman, Barry and S. D. Berkowitz (eds.), 1997. Social Structures: A Network Approach. JAI Press reprint edition.

Searching on Networks

L. A. Adamic, R. M. Lukose, A. R. Puniyani, and B. A. Huberman. Search in power-law networks. Physical Review E. 64, 046135 (2001)
Available on-line at http://www.parc.xerox.com/istl/groups/iea/papers/plsearch/
G. W. Flake, S. Lawrence, and C. L. Giles. Efficient identification of web communities. Available on-line at http://www.neci.nec.com/~lawrence/papers/web-kdd00/bib.html
J. Kleinberg Navigation in a small world. *Nature* 406(2000), 845.
J. Kleinberg. The small-world phenomenon: An algorithmic perspective. Proc. 32nd ACM Symposium on Theory of Computing (2000). Available online at http://www.cs.cornell.edu/home/kleinber/kleinber.html
J. Kleinberg. Authoritative sources in a hyperlinked environment. Available on-line at http://www.cs.cornell.edu/home/kleinber/kleinber.html

Scale Free Networks

D. S. Callaway, M. E. J. Newman, S. H. Strogatz, and D. J. Watts. Exact solution of percolation on random graphs with arbitrary degree distributions. *Physical Review Letters* **85**, 5468-5471 (2000).
Krapivsky, P. L., S. Redner, et al. Connectivity of growing random networks. *Physical Review Letters* 85(21): 4629-4632. (2000)
Krapivsky, P. L. and S. Redner. Organization of growing random networks. *Physical Review E* 6306(6): art. no.-066123 (2001)
D. Price. Networks of scientific papers. *Science*, 149, 510-515 (1965)
Price, D. J. A general theory of bibliometric and other cumulative advantage processes. *J. Amer. Soc. Inform. Sci.* 27: 292-306 (1980)

Disease Spreading

M. Kretschmar and M. Morris. Measures of Concurrency in Networks and the Spread of Infectious Disease. *Mathematical Biosciences* 133: 165-195 (1996)

M. Morris. Telling tails explain the discrepancy in sexual partner reports. *Nature*. 1993 Sep 30;365(6445):437-40.
Newman, M. E. J. Assortative mixing in networks. *Physical Review Letters* 89(20): art. no.-208701 (2002)
Pastor-Satorras, R. and A. Vespignani Epidemic spreading in scale-free networks. *Physical Review Letters* 86(14), 3200-3203 (2001).

Social Contagion

Bikhchandani, S., D. Hirshleifer, et al. A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades. *Journal of Political Economy* 100(5): 992-1026 (1992)
Bikhchandani, S., D. Hirshleifer, et al. Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades. *The Journal of Economic Perspectives* 12(3): 151-170 (1998)
S. C. Dodd. Formulas for Spreading Opinions. *Public Opinion Quarterly*, 22(4), 537-554 (1958).
M. Gladwell. The Tipping Point (Little Brown, 2000)

E. J. Johnson and D. Goldstein. Do defaults save lives? *Science*, 302, 1338-1339 (2003).
E. Katz and P. F. Lazarsfeld. *Personal Influence* (Free Press, 1955)

S. Lohmann. The dynamics of information cascades: The Monday demonstrations in Leipzig, East Germany, 1989-91. *World Politics*, 47, 42-101 (1994).
T. Schelling. Hockey helmets, concealed weapons, and daylight saving: A study of binary choices with externalities. *Journal of Conflict Resolution*, 17(3), 381-428 (1973). Also reprinted in T. Schelling. *Micomotives and Macrobehavior*, Chapter 7. (Norton, 1978)

Organizations, Problem Solving, and Robustness

Granovetter, Mark S. Economic action and social structure: The problem of embeddedness. American Journal of Sociology, 91: 481-510 (1985).
J. P. MacDuffie. Organizational influences on process quality improvement: Shop-floor problem-solving in auto assembly plants. *Management Science*, 43, 4 (1997).
T. Nishiguchi and A. Beaudet. Fractal design: Self-organizing links in supply chain management. In Nonaka et al. (Eds.) *Knowledge Creation: A New Source of Value* (London, Macmillan, 1999).
W. Powell and P. DiMaggio (Eds.) The New Institutionalism in Organizational Analysis (University of Chicago Press, 1991).
R. Radner. Bounded rationality, Indeterminacy, and the theory of the firm. *The Economic Journal* 106, 1360-1373 (1996).
B. Staw and L. Cummings, eds., *Research in Organizational Behavior*, 12: 295-336. (JAI Press, Greenwich, CT, 1990).
A. Ward, J. K. Liker, J. J. Cristiano, and D. K. Sobek. The second Toyota paradox: How delaying decisions can make better cars faster. *Sloan Management Review*, 36(3), 43-51 (1995).
O. E. Williamson. Transaction cost economics and organization theory. In N. J. Smelser and R. Swedberg (Eds.) *The Handbook of Economic Sociology* (Princeton, Princeton University Press, 1994).

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University of California, Santa Barbara

Introduction to Social Network Methods

This course provides an introduction to the concepts and methods needed to conduct social network analysis. The topics covered include elementary social network constructs, social cohesion and social positions in social networks, macro-models of social network structure, and structural bases and indicators of social influence. **Note to the readers (not included in the syllabus). This course is limited to 30 students. The enrollments usually consist of about 25 upper division undergraduates and 5 graduate students. The format of the TR classes is lecture and discussion. After each of these classes, there is a one hour session in the computer laboratory with 15 students, where they employ UCINET to prepare their projects. The four projects involve an analysis of one of the data sets in the UCINET archive. I structure all of these projects, except the last one. Students select the data set for their analysis (a different one for each project), work independently on them, and submit their results. Occasionally, depending on the interests of the graduate students, I have introduced them to the fundamentals of programming in GAUSS. All of the readings are made available in pdf format on my website.**

Class: **Sociology 148MA/248MA, Winter 2008,**
TR Phelps 3523 (2:00-3:15), Ellison 2626 (3:30-4:30)

Instructor: **Noah Friedkin**

Office Hours: TR 4:30-5:30 Ellison 2806; 893-2840; friedkin@soc.ucsb.edu

Readings: http://www.soc.ucsb.edu/faculty/friedkin

Class Schedule

Weeks 1-2 (Jan 8-17): Network Relations

Elementary Network Constructs and Network Visualization

Reading Assignment:

Granovetter, M. 1973 "The Strength of Weak Ties." *American Journal of Sociology* 78: 1360-80.

Friedkin, N.E. 1983. "Horizons of Observability and Limits of Informal Control in Organizations." *Social Forces* 62: 54-77.

Optional Reading:

Harary, Frank, Robert Z. Norman and Dorwin Cartwright 1965. *Structural Models: An Introduction to the Theory of Directed Graphs*. New York: John Wiley.

Weeks 3-4 (Jan 22 – 31): Structural Cohesion

Structural Cohesion and Cohesive Subgroups
Balance Theory and Network Macrostructures

Reading Assignment:

Davis, James A. 1963. "Structural Balance, Mechanical Solidarity, and Interpersonal Relations." *American Journal of Sociology* 68: 444-462.

Davis, James A. 1970. "Clustering and Hierarchy in Interpersonal Relations: Testing Two Graph Theoretical Models on 742 Sociomatrices." *American Sociological Review* 35: 843-851.

Optional Reading:

Johnsen, Eugene C. 1985. "Network Macrostructure Models for the Davis-Leinhardt Set of Empirical Sociomatrices" *Social Networks* 7: 203-24.

Freeman, Linton C. 1992. "The Sociological Concept of Group: An Empirical Test of Two Models." *American Journal of Sociology* 98: 152-166.

Weeks 5-6 (Feb 5 – 14): Social Networks and Multidimensional Scaling

Social Distance and Multidimensional Scaling

Reading Assignment:

Burt, Ronald S. 1976. "Positions in Networks" *Social Forces*. 55: 93-122.

Laumann, Edward O. and Peter V. Marsden. 1979. "The Analysis of Oppositional Structures in Political Elites: Identifying Collective Actors" *American Sociological Review* 44: 713-732.

Optional Reading:

Kruskal, Joseph B. and Myron Wish. 1978. *Multidimensional Scaling.* Beverly Hills: Sage.

Weeks 7-8 (Feb 19 – 28): Blockmodels and Hierarchical Cluster Analysis

Cluster Analysis and Blockmodels

Reading Assignment:

H. C. White, S. A. Boorman, and R. L. Breiger. 1976. "Social Structure From Multiple Networks, I: Blockmodels of Roles and Positions" *American Journal of Sociology*, 81, pp. 730-780.

Padgett, John F. and Christopher K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." American Journal of Sociology 98:1259-1319.

Optional Reading:

Aldenderfer, Mark S. and Roger K. Blasfield. 1984. *Cluster Analysis*. Beverly Hills: Sage.

Weeks 9- 10 (Mar 4-13): Structural Bases of Interpersonal Influence

Self-Weight, Visibility, and Salience

Reading Assignment:

Freeman Linton C. 1979. "Centrality in Social Networks: A Conceptual Clarification." *Social Networks* 1: 211-213.

Brass, Daniel J. 1984. "Being in the Right Place: A Structural Analysis of Individual Influence in an Organization" *Administrative Science Quarterly* 29: 518-539.

Optional Reading:

Friedkin, Noah E. 1991. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology* 96: 1478-1504.

Keith Hampton
Annenberg School for Communication
University of Pennsylvannia

COMM/SOCI 481 – Social Networks
Annenberg School for Communication
University of Pennsylvania

Spring, 2008

Thu 1:30-4:30 (Room ASC 318)

Prof. Keith Hampton
Email: khampton@asc.upenn.edu
Office Hours : Thursdays 12:00-1:00 (Room ASC 327)

DESCRIPTION
Social network analysis is the study of the patterns of social relations. Network analysis examines how the structure of social relations allocates resources, constrains behavior, and channels social change. It has applications in the study of friendship, communities, social support, Internet use, organizational behavior, mental and physical health, and the diffusion of information. This seminar takes a non-mathematical approach to the study of network theories and methods. It is an introduction to the fundamental concepts of social structure, including: network size, diversity, density, centrality, multiplexity, frequency of contact, tie duration, and tie strength. The course focuses on how network structure is related to everyday life, such as health, access to social support, job attainment, and the spread of information. Particular attention is given to the role of communications media in facilitating interpersonal connectivity (face-to-face, telephone, and new media), and the role of information and communication technologies (i.e. the Internet) in social support. Students will critically examine empirical studies, formulate theories of how networks influence behavior and how behavior influences networks, and test theories through the use of network methods.

REQUIREMENTS
Seminar sessions will involve intensive discussions of assigned readings. Final grades will be based on an evaluation of 10 blog postings on the subject of the weekly course readings (30%), 20 comments on other students' blog postings (10%), four assignments (50%), and class participation (10%). Students are urged to pay close attention to due dates, late assignments will not be accepted.

A major component of the course will involve the development and use of a personal blog. Students will receive access to the necessary blogging software and will be provided with basic instruction on how to maintain a blog. Students are not expected to have prior experience with blogs.

Course readings and participation: Students are expected to have read the week's readings in advance of the course meeting. Class meetings will be in a seminar format and students should be prepared to participate in a discussion based on the topic and readings of the week.

Blog Postings: Students are responsible for submitting short commentaries on 10 of the weeks' readings (300-500 words). Commentaries should focus on all of the readings from each week and should consist of limited summary; focusing on an evaluation of the readings and identifying 2-3 questions for discussion during the class meeting (focus on the papers' key issues, strengths and limitations, and a comparison to previous weeks' readings). Each commentary should be submitted as a post to the student's blog by

8:00am on the Tuesday before the class meeting. To be clear, students should post commentaries to their blog on the Tuesday before the topic is discussed in class.

Blog Comments: Each student is responsible for contributing comments to fellow students' blogs. Comments should be a minimum of 125 words and offer a critique of that week's posting, seek clarification, compare or contrast postings, or provide additional evidence or new information (such as a link to a related article, website, etc.). Each student must contribute a minimum of 20 comments, credit will be given for a maximum of two comments each week, students cannot comment on the same blog more than three times over the duration of the course. Comments must be posted by 8:00am on the day of class for posts related to that week's readings.

A*ssignments:* Students are responsible for completing all four of the following assignments. The following are intended as brief outlines of each assignment, detailed instructions will be provided in class and supporting material will be posted to the course blog.

1) The Small World of the University (17%). Handout: January 31, Part 1 due: February 7, Part II in class on March 27, Part III due: April 24. Your goal is to get your folder to the target person through the shortest chain of intermediaries. Following the instructions in the assignment handout, start the chain by passing your folder to someone on the Penn campus that you have had at least several conversations with outside the classroom and who is more likely than you to reach the target person. Each intermediary is instructed to return a postcard describing themselves. Part I (5%): Post a commentary to your blog (500-750 words) addressing the questions and hypotheses outlined in the assignment handout. Part II (2%) (in class): Meet with your small group and compile the results using the group handout. Part III (10%): Post a short paper to your blog (1250-2000 words) discussing the findings of your individual project and the aggregated findings of your group, address the questions and hypotheses you formulated in Part I.

2) Important Matters (5%), Handout: February 7, Due: February 21. Listen to the radio interview featuring Prof. Lynn Smith-Lovin (Duke University) and Prof. Robert Putnam (Harvard University). Write a blog posting (500-750 words) addressing the questions in the assignment handout.

3) Communication Diary (15%), Handout: February 28, Due: March 27. Over the next week, track the interactions you have with people using 'new media' (e.g., mobile phones and the Internet). Addressing the questions in the assignment handout, write a blog posting (1250-1750 words) discussing your findings. Bring the project handout to class, meet with your small group, combine your results using the group handout and make a short 10 minute group presentation explaining your findings.

4) Network Measures (13%), Handout: March 20, Due: April 24. Administer the "important matters" name generator, the "position generator," and short demographic survey to 20 people. Write a blog posting (1250-1700 words) discussing the interview process and your findings.

COURSE MATERIALS
Readings, audio files, and grades will be available from the course Blackboard website:
https://courseweb.library.upenn.edu/

Handouts, information on assignments, and other announcements will be available from the course blog:
http://www.mysocialnetwork.net/blog08/481/

COURSE OUTLINE

Week 1 (January 17) - Introduction and Organization

Week 2 (January 24) – What is Social Network Analysis? (NOTE: NO CLASS!)

Wellman, Barry. 1999. The Network Community: an Introduction. Pp. 1-48 in *Networks in the Global Village*, edited by Barry Wellman. Boulder: Westview Press.

Freeman, L. C. (2000). See you in the funny papers: Cartoons and social networks. *Connections, 23*(1), 32-42.

Munge, Peter and Noshir Contractor. 2003. *Theories of Communication Networks*. Oxford: Oxford University Press (pp 29-45).

Week 3 (January 31) – Small World

Milgram, Stanley. (1967). The Small-World Problem. *Psychology Today 1*:62-67

Gladwell, M. (1999). Six Degrees of Lois Weisberg. *The New Yorker 74*(41): 52-64.

Korte, C., & Milgram, S. (1970). Acquaintance Networks Between Racial Groups. *Journal of Personality and Social Psychology, 15*(2), 101-108.

Kilworth, Peter, Christopher McCarthy, Russell Bernard and Mark House. (2006). The Accuracy of Small World Chains in Social Networks. *Social Networks 28*(1): 85-96.

Watts, Duncan. (2004). The 'New' Science of Networks. *Annual Review of Sociology 30*: 243-270.

Week 4 (February 7) – Tie Strength.

Granovetter, Mark. (1973). The Strength of Weak Ties. *American Journal of Sociology* 78(6): 1360-1380.

Burt, Ronald. (1993). The Social Structure of Competition. Pp. 65-103 in *Explorations in Economic Sociology*, edited by Richard Swedberg. New York: Sage.

McPherson, M., Smith-Lovin, L., & Brashears, M. E. (2006). Social Isolation in America: Changes in Core Discussion Networks over Two decades. *American Sociological Review, 71*, 353-375.

Week 5 (February 14) – Community

Bott, Elizabeth. (1955). Urban Families: Conjugal Roles and Social Networks. *Human Relations 8*:345-83

Fischer, Claude. (1982). *To Dwell Among Friends*. Berkeley: University of California Press. [Ch. 1, 7-10]

Wellman, Barry, and Scot Wortley. (1990). Different Strokes From Different Folks: Community Ties and Social Support. *American Journal of Sociology 96*(3):558-88.

Kalmijn, M. (2003). Shared friendship networks and the life course. *Social Networks, 25*, 231-249.

Week 6 (February 21) – Network Size and Homophily.

McPherson, Miller, Lynn Smith-Lovin and James Cook. (2001). Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology 27*: 415-444.

Pearson, M., Steglich, C., & Snijders, T. (2006). Homophily and assimilation among sport-active adolescent substance users. *Connections, 27*(1), 47-63.

Hill, R. A., & Dunbar, R. I. M. (2003). Social Network Size in Humans. *Human Nature, 14*(1), 53-72.

Killworth, Peter, Eugene Johnsen, H Russell Bernard, Gene Ann Shelley, and Christopher McCarthy. 1990. Estimating the Size of Personal Networks. *Social Networks 12*: 289-312.

Week 7 (February 28) – Popularity, Centrality and Prestige

Wasserman, S., & Faust, K. (1994). Chapter 6: Centrality and prestige. In *Social Network Analysis: Methods and Applications*. Cambridge University Press.

Freeman, Linton. 1979. Centrality in Social Networks: Conceptual Clarification. *Social Networks 1*: 215-39.

Krebs, V. (2002). Uncloaking Terrorist Networks. *First Monday, 7*(4).

Valente, T., Unger, J., & Johnson, A. (2005). Do popular students smoke? The association between popularity and smoking among middle school students. *Journal of Adolescent Health, 37*, 323-329.

Week 8 (March 6) – Measurement

Zwijze-Koning, K., & Jong, M. D. T. d. (2005). Auditing Information Structures in Organizations. *Organizational Research methods, 8*(4), 429-453.

Marin, Alexandra & Keith Hampton (2007). Simplifying the Personal Network Name Generator: Alternatives to Traditional Multiple and Single Name Generators. Field Methods 19(2), 163-193.

Lin, Nan, Yang-chih Fu, & Ray-May Hsung. (2001). The Position Generator: Measurement Techniques for Investigations of Social Capital. Pp. 57-84 in *Social Capital: Theory and Research,* edited by Nan Lin, Karen Cook, and Ronald Burt. New York: Aldine De Gruyter.

van der Gaag, Martin and Tom .A.B. Snijders. (2005). The Resource Generator: Social Capital Quantification with Concrete Items. *Social Networks* 27(1): 1-29.

Week 9 (March 13) – Spring Break (NO CLASS!)

Week 10 (March 20) -- Computer Networks as Social Networks I.

Kronholz , June (2003, February 13). After the Science Fair: Dear World, Please Stop Writing Me: A Girl's E-Mail Experiment Clogs In-Box for Weeks. *The Wall Street Journal*: A1.

Wellman, Barry and Milena Gulia. 1999. Net-Surfers Don't Ride Alone: Virtual Communities as Communities. Pp. 331-366 in *Networks in the Global Village*, edited by Barry Wellman. Boulder, CO: Westview Press.

Hampton, Keith & Barry Wellman (2003). Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb. *City and Community 2*(4), 277-311.

Baym, N., Zhang, Y. B., & Lin, M.-C. (2004). Social Interactions Across Media: Interpersonal Communication on the Internet, Telephone and Face-to-Face. *New Media & Society, 6*(3), 299-318.

Mesch, Gustavo, & Talmud, Ilan. (2007). Similarity and the Quality of Online and Offline Social Relationships Among Adolescents in Israel. *Journal of Research on Adolescence, 17*(2), 455-466.

Week 11 (March 27) – Small World Assignment Part II (ATTENDANCE MANDITORY!)

Week 12 (April 3) – Computer Networks as Social Networks II.

Marks, Paul (2006, June 9). Pentagon sets its sights on social networking websites. *New Scientist*. http://www.newscientist.com/article/mg19025556.200

Ellison, N., Steinfield, C., & Lampe, C. (2007). The Benefits of Facebook 'Friends:' Social Capital and College Students' Use of Online Social Network Sites. Journal of Computer-Mediated Communication, 12(4). http://jcmc.indiana.edu/vol12/issue4/ellison.html

Miyata, Kakuko, Boase, Jeffrey., & Wellman, Barry (2008). The Social Effects of Keitai and Personal Computer E-mail in Japan. In *Handbook of Mobile Communication Studies*, edited by James Katz. Cambridge, MA: MIT Press.

Hampton, Keith, et al (forthcoming). WiFi and Public Space, a Poor Interface? An Empirical Study of Wireless Internet Use and Sociability.

Wellman, Barry (2001). Physical Place and Cyber Place: The Rise of Personalized Networking. *International Journal of Urban and Regional Research 25*(2), 227-252.

Week 13 (April 10) – Search Process and Information Flow

Tepperman, Lorne. (1975). Deviance as a Search Process. *Canadian Journal of Sociology 1 (3)*: 277-294.

Rogers, Everett. (2003). Diffusion Networks. Pp. 300-364 in *Diffusion of Innovations*. New York: The Free Press.

Markus, Lynne (1987). Toward a 'Critical Mass' Theory of Interactive Media: Universal Access, Interdependences and Diffusion. Communication Research 14(5): 491-511.

Metcalf, Bob (2006, August 18). Guest Blogger Bob Metcalf's Law Recurses Down the Long Tail of Social Networks. VCMike's Blog. Retrieved on January 1, 2007: http://vcmike.wordpress.com/2006/08/18/metcalfe-social-networks/

Week 14 (April 17) – Health

Cohen, S., Brissette, I., Doyle, W. J., & Skoner, D. P. (2000). Social Integration and Health: The Case of the Common Cold. *Journal of Social Structure 1*(3).

Dickens, C.M., L. McGowen, C. Percival, J. Douglas, B. Tomensen, L. Cotter, A Heagerty, and F.H. Creed. (2004). Lack of Close Confidant, but not Depression, Predicts Further Cardiac Events After Myocardial Infraction. *Heart 90*(5): 518-522.

Christakis, N.A. & Fowler, J.H. (2007). The Spread of Obesity in a Large Social Network over 32 Years. The New England Journal of Medicine, 357: 370-379.

Bearman, P. S., Moody, J., & Stovel, K. (2004). Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks. *American Journal of Sociology, 110*(1), 44-91.

Week 15 (April 24) – Social Inequality

Fernandez, Roberto and David Harris. (1992). Social Isolation and the Underclass. Pp. 257-293 in *Drugs, Crime, and Social Isolation,* edited by Adele Harrell and George Peterson: The Urban Institute.

Marsden, Peter, and Jeanne Hurlbert. (1988). Social Resources and Mobility Outcomes. *Social Forces 66*:1038-1059.

Alexandra Marin
Department of Sociology
University of Toronto

SOCIOLOGY 355 -STRUCTURAL ANALYSIS
Prof. Alexandra Marin
Class Time: W12-2 275 Spadina Ave. Rm. 362
Location: SS2106 416-946-5880
Office Hours: T12-2 alexandra.marin@utoronto.ca

COURSE DESCRIPTION

We've all heard it said, "It's not what you know; it's who you know." *Structural Analysis*, more commonly known as *Social Network Analysis*, is the study of who you know, who *they* know, and why it matters.

You will learn to describe different kinds of networks, including social support networks, workplace networks, sexual networks, organizational, friendship networks, and internet-based social networks. You will also learn why these networks matter for outcomes such as being healthy, finding a job, getting a promotion, escaping poverty, catching a cold, having a great idea, and getting other people to recognize your great idea.

COURSE GOALS
After completing this course, students should be able to:
i) Describe how social network analysts view the social world and use this perspective to ask sociological questions. ii) Describe the basic concepts and measures used in social network analysis. iv) Apply the concepts social network analysis to problems of sociological interest. v) Describe how different kinds of networks are related to sociologically significant outcomes.

REQUIREMENTS AND GRADING
Short Problem Set: 15% Test #1: 20% Final Paper: 30% Final Exam: 25% Participation: 10%
Total 100%

READINGS
Available at U of T Bookstore:

Scott, John. 1991. Social Network Analysis: A Handbook. London: Sage.
Watts, Duncan J. 2003. Six Degrees: The Science of a Connected Age. New York.
W.W. Norton. Short course reader available from Canadian Scholar's Press, 180 Bloor St.

West, Suite 801. All other readings are available online with links provided on the online course syllabus.

COURSE OUTLINE

Week #		
	PART I -INTRODUCTION TO STRUCTURAL ANALYSIS AND NETWORK ANALYSIS	
	A. What is Structural Analysis	
1	September 12 *Course Introduction*	**No Reading Assignment**
2	September 19 *Introducing Networks*	Barabasi, Albert-Laszlo. 2003. Linked: How Everything Is Connected to Everything Else and What it Means for Business, Science, and Everyday Life. New York: Plume. Chapter 12.
3	September 26 *Theorizing Structurally*	Smith-Lovin, Lynn and J. Miller McPherson, 1993, "You Are Who You Know: A Network Approach to Gender," in Paula England ed., Theory on Gender / Feminism on Theory, Hawthorne, NY: Aldine de Gruyter, 223-251. Wellman, Barry. 1983. "Network Analysis: Some Basic Principles." Sociological Theory. 1: 155-200 http://simplelink.library.utoronto.ca/url.cfm/27321
	B. Introduction to Social Network Analysis	
4	*October 3 Operationalizing Structure*	Scott, Chapters 1 and 2. Freeman, Linton C. 2004. The Development of Social Network Analysis: A Study in the Sociology of Science. Vancouver: Empirical Press. Chapters 8-9.
5	October 10 *Introduction to Network Data*	Scott, Chapters 3-4 Marsden, Peter. 2005."Recent Developments in Network Measurement." in Peter J. Carrington, John Scott, and Stanley Wasserman (eds) Advances in Social Network Analysis. Cambridge: Cambridge University Press. Pp. 8-30
6	October 17 *Measures of Network Structure*	Scott, Chapters 5-6
7	October 24 *Where Do Networks Come From? What do they look like?*	**Problem Set Due (15%)** Marsden. Peter. 1987. Core Discussion Networks of Americans. American Sociological Review. 52:122-131 http://simplelink.library.utoronto.ca/url.cfm/27322 Feld, Scott. 1981. "The Focused Organization of Social Ties." American Journal of Sociology. 86:1015-1035. http://simplelink.library.utoronto.ca/url.cfm/27323 McPherson Miller J., and Lynn Smith-Lovin. 1987. Homophily in Voluntary Organizations: Status Distance and the Composition of Face-to-Face Groups. American Sociological Review. 52:370-379. http://simplelink.library.utoronto.ca/url.cfm/27324
	PART II. SUBSTANTIVE APPLICATIONS OF SOCIAL NETWORK ANALYSIS	

	A. Community, Social Support and Health	
8	October 31 *Social Support and Personal Communities*	Wellman, Barry. "The Community Question: The Intimate Network of East Yorkers. American Journal of Sociology. 84:1201-1231 http://simplelink.library.utoronto.ca/url.cfm/27325 McPherson, Miller, Lynn Smith-Lovin and Matthew E. Brashears. 2006. "Social Isolation in America: Changes in Core Discussion Networks Over Two Decades." 71:353-375 http://simplelink.library.utoronto.ca/url.cfm/27326
9	November 7 *Social Support and Health*	Sheldon Cohen, Ian Brissette, David Skoner, and William Doyle(2000). Social Integration and Health: The Case of the Common Cold. Journal of Social Structure. http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/35316 Elwert, Felix and Nicholas A. Christakis. 2006. "Widowhood and Race." American Sociological Review. 71:16-41 http://simplelink.library.utoronto.ca/url.cfm/27327
	C. Social Support, Community, and the Internet	
10	**November 14** *The Internet and Networks*	Hampton, Keith, and Barry Wellman. 2003. "Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb." *City and Community* 2:277311. http://simplelink.library.utoronto.ca/url.cfm/27330 Katz, James E., and Ronald E. Rice. 2002. "Project Syntopia: Social Consequences of Internet Use." *IT and Society* 1:166-179. http://www.stanford.edu/group/siqss/itandsociety/v01i01/v01i01a11.pdf
		B. Sexual Networks
11	November 21 *Sexual Networks*	Laumann, Edward, Stephen Ellingson, Jenna Mahay, Anthony Paik, and Yoosik Youm (Eds.). 2004. The Sexual Organization of the City. Chicago: University of Chicago Press. Bearman, Peter. 2004. "Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks." *American Journal of Sociology* 110:44-91. http://simplelink.library.utoronto.ca/url.cfm/27333
		D. Social Networks and Inequality
12	November 28 *Human, Social, and Cultural Capital*	Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." American Journal of Sociology. 94: S95-S120 http://simplelink.library.utoronto.ca/url.cfm/27335 Erickson, Bonnie H. 1996. "Culture, Class, and Connections." American Journal of Sociology. 102:217-251 http://simplelink.library.utoronto.ca/url.cfm/27336 Harding, David J. 2005. "Neighborhood Violence and the Age Structure of Peer Networks: Socialization of Adolescent Boys in Disadvantaged Neighborhoods." Population Studies Center: Research Report 05-586 http://64.233.179.104/scholar?hl=en&lr=&q=cache:0_mhn3GYw8oJ:www.psc.isr.umich.ed u/pubs/pdf/rr05-586.pdf+%22Neighborhood+Violence+and+the+Age+Structure+of+Peer+

		Networks:+Socialization+of+Adolescent+Boys+in+Disadvantaged+Neighborhood
13	December 5 *Networks and Resource Access*	Sandra Smith. 2005. "Don't Put My Name on It" American Journal of Sociology. 111:1-57 Stack. Carol. 1970. "All Our Kin". New York: Harper. Chapters 3 and 6. Review: Smith-Lovin, Lynn and J. Miller McPherson, 1993, "You Are Who You Know: A Network Approach to Gender," in Paula England ed., Theory on Gender / Feminism on Theory, Hawthorne, NY: Aldine de Gruyter, 223-251.
14		**Test #1.**
		E. Social Networks and Work
15	January 16 *Using Networks to Find Jobs*	Granovetter, Mark. 1973. The Strength of Weak Ties. American Journal of Sociology. 78:1360-1380. http://simplelink.library.utoronto.ca/url.cfm/27338 Bian, Yanjie. 1997. "Bringing Strong Ties Back In: Indirect Ties, Network Bridges, and Job Searches in China." American Sociological Review 62:266-285. http://simplelink.library.utoronto.ca/url.cfm/27339 Fernandez, Roberto M. and Nancy Weinberg. 1997. Sifting and Sorting:Personal Contacts and Hiring in a Retail Bank. American Sociological Review. 62:883-902 http://simplelink.library.utoronto.ca/url.cfm/27340
16	January 23 *Networks and Job Performance*	**DUE: Short (1 paragraph) description of final paper topic and/or research question. If have not yet chosen a single topic, you may describe (1 para) each, two or three topics that you are considering.** Burt, Ronald S. 1998. "The Gender of Social Capital." Rationality and Society. 10:5-46 http://simplelink.library.utoronto.ca/url.cfm/27370 Burt, Ronald S. 1997. "The Contingent Value of Social Capital." Adminstrative Science Quarterly. 42:339-365. http://simplelink.library.utoronto.ca/url.cfm/27371 Podolny, Joel, and James Baron.1997. "Resources and Relationships: Social Networks and Mobility in the Workplace." American Sociological Review. 62:673-693 http://simplelink.library.utoronto.ca/url.cfm/27372
17	January 30 *Locating and Using Sociological Research*	**No Reading Assignment** Class will meet in Robarts Library.

F. Social Networks in the Marketplace		
18	February 6 *How Do Economic Transactions Happen?*	Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." American Journal of Sociology. *91: 481-510* http://simplelink.library.utoronto.ca/url.cfm/27373 Uzzi, Brian 1996. "Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." American Sociologcial Review http://simplelink.library.utoronto.ca/url.cfm/27374 DiMaggio, Paul and Hugh Louch. 1998. Socially Embedded Consumer Transactions: For What Kinds of Purchases Do People Most Often use Networks? American Sociological Review. 63: 619-637. http://simplelink.library.utoronto.ca/url.cfm/27375
G. Social Networks, Innovation and Diffusion		
19	February 13 *Innovation and Networks*	Hargadon, Andrew Robert I. Sutton. 1997. "Technology Brokering and Innovation in a Product Development Firm". Administrative Science Quarterly. 42:716-749 http://simplelink.library.utoronto.ca/url.cfm/27377 Burt,.Ronald S. 2004. "Structural Holes and Good Ideas." American Journal of Sociology. 110:349-399. http://simplelink.library.utoronto.ca/url.cfm/27379 Liebeskind, Julia Porter, et. al. 1996. "Social Networks, Learning, and Flexibility: Sourcing Scientific Knowledge in the New Biotechnology Firms." 7:428-443 http://simplelink.library.utoronto.ca/url.cfm/27380 Gibson, David. "Concurrency and Commitment: Network Scheduling and Its Consequences for Diffusion" Journal of Mathematical Sociology. 29:295-323 http://simplelink.library.utoronto.ca/url.cfm/27381
20	February 27 *Writing Sociology*	**No Reading Assignment.** Guest Speaker: Margaret Procter
Social Networks and Disaster		
21	March 5 *Networks and Disaster*	Klinenberg, Eric. 2002. Heat Wave: A Social Autopsy of Disaster in Chicago. Chicago: University of Chicago Press. Hurlbert, Jeanne S., Valerie A. Haines, and John J. Beggs. 2000. "Core Networks and Tie Activation: What Kinds of Routine Networks Allocate Resources in Nonroutine Situations?" American Sociological Review 65:598-618. http://simplelink.library.utoronto.ca/url.cfm/42933

H. The Joy of Structure		
22	March 12 *Structure and Personal Networks*	Travers, J. and S. Milgram 1969. "An experimental study of the small world problem," Sociometry 32:425-43 http://simplelink.library.utoronto.ca/url.cfm/27383 Killworth, Peter. et. al. 1990. "Estimating the Size of Personal Networks." Social Networks. Social Networks. 12: 289-312. http://scholarsportal.info/pdflinks/07082118201709624.pdf Feld, Scott. 1991. "Why your Friends Have more Friends Than You Do. American Journal of Sociology. 96:1464-1477 http://simplelink.library.utoronto.ca/url.cfm/27384
23	March 19 *Structure and Whole Networks*	Watts, Duncan J. 2003. Six Degrees: The Science of a Connected Age. New York:W.W. Norton. Chapters 1-3.
I. Showing Off What You've Learned		
24	March 26 *Peer Comment and Editing*	**No Reading Assignment. Bring a Draft of Your Final Proposal.**
25	April 2 *Network Olympics*	**Final Paper Due. No Reading Assignment.** Second Annual Network Olympics Bring your thinking hats and your love of networks for a fun-filled two hours of games and prizes.
26	April 2 *Course Wrap-Up*	**No Reading Assignment. Course Wrap-Up Exam Review**

COURSE POLICIES Attendance: Students are responsible for all material presented in class. Students who are unable to attend class on a given day are responsible for obtaining from their classmates' notes on all material covered, as well as information regarding any administrative announcements that may have been made.

Preparation and Participation
Students are expected to complete all assigned readings in advance of the class period for which they are assigned, and to attend class prepared to discuss the assigned readings. 10% of each student's mark in the course will be based on class participation including preparation, contributions to in-class discussions, in-class group work participation, and reading responses (see below).

Reading Responses

Students are required to submit short reading responses, approximately one half page long. These should be pasted into the appropriate forum thread on the course web site and uploaded to Turnitin.com before class each week. These responses should not summarize the readings, but rather engage the ideas they present. Because response papers are intended to prepare students to participate in class discussions, **reading responses will only be accepted for students who attend class**; absent students may not submit reading responses. I will read each response and provide *extremely brief* feedback. However, no formal grade will be assigned. Completion and quality of reading responses will be one basis of evaluation for the participation portion of each student's mark.

Dr. Joerg Raab
Department of Organisation Studies
Faculty of Social and Behavioural Sciences
Tilburg University

SYLLABUS
RELATIONS AND NETWORKS OF ORGANIZATIONS
2ND SEMESTER STUDY YEAR 2007-2008

Lecturers	Prof. Dr. Leon Oerlemans (course coordinator) l.a.g.oerlemans@uvt.nl Phone: +31 13 466 3153 Room P-1.159	Dr. Jörg Raab j.raab@uvt.nl Phone: +31 13 466 3651 Room: P-1.162
	Drs. Rob Jansen r.j.g.jansen@uvt.nl Phone: +31 13 466 3496 Room: P-3.104	Drs. Maryse Chappin m.m.h.chappin@uvt.nl Phone: +31 13 466 2523 Room: P-1.169
Consulting hours	You can contact us by e-mail for simple and practical questions and matters. Please make an appointment with us if you want to discuss more complicated matters. This can be done via e-mail or by contacting the secretary of the Department of Organisation Studies: Gita Gokoel (+31 13 466 2069) or Franka Beeks (+31 13 466 8762)	
Information on the course	All information on the course (e.g. announcements, papers and slides) can be found on the homepage http://blackboard.uvt.nl/webapps/login. Please consult these pages on a regular basis as all up-to-date information will be published there.	
Time	2nd semester: week of January 31, 2008 to the week of May 22, 2008.	
Lectures	2nd semester: Thursday, 12.45 – 14.30; mostly in Room DZ-2 (see the detailed schedule on Blackboard for some exceptions).	
Type of lectures	Lectures, practicum, group assignments, feedback sessions	
Practicum	Compulsory practicum (computer lab) for 8 groups on Monday 25-02-08, Wednesday 27-02-08 and Thursday 28-02-08 in Rooms M-21 and M-23	
Type of exams	Deductive written group assignments (40%) Internet exam after compulsory practicum (10%) Individual written exam (50%)	
Literature	All study materials can be downloaded from or through the Blackboard pages of the course. Please go to the "Course Documents" map where you can find the folders "Slides" and "Papers".	

COURSE DESCRIPTION

441057: Relations and Networks of Organizations

General info

Type of lectures:	Lectures, practicum, group assignments and feedback sessions
Type of exams:	Written exam, internet exam, written group assignments
Study load:	6 credits

Objectives:
The general aim of the course is to increase students' knowledge and understanding of the field inter-organizational relationships and networks, a field that is mainly rooted in organization theory, organization sociology, organization economics and industrial organization.
After taking this course, students: (a) will have developed critical insights and understanding of inter-organisational relationships and networks; (b) are able to position their insights on inter-organisational relationships and networks in the wider field of organisation science; (c) are able to use these insights and understanding to analyse societal issues; (d) are able to apply a number of analytical tools (network analytical tools, factor and regression analysis) in the context of the study of inter-organizational relations and networks.

Contents:
The course Relations and Networks of Organizations takes a theory-based approach and assumes that the student already has some knowledge about the basic concepts of organization sociology and organization theory. In particular, this course builds on the BA courses "Introduction to Organisation Studies", "Organisation Theory" and "Innovation and Organization".
The focus of the course is on inter-organizational relationships between two or more organizations. The inter-organizational relationships are important for two reasons. First, as an analytical perspective 'networks of organizations' are of growing importance in organization science, economic sociology and in the policy sciences. Second, profit as well as not-for-profit organizations recognize the value of inter-organizational relationships, since they are of crucial importance for success in society and in the market place.
The course consists of four parts. In the first part, the question what inter-organisational relationships and networks are and how they can be measured and analysed will be answered. The second part deals with the determinants and causes of networking, whereas the third part focuses on the management of inter-organisational relationships. Lastly, the fourth part discusses effects and outcomes of networks and relationships.

Approach:
To realise the goals of this course, we use a number of instruction types that maximize on interaction between teaching staff and students on the one hand, and the internalization of course contents on the other. Types of instruction used are plenary lectures and feedback sessions, a computer practicum, and walk-in question hours.

SCHEDULE
RELATIONS AND NETWORKS OF ORGANISATIONS
2ND SEMESTER 2007-2008

LECTURE: Week 1: *31.01.2008* (Room DZ-2: 12h45 – 14h30)
General introduction of the course:

- ***Definitions, types and characteristics of relationships between organizations and networks of organizations***
- ***Introduction to the group assignments***

Baker W. (2000) "What is Social Capital and Why Should You Care About It?", Chapter 1 in: W. E. Baker (2000) *Achieving Success Trough Social Capital*.
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

Stern, R.N., Mitsuhashi H.M. & Ch. Oliver (2001) "An introductory Essay: Research on Inter-organizational Relations (IORs)" Forthcoming *in Studies of Inter-organizational Relations.* Sage.
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

LECTURE: Week 2 *14.02.2008 (*Room DZ-2: 12h45 – 14h30*)*

- ***Definitions, types and characteristics of relationships between organizations and networks of organizations***

Baker W. (2000) "What is Social Capital and Why Should You Care About It?", Chapter 1 in: W. E. Baker (2000) *Achieving Success Trough Social Capital*.
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

Stern, R.N., Mitsuhashi H.M. & Ch. Oliver (2001) "An introductory Essay: Research on Inter-organizational Relations (IORs)" Forthcoming in *Studies of Inter-organizational Relations.* Sage.
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

LECTURE: Week 3 *21.02.2008 (***Room WZ-1: 14h45 – 16h30***)*

- ***Relational thinking and network analysis***

Wassermann, S. and K. Faust (1994). *Social Network Analysis: Methods and Applications*. Cambridge/New York, Cambridge University Press, (pp. 3-22).
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

Scott, J. (2000). *Social Network Analysis. A Handbook* (2nd ed.). London: Sage Publications, pp. 1-5, 38-49, 63-73, 82-89, as pdf via BB
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

COMPUTERLAB Week 4 *25.02.2008 to 28.02.2008*

In this week, a computer lab will be organized, which is **compulsory** to all participating students. You can enroll through COMAP where 8 slots are scheduled (details on when and how to enroll through COMAP will be announced later):

- RNO1; Monday, 25.02.2008: **08h45 – 10h30**, Room M-23;
- RNO2; Monday, 25.02.2008: **10h45 – 12h30**, Room M-23;
- RNO3; Monday, 25.02.2008: **12h45 – 14h30**, Room M-23;
- RNO4; Wednesday, 27.02.2008: **08h45 – 10h30**, Room M-21;
- RNO5; Wednesday, 27.02.2008: **10h45 – 12h30**, Room M-21;
- RNO6; Wednesday, 27.02.2008: **14h45 – 16h30**, Room M-23;
- RNO 7; Thursday, 28.02.2008: **08h45 – 10h30**; Room M-23;
- RNO 8; Thursday, 28-02.2008: **10h45 – 12h30**, Room M23.

Scott, J. (2000). *Social Network Analysis. A Handbook* (2nd ed.). London: Sage Publications, pp. 100-145.
⇒ Download from "Course documents" on http://blackboard.uvt.nl/webapps/login

LECTURE Week 4: *28.02.2008 (Room DZ-2:* 12h45 – 14h30*)*
Explaining the determinants of interorganizational relationships and networks
Oliver, Christine (1990) "Determinants of Inter-organizational Relationships: Integration and Future Directions", *Academy of Management Review* 15 (2): 241-265.
⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Oliver**> and choose <**Author**> from the pull-down menu; Also enter <**determinants**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

INTERNET EXAM Week 4:
In this week, an internet exam (through Blackboard) is planned. The exact date of this exam will be announced in due course. This exam will assess your knowledge and insights on the course contents of Week 3 and the computer lab.

LECTURE Week 5: *06.03.2008 (Room DZ-2:* 12h45 – 14h30*)*
Explaining the determinants of inter-organizational relationships and networks (continued)

Das, T.K. & B.S. Teng (1988) "Between Trust and Control: Developing Confidence in Partner Cooperation in Alliances*", Academy of Management Review* 23 (3): 491-512.
⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Das**> and choose <**Author**> from the pull-down menu; Also enter <**trust**> and choose <**Document title**> from

the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

LECTURE Week 6: *13.03.2008 (**Room CZ-10:*** 12h45 – 14h30*)*

Explaining form of and developments in relationships and networks

Gulati, R. & H. Singh (1998) "The architecture of cooperation: Managing coordination costs and appropriation concerns in strategic alliances*." Administrative Science Quarterly* 43: 781-814.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Gulati**> and choose <**Author**> from the pull-down menu; Also enter <**architecture**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 7: *17.03.2008*

- Deductive research group assignment (**Part I**) will be available on Blackboard.
- This assignment has to be carried out in groups of 3 students.
- In the weeks 7 – 13, the lecturers will provide 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 7: *20.03.2008 (Room DZ-2:* 12h45 – 14h30*)*

Explaining form of and developments in relationships and networks (continued)

Levinthal, D.A. & M. Fichman (1988) "Dynamics of inter-organizational attachments: Auditor-client relationships." *Administrative Science Quarterly* 33: 345-369.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Levinthal**> and choose <**Author**> from the pull-down menu; Also enter <**dynamics**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

LECTURE Week 8: *03.04.2008 (Room DZ-2:* 12h45 – 14h30*)*

Explaining form of and developments in relationships and networks (continued)

Guest lecture by Dr. Joris Knoben (Dutch Spatial Planning Agency & Department of Organization Studies):

Radical changes in inter-organizational network structures: A longitudinal gap?

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ScienceDirect**)>; Choose the <**Journals**> tab and go to the journal *Technological Forecasting and Social Change*. Click on the title; Enter <**Knoben**> in the Quick Search option. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 8: Walk-in question hours

- In this week (8), the lecturers will provide 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 9: *10.04.2008 (Room DZ-2:* 12h45 – 14h30*)*

Consequences of networks and relations at the organizational level

Ahuja, G. (2000) "Collaboration Networks, Structural Holes and Innovation: A Longitudinal Study", *Administrative Science Quarterly* 45(3): 425-455.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Ahuja**> and choose <**Author**> from the pull-down menu; Also enter <**collaboration**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 9: *11.04.2008*

- The report on the deductive research group assignment (**Part I**) has to be handed in on this date. Details on the hand-in procedure will be announced on Blackboard.
- Deductive research group assignment (**Part II**) will be available on Blackboard.
- This assignment has to be carried out in groups of 3 students.
- In this week (9), the lecturers will provide a 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 10: *17.04.2008 (Room DZ-2:* 12h45 – 14h30*)*
Consequences of networks and relations at the organizational level (continued)

Brass, D.J., Butterfield, K.D. & B. Skaggs (1998) "Relationships and Unethical Behavior: A Social Network Perspective", *Academy of Management Review* 23(1): 14-31.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface**)>; Choose the <**Advance**> tab; Enter <**Brass**> and choose <**Author**> from the pull-down menu; Also enter <**relationships**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 10: **Walk-in question hours**

- In this week (10), the lecturers will provide 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 11: *24.04.2008 (Room DZ-2:* 12h45 – 14h30*)*
Consequences of networks and relations at the organizational level (continued)

Park, S. & M. Russo (1996) "When competition eclipses cooperation: An event history analysis of joint venture failure", *Management Science* 42 (6) p. 875

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface)**>; Choose the <**Advance**> tab; Enter <**Park**> and choose <**Author**> from the pull-down menu; Also enter <**cooperation** > and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 11: *25.04.2008*

- The report on the deductive research group assignment (**Part II**) has to be handed in on this date. Details on the hand-in procedure will be announced on Blackboard.
- Deductive research group assignment (**Part III**) will be available on Blackboard.
- This assignment has to be carried out in groups of 3 students.
- In this week (11), the lecturers will provide a 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 12: *08.05.2008 (Room DZ-2:* 12h45 – 14h30*)*
Consequences of relationships and networks at the network level

Provan K.G. & H.B. Milward (1995) "A preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems", *Administrative Science Quarterly* 40 (1): 1-33.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface)**>; Choose the <**Advance**> tab; Enter <**Provan**> and choose <**Author**> from the pull-down menu; Also enter <**theory**> and choose <**Document title**> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

Provan K.G. & H.B. Milward (2001) "Do networks really work? A framework for evaluating public-sector organizational networks", *Public Administration Review*, 61 (4): 414-423.

⇒ Go to: http://dbiref.uvt.nl/. Click: <**Databases in alphabetical order**>; Click: <**ABI/Inform Global (ProQuest interface)**>; Choose the <**Advance**> tab; Enter <**Provan**> and choose <**Author**> from the pull-down menu; Also enter <**framework**> and choose <**Document**

title> from the pull-down menu. Next, click the <**Search**> button. *Download and save the PDF-version of the paper mentioned above*.

ASSIGNMENT Week 12: *08.05.2008*

- In this week (12), the lecturers will provide a 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- Exact dates and times of the 'walk-in question hours' will be announced on Blackboard.

LECTURE Week 13: *15.05.2008 (Room DZ-2:* 12h45 – 14h30*)*

- Wrap-up
- Feedback on results deductive research group assignment (Part III)
- Preparing for the written exam RANO

ASSIGNMENT Week 13: *16.05.2008*

- In this week (13), the lecturers will provide a 'walk-in question hours' to give guidance and answer questions regarding the assignment.
- The report on the deductive research group assignment (**Part III**) has to be handed in on this date. Details on the hand-in procedure will be announced on Blackboard.

LECTURE Week 14: *22.05.2008 (Room DZ-2:* 12h45 – 14h30*)*

- Provisional lecture/question hour

Written Exam (1st opportunity): Monday 26.05.2008

Written Exam (2nd opportunity): Tuesday 24.06.2008

David Gartrell
Department of Sociology
University of Victoria

UNIVERSITY OF VICTORIA
Department of Sociology
Sociology 326 (F01)

Social Network Analysis - Fall 2006

Professor: David Gartrell
Office: Cornett B312
Phone: 721-7579
***email*:**gartrell@uvic.ca
Office Hours: 2:30 - 4:00 MTh or by appointment
T.A.: TBA

***Course Objectives*:**

We all inhabit social networks, yet like fish in water, we are often not conscious of their presence or aware of their impact on our lives. This course will introduce you to the network way of viewing the social world, to its history, major findings, methods, and models. In addition to discussion and small group work, lectures, and reading, there will be hands-on experience with network data in labs and class exercises. You will also be encouraged to develop further your analytical abilities in short written assignments for the course.

Course Organization and Format:

1. *Discussion/lecture - Thursdays*:

On most Thursdays, there will be small group and class discussion during the first 40 minutes, followed by and a short break, and then a lecture of 30 minutes. On days when discussion is scheduled (see ***Course Schedule***, below), you should go over the readings carefully before class and type up one or two questions and/or comments about the readings, along with a brief explanatory paragraph in the case of questions. (Be sure to read about the recommended content, length, and grading of these written questions/comments under ***Assignments and Grading***, below). Bring two copies of these written comments and questions to class to share with the other members of your discussion group and me.

Discussion in action: On a day when small group discussion is scheduled you should do the following:

- Bring two copies of your comments on the reading(s) for the day. One is for your use in the group, the other is for me.
- Following the announcements, join any three or four other students to form a discussion group and move into a circle. *It's important to keep the groups small so that everyone has a chance to participate in the time allotted for discussion*. I encourage you to change groups so that you will have a chance to meet others and be exposed to a range of views.
- Choose one member of the group to keep notes on the group's discussion. The person chosen should try to include the major themes of the discussion and any unresolved questions or

problems that have come up. This role should be rotated among class members.
- Each member of the group should present her/his first comment in turn. The point of introducing one comment from each person at the beginning is to ensure that everyone has the opportunity to share their ideas and concerns, as well as to allow the group to address questions or comments that have common threads.
- Begin group work/discussion.
- When the group feels it has addressed each of the first round of questions/comments, it may proceed to a second round, if time allows.
- The TA and I will circulate among the groups to collect my copies of the comments, to listen in and help keep things on track.
- The discussion period will last about 20 minutes. It will be followed by a check-in period of about 15 minutes' duration during which I will ask some of those students who have recorded their group's discussion to give a brief report on one or two highlights of the discussion.Given time constraints it may note be possible to include reports from every group each time we meet for discussion.

Following a five minute break, I will use the remainder of our session to address issues raised in the groups and to lecture on the day's topic.

2. *Labs - Mondays:*

While reading about what others have done, discussing, and listening to lectures is a good way to learn about networks, it is also important to try some of these methods yourself. In the lab sessions the emphasis will be on network methods and data analysis. We will examine some of the research instruments used in studies covered in class, collect some network data of our own, and analyze these data as well as data collected by other researchers. In our data analysis we will use paper-and-pencil techniques as well as computer programs for social network analysis (e.g., UCINET). ***I assume basic familiarity with high school math (Principles of Math 11) and research methods at the level of Soci 211***. In those labs that involve computers and/or data analysis I will take you through the steps you'll need to know to complete the lab assignments, from "start to finish".

Generally, I will teach for the first 45-50 minutes of the lab. After a short break, I will be in the lab to take questions and to help with the lab assignment. You may begin work on the lab assignment during this time, or leave to do your work elsewhere.

Assignments and Grading

In grading your work I will take into account the following: accuracy; insightfulness (do you note interesting aspects of your results or of the other course materials); sociological sensitivity (what sociological ideas are reflected in your writing?); coherence, clarity and organization. The quality of your writing is important and will affect the grade that you receive on comments and essays. ***Assignments that are seriously deficient in written English will not be accepted.*** See also the statement about grading criteria which appears at the end of this outline.

1. *Discussion Questions/Comments:* (25%)

These will consist of one or two questions or comments about one or more of the readings which you will type up ahead of time and bring to class on days when there is discussion/lecture**.** Bring two (2) copies. In the case of a question, you should either try to sketch an answer to the

question, or say why you find the question important or difficult, or both. The comments and questions-with-explanatory-remarks that you write should have a ***combined maximum length of ONE (1) double-spaced, typed page with margins of 1" or more and should be typed in 12-point font.***

The focus of these questions and comments is open, but examples include:

- a point made (or a passage or section) in the day's reading that you find particularly insightful, convincing, confusing, difficult, contentious, or otherwise noteworthy. Why do you find the material to be this way?
- an example -- from your own experience, current events, the historical record, other social science research -- that bears on the reading or some part of the reading. How does the example relate to the reading - e.g., does it support or contradict the reading? Does it suggest the author's analysis is incomplete?
- a comparison of an aspect of the reading with readings and analyses we have already taken up in this course, or that you have encountered in other courses;
- evaluation of the methods used in the reading -- strengths/weaknesses, suggestions for alternative approaches, if warranted.

You will be writing seven comments of which I will grade four. The first comment (due Thursday Sept. 28th) will be graded; I will not announce ahead of time which three of the next six comments I will grade. ***You should therefore prepare all the discussion questions/comments equally diligently.*** I will count your best three at 8.33% each for a total of 25%.

Because they are intended to help you prepare for and participate in class discussions, your questions/comments will not be accepted (1) before or after the time they are due or (2) if they are submitted by another student. Exceptions will be made only for serious illness or personal crisis (see lateness policy on p. 5).

2. Labs (40%)

There will be eight lab assignments. Most lab assignments will consist of a page or two of short-answer and "fill-in-the-blank" questions, based on computations that you will do either by hand or with the computer. I will count your best seven of the eight lab assignments at 5.7% each for a total of 40%.

3. Essay (35%)

Answer *one (1)* of the essay questions at the end of this course outline. Your essay is due by 3:30pm on Thursday Dec. 7 in the Sociology main office. The maximum length for the essay is 1000 words (about four double-spaced pages **typed in 12-point font with at least 1" margins**). To prepare your essay, you may find it helpful to keep the question in mind as you do your work for the course. You need not consult sources other than the course materials (readings, lectures, films, etc.). In your discussion, you should try to incorporate relevant concepts, ideas, and findings from the course. Graphs, tables, etc. should be appended to the essay, labelled, and referred to in the text; they do not count towards the page limit.

Grading Summary

Grades for the course will be determined as follows:

Questions/comments (best 3 at 8.3%)	25%
Labs (best 7 at 5.7%)	40%
Essay	35%
Total	100%

Texts

The following can be purchased in the bookstore:

- (KK) Knoke, David and James Kuklinski. 1982. *Network Analysis.* Beverly Hills: Sage.
- Scott, John. 2000. *Social Network Analysis*. 2nd ed. London: Sage.
- *Coursepack for SOCI 326*
- *Course notes for SOCI 326*

We will be reading most of Knoke and Kuklinski (KK) and Scott. The coursepack contains the articles and chapters not contained in the two books. All readings will be available on Reserve in the main library.

Course Schedule and Topics

Note: Readings may be added to or deleted from this list.
Readings and assignments *follow* the date and topic heading.
Generally, we meet on Thursdays in CORA148 and on Mondays in BEC 160. Exceptions are noted below.

Thursday Sept. 7 - *Introduction to the Course* (COR A148)

- "Six Degrees of Horror"
- Marsden "Social Networks"

Monday Sept. 11 - Lab - *The Network Point of View* (BEC 160)

- KK pp. 7-21 "Introduction" and "Basic concepts" and pp. 35-42, "Methods and Models" (to the end of "Visual Displays" only)
- Scott, Ch. 1 "Networks and Relations" and Ch. 3 "Handling Network Data"

Lab Assignment 1 out (Network Questions)

Thursday Sept 14 - *The Network Point of View (continued)* (COR A148)

Discussion Questions/Comments due (may be on any of the readings so far)

Monday Sept. 18 - Lab - *Network Data and UCINET* (**Note change:** BEC 170)

- UCINET User's Guide (sections TBA)

Lab Assignment 1 due
Lab Assignment 2 out (Network Data with UCINET)

Thursday Sept 21 - *The Development of Social Network Analysis* (COR A148)

- Scott, Ch. 3 "The Development of Social Network Analysis"
- Kapferer, "Norms and the Manipulation of Relationships in a Work Context" [on Reserve]

(NOTE: No discussion questions/comments on the readings are due today; we will discuss your work on Lab Assignment 1)

Monday Sept. 25 - Lab - *Indeces (degree, density), reachability, and path distance* (BEC 170 ***note room change***)

- KK pp. 42-50 "Matrix Representation"
- Scott Ch. 4 "Lines, Directions, Density"

Lab Assignment 2 due
Lab Assignment 3 out (Indices: hand computations)

Thursday Sept. 28 - *Social Cognition* (COR A148)

- Erickson "The Relational Basis of Attitudes"
- Gartrell "The Embeddedness of Social Comparison"

Discussion Questions/Comments due

Monday Oct. 2 - Lab - *Indices with UCINET* (BEC 170 ***note room change***)

Lab Assignment 3 due
Lab Assignment 4 out (Indices with UCINET)

Thursday, Oct. 5 - Film: "*Six Degrees of Separation*"

Monday, Oct. 9 - No class - Happy Thanksgiving!

Thursday, Oct. 12 - *Diffusion and Cohesion* (COR A148)

- Granovetter, "The Strength of Weak Ties"

- Travers and Milgram, "An Experimental Study of the Small World Problem"
- Dodds et al, “An Experimental Study of Search in Global Social Networks”

Discussion Questions/Comments due

Monday, Oct. 16 - *Small World Exercise/Discussion* - (COR A148 ***note room change***)

Lab Assignment 4 due

Thursday, Oct. 19 -- *Homophily* (COR A148)

- Suitor et al., “When Experience Counts...”

Discussion Questions/Comments due

Monday, Oct. 23 -- Lab - *Centrality* (BEC 160)

- Scott Ch. 5 “Centrality and Centralization”

Lab Assignment 5 out (Centrality)

Thursday, Oct. 26 -- Film "*French Twist*"

Monday, Oct. 30 - Lab - *Exchange and Power - Exercise/Discussion* (COR A148 ***note room change***)

Lab Assignment 5 due

Thursday, Nov. 2 -- *Exchange and power (continued)* (COR A148)

- Espinoza, "Social Networks Among the Urban Poor..."
- Markovsky et al. "Power Relations in Exchange Networks." (Pp. 220-227 only)

Discussion Questions/Comments due

Monday, Nov. 6 - Lab - *Cliques and Subgroups* (BEC 160)

- KK pp. 56-59
- Scott Ch. 6 "Components, Cores, and Cliques"

Lab Assignment 6 out (Cliques and Subgroups)

Thursday, Nov. 9 - *Markets* - (COR A148)

- Gartrell, "Relational and Distributional Models of Collective Justice Sentiments."

- Smith and White "Structure and Dynamics of the Global Economy"

Discussion Questions/Comments due

Monday, Nov. 13 - -- Reading Break -- Have a good break!

Thursday, Nov. 16 - Lab - *Structural Equivalence and Blockmodels* (CORA148 ***note room change***)

- KK pp. 59-60, 69-77 and skim 60-69 "Continuous distance"
- Scott, Ch. 7 "Positions, Roles, and Clusters"

Lab Assignment 6 due
Lab Assignment 7 out (Structural equivalence I)

Monday, Nov. 20 - Lab - *Structural equivalence (continued)* - (BEC 160)

Lab Assignment 7 due
Lab Assignment 8 out (Structural Equivalence II)

Thursday, Nov. 23 - *Markets (continued)* - (COR A148)

- DiMaggio and Louch, "Socially embedded consumer transactions..."

Discussion Questions/Comments due

Monday, Nov. 27 - Lab - *Class Data* - (BEC 160)

Lab Assignment 8 due

Thursday, Nov. 30 - *Personal Networks and Communities* - (COR A148)

Wellman and Gulia, "Net-surfers don't ride alone..."
McPherson et al, “Social isolation in America...”

Discussion Questions/Comments due

Essay Questions

Answer one (1) of the following questions, following the guidelines on pp. 4 and 5 of the course outline, above.

1. Draw a sociogram of the ties in the social network connecting the central characters in the "Six Degrees of Separation" at the point where Paul has gained entrée to the households of the Kitteridges, their friends Kitty and Marvin, and Dr. Fine. Assume that you have knowledge of all the characters and their relationships even though these may not be visible at this point in the film. For each dyad (set of two persons connected by a tie) list the type of relation, its direction (symmetry), and its strength (i.e., weak or strong, using Granovetter's definition). For example,

Dyad	Type of Tie	Direction	Strength
(Flan, Ouisa)	is married to	symmetric	strong

For asymmetric relations, list first in the "dyad" the node which "sends" the relation followed by the node which "receives" the relation. In your graph of the network, indicate strong ties by solid lines, weak ties by dashed lines. Use arrows to indicate directionality of ties.

Discuss how (1) the types of ties, (2) the structural properties of the network and (3) the attributes of the persons in the network play a role in Paul's initial successes with the Kitteridges, their friends Kitty and Marvin, and Dr. Fine.

2. "French Twist" is a wonderful study of shifting power dynamics in a small social network. Comment on power differentials among the major characters (Loli, Laurent, Marijo) in the following segments of the film:

a) The scene in which Laurent and Marijo come to blows through the scene in which a smiling Loli tucks her children into bed, hugs Laurent, then Marijo, and finally ascends the staircase to her bedroom;

b) The scene in which Marijo brings home her old friends, Dany and Solange through the scene in which Loli bids goodnight to Marijo, Dany, Solange and Laurent and ascends the staircase.

Following Markovsky et al.'s discussion of power in exchange networks, draw exchange network sociograms to represent the relationships between Loli, Laurent, and Marijo in these scenes. Show how (1) each of these three characters' power and (2) their emotional responses in these scenes are determined, at least in part, by the structure and content of the network.

3. Continue your analysis of the Kapferer dataset using UCINET and methods from any two (2) of our lab sessions (other than those already used to analyze this dataset in lab assignment 5) . Discuss how the methods you have selected help to shed light on the mobilization of support in the dispute described by Kapferer in his article. Interpret your findings, and discuss the results. Include selected printout with your report.

* Note: this syllabus has been edited slightly by the editors in order to shorten its length.

Graduate Course Syllabi

David Knoke
Department of Sociology
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SOCIOLOGY 8412
SOCIAL NETWORK ANALYSIS
THEORY & METHODS

Fall 2007, Thurs 2:30-5:00, HHHCtr 60
http://www.soc.umn.edu/~knoke/pages/SOC8412.htm

Professor: David Knoke
knoke@atlas.socsci.umn.edu; 939 Social Sciences; (612) 624-4300
Office Hours: Tuesdays & Thursdays 11:00-12:00; other times by appointment

Seminar Objectives

This seminar introduces social network analysis to graduate students, emphasizing its theoretical, substantive, and methodological foundations. Our collective goal is to acquire a sufficient grasp of the contemporary network literatures to pursue independent advanced study, and ultimately, to contribute original research results to our disciplines. Specifically, we'll identify key network concepts and principles; examine data collection, measurement, and computer analysis techniques; and investigate applications in sociology, organization studies, political science, public administration, and related disciplines.

Network analysis spans a diverse range of phenomena from ego-centric ties, to small work-team sociograms, to organizational relations, to trade and military alliances among nation states. Based on the summer survey of registered students' substantive interests, we'll concentrate on social capital, communication, personal networks, learning and innovation diffusion, intra- and interorganizational relations, social movements and collective action, political networks, international systems, and small world and Internet dynamics. About an hour of each class will be spent on network methodologies. The principles that students learn in this course will enable them to study advanced topics of their own choosing.

Wasserman & Faust's encyclopedic *Social Network Analysis* provides our primary text, with required and background articles and chapters selected from the research literatures of several disciplines. Students will learn how to perform basic network analyses of previously collected datasets, using the UCINET computer package. We'll also explore network visualizations using spatial plotting programs.

Doctoral students in the Department of Sociology may use this course to fulfill their advanced methods requirement.

Format and Expectations

The course is conducted as a seminar. Weekly class meetings consist of four types of activities: (1) an overview of the main aspects of a topic, in a formal presentation by the instructor; (2) a constructively critical evaluation of the required readings, led by a student; (3) open discussion among all participants of key issues, applications to empirical research, and potential directions for future developments; and (4) a tutorial in network data analysis methods by the instructor.

For any seminar to succeed, all students must aid one another's learning by thorough preparation and active participation. Preparation includes careful reading of all required articles in advance, while class participation includes informed listening and frequent oral contributions to the discussions.

Class Discussions: Each week, different students serve as the discussion leaders for the required readings. They should also try to include additional insights on that week's topic from the baqckground readings. Their responsibility is to raise critical questions about the articles/chapters. The leader must also prepare a brief discussion guide that systematically outlines and assesses that perspective (see page below). As much as possible, discussions should be devoted to interpreting and evaluating the merits and shortcomings of the perspective, going beyond just recapping the details of individual papers.

Exercises: A better understanding of network methods requires hands-on experiences in using computer programs to analyze network datasets. Five times during the semester, the instructor will provide short exercises to give students some experiences in applying UCINET to network data. Students should report their findings in brief written summaries (2-3 pages). Only the four best reports will count towards a student's course grade.

Course Paper: Each student will write a paper on some aspect of social network analysis. Some possibilities include, but are not limited to: (1) a critical evaluation of an existing network perspective, identifying logical holes in its proponents' arguments and suggesting possible remedies; (2) an application of alternative approaches to some substantive application of network analysis, suggesting how an empirical study or a theoretical synthesis might extend knowledge about this topic; (3) a theory-construction exercise, which attempts to build an original network explanation of some social behavior; (4) a secondary analysis of a previously collected network dataset, such as the National Policy Domains projects; (5) a case study of a single network using such qualitative methods as participant-observation, archival records, and/or in-depth interviews to explain some important aspect of its behavior; (6) a proposal for a thesis or grant funds, consisting of a detailed research design to test network ideas.

The choice of paper topic is up to each student, but should be discussed with the instructor before devoting time and effort, preferably by the beginning of October. Papers should not exceed 15 pages, excluding title page and references (doubled-spaced, one-inch margins, 12-point Times Roman font), and are due by the final day of classes (December 12, 2007; not by our final class meeting, which is six days earlier).

Course Grading: The grade for this course is based on the following weighted components: leading a class discussion (10%), discussion guide (10%), four best data analysis exercises (40%), course paper (40%).

Course Website

The Website contains course materials and hyperlinks to other potentially useful sites. New information may be added during the semester. Click through my Webpages or bookmark this URL: <**http://www.soc.umn.edu/~knoke/pages/SOC8412.htm**>.

UCINET Computer Package

The data analysis exercises use UCINET 6.166, which should be cited:

> Borgatti, S.P., M.G. Everett and L.C. Freeman. 2002. *UCINET6 for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.

UCINET is installed on machines in Social Science 1083. This program is copyright restricted, so it must not be copied. Students who wish to purchase a personal copy of UCINET at the student price ($40) should order directly from the publisher:
<http://www.analytictech.com>. It's also available as a free 30-day trial.

Required & Background Readings

The following required paperback is available for purchase at the University bookstore:

> Wasserman, Stanley and Katherine L. Faust. 1994. *Social Network Analysis: Methods and Applications*. New York: Cambridge University Press.

Other required and background readings emphasize representative network theories, methods, and substantive applications. I kept the number of weekly required articles and chapters (✱) to six plus one page of background readings, to give sufficient time to ponder the issues they raise, and so that everyone would likely read the required materials in advance of our meetings. I encourage you to read many other articles and materials that you may find on your own, to develop greater depth in topics of particular personal interest. I retain the option to revise the reading list during the course, with sufficient advance notification, pending article availability and new publications.

The required readings are available from Wilson Library eReserve, which created a password-protected Website for this course. You should bookmark the URL on your browser: <http://eres.lib.umn.edu/eres/coursepage.aspx?cid=1032 > (It is also hyperlinked on this course's Website.) You must first login using your x.500 Internet ID (U of MN email) and corresponding email password. During the first class meeting, I will reveal the eReserve password. A few pre-publication documents will be circulated by other means.

Extended Bibliography

References numerous articles, chapters, and books related to the weekly topics are in the Extended Bibliography file, which is hyperlinked on the course Website. You may download and save this Word.doc file, then search it for additional materials useful in your social network studies (but don't print – it's more than 40 pages!).

IMPORTANT INFORMATION

DISCUSSION GUIDE

Prepare a short discussion guide, about two or three pages, with 18 copies to hand out to the class at the beginning of your discussion session. You may also create any visual aids (Powerpoint slides, transparencies) that could help to foster discussion.

The guide's main emphasis should be the network ideas in that week's required and background readings. However, a guide should not summarize each article/chapter. Rather, it should extract and emphasize core themes, principles, issues, controversies. Your goal is to stimulate the class' critical interpretation and evaluation of the theories, methods, and substantive applications of network concepts and principles.

Structurally, a guide might consist of several bullet points and/or questions that highlight the topics and problems that you expect the class to discuss. Try to be balanced, noting strengths as well as weaknesses. Look for opportunities to integrate ideas from other sources, including preceding weeks, and suggest potential ways to advance inquiry through novel approaches to the topic.

The particular guide format you choose is up to you. Here are some questions to ponder when preparing it:

- What are the key network theories, concepts, and propositions in this field?
- What alternative theoretical perspectives compete to explain important behaviors?
- How could network ideas improve our knowledge and understanding of the topic?
- What structural patterns or relational processes are crucial for better understanding?
- What are the origins of network relationships and what are their consequences?
- How close is the fit between theoretical concepts and network measures or data collection procedures?
- What improvements in network research designs to study this topic are feasible?
- Have researchers used (in)appropriate network methods to test their hypotheses?

- Given inevitable empirical limitations, are analysts' conclusions warranted or suspect?

TOPICAL CALENDAR FALL 2007

Week	Topic
Week 1 Sept. 6	INTRODUCTION TO NETWORK ANALYSIS
Week 2 Sept. 13	NETWORK THEORIES: BALANCE, EXCHANGE & EMBEDDEDNESS
Week 3 Sept. 20	COMMUNICATION: SMALL GROUPS
Week 4 Sept. 27	KIN, FRIENDS, COMMUNITY **Assignment #1 Creating Network Datasets DUE**
Week 5 Oct. 4	SOCIAL CAPITAL, TRUST, REPUTATION
Week 6 Oct. 11	INTRAORGANIZATIONAL NETWORKS:TEAMS & OCCUPATIONS **Assignment #2 Graphing & Centrality DUE**
Week 7 Oct. 18	LEARNING: MIMESIS, CONTAGION, DIFFUSION
Week 8 Oct. 25	INTERORGANIZATIONAL RELATIONS: STRATEGIC ALLIANCES **Assignment #3 Subgroup Cohesion DUE**
Week 9 Nov. 1	CONFLICT: SOCIAL MOVEMENTS & COLLECTIVE ACTION
Week 10 Nov. 8	INFLUENCE: POLITICAL AFFILIATION & ACTION **Assignment #4 Structural Equivalence DUE**
Week 11 Nov. 15	POWER & AUTHORITY: POLICY NETS & LOBBYING
Week 12 Nov. 22	THANKSGIVING – NO CLASS
Week 13 Nov. 29	INTERNATIONAL RELATIONS **Assignment #5 Blockmodels DUE**
Week 14 Dec. 6	SMALL WORLD DYNAMICS & INTERNET **Course paper due DEC 12**
Week 15 Dec. 13	NO CLASS THURSDAY DEC 13

READING CALENDAR FALL 2007

WEEK 1 SEPT. 6: INTRODUCTION TO NETWORK ANALYSIS

✱ Wasserman, Stanley and Katherine Faust. 1994. "Introduction" and "Social Network Data." Chapters 1 and 2 in *Social Network Analysis: Methods and Application*s. New York: Cambridge University Press.

✱ Emirbayer, Mustafa. 1997. "Manifesto for a Relational Sociology." *American Journal of Sociology* 103:281-317.

✱ Pescosolido, Bernice A. and Beth A. Rubin. 2000. "The Web of Group Affiliations Revisited: Social Life, Postmodernism, and Sociology." *American Sociological Review* 65:52-76.

✱ Knox, Hannah, Mike Savage and Penny Harvey. 2006. "Social Networks and the Study of Relations: Networks as Method, Metaphor and Form." *Economy and Society* 35:113-140.

Castells, Manuel. 1996. *The Rise of the Network Society*. Cambridge, MA: Blackwell.

Castells, Manuel. 2000. "Materials for an Exploratory Theory of the Network Society." *British Journal of Sociology* 51:5-24.

Fredericks, Kimberly A. and Maryann M. Durland. 2005. "The Historical Evolution and Basic Concepts of Social Network Analysis." *New Directions for Evaluation* 107:15-23.

Freeman, Linton C. 1996. "Some Antecedents of Social Network Analysis." *Connections* 19:39-42. <http://www.analytictech.com/mb874/antecedents.pdf>

Hiller, Petra. 2005. "Corruption and Networks: Confusion in the Scheme of Organizations and Society." *Zeitschrift Fur Rechtssoziologie* 26:57-77.

Kilduff, Martin and Wenpin Tsai. 2003. *Social Networks and Organizations*. Thousand Oaks, CA: Sage.

Knoke, David and Song Yang. 2007. *Social Network Analysis*, 2nd Ed. Thousand Oaks, CA: Sage.

Lury, Celia. 2003. "The Game of Loyalt(o)y: Diversions and Divisions in Network Society." *The Sociological Review* 51:301-320.

Mizruchi, Mark S. 1994. "Social Network Analysis: Recent Achievements and Current Controversies." *Acta Sociologica* 37:329-343.

Muller-Jentsch, Walther. 2002. "Organization and Networks as Social Institutions or Organizational Sociology from a Social Theorists Perspective." *Soziologische Revue* 25:418-434.

Stehr, Nico. 2000. "Deciphering Information Technologies: Modern Societies as Networks." *European Journal of Social Theory* 3:83-94.

Vera, Eugenia R. and Thomas Schupp. 2006. "Network Analysis in Comparative Social Sciences." *Comparative Education* 42:405-429.

Wellman, Barry. 1988. "Structural Analysis: From Method and Metaphor to Theory and Substance." Pp. 19-61 in Social Structures: A Network Approach edited by Barry Wellman and S. D. Berkowitz. New York: Cambridge University Press.

WEEK 2 SEPT. 13: NETWORK THEORIES: BALANCE, EXCHANGE & EMBEDDEDNESS

✱ Wasserman, Stanley and Katherine Faust. 1994. "Notation for Social Network Data." Chapter 3 in Social Network Analysis.
✱ Wasserman, Stanley and Katherine Faust. 1994. SKIM pp. 220-230 of "Structural Balance and Transitivity." Chapter 6 in Social Network Analysis.

✱ Doreian, Patrick, Roman Kapuscinski, David Krackhardt and Janusz Szczypula. 1996. "A Brief History of Balance through Time." *Journal of Mathematical Sociology* 21:113-131.

✱ Ghezzi, Simone and Enzo Mingione. 2007. "Embeddedness, Path Dependency and Social Institutions: An Economic Sociology Approach." *Current Sociology* 55:11-23.

✱ Molm, Linda D. 2003. "Theoretical Comparisons of Forms of Exchange." *Sociological Theory* 21:1-17.

✱ Simpson, Brent and David Willer. 2005. "The Structural Embeddedness of Collective Goods: Connection and Coalitions in Exchange Networks." *Sociological Theory* 23:386-407.

✱ Walker, Henry A., Shane R. Thye, Brent Simpson, Michael J. Lovaglia, David Willer and Barry Markovsky. 2000. "Network Exchange Theory: Recent Developments and New Directions." *Social Psychology Quarterly* 63:324-337.

Bearman, Peter. 1997. "Generalized Exchange." *American Journal of Sociology* 102:1383-1415.

Breiger, Ronald L. and James G. Ennis. 1997. "Generalized Exchange in Social Networks: Statistics and Structure." *L'Annee sociologique* 47:73-88.

Buskens, Vincent and Jeroen Weesie. 2000. "An Experiment on the Effects of Embeddedness in Trust Situations: Buying a Used Car." *Rationality and Society* 12:227-253.

Friedkin, Noah E. and Eugene C. Johnsen. 2003. "Attitude Change, Affect Control, and Expectation States in the Formation of Influence Networks." *Advances in Group Processes* 20:1-29.

Gachter, Simon and Ernst Fehr. 1999. "Collective Action as a Social Exchange." *Journal of Economic Behavior and Organization* 39:341-369.

Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91:481-510.

Hummon, Norman P. and Patrick Doreian. 2003. "Some Dynamics of Social Balance Processes: Bringing Heider Back into Balance Theory." Social Networks 25:17-49.

Le Velly, Ronan. 2002. "'Embeddedness': A Sociological Theory of Market Transactions." *Sociologie du Travail* 44:37-53.

Mizruchi, Mark S., Linda Brewster Stearns, and Christopher Marquis. 2006. "The Conditional Nature of Embeddedness: A Study of Borrowing by Large U.S. Firms, 1973-1994." *American Sociological Review* 71:310-333.

Molm, Linda D., Jessica L. Collett and David R. Schaefer. 2006. "Conflict and Fairness in Social Exchange." *Social Forces* 84:2331-2352.

WEEK 3 SEPT. 20: COMMUNICATION IN SMALL GROUPS

✱ Wasserman, Stanley and Katherine Faust. 1994. "Graphs and Matrices." Chapter 4 in Social Network Analysis.

✱ Eguiluz, Victor M., Martin G. Zimmermann and Camilo J. Cela-Conde. 2005. "Cooperation and the Emergence of Role Differentiation in the Dynamics of Social Networks." *American Journal of Sociology* 110:977-1008.

✱ Gibson, David R. 2005. "Taking Turns and Talking Ties: Networks and Conversational Interaction." *American Journal of Sociology* 110:1561-1597.

✱ Harrington, Brooke and Gary Alan Fine. 2006. "Where the Action Is: Small Groups and Recent Developments in Sociological Theory." *Small Group Research* 37:4-19.

✱ Katz, Nancy, David Lazer, Holly Arrow and Noshir Contractor. 2004. "Network Theory and Small Groups." *Small Group Research* 35:307-332.

✱ Smith, Thomas S. and Gregory T. Stevens. 1999. "The Architecture of Small Networks: Strong Interaction and Dynamic Organization in Small Social Systems." *American Sociological Review* 64:403-420.

Boggs, Leanne, Stuart C. Carr, Richard B. Fletcher and David E. Clarke. 2005. "Pseudoparticipation in Communication Networks: The Social Psychology of Broken Promises." *Journal of Social Psychology* 145:621-624.

Breiger, Ronald L. and James G. Ennis. 1979. "Personae and Social Roles: The Network Structure of Personality Types in Small Groups." *Social Psychology Quarterly* 42:262-270.

Brown, Thomas M. and Charles E. Miller. 2000. "Communication Networks in Task-Performing Groups: Effects of Task Complexity, Time Pressure, and Interpersonal Dominance." *Small Group Research* 31(2):131-157.

Chattoe, Edmund and Heather Hamill. 2005. "It's Not Who You Know: It's What You Know about People You Don't Know That Counts: Extending the Analysis of Crime Groups as Social Networks." *British Journal of Criminology* 45(6):860-876.

Creti, Anna. 2001. "Firms' Organization and Efficient Communication Networks." *Manchester School* 69:77-102.

Fuhse, Jan. 2006. "Goup and Network: A History of Concepts and Their Reformulation." *Berliner Journal fur Soziologie* 16:245-263.

Harrington, Brooke and Gary Alan Fine. 2000. "Opening the 'Black Box': Small Groups and Twenty-First-Century Sociology." *Social Psychology Quarterly* 63:312-323.

Moy, Patricia and John Gastil. 2006. "Predicting Deliberative Conversation: The Impact of Discussion Networks, Media Use, and Political Cognitions." *Political Communication* 23:443-460.

Oleinik, Anton. 2005. "'Small' Society and Networks: On the Meaning Lost in Semiotic Translation." *Journal of Economic Issues* 39(3):813-817.

Simpson, Brent and Casey Borch. 2005. "Does Power Affect Perception in Social Networks? Two Arguments and an Experimental Test." *Social Psychology Quarterly* 68(3):278-287.

WEEK 4 SEPT. 27: KIN, FRIENDS, COMMUNITY
Assignment #1 Creating Network Datasets DUE

✱ Wasserman, Stanley and Katherine Faust. 1994. "Centrality and Prestige." Chapter 5 in Social Network Analysis.

✱ DiMaggio, Paul and Hugh Louch. 1998. "Socially Embedded Consumer Transactions: For What Kinds of Purchases Do People Most Often Use Networks?" *American Sociological Review* 63:619-637.

✱ Entwisle, Barbara, Katherine Faust, Ronald R. Rindfuss and T. Kaneda. 2007. "Networks and Contexts: Variation in the Structure of Social Ties." *American Journal of Sociology* 112:1495-1533.

✱ McPherson, Miller, Lynn Smith-Lovin and Matthew E. Brashears. 2006. "Social Isolation in America: Changes in Core Discussion Networks over Two Decades." *American Sociological Review* 71:353-375.

✱ Moody, James. 2001. "Race, School Integration, and Friendship Segregation in America." *American Journal of Sociology* 107:679-716.

✱ Piselli, Fortunata. 2007. "Communities, Places, and Social Networks." *American Behavioral Scientist* 50:867-878.

Clark, Janine A. 2004. *Islam, Charity, and Activism: Middle-Class Networks and Social Welfare in Egypt, Jordan, and Yemen*. Bloomington, IN: Indiana University Press.

Dawkins, Casey J. 2006. "Are Social Networks the Ties That Bind Families to Neighborhoods?" *Housing Studies* 21:867-881.

Ennett, Susan T., Karl E. Bauman, Andrea Hussong, Robert Faris, Vangie A. Foshee, Li Cai and Robert H. DuRant. 2006. "The Peer Context of Adolescent Substance Use: Findings from Social Network Analysis." *Journal of Research on Adolescence* 16:159-186.

Fiore, F. D. 2007. "Communities Versus Networks: The Implications on Innovation and Social Change." *American Behavioral Scientist* 50:857-866.

Gifford-Smith, Mary E. and Celia A. Brownell. 2003. "Childhood Peer Relationships: Social Acceptance, Friendships, and Peer Networks." *Journal of School Psychology* 41:235-284.

Huckfeldt, R Robert. 1983. "Social Contexts, Social Networks, and Urban Neighborhoods: Environmental Constraints on Friendship Choice." *American Journal of Sociology* 89:651-669.

Musalia, John M. 2005. "Gender, Social Networks, and Contraceptive Use in Kenya." *Sex Roles* 53:835-846.

Palloni, Alberto, Douglas S. Massey, Miguel Ceballos and Kristin Espinosa, Michael Spittel. 2001. "Social Capital and International Migration: A Test Using Information on Family Networks." *American Journal of Sociology* 106:1262-1298.

Rindfuss, Ronald R., Minja K. Choe, Larry L. Bumpass and Noriko O. Tsuya. 2004. "Social Networks and Family Change in Japan." *American Sociological Review* 69:838-861.

Wellman, Barry. 1990. "The Place of Kinfolk in Personal Community Networks." *Marriage and Family Review* 15:195-228.

WEEK 5 OCT. 4: SOCIAL CAPITAL, TRUST, REPUTATION

✱ Wasserman, Stanley and Katherine Faust. 1994. "Cohesive Subgroups." Chapter 7 in Social Network Analysis.

✱ Burt, Ronald S. 2004. "Structural Holes and Good Ideas." *American Journal of Sociology* 110:349-99.

✱ Gargiulo, Martin and Mario Benassi. 2000. "Trapped in Your Own Net? Network Cohesion, Structural Holes, and the Adaptation of Social Capital." *Organization Science* 11:183-196.

✱ Lin, Nan. 2001. "The Theory and Theoretical Propositions." Pp. 55-77 in *Social Capital: A*

Theory of Social Structure and Action. New York: Cambridge University Press.

✱ Moody, James and Douglas R. White. 2003. "Structural Cohesion and Embeddedness: A Hierarchical Concept of Social Groups."*American Sociological Review* 68:103-127.

✱ Preston, Lee E. 2004. "Reputation as a Source of Corporate Social Capital." *Journal of General Management* 30(2):43-49.

Boggs, Carl. 2001. "Social Capital and Political Fantasy: Robert Putnam's Bowling Alone." *Theory and Society* 30:281-297.

Brehm, John and Wendy Rahn. 1997. "Individual-level Evidence for the Causes and Consequences of Social Capital." *American Journal of Political Science* 41:999-1024.

Burt, Ronald S. 2005. *Brokerage & Closure: An Introduction to Social Capital.* Oxford, UK: Oxford University Press.

Coleman, James S. 1990. "Social Capital." Pp. 300-321 in *Foundations of Social Theory*. Cambridge, MA: Harvard University Press.

Frank, Kenneth A. and Jeffrey Y. Yasumoto. 1998. "Linking Action to Social Structure with a System: Social Capital within and between Subgroups." *American Journal of Sociology* 104:642-686.

Lewicki, R.J., D.J. McAllister and R.J. Bies. 1998. "Trust and Distrust: New Relationships and Realities." *Academy of Management Review* 23:438-458.

Lin, Nan, Karen Cook and Ronald Burt (eds.). 2001. *Social Capital: Theory and Research.* New York: Aldine De Gruyter.

McEvily, Bill, Vincenzo Perrone and Akbar Zaheer. 2003. "Trust as an Organizing Principle." *Organization Science* 14:91-103.

Morgan, Stephen L. and Aage B. Sorensen. 1999. "Parental Networks, Social Closure, and Mathematics Learning: A Test of Coleman's Social Capital Explanation of School Effects." *American Sociological Review* 64:661-681.

Smith, Stephen Samuel and Jessica Kulynych. 2002. "It May Be Social, But Why Is It Capital? The Social Construction of Social Capital and the Politics of Language." *Politics & Society* 30:149-187.

Yang, Mayfair Mei-hui. 2002. "The Resilience of Guanxi and Its New Deployments: A Critique of Some New Guanxi Scholarship." *China Quarterly* 170:459-447.

WEEK 6 OCT. 11: INTRAORG'L NETWORKS: TEAMS & OCCUPATIONS
Assignment #2 Graphing & Centrality DUE

✱ Krackhardt, David. 1999. "The Ties That Torture: Simmelian Tie Analysis in Organizations." *Research in the Sociology of Organizations* 16:183-210.

✱ Mizruchi, Mark S. and Linda Brewster Stearns. 2001. "Getting Deals Done: The Use of Social Networks in Bank Decision-Making." *American Sociological Review* 66:647-671.

✱ Mouw, Ted. 2003. "Social Capital and Finding A Job: Do Contacts Matter?" *American Sociological Review* 68:868-898.

✱ Reagans, Ray, Ezra Zuckerman and Bill McEvily. 2004. "How to Make the Team: Social Networks vs. Demography as Criteria for Designing Effective Teams." *Administrative Science Quarterly* 49:101-133.

✱ Wholey, Douglas R., Amy R. Wilson, William Riley and David Knoke. 2007. "Work and Talk: Information Provision by Informal Consulting in Medical Clinics" University of Minnesota School of Public Health mimeo.

Bian, Yanijie, Ronald Breiger, Deborah Davis and Joseph Galaskiewicz. 2005. "Occupation, Class, and Social Networks in Urban China." *Social Forces* 83:1443-1468.

Burris, Val. 2004. "The Academic Caste System: Prestige Hierarchies in PhD Exchange Networks." *American Sociological Review* 69:239-264.

Cheng, Bor-Shiuan, Li-Fang Chou, Min-Ping Huang and Hung-Yueh Cheng. 2006. "Guanxi Networks and Members' Effectiveness in Chinese Work Teams: Mediating Effects of Trust Networks." *Asian Journal of Social Psychology* 9:79-95.

Fernandez, Roberto M., Emilio J. Castilla and Paul Moore. 2000. "Social Capital at Work: Networks and Employment at a Phone Center." *American Journal of Sociology* 105:1288-1356.

Ibarra, Herminia. 1997. "Paving an Alternative Route: Gender Differences in Managerial Networks." *Social Psychology Quarterly* 60:91-102.

Johnson, LuAnne R. and David Knoke. 2005. "'Skonk Works Here': Activating Network Social Capital in Complex Collaborations." *Advances in Interdisciplinary Studies of Work Teams* 10:243-262.

Lamertz, Kai and Karl Aquino. 2004. "Social Power, Social Status and Perceptual Similarity of Workplace Victimization: A Social Network Analysis of Stratification." *Human Relations* 57:795-922.

McGuire, G. M. 2007. "Intimate Work: A Typology of the Social Support that Workers Provide to Their Network Members." *Work and Occupations* 34:125-147.

Podolny, Joel M. and James N. Baron. 1997. "Relationships and Resources: Social Networks and Mobility in the Workplace." *American Sociological Review* 62:673-693.

Renzulli, Linda A., Howard Aldrich and James Moody. 2000. "Family Matters: Gender, Networks, and Entrepreneurial Outcomes." *Social Forces* 79:523-546.

Yeung, Henry W. 2005. "The Firm as Social Networks: An Organisational Perspective." *Growth and Change* 36:307-328.

WEEK 7 OCT. 18: LEARNING: MIMESIS, CONTAGION, DIFFUSION

✱ Wasserman, Stanley and Katherine Faust. 1994. "Structural Equivalence." Chapter 9 in SNA.

✱ Chang, Myong-Hun and Joseph E. Harrington Jr. 2005. "Discovery and Diffusion of Knowledge in an Endogenous Social Network." *American Journal of Sociology* 110:937-976.

✱ Dal Fiore, Filippo. 2007. "Communities versus Networks: The Implications on Innovation and Social Change." *American Behavioral Scientist* 50:857-866.

✱ Deroian, Frederic. 2002. "Formation of Social Networks and Diffusion of Innovations." *Research Policy* 31:835-846.

✱ Reagans, Ray and Bill McEvily. 2003. "Knowledge Structure and Knowledge Transfer: The Effects of Cohesion and Range." *Administrative Science Quarterly* 48:240-267.

✱ Wejnert, Barbara. 2002. "Integrating Models of Diffusion of Innovations: A Conceptual Framework. *Annual Review of Sociology* 28:297-326.

Argote, Linda and Ron Ophir. 2002. "Intraorganizational Learning." Pp. 181-207 in *The Blackwell Companion to Organizations*, edited by Joel A. C. Baum. Oxford, UK: Blackwell.

Beckman, Christine M. and Pamela Haunschild. 2002. "Network Learning: The Effects of Partners' Heterogeneity of Experience on Corporate Acquisitions." *Administrative Science Quarterly* 47:92-124.

Burt, Ronald S. 1987. "Social Contagion and Innovation: Cohesion Versus Structural Equivalent." *American Journal of Sociology* 92:1287-1335.

Knoke, David. 1999. "Organizational Networks and Corporate Social Capital." Pp. 17-42 in *Corporate Social Capital and Liability*, edited by Leenders, Roger Th. A. J. and Shaul M. Gabbay. Boston: Kluwer Academic Publishers.

Kogut, Bruce and Udo Zander. 1996. "What Do Firms Do? Coordination, Identity and Learning." *Organization Science* 7:502-518.

McEvily, Bill and Akbar Zaheer. 1999. "Bridging Ties: A Source of Firm Heterogeneity in Competitive Capabilities." *Strategic Management Journal* 20:1133-1156.

Pereles, Lauretta, Jocelyn Lockyer and Herta Fidler. 2002. "Permanent Small Groups: Group Dynamics, Learning, and Change." *Journal of Continuing Education in the Health Professions* 22:205-213.

Powell, Walter W., Kenneth W. Koput, and Laurel Smith-Doerr. 1996. "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology." *Administrative Science Quarterly* 41:116-145.

Tsai, Wenpin. 2002. "Social Structure of 'Coopetition' within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing." *Organization Science* 13:179-191.

Valente, Thomas W. 1995. *Network Models of the Diffusion of Innovations*. Cresskill, NJ: Hampton Press.

Valente, Thomas W. and Davis, Rebecca L. 1999. "Accelerating the Diffusion of Innovations Using Opinion Leaders." *Annals of the American Academy of Political and Social Science* 566(Nov):55-67.

WEEK 8 OCT. 25: INTERORGANIZATIONAL RELATIONS: STRATEGIC ALLIANCES
Assignment #3 Subgroup Cohesion DUE

✱ Wasserman, Stanley and Katherine Faust. 1994. "Network Positions and Roles." Chapter 12 in Social Network Analysis.

✱ Knoke, David. 2007. "Playing Well Together: Creating Corporate Social Capital in Strategic Alliance Networks." *American Behavioral Scientist*. Forthcoming.

✱ Podolny, Joel M. 2001. "Networks as the Pipes and Prisms of the Market." *American Journal of Sociology* 107:33-60.

✱ Powell, Walter W., Douglas R. White, Kenneth W. Koput and Jason Owen-Smith. 2005. "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences" *American Journal of Sociology* 110:1132-1205.

✱ Provan, Keith G., Mark A. Veazie, Lisa K. Staten and Nicolette I. Teufel-Shone. 2005. "The Use of Network Analysis to Strengthen Community Partnerships." *Public Administration Review* 65:603-613.

✱ Uzzi, Brian and Ryon Lancaster. 2004. "Embeddedness and Price Formation in the Corporate Law Market." *American Sociological Review* 69:319-344.

Ahuja, Gautam. 2000. "Collaborative Networks, Structural Holes, and Innovation: A Longitudinal Study." *Administrative Science Quarterly* 45:425-455.

Carbonara, Nunzia. 2002. "New Models of Inter-firm Networks within Industrial Districts." *Entrepreneurship and Regional Development* 14:229-246.

Das, T.K. and Bing-Sheng Teng. 2002. "Alliance Constellations: A Social Exchange Perspective." *Academy of Management Review* 27:445-456

Granovetter, Mark. 2005. "Business Groups and Social Organization." Pp. 429-450 *Handbook of Economic Sociology, Second Edition*, edited by Neil Smelser and Richard Swedberg. Princeton, NJ: Princeton University Press.

Gulati, Ranjay and Martin Gargiulo. 1999. "Where Do Networks Come From?" *American Journal of Sociology* 104:1439-1493.

Kenis, Patrick and David Knoke. 2002. "How Organizational Field Networks Shape Interorganizational Tie-Formation Rates." *Academy of Management Review* 27:275-293.

Kono, Clifford, Donald Palmer, Roger Friedland, and Matthew Zafonte. 1998. "Lost in Space: the Geography of Corporate Interlocking Directorates." *American Journal of Sociology* 103:863-911.

Lincoln, James R. and Michael L. Gerlach. 2004. *Japan's Network Economy: Structure, Persistence, and Change*. New York: Cambridge University Press.

Smangs, Mattias. 2006. "The Nature of the Business Group: A Social Network Perspective." *Organization* 13:889-909.

Zuckerman, Ezra W. and Stoyan V. Sgourev. 2006. "Peer Capitalism: Parallel Relationships in the U.S. Economy." *American Journal of Sociology* 111:1327-1366.

WEEK 9 NOV. 1: CONFLICT: SOCIAL MOVEMENTS & COLLECTIVE ACTION

✱ Wasserman, Stanley and Katherine Faust. 1994. "Blockmodels." Chapter 10 in Social Network Analysis.

✱ Andrews, Kenneth T. and Michael Biggs. 2006. "The Dynamics of Protest Diffusion: Movement Organizations, Social Networks, and News Media in the 1960 Sit-Ins." *American Sociological Review* 71:752-777.

✱ Chwe, Michael Suk-Young. 1999. "Structure and Strategy in Collective Action." *American Journal of Sociology* 105:128-156.

✱ Passy, Florence and Marco Giugni. 2001. "Social Networks and Individual Perceptions: Explaining Differential Participation in Social Movements." *Sociological Forum* 16:123-153.

✱ Pedahzur, Ami and Arie Perliger. 2006. "Changing Nature of Suicide Attacks: A Social Network Perspective." *Social Forces* 84:1987-2008.

✱ Raab, Jörg and Brint Milward. 2003. "Dark Networks as Problems." *Journal of Public Administration Research and Theory* 13: 413-439.

Brams, Steven J., Hande Mutlu, and Shawn Ling Ramirez. 2006. "Influence in Terrorist Networks: From Undirected to Directed Graphs." *Studies in Conflict & Terrorism* 29:679-694.

Barozet, Emmanuelle. 2003. "Mobilization of Resources and Social Networks in Neopopulisms: A Working Hypothesis for the Chilean Case." *Revista De Ciencia Politica* 23:39-54.

Diani, Mario. 2000. "Simmel to Rokkan and Beyond: Towards a Network Theory of (New) Social Movements." *European Journal of Social Theory* 3:387-406.

Enders, Walter and Xuejuan Su. 2007. "Rational Terrorists and Optimal Network Structure." *Journal of Conflict Resolution* 51:33-57.

Granovetter, Mark. 1978. "Threshold Models of Collective Behavior." *American Journal of Sociology* 83:1420-1443.

Kitts, James A. 2000. "Mobilizing in Black Boxes: Social Networks and Participation in Social Movement Organizations." *Mobilization* 5:241-257.

McAdam, Doug and Ronnelle Paulsen. 1993. "Specifying the Relationship between Social Ties and Activism." *American Journal of Sociology* 99:640-667.

Mendelsohn, Barak. 2005. "Sovereignty under Attack: The International Society Meets the Al Qaeda Network." *Review of International Studies* 31:45-68.

Ray, Kathryn, Mike Savage, Gindo Tampubolon, Alan Warde, Brian Longhurst and Mark Tomlinson. 2003. "The Exclusiveness of the Political Field: Networks and Political Mobilization." *Social Movement Studies* 2:37-60.

Tindall, David. B. 2004. "Social Movement Participation over Time: An Ego-Network Approach to Micro-Mobilization." *Sociological Focus* 37:163-184.

WEEK 10 NOV. 8: INFLUENCE: POLITICAL AFFILIATION & ACTION
Assignment #4 Structural Equivalence DUE

✱ Wasserman, Stanley and Katherine Faust. 1994. "Affiliations and Overlapping Subgroups" Chapter 8 in Social Network Analysis.

✱ Fowler, James H. 2006. "Connecting the Congress: A Study of Cosponsorship Networks." *Political Analysis* 14:456-487.

✱ Huckfeldt, Robert, Jeanette M. Mendez and Tracy Osborn. 2004. "Disagreement, Ambivalence, and Engagement: The Political Consequences of Heterogeneous Networks." *Political Psychology* 25:65-95.

✱ Ikeda, Ken'ichi and Sean E. Richey. 2005. "Japanese Network Capital: The Impact of Social Networks on Japanese Political Participation." *Political Behavior* 27:239-260.

✱ McClurg, Scott D. 2006. "The Electoral Relevance of Political Talk: Examining Disagreement and Expertise Effects in Social Networks on Political Participation." *American Journal of Political Science* 50:737-754.

✱ Mutz, Diana C. 2002. "Cross-Cutting Social Networks: Testing Democratic Theory in Practice." *American Political Science Review* 96:111-126.

Baker, Andy, Barry Ames and Lucio R. Renno. 2006. "Social Context and Campaign Volatility in New Democracies: Networks and Neighborhoods in Brazil's 2002 Elections." *American Journal of Political Science* 50:382-399.

Baybeck, Brady and Robert Huckfeldt. 2002. "Spatially Dispersed Ties among Interdependent Citizens: Connecting Individuals and Aggregates." *Political Analysis* 10:261-275.

Beck, Paul A., Russell J. Dalton, Steven Greene and Robert Huckfeldt. 2002. "The Social Calculus of Voting: Interpersonal, Media, and Organizational Influences on Presidential Choices." *American Political Science Review* 96:57-73.

Huckfeldt, Robert, Paul E. Johnson and John Sprague. 2004. *Political Disagreement: The Survival of Diverse Opinions within Communication Networks*. New York: Cambridge University Press.

Jackman, Robert W. and Ross A. Miller. 1998. "Social Capital and Politics." *The Annual Review of Political Science* 1:47-73.

Knoke, David. 1990. "Networks of Political Action: Toward Theory Construction." *Social Forces* 68:1041-1063.

McClurg, Scott D. 2003. "Social Networks and Political Participation: The Role of Social Interaction in Explaining Political Participation." *Political Research Quarterly* 56:449-464.

Scheufele, Dietram A., Matthew C. Nisbet, Dominique Brossard and Erik C. Nisbet. 2004. "Social Structure and Citizenship: Examining the Impacts of Social Setting, Network Heterogeneity, and Informational Variables on Political Participation." *Political Communication* 21:315-338.

Teorell, Jan. 2003. "Linking Social Capital to Political Participation: Voluntary Associations and Networks of Recruitment in Sweden." *Scandinavian Political Studies* 26:49-66.

WEEK 11 NOV. 15: POWER & AUTHORITY: POLICY NETS & LOBBYING

✱ Wasserman, Stanley and Katherine Faust. 1994. "Relational Algebras." Chapter 11 in *Social Network Analysis*.

✱ Granados, Francisco J. and David Knoke. 2005. "Organized Interest Groups and Policy Networks." Pp. 287-309 in *Handbook of Political Sociology: States, Civil Societies, and Globalization*, edited by Thomas Janoski, Robert R. Alford, Alexander M. Hicks, and Mildred A. Schwartz. New York: Cambridge University Press.

✱ Kriesi, Hanspeter, Silke Adam and Margit Jochum. 2006. "Comparative Analysis of Policy Networks in Western Europe." *Journal of European Public Policy* 13:341-361.

✱ Marsh, David and Martin Smith. 2000. "Understanding Policy Networks: Towards a Dialectical Approach." *Political Studies* 48(4):4-21.

✱ Raab, Jörg. 2002. "Where Do Policy Networks Come From?" *Journal of Public Administration Research and Theory*12:581-622.

✱ Weible, Christopher M. and Paul A. Sabatier. 2005. "Comparing Policy Networks: Marine Protected Areas in California." *Policy Studies Journal* 33:181-201.

Barbera, Filippo. 2005. "Social Networks, Collective Action and Public Policy: The Embeddedness Idea Reconsidered." Pp. 119-141 in *Networks, Trust and Social Capital: Theoretical and Empirical Investigations from Europe*, edited by S.M. Koniordos. Aldershot, U.K. and Burlington, VT: Ashgate.

Börzel, Tanja A. 1998. "Organizing Babylon: On the Difference Conceptions of Policy Networks." Public Administration 76:253-273.

Christensen, Bolette M. 2005. "Power and Counterpower in the Network Society." *Politik* 8(2):42-56.

Guiraudon, Virginie. 2003. "The Constitution of a European Immigration Policy Domain: A Political Sociology Approach." *Journal of European Public Policy* 10:263-282.

Kisby, Ben. 2007. "Analysing Policy Networks: Towards an Ideational Approach." *Policy Studies* 28:71-90.

Knoke, David. 1998. "The Organizational State: Origins and Prospects." *Research in Political Sociology* 8:147-163.

Lubell, Mark. 2007. "Familiarity Breeds Trust: Collective Action in a Policy Domain." *Journal of Politics* 69:237-250.

MacLean, Lauren M. 2003. "State Social Policies and Social Support Networks: The Unintended Consequences of State Policymaking on Informal Networks in Ghana and Cote d'Ivoire." *International Journal of Public Administration* 26(6):665-691.

Osa, Maryjane. 2003. *Solidarity and Contention: Networks of Polish Opposition*. Minneapolis, MN: University of Minnesota Press.

Scholz, John T. and Cheng-Lung Wang. 2006. "Cooptation or Transformation? Local Policy Networks and Federal Regulatory Enforcement." *American Journal of Political Science* 50:81-97.

WEEK 13 NOV. 29: INTERNATIONAL RELATIONS
Assignment #5 Blockmodels DUE

✱ Alderson, Arthur S. and Jason Beckfield. 2004. "Power and Position in the World City System." *American Journal of Sociology* 109: 811-51.

✱ Hafner-Burton, Emilie M. and Alexander H. Montgomery. 2006. "Power Positions: International Organizations, Social Networks, and Conflict." *Journal of Conflict Resolution* 50:3-27.

✱ Ingram, Paul, Jeffrey Robinson and Marc L. Busch. 2005. "The Intergovernmental Network of World Trade: IGO Connectedness, Governance, and Embeddedness." *American Journal of Sociology* 111:824-858.

✱ Kim, Sangmoon and Eui-Hang Shin. 2002. "A Longitudinal Analysis of Globalization and Regionalization in International Trade: A Social Network Approach." *Social Forces* 81:445-471.

✱ Stark, David and Balazs Vedres. 2006. "Social Times of Network Spaces: Network Sequences and Foreign Investment in Hungary." *American Journal of Sociology* 111:1367-1411.

Blanco, Hilda and Tim Campbell. 2006. "Social Capital of Cities: Emerging Networks of Horizontal Assistance." *Technology in Society* 28(1-2):169-181.

Bolewski, Wilfried. 2005. "Learning from the Multinational Corporations: Corporate Diplomacy and Foreign Policy Networks." *Internationale Politik* 60(9):82-89.

Boli, John. 2003. "Restructuring World Politics: Transnational Social Movements, Networks, and Norms." *Perspectives on Politics* 1(4):833-834.

Borgatti, Stephen P. and Martin G. Everett. 1999. "Models of Core/Periphery Structures." *Social Networks* 21:375-395. <www.analytictech.com/borgatti/CP_Structure.doc>

Kick, Edward and Byron L. Davis. 2001. "World-System Structure and Change: An Analysis of Global Networks and Mobility across Two Time Periods." *American Behavioral Scientist* 44(10):1561-1578.

Sacks, Michael Alan, Marc J. Ventresca and Brian Uzzi. 2000. "Stateness and System in the Global Structure of Trade: A Network Approach to Assessing Nation Status." Pp. 33-49 in *Questioning Geopolitics: Political Projects in a Changing World System*, edited by Georgi M. Derluguian and Scott Greer. Westport, CT: Greenwood Press.

Salisbury, Joseph and George Barnett. 2002. "The World System of International Monetary Flows: A Network Analysis." *Information Society* 15:31-49.

Smith, David A. and Roger J. Nemeth. 1988. "An Empirical Analysis of Commodity Exchange in the International Economy: 1965-80." *International Studies Quarterly* 32:227-240.

Su, Tieting. 2002. "Myth and Mystery of Globalization: World Trade Networks in 1928, 1938, 1960, and 1999." *Review* 25:351-392.

Van Rossem, Ronan. 1996. "The World System Paradigm as General Theory of Development: A Cross-National Test." *American Sociological Review* 61:508-527.

Wolfe, Alvin W. 2004. "Network Thinking in Peace and Conflict Studies." *Peace and Conflict Studies* 11:68-75.

WEEK 14 DEC. 6: SMALL WORLD DYNAMICS AND THE INTERNET
Course paper due DEC 12

✱ DiMaggio, Paul, Eszter Hargittai, W. Russell Neuman and John P. Robinson. 2001. "Social Implications of the Internet." Annual Review of Sociology 27:307-336.

✱ Moody, James. 2004. "The Structure of a Social Science Collaboration Network: Disciplinary Cohesion from 1963 to 1999." *American Sociological Review* 69:213-238.

✱ Robins, Garry, Philippa Pattison and Jodie Woolcock. 2005. "Small and Other Worlds: Global Network Structures from Local Processes." *American Journal of Sociology* 110:894-936.

✱ Uzzi, Brian and and Jarrett Spiro. 2005. "Collaboration and Creativity: The Small World Problem." *American Journal of Sociology* 111:447-504.

✱ Watts, Duncan J. 2004. "The 'New' Science of Networks." *Annual Review of Sociology* 30:243-270.

Barabasi, Albert-Laszlo. 2002. *Linked: How Everything is Connected to Everything and What It Means for Business, Science, and Everyday Life*. New York: Penguin.

Castells, Manuel. 2001. *The Internet Galaxy: Reflections on the Internet, Business, and Society*. Oxford: Oxford University Press.

Hampton, Keith and Barry Wellman. 2003. "Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb." *City & Community* 2:277-311.

Killworth, Peter D., Christopher McCarty, H. Russell Bernard and Mark House. 2006. "The Accuracy of Small World Chains in Social Networks." *Social Networks* 28:85-96.

Kogut, Bruce and Gordon Walker. 2001. "The Small World of Germany and the Durability of National Networks." *American Sociological Review* 66:317-335.

Milgram, Stanley. 1967. "The Small World Problem." *Psychology Today* 2:60-67.

Moody, James, Daniel McFarland and Skye Bender-deMoll. 2005. "Dynamic Network Visualization." *American Journal of Sociology* 110:1206-1241.

Townsend, Anthony M. 2001. “Network Cities and the Global Structure of the Internet.” *American Behavioral Scientist* 44:1697-1716.

Watts, Duncan J. 1999. “Networks, Dynamics, and the Small-World Phenomenon.” *American Journal of Sociology* 105:493-528.

Weare, Christopher, William E. Loges and Nail Oztas. 2007. “Email Effects on the Structure of Local Associations: A Social Network Analysis.” *Social Science Quarterly* 88:222-243.

Wellman, Barry, Anabel Quan Haase, James Witte and Keith Hampton. 2001. “Does the Internet Increase, Decrease, Or Supplement Social Capital? Social Networks, Participation, and Community Commitment.” *American Behavioral Scientist* 45: 436-455.

Katherine Faust
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SPRING 2007
SOCIOLOGY 280: ANALYSIS OF SOCIAL NETWORK DATA
MONDAY 9:00-10:50 SSL 159 AND 11:00-11:50 SST 630
Katherine Faust

Office: 3285 SSPB
email: kfaust@uci.edu
Office hours: Monday 1:00-2:00
Phone: 949 824-9383

Course Description

Social network analysis focuses on relationships between or among social entities. This course presents an introduction to various concepts, methods, and applications of social network analysis drawn from the social and behavioral sciences. The primary focus of these methods is the analysis of relational data measured on populations of social actors. Topics include an introduction to graph theory and the use of directed graphs and matrices to study actor interrelations; structural and locational properties of actors, such as centrality, prestige, and prominence; subgroups and cliques; equivalence of actors, including structural equivalence and, blockmodels; local analyses, including dyadic and triad analysis; and introduction to statistical global analyses, using models such as p_1, p^*, and their relatives. Methods are illustrated on a wide range of social network examples using both standard social network analysis software and special purpose computer programs.

Textbook

Required: Stanley Wasserman and Katherine Faust. 1997. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Recommended: Carrington, Peter J., John Scott, and Stanley Wasserman (eds.) 2005. *Models and Methods in Social Network Analysis*. Cambridge: Cambridge University Press.

Plus additional readings on specific topics

Requirements

Class participation including in-class network analysis exercises and "show-and-tell" presentations (30% of grade) A final project including an in-class presentation (20%) and a written paper (50% of grade)

Course website through eee

http://eee.uci.edu/07s/69790/

Computer Programs

We will be using a number of different social network analysis computer programs. All of these are available in Social Science computer labs.

UCINET, available in computer labs and for purchase from Analytic Technologies at: http://www.analytictech.com/

PAJEK, available to download at: http://vlado.fmf.uni-lj.si/pub/networks/pajek/default.htm

NETDRAW, available in computer labs and for purchase from Analytic Technologies at: http://www.analytictech.com/

StocNet, available to download at: http://stat.gamma.rug.nl/stocnet/

Other Resources

These are some especially useful resources on social networks. I encourage you to explore them and to take advantage of what they have to offer.

The International Network for Social Network Analysis (INSNA) is the international and interdisciplinary professional association for people interested in social network research. Its website (http://www.insna.org) is a wonderful source of information and resources on social networks, including links to many informative sites and to social network computer programs and data.

Social Networks – the flagship journal of the discipline. Edited by Lin Freeman and Ron Breiger, and housed at UCI since its inception.

The listserv, SOCNET, is the main on-line forum for discussion of current topics on social networks. Information on how to join is available through the INSNA site (see above) or at: http://www.insna.org/INSNA/socnet.html

Connections is INSNA's newsletter/ informal journal. It is available through the INSNA website or directly at: http://www.insna.org/indexConnect.html

Journal of Social Structure is an online journal with many articles of interest to social network researchers. http://www.cmu.edu/joss/index.html

Steve Borgatti's web page is a nice source of introductory material and handouts on various topics on social networks. http://www.analytictech.com/networks/

Data examples from Wasserman and Faust are available at:
http://www.insna.org/INSNA/data_inf.html

Carter Butts's R routines for social network analysis
http://erzuli.ss.uci.edu/~buttsc/index.html#ADAT

Other miscellaneous social network data and information about Pajek from the Pajek sites
http://vlado.fmf.uni-lj.si/pub/networks/book/
http://vlado.fmf.uni-lj.si/pub/networks/data/esna/default.htm

Schedule and Readings

1: Introduction to Social Networks and Network Applications

Wasserman and Faust, Chapters 1 and 2

Wellman, Barry 1988. "Structural analysis: From method and metaphor to theory and substance." Pages 19-61 in Wellman and Berkowitz (eds.) Social Structures: A Network Approach. Cambridge: Cambridge University Press. Note, this is available on Barry Wellman's NetLab website
http://www.chass.utoronto.ca/~wellman/publications/structuralanalysis/structanaly.pdf

Marsden, Peter. 2004. "Network Analysis." Pp. 819-825 in Kimberly Kempf-Leonard (ed.) *Encyclopedia of Social Measurement*. San Diego, CA: Academic Press,

2: Representing Networks: Graphs, Matrices, and Network Visualization

Wasserman and Faust, Chapters 3 and 4

Freeman, Linton "Visualizing Social Networks" *Journal of Social Structure*, available at:
http://www.cmu.edu/joss/content/articles/volume1/Freeman.html

Freeman, Linton 2005. "Graphic techniques for exploring social network data." Chapter 12, pages 248-269 in Carrington, Peter J., John Scott, and Stanley Wasserman (eds.) *Models and Methods in Social Network Analysis*. Cambridge: Cambridge University Press.

McGrath, Cathleen, Jim Blythe, and David Krackhardt "Seeing Groups in Graph Layouts" available at http://www.andrew.cmu.edu/user/cm3t/groups.html

3: Graph Theory for Network Analysis

Wasserman and Faust, Chapter 4

4: Centrality and Centralization

Wasserman and Faust, Chapter 5

Freeman, Linton 1979. "Centrality in social networks: Conceptual clarification." *Social Networks* 1:215-239.

Friedkin, Noah 1991. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology*, 96(6):1478-1504.

5: Cohesive Subgroups and Two Mode Networks

Wasserman and Faust, Chapters 7 and 8

Erickson, Bonnie. 1988. "The relational basis of attitudes." Pages 99-121 in Barry Wellman and Stephen Berkowitz (eds.) *Social Structures: A Network Approach*. Cambridge: Cambridge University Press.

Freeman, Linton 1992 "The sociological concept of group: An empirical test of two models." *American Journal of Sociology*. 98(1):152-166.

Breiger, Ronald. 1974. "The duality of persons and groups." *Social Forces*. 53:191-190.

Moody, James and Douglas R. White. 2003. "Structural Cohesion and Embeddedness: A hierarchical conception of Social Groups." *American Sociological Review* 68:103-127

6: Equivalences and Blockmodels, Network Roles and Algebraic Models

Wasserman and Faust, Chapter 9, 10, and 11

Lorrain, Francois and Harrison White. 1971. "Structural equivalence of individuals in social networks. *Mathematical Sociology* 1:49-80.

White, Harrison, Scott Boorman and Ronald Breiger. 1976. "Social structure from multiple networks: I. Blockmodels of roles and positions." *American Journal of Sociology* 81(4):730-780.
Borgatti, Steve and Martin Everett 1992. "Notions of position in network analysis." *Sociological Methodology* 22:1-36.

Doreian, Patrick, Vladimir Batagelj, and Anuska Ferligoj 2005. "Positional analyses of sociometric data." Chapter 5 pages 77-97 in Carrington, Peter J., John Scott, and Stanley Wasserman (eds.) *Models and Methods in Social Network Analysis*. Cambridge: Cambridge University Press.

Mahutga, Matthew C. 2006 “The persistence of structural inequality? A network analysis of international trade, 1965-2000” *Social Forces* 84 (4): 1863-1889.

7: Subgraphs: Dyads, and Triads

Wasserman and Faust, Chapters 6, 13 and 14

Holland, Paul, and Samuel Leinhardt 1971. “Transitivity in structural models of small groups.” *Comparative Group Studies* 2:107-124.

Cartwright, D. and Frank Harary. 1979. Balance and clusterability: An overview. In Holland, P.W. and Leinhardt, S. (eds.), *Perspectives on Social Network Research*, pages 25-50. New York: Academic Press.

Davis, James. 1967. “Clustering and structural balance in graphs.” *Human Relations*. 20:181-187.

8: Multiple Relations, Testing Hypotheses about Social Networks

Hubert, L. 1978. “Evaluating the conformity of sociometric measurements.” *Psychometrika* 43:31-41.

9: Statistical Models

Wasserman and Faust, Chapter 15

Anderson, C. J., Wasserman, S., and Crouch, B. (1999), "A p* Primer: Logit Models for Social Networks," Social Networks, 21, pp. 37-66.

Wasserman, Stanley and Garry Robins 2005. “An introduction to random graphs, dependence graphs, and p*” Chapter 8 pages 148-161 in Carrington, Peter J., John Scott, and Stanley Wasserman (eds.) *Models and Methods in Social Network Analysis*. Cambridge: Cambridge University Press.

10: Student presentations (also during finals week if necessary)

Noah Friedkin
Department of Sociology
University of California, Santa Barbara

Social Networks Seminar (Soc 148/294)
Fall 2007, Ellison 2824, Tuesdays 2-5 PM

Note to the readers (not included in the syllabus). This course is limited to 15 students. The enrollments usually consist of about 10 upper division undergraduates and 5 graduate students. The format of the classes is lecture and discussion. I provide a bibliography of articles from which the students select those articles that they would most like to read and discuss. Since the bibliography is based on a broad search of network-related articles (see below), the possible readings include many articles that I have not read nor would read because their substantive focus is not of obvious interest to me. One-half of the readings are student selections, and the other half are my selections. I learn a lot from this course. It's remarkable that most sociological research on networks do not actually deal with the larger network structures in with persons, firms, or other social units are embedded, or with the social processes that unfold in these networks. Thinking about this research automatically leads to ideas about what might have been done to advance various lines of work. I lecture a bit on network methods as the need arises, but the emphasis of the course is substantive. The combination of undergraduate and graduate student works well.

The purpose of this seminar is to explore and discuss the frontier of substantive (non-methodological) research on social networks in Sociology, where this frontier is manifested in articles that have appeared in mainstream sociological journals. Since orientation of the course is substantive, we will not be spending much time on the methodological foundations of the findings presented in the articles. Our discussion will focus on the research problem of the article, the findings, the conclusions, and how social networks entered into the analysis and thinking of the author(s).

Attached are recent articles on networks that were published in the American Journal of Sociology, American Sociological Review, Social Forces, or Social Psychology Quarterly, archived in JSTOR and covering the period 1970-1990, in which the word "network" or "networks" appeared in the title or abstract. **Note the reader: I change this period from year to year.**

Week 1

Your first assignment is browse through the articles and email friedkin@soc.ucsb.edu your top five choices for reading and discussion this quarter: give me the names of the authors and the titles of the articles, ranked in order of your preference. I need to receive your selections on Thursday.

Your reading assignment for the week are two articles that I have selected. One is from the bibliography, and the other is not:

Granovetter, Mark 1973 "The Strength of Weak Ties." *American Journal of Sociology* 78: 1360-80.

Padgett, John F. and Christopher K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." American Journal of Sociology 98:1259-1319.

You can get these articles in one of two ways:

Go to http://www.jstor.org. Type an author's last name and search. Several articles may appear. Locate the one that we are reading and click on the title, or if your computer can read pdf files, go to my webpage http://www.soc.ucsb.edu/faculty/friedkin/ and click on Course Syllabi. Then click on Soc 148/294 and find the article. After locating an article, you may either print it, or read it online and take notes.

Writing Assignment: for each article on the syllabus:

1. Describe the research problem that is dealt with by the author(s).

2. Describe the main findings, arguments and conclusions presented in the article, and

3. Discuss how social networks entered into the analysis and thinking of the author(s).

For each article, do this in two double-spaced type written pages.

Come to class prepared to discuss the articles. I will lead the discussion. Be prepared for me to call on you by name and ask for your comments. I expect the active participation of many students in the discussion. Do not take this course if you are uncomfortable with this expectation.

NB. As you will see (after scanning the 1970-1990 JSTOR bibliography of network articles), many different substantive fields and methods are represented, so that you should have little trouble finding articles to discuss related to your interests. Not all of the articles in the bibliography may actually deal with data on one more social networks. In some cases there may only be a loose metaphorical reference to social networks and no real analysis of any network structure. I leave the choice of the articles up to you; presumably, since you are in this seminar, you will choose articles that involve social networks in the way that you are interested in dealing with them. That is fine with me.

Week 2 and Onwards

Over the weekend, I will compose the reading schedule for the quarter – two articles per week – from your selections. I cannot promise that all, or any, of your own selections will be included in the reading schedule. But I do promise that all of the readings will be articles that one or more of you have selected.

The written assignment and expectation of participation in class discussion will be the same each week.

Phillip Bonacich
Department of Sociology
University of California, Los Angeles

Sociology 208A
Network Methods
Professor Phillip Bonacich

Social network analysis is both an approach and a method for the analysis of social structure. The social network approach has been used on a variety of topics, from the position of the Medici family in Florence in the Middle Ages to the spread of AIDS, from the activities of economic elites to how people get jobs. In this first of two courses we will be reading new and classic substantive papers that use the social network approach. In the 208B we will learn more about the mathematics and statistics of network analysis, including how to use some computer programs, and you will write papers analyzing the data sets you have chosen.

All seminar participants will be expected to do all the reading. Each journal article will be the particular responsibility of one participant, who will lead the discussion on that article.

Next quarter 208B, taught by Rick Grannis, will be devoted to network methods and computer programs designed to implement these methods. .

Week 1. Conceptual

Granovetter, Mark. 1985. Economic action and social structure: the problem of embeddedness. *American Journal of Sociology*.
91:481-510.

Emirbayer, Musafa, and Jeff Goodwin. 1994. Network analysis,
culture, and the problems of agency. *American Journal of Sociology*. 99:1411-54.

McPherson, Miller, Lynn Smith-Lovin, and Matthew E. Brashears. 2006. Social isolation in America: changes in core discussion networks over two decades. *American Sociological Review*. 71:353-375.

Week 2. Weak Ties and Cohesive Subgroups

Granovetter, Mark. 1973. The strength of weak ties. *American Journal of Sociology*.
78:1360-1380.

Bian, Yanjie. 1997. Bringing strong ties back in: Indirect ties, network bridges, and job searches in China. *American Sociological Review.* 62:366-385.

Mouw, Ted. 2003. Social capital and finding a job: do contacts matter? *American Sociological Review*. 68:868-898.

Fernandez, Roberto, and Isabel Fernandez-Mateo. 2006. Networks, Race, and Hiring. *American Sociological Review*. 71:42-71

Peng, Yusheng. 2004. Kinship networks and entrepreneurs in China's transitional economy. *American Journal of Sociology*. 109:1045-74.

Burt, Ronald S. 2004. Structural holes and good ideas. *American Journal of Sociology.* 110:349-399.

Week 3 Diffusion and Structural Equivalence

Coleman, James, Elihu Katz, and Herbert Menzel. 1957. The diffusion of innovation among physicians. *Sociometry*. 20:253-270.

Burt, Ronald. 1987. Social contagion and innovation. *American Journal of Sociology*. 92:1287-1335

Van den Bulte, Christophe and Gary L. Lilien. 2001. *Medical Innovation* revisited: social contagion versus marketing effort. *American Journal of Sociology*. 106:1409-35.

Meyers, Daniel J. 2000. The diffusion of collective violence: infectiousness, susceptibility, and mass media networks. *American Journal of Sociology.* 106:173-208.

Week 4 - Social Exchange

Cook, K.S., R.M. Emerson, M.R. Gilmore, and T.Yamagishi. 1983. The distribution of power in exchange networks: theory and experimental results. *American Journal of Sociology*. 89:275-305.

Yamagishi, Toshio, and Karen S. Cook. 1993. Generalized exchange and social dilemmas. *Social Psychology Quarterly* 56:235-248.

Molm, Linda, Nobuyuki Takahashi, and Gretchen Peterson. 2003. In the eye of the beholder: procedural justice in social exchange. *American Sociological Review*. 68:128-152.

Burris, Val. 2004. The academic caste system: prestige hierarchies in PhD exchange networks. *American Sociological Review*. 69:239-264.

Week 5 Economic Sociology - Interfirm Relations

Lincoln, James R., Michael L. Gerlach, and Christina L. Abmadjian. 1996. *Keiretsu* networks and corporate performance in Japan. *American Sociological Review*. 61:67-88.

Podolny, Joel M., Toby E. Stuart, and Michael T. Hannan. 1997. Networks, Knowledge, and Niches: Competition in the Worldwide Semiconductor Industry, 1984-1991. *American Journal of Sociology*. 102:659-89.

Podolny, Joel M. 2001. Networks as the pipes and prisms of the market. *American Journal of Sociology* 107:33-60.

Lisa A. Keister. 2001. Exchange structures in transition: lending and trade relations in Chinese business groups. *American Sociological Review*. 66:336-360.

Burris, Val. 2005. Interlocking directorates and political cohesion among corporate elites. *American Journal of Sociology*. 111:249-83.

Week 6 More Economic Sociology and embeddedness

Uzzi, Brian. 1996. The sources and consequences of embeddedness for the economic performance of organizations: the network effect. *American Sociological Review*. 61:674-698..

Zhou,Xueguang, Wei Zhao, Quang Li, and He Cai. 2003. Embeddedness and contractual relationships in China's transitional economy. *American Sociological Review*. 68:75-102..

Korinek, Kim, Barbara Entwisle, and Aree Jampaklay. 2005. Through thick and thin: layers of social ties and urban settlement among Thai migrants. *American Sociological Review*. 70:779-800.

Misruchi, Mark S., Linda Brewster Stearns, and Christopher Marquis. 2006. The conditional nature of embeddedness: a study of borrowing by large U.S. forms, 1973-1994. *American Sociological Review*. 71:310-333.

Week 7 Politics

Padgett, John F. and Christopher K. Ansell. 1993. Robust Action and the Rise of the Medici, 1400-1434. *American Journal of Sociology* 98:1259-1319.

Beckfield, Jason. 2003. Inequality in the world polity: The structure of international organization. *American Sociological Review*. 68: 401-424.

Fernandez, Roberto M. and Roger V. Gould. 1994. A dilemma of state power: brokerage and influence in the national health policy domain. *American Journal of Sociology*. 99:1455-91

Alderson, Arthur S., and Jason Beckfield. 2004. Power and position in the world city system. *American Journal of Sociology*. 109:811-851.

Week 8 Politics continued

Gould, Roger V. 1991. Multiple networks and mobilization in the Paris Commune, 1871. *American Sociological Review*. 56:716-729

Fernandez, Roberto M. and Doug McAdam. 1988. "Social Networks and Social Movements: Multiorganizational Fields and Recruitment to Mississippi Freedom Summer" *Sociological Forum* 3 (3): 357-382

Gould, Roger V. 1993. Trade cohesion, class unity, and urban insurrection: artisinal activism in the Paris Commune. *American Journal of Sociology*. 98: 721-54.

Kadushin, Charles. 1995. Friendship among the French financial elite. *American Sociological Review*. 60:202-221.

Kim, Hyojoung, and Peter S. Bearman. 1997. The structure and dynamics of movement participation. *American Sociological Review.*
62:70-93.

Week 9. Small Worlds and Complexity

Watts, Duncan J. 1999. Network dynamics and the small world phenomenon. *American Journal of Sociology*. 105:493-527.

Hedström, Peter, Richard Sandell, and Charlotta Stern. 2000. Mesolevel networks and the diffusion of social movements: the case of the Swedish Social Democratic Party. *American Journal of Sociology*. 106:145-72.

Uzzi, Brian, and Jarrett Spiro. 2005. Collaboration and creativity: the small world problem. *American Journal of Sociology.* 111:447-504.

Biggs, Michael. 2005. Strikes as forest fires: Chicago and Paris in the late nineteenth century. *American Journal of Sociology*. 110:1684-1714.

Week 10. Other interesting topics

Quillian, Lincoln, and Mary E. Campbell. 2003. Beyond black and white: the present and future of multiracial friendship segregation. *American Sociological Review*. 68:540-566.

Mouw, Ted, and Barbara Entwisle. 2006. Residential segregation and interracial friendship in schools. *American Journal of Sociology*. 394-441.

Moody, James. 2004. The structure of social science collaboration networks: disciplinary cohesion from 1963 to 1999. *American Sociological Review.* 69:213-238.

Sandberg, John. 2006. Infant mortality, social networks, and subsequent fertility. *American Sociological Review*. 71:288-309.

Bearman, Peter, James Moody, and Katherine Stovel. 2004. Chains of affection: the structure of adolescent romantic and sexual networks. *American Journal of Sociology*. 110:44-91.

Gibson, David R. 2005. Taking turns and talking ties: networks and conversational interaction. *American Journal of Sociology*. 110:1561-97.

Phillip Bonacich
Department of Sociology
University of California, Los Angeles

Sociology 208B
Network Methods
Professor Phillip Bonacich

Social network methods consist of a variety of concepts, measures, and statistical techniques useful in the analysis of social networks. These techniques have proven useful in network research in all social science fields.

Texts

1. Wasserman, Stanley, and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.
2. *UCINET 5 for Windows Software for Social Network Analysis*, available for downloading from Analytic Technologies, http://analytictech.com/
3. StOCNET Users's Manual available at http://stat.gamma.rug.nl/stocnet/

Software

1. UCINET (required), available in the CLICC and SSC computer labs. Student edition can be ordered from Analytic Technologies, http://analytictech.com/ , for $40.
2. NetDraw (required), available for free from Analytic Technologies
3. StOCNET (required), available for free at http://stat.gamma.rug.nl/stocnet/ .
4. *Mathematica*, (strictly optional) available in all campus computer labs and as a student edition http://www.wolfram.com/products/student/mathforstudents/index.html for $140.00. *Mathematica* 5 contains some very nice functions for drawing and analyzing networks, a powerful programming language, and the ability to do symbolic mathematics.

Class Organization and grades

1. Everyone is expected to do the reading for each class meeting beforehand.
2. There will be homework. The homework will also provide class discussion topics.
3. Grades will be determined by class participation and a paper due at the end of the quarter. Ideally the paper is related to your dissertation work.

Week 1. The Organization of Network Data

Wasserman and Faust, Chapter 2
UCINET 5 USER'S GUIDE, Chapter 2

Week 2-3. The Mathematics of Networks: Graph Theory

Wasserman and Faust, Chapter 3, Chapter 4 sections 4.1-4.8.
UCINET 5 USERS'S GUIDE, Chapter 3

Week 4-5. The Mathematics of Networks: Matrices

Wasserman and Faust, Chapter 4 sections 4.9-4.10
UCINET 5 USER'S GUIDE, chapter 4

Week 6. Subgroups

Wasserman and Faust, Chapter 7

Week 7. Diffusion and Structural equivalence

Wasserman and Faust, Chapters 9 and 12

Week 8. Centrality

Wasserman and Faust, Chapters 5, 8.

Week 9 Blockmodels

Wasserman and Faust, Chapter 10

White, Harrison C., Scott A. Boorman, and Ronald L. Breiger.
1976, Social Structure from Multiple Networks: I. Blockmodels of Roles and Positions.
American Journal of Sociology. 81: 730-780.

Week 10 StOCNET

StOCNET will be introduced earlier in the quarter in connection with particular models and topics.

Joseph Galaskiewicz
Department of Sociology
University of Arizona

Sociology 527
Spring, 2008
Social Science 415
Thursday, 3:30-6:00 PM

Joseph Galaskiewicz
Social Science 434
520-621-7084
galaskie@email.arizona.edu

SOCIAL NETWORK ANALYSIS

Introduction:

The purpose of this course is to give graduate students in the social and behavioral sciences a better understanding of how social network analysis has been used to study a variety of informal social processes. More specifically, we want to identify the key network concepts that have been used by social and behavioral scientists, describe the ways in which they've been operationalized in empirical research, evaluate their contribution to the understanding of substantive problems in sociology and administrative science in particular, and critique their use. This course cannot cover all the work that has been done in the social and behavioral sciences in the network tradition. The literature is too massive. Nonetheless, the course will be useful for those who wish to learn more about network analysis and some of its applications.

Soc 527 (this course) and Soc 526 (*Research Methods in Social Network Analysis*) are often offered in alternate years. Students may, if they choose to do so, take both courses for credit, in either order. Soc 526 concerns qualitative and quantitative methods for researching social networks.

Format:

For the first nine weeks the format for the seminar is straightforward. Students are expected to read all the readings beforehand. The instructor will give some background on the topics and some of his own opinions on the readings. I expect students in class to comment and offer their opinions on the readings. The first 90 minutes will be spent discussing substantive work; the last 60 minutes will be devoted to methodological issues.

The last six weeks of the seminar will be run like a workshop. This will commence March 27th. This means that your projects are really the subject matter for the class. My goal is that each of you is able to use the seminar to write a master's paper, a Ph.D. proposal, a publishable article, or even a dissertation! The advantage of taking this class is that other students and myself will be available to provide feedback and suggestions. Hopefully, that will result in a much higher quality product. I am completely open to joint projects where two or even three of you would work on a paper together. It may be useful to pair someone who has taken Soc 526 with a network novice. The norms are that individual papers would be 15 pages in length and multi-authored papers would be 30 or 45 pages in length. Your grade will be based on whether or not you accomplish the goals that you set out for yourself at the start, i.e., 100% of your grade is

based on the paper. The final paper is due Thursday, May 8th, but I will certainly accept papers before that. I will give incompletes, but only under duress.

During the 4th, 5th, and 6th weeks of class you will be expected to present orally an outline of what you want to accomplish this semester. This presentation will be only 5 minutes long and there should be a one-page handout for the other students. It will not be graded. Time flies by quickly, and nothing like getting an early start.

Each of you will be responsible for two classes. This is necessary in order to get a grade, however, you will not be graded on the class per se. In other words, it is the price of admission. I am not too worried about quality controls, because I think that peer pressure will take care of this. Most students do not enjoy being associated with a "disaster." If you are auditing, are you required to make a presentation? No, but you can if you want.

Since we have 18 students, each will present two classes, and there are six weeks, you will need to fill up 25 minutes of class time each time you present (six students will present each session). In the case of two and three person teams each student is still required to present a total of 50 minutes. During the first class presentation, you will select a reading for the other students to read beforehand, state your research question, present a literature review related to your topic, and lead the discussion. In the second class, you will present the methodology and empirical results from your paper. The purpose of both presentations is to give students exposure to a different application of social network analysis and to get feedback on your paper. Since we want to ensure that you get "rigorous criticisms," I will not assign a grade for the presentation but will provide feedback.

At this stage, you need to select a topic, which is related to your research. You need to select background readings for the other students. You will also need to decide on a tentative title for your paper. You then need to decide when you want to present. You will put these all together in a proposal. The proposal should also state your goals for the semester and what you want to be graded on. You will submit the proposal to me on Thursday, March 6th. The 6th is a ***hard*** deadline. That way I can put together a syllabus to be distributed in time for the next class on March 13th. Write the proposal as a Word document and send it to me as an email attachment, if you cannot bring it to class.

Finally, there is the sticky issue of participation. Are you expected to attend every class? Are you expected to do the readings even though you won't be tested on them? Yes. I have no way of enforcing this, but it seems terribly unfair if others come to hear you and you do not come to hear them. (If you want to skip out on a class that I am presenting, no hard feelings.)

Readings:

The following books are both at the bookstore and Wilson Reserve. I have not assigned any readings from the Carrington, Scott, and Wasserman volume because those are very advanced readings and more appropriate for students who have a solid background in social network methods.

David Knoke and Song Yang. 2008. Network Analysis, 2nd ed. Los Angeles: Sage Publications (978-1-4129-2749-9, paperback)

Peter J. Carrington, John Scott, and Stanley Wasserman. 2005. Models and Methods in Social Network Analysis. New York: Cambridge University Press (0-521-60097-9, paperback)

Stanley Wasserman and Katherine Faust. 1994. Social Network Analysis: Methods and Applications. New York: Cambridge University Press (0-521-38707-8, paperback)

Martin Kilduff and Wenpin Tsai. 2003. Social Networks and Organizations. Thousand Oaks, CA: Sage Publications (0-7619-6957-8, paperback)

The required readings are on e-reserves. You are to put the readings you require for your class on e-reserves as well. See Scott Savage if you need help.

Software:

The computer software, *UCINET VI* for Windows (Version 6.162) will be on machines in DASL (Social Science 155). Students who wish to purchase the software can do so through the website, http://www.analytictech.com/.

SCHEDULE OF CLASSES

January 17th **Introduction to Network Analysis**

Martin Kilduff and Wenpin Tsai. 2003. Social Networks and Organizations. Thousand Oaks, CA: Sage. Chapters 1-3.

Mustafa Emirbayer. 1997. "Manifesto for a Relational Sociology." American Journal of Sociology, 103:281-317.

Bernice A. Pescosolido and Beth A. Rubin. 2000. "The Web of Group Affiliations Revisited: Social Life, Postmodernism, and Sociology." American Sociological Review, 65:52-76.

Introduction to Network Methods

Stanley Wasserman and Katie Faust. 1994. "Introduction." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapters 1.

David Knoke and Song Yang. 2008. "Introduction to Social Network Analysis" and "Network Fundamentals." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapters 1, 2.

January 24th **Sunbelt Social Network Conference**

January 31st **Embeddedness of Economic Transactions**

Mark Granovetter. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." American Journal of Sociology, 91:481-510.

Stewart Macauley. 1963. "Non-Contractual Relations in Business: A Preliminary Study." American Sociological Review, 28:55-67.

Brian Uzzi. 1997. "Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness." Administrative Science Quarterly, 42:35-67.

Paul DiMaggio and Hugh Louch. 1998. "Socially Embedded Consumer Transactions: For What Kinds of Purchases do People Most Often Use Networks?" American Sociological Review, 63:619-637

Social Network Data

Stanley Wasserman and Katie Faust. 1994. "Social Network Data." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 2.

David Knoke and Song Yang. 2008. "Data Collection." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapter 3.

February 7th **Social Capital as Individuals' Resources**

Alejandro Portes. 1998. "Social Capital: Its Origins and Applications in Modern Sociology." Pp. 1-24 in Annual Review of Sociology edited by John Hagan and Karen S. Cook. Palo Alto, CA: Annual Reviews Inc.

Mark Granovetter. 1974. "The Strength of Weak Ties." American Journal of Sociology, 78: 1360-80.

Ronald S. Burt. 2005. Brokerage and Closure: An Introduction to Social Capital. New York: Oxford University Press. Introduction, Chapters 1

Ronald S. Burt. 2004. "Structural Holes and Good Ideas." American Journal of Sociology, 110:349-399.

Zhixing Xiao and Anne S. Tsui. 2007. "When Brokers May Not Work: The Cultural Contingency of Social Capital in Chinese High-tech Firms." Administrative Science Quarterly, 52:1-31.

Notation, Graphs, and Matrices

Stanley Wasserman and Katie Faust. 1994. "Notation for Social Network Data" and "Graphs and Matrices." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 3, 4.

February 14th **Social Capital as Collective Resources**

James S. Coleman. 1988. "Social Capital in the Creation of Human Capital." American Journal of Sociology, 94 (Supplement):95-120.

Stephen L. Morgan and Aage B. Sorensen. 1999a. "Parental Networks, Social Closure, and Mathematics Learning: A Test of Coleman's Social Capital Explanation of School Effects." American Sociological Review, 64:661-681.

Robert Putnam. 1993. Making Democracy Work: Civic Traditions in Modern Italy. Princeton, NJ: Princeton University Press. Chapter 6.

Dylan Riley. 2005. "Civic Associations and Authoritarian Regimes in Interwar Europe: Italy and Spain in Comparative Perspective." American Sociological Review, 70:288-310.

Structural Equivalence and Block Modeling

Stanley Wasserman and Katie Faust. 1994. "Structural Equivalence" and "Blockmodels." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 9-10.

David Knoke and Song Yang. 2008. "Basic Methods for Analyzing Networks." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapter 4.

February 21st **Social Support and Social Influence**

Robert Putnam. 1995. "Bowling Alone: America's Declining Social Capital." Journal of Democracy (January), 6:65-78.

Miller McPherson, Lynn Smith-Lovin, Matthew Brashears. 2006. "Social Isolation in America: Change in Core Discussion Networks Over Two Decades." American Sociological Review, 71:353-375.

Peter V. Marsden and Noah E. Friedkin. 1994. "Network Studies of Social Influence." Pp. 3-25 in Advances in Social Network Analysis: Research in the Social and Behavioral Sciences edited by Stanley Wasserman and Joseph Galaskiewicz. Thousand Oaks, CA: Sage.

Mark Mizruchi. 1993. "Cohesion, Equivalence, and Similarity of Behavior: A Theoretical and Empirical Assessment." Social Networks, 15: 275-307.

Analyzing Dyads

Frank Baker and Lawrence Hubert. 1981. "The Analysis of Social Interaction Data." Sociological Methods and Research, 9(3):339-61.

Stanley Wasserman and Katie Faust. 1994. "Dyads." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 13.

David Knoke and Song Yang. 2008. "Advanced Methods for Analyzing Networks." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapter 5.

February 29th Powell, DiMaggio, and Clemens Colloquium

Meyer, John and Brian Rowan. 1977. "Institutionalized Organizations: Formal Structure as Myth and Ceremony." American Journal of Sociology, 83: 333-63.

Paul DiMaggio and Walter W. Powell. 1983. "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." American Sociological Review, 48:147-160.

Powell, Walter W. and P. J. DiMaggio, eds. The New Institutionalism in Organizational Analysis. Chicago, IL: University of Chicago Press, 1991. Chapters 1

Clemens, Elisabeth S. 1993. "Organizational Repertoires and Institutional Change: Women's Groups and the Transformation of U.S. Politics, 1890-1920." American Journal of Sociology, 98:755-98.

March 6th Networks and Organizational Research

Daniel J. Brass, Joseph Galaskiewicz, Henrich R. Greve, and Wenpin Tsai. 2004. "Taking Stock of Networks and Organizations: A Multilevel Perspective." Academy of Management Journal, 47: 795-817.

Walter W. Powell, Douglas R. White, Kenneth W. Koput, Jason Owen-Smith. 2005. "Network Dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences 1. American Journal of Sociology, 110: 1132-1205.

Joseph Galaskiewicz, Wolfgang Bielefeld, and Myron Dowell. 2006. "Networks and Organizational Growth: A Study of Community Based Nonprofits." Administrative Science Quarterly, 51:337-380.

Joseph Galaskiewicz. 2007. "Editorial: Has a Network Theory of Organizational Behavior

Lived Up to its Promises?" Management and Organization Review, 3:1-18.

Centrality

Stanley Wasserman and Katie Faust. 1994. "Centrality and Prestige." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 5.

David Knoke and Song Yang. 2008. "Basic Methods for Analyzing Networks." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapter 4.

March 13th Small Worlds

Stanley Milgram. 1967. "The Small-World Problem." Psychology Today, 1:62-67.

J. Travers and Stanley Milgram. 1969. "An Experimental Study of the Small World Problem." Sociometry, 32:425-443.

Watts, Duncan J. 1999. "Networks, Dynamics, and the Small-World Phenomenon." American Journal of Sociology, 105:493-528.

Ranjay Gulati, Maxim Sytch, and Adam Tatarynowicz. 2007. "The Dynamics of Social Structure: The Emergence and Decline of Small Worlds." Working paper, Kellogg School of Management, Northwestern University, Evanston, IL.

Affiliation Networks

Ronald L. Breiger. 1974. "The Duality of Persons and Groups." Social Forces, 53:181-90.

Stanley Wasserman and Katie Faust. 1994. "Affiliations and Overlapping Subgroups." Social Network Analysis: Methods and Applications. New York: Cambridge University Press. Chapter 8.

David Knoke and Song Yang. 2008. "Advanced Methods for Analyzing Networks." Social Network Analysis, 2nd Edition. Los Angeles: Sage. Chapter 5.

March 27th First Student presentations
Session I: Scientific Collaborations (Nyitray, Wakhare, Medicamento)

R. Cross, S. P. Borgatti, et al. 2002. "Making invisible work visible: Using social network analysis to support strategic collaboration." California Management Review 44(2): 25-46.

Daniel J. Brass, Joseph Galaskiewicz, Henrich R. Greve, and Wenpin Tsai. 2004. "Taking stock of networks and organizations: A multilevel perspective." Academy of Management Journal, 47: 795-817.

Friedkin Peter E. 1978. "University social structure and social networks among scientists," American Journal of Sociology, 83 (6).

Session II: Social Welfare Networks (Carboni, Keagy, Hargroder)

H. Brinton Milward and Keith G. Provan, 2000. "Governing the hollow state". Journal of Public Administration Research and Theory, 10 (2): 359-379

Keith G. Provan and Patrick Kenis. 2007. "Modes of network governance: Structure, management and effectiveness." Journal of Public Administration Research and Theory

Provan, Keith G. and Milward, H. Brinton, 1995. "A preliminary theory of network effectiveness: A comparative study of four community mental health systems." Administrative Science Quarterly, 40: 1-33.

April 3th First Student presentations
Session I: Social Capital in the Arizona Desert (Bergstrand, Springer, Hoegeman

Doug McAdam and Ronnelle Paulsen. 1993. "Specifying the relationship between social ties and activism." The American Journal of Sociology, 99 (3):640-667.

John Wilson and Marc Musick. 1998. "The contribution of social resources to volunteering." Social Science Quarterly, 79(4): 799-814.

Cathleen McGrath and Jim Blythe. 2004. "Do you see what I want you to see? The effects of motion and spatial layout on viewer's perception of graph structure." Journal of Social Structure. 5(4).

Session II: Social Capital and Community Development (Navarro, Payosova, Whitham)

M. Woolcock and Deepa Narayan. 2000. "Social capital: Implications for development theory." Research and Policy. The World Bank Research Observer, 15 (2): 225-49.

Marcel Fafchamps. Forthcoming. "Spontaneous Markets, Networks, and Social Capital: Lessons from Africa?" In The Microeconomics of Institutions, edited by Tim Besley and Raji Jayaraman. Cambridge, MA: MIT Press.

Anthony, Denise. 2005. "Cooperation in microcredit borrowing groups: Identity, sanctions, and reciprocity in the production of collective goods." American Sociological Review, 70: 496-515.

April 10th First Student presentations
Session I: Networks and Culture (Taber, Schultz, Black)

Ulrik Brandes and Steven R. Corman. 2003. "Visual unrolling of network evolution and the analysis of dynamic discourse." Information Visualization, 2(1).

Katherine Guiffre. 1999. "Sandpiles of Opportunity: Success in the Art World". Social Forces. 77(3): 815-32.

Stefanie Bailey and Peter Marsden. 1999. "Interpretation and interview context: examining the General Social Survey name generator using cognitive methods." Social Networks. 21:287–309.

Session II: Organizations and Networks (Savage, Barringer)

James G. Anderson, Michelle R. Rainey, and Gunther Eysenbach. 2003. "The impact of CyberHealthcare on the physician-patient relationship." Journal of Medical Systems, 27:67-84.

Ehrenberg, Ronald G. 2006. "Introduction". In What's Happening to Public Higher Education?: The Shifting Financial Burden. Baltimore: John Hopkins University Press. Pg. xiii-xxi.

Jeffrey Selingo. 2003. "The disappearing state in public higher education." Chronicle of Higher Education. February 28.

April 17th Second Student presentations
Session I: Scientific Collaborations (Nyitray, Wakhare, Medicamento)

J. Allen, A. D. James, et al. 2007. "Formal versus informal knowledge networks in R&D: A case study using social network analysis." R & D Management, 37(3): 179-196.

Ranjay Gulati, Maxim Sytch, and Adam Tatarynowicz. 2007. "The dynamics of social structure: The emergence and decline of small worlds." Working paper, Kellogg School of Management, Northwestern University, Evanston, IL.

Session II: Social Welfare Networks (Carboni, Keagy, Hargroder)
Sherrie E. Human and Keith G. Provan. 2000. "Legitimacy building in the evolution of small-firm networks: A comparative study of success and demise." Administrative Science Quarterly, 45: 327-365.

Keith G. Provan, Kim R. Isett and H. Brinton Milward. 2004. "Cooperation and compromise: A network response to conflicting institutional pressures in community mental health." Nonprofit and Voluntary Sector Quarterly, 33: 489-514.

April 24th Second Student presentations
Session I: Social Capital in the Arizona Desert (Bergstrand, Springer, Hoegeman)

Florence Passy. 2001. "Socialization, connection, and the structure/agency gap: A specification of the impact of networks on participation in social movements." Mobilization 6:173-192.

J. Miller McPherson, Pamela A. Popielarz and Sonja Drobnic. 1992. "Social networks and organizational dynamics." American Sociological Review, 57(2): 153-170.

James Moody, Daniel McFarland, and Skye Bender-deMoll. 2005. "Dynamic network visualization." American Journal of Sociology, 110 (4): 1206-41.

Session II: Social Capital and Community Development (Navarro, Payosova, Whitham)

Lan Anh Hoang, Jean-Christophe Castella, and Paul Novosad. 2006. "Social networks and information access: Implications for agricultural extension in a rice farming community in northern Vietnam." Agriculture and Human Values, 23:513–527.

Jonathan Isham. 2000. "The effect of social capital on technology adoption: Evidence from rural Tanzania." Middlebury College, The Centre for the Study of African Economies.

May 1st Second Student presentations

Session I: Networks and Culture (Taber, Schultz, Black)

Donal Carbaugh. 2001. "'The mountain' and 'the project': dueling depictions of a natural environment." Pp. 124-42 in The ecolinguistics reader: Language, ecology and the environment, edited by Alwin Fill and Peter Muhlhauser. New York: Continuum Press.

Bonnie H. Erickson. 1996. "Culture, class, and connections." American Journal of Sociology. 102(1): 217-251.

Barry Wellman. 1990. "Different strokes for different folks: Community ties and social support." The American Journal of Sociology. 96:558-588.

Session II: Organizations and Networks (Savage, Barringer)

Faust, Katherine. 2005. "Using correspondence analysis for joint displays of affiliation …"

Joseph Galaskiewicz and Wolfgang Bielefeld. 1998. Nonprofit Organizations in an Age of Uncertainty: A Study of Organizational Change. Hawthorne, NY: Aldine de Gruyter. Chapter 3.

May 8th Paper Due

* Note: the original syllabus contains and additional 22 pages of supplementary readings, but these have been cut by the editors due to space constraints for this volume.

Ken Frank
Department of Counseling, Educational Psychology, and Special Education
Michigan State University

Ken Frank **Social Networks Seminar/ CEP991B** Fall 2007

My info: Room 462 Erickson Hall
East Lansing, MI 48824-1034
517-355-9567 fax:517-353-6393
kenfrank@msu.edu; http://www.msu.edu/~kenfrank/

Time: Thurs 9:10-1:00
Room: 321 Baker Hall

Motivation

Many quantitative analyses in the social sciences are applied to data regarding characteristics of people, but not to data describing interactions among people. But interactions play an important role in affecting people's behavior and beliefs that cannot be explained purely in terms of individual attributes or organizational context. In this seminar we will focus on analyzing social network data (who interacts with whom) so that we can relate people's interactions with what they think and do. We draw on statistical concepts that account for the unusual nature of network data as well as substantive theories across the social sciences to specify and interpret social network models.

Students taking this course should have roughly one year of applied statistics so that they are extremely comfortable with the general linear model (regression and ANOVA), and analysis of 2x2 tables. Students will be solicited to critique an empirical or review article using social network ideas and tools (see "Outline for article presentations," second from last page in course pack). Students will be responsible for one paper due at the end of the semester, topic to be arranged with the professor (see "Your Final Papers" on Angel).

Plan of the course: In the first section of the course (Sept-Oct) I will introduce concepts of social networks and related statistical tools. I will provide applications through current work on social capital. In the middle of the course (Mid-Oct to Late Nov) students will present critiques of articles. The last part of the course will be devoted to student presentations and special topics, including an introduction to KliqueFinder.

Goals:
*Help you appreciate the special nature of social network data
*Help you use social network data in statistical analysis as independent or dependent variables
* Help you use using graphs and formulas to represent the structure of the social network data.
* Help you integrate the use and interpretation of social network data with sociological, psychological or other theory.
* Help you understand the application of social network theory and analysis to the study of schools, education, and general sociological phenomenon.
* Take you into my work as a basis for future collaboration.
* Help you develop an understanding of the research process.

Resources

Text Book – on-line

Models and Methods in Social Network Analysis -- Peter J. Carrington, John Scott, Stanley Wasserman
http://www.cambridge.org/uk/catalogue/catalogue.asp?isbn=0521809592

Other books (optional)

Wasserman, S., & Faust, K. (2005). *Social networks analysis: Methods and applications.* New York: Cambridge University. Go to Amazon to order electronically.

For highly accessible introductions, see

Freeman, Linton (2004). The Development of Social Network Analysis: A Study in the Sociology of Science. Empirical Press of Vancouver, BC, Canada
http//www.booksurge.com/product.php3?bookID=GPUB01133-00001

Scott, J., 1992, Social Network Analysis. Newbury Park CA: Sage.

Wellman, Barry and S.D. Berkowitz, 1997. Social Structures: A Network Approach.(updated edition) Greenwich, CT: JAI Press.

Wasserman, S., & Faust, K. (1994). Social networks analysis: Methods and applications. New York: Cambridge University.

On the Web

Borgatti's slide show:
http://www.analytictech.com/networks/intro/index.html

David Knoke's intro to social network methods:
http://www.soc.umn.edu/%7Eknoke/pages/SOC8412.htm

Jim Moody's course: http://www.sociology.ohio_state.edu/jwm/

Other Web Resources

*j p**International social network analysis web page: http://www.insna.org/**

Agna portal: http://www.geocities.com/imbenta/agna/links.htm

Syllabi: http://www.ksg.harvard.edu/netgov/html/sna_courses_events.htm

Individual Web Pages:

Phil Bonacich http://www.sscnet.ucla.edu/soc/faculty/bonacich/home.htm

Ron Breiger (http://www.u.arizona.edu/~breiger/):

Ronald Burt (google Ron Burt):
http://portal.chicagogsb.edu/portal//server.pt/gateway/PTARGS_0_2_332_207_0_43/http%3B/portal.chicagogsb.edu/Facultycourse/Portlet/FacultyDetail.aspx?&min_year=20044&max_year=20063&person_id=30400

Ken Frank http://www.msu.edu/~kenfrank/

Linton Freemanh http://moreno.ss.uci.edu/lin.html

James Moody http://www.sociology.ohio_state.edu/jwm/

Tom Snijders http://stat.gamma.rug.nl/snijders/

Barry Wellman: http://www.chass.utoronto.ca/~wellman/

Software

Huisman and Van Duijn chapter 13 in Carrington et al

Social Networks web site
http://www.insna.org/INSNA/soft_inf.html

Introduction to Social Network Ideas and Methods (Weeks 1-7: 8-30 through 10-18 (no class 9-13))

Background Reading and Theory

Frank, K. A. 1998. "The Social Context of Schooling: Quantitative Methods" *Review of Research in Education*, 23, chapter 5: 171-216. See my web page:
http://www.msu.edu/~kenfrank/
Reviews application of multilevel models and network tools in education. See especially pages 184-203

Breiger, R.L. "The Analysis of Social Networks." Pp. 505–526 in Handbook of Data Analysis, edited by Melissa Hardy and Alan Bryman. London: Sage Publications, 2004.
http://www.u.arizona.edu/~breiger/NetworkAnalysis.pdf
Conceptualization of network studies from a sociological and social-psychological perspective

Wellman, B. "Structural Analysis: From Method and Metaphor to Theory and Substance" Pp. 19_61 in Social Structures a Network Approach, edited by Barry Wellman & S.D. Berkowitz.

Cambridge, Cambridge University Press, 1988. Available at:
http://www.chass.utoronto.ca/~wellman/publications/index.html
An oldy but a goody, grounded in theory of science

Doreian, Patrick (2001). "Causality in Social network Analysis." *Sociological Methods and Research*, Vol 30, No. 1, 81-114. http://smr.sagepub.com/cgi/reprint/30/1/81
Critique of Wellman 1988 in terms of contemporary understandings of causality.

Wasserman S.; Scott, J. and Carrington, P. "Introduction" in Carrington et al.
General commentary on the social networks field, and mapping of rest of book

Presentations in Class

Frank, K. Introduction to the Tools of Social Networks
Technical overview of fundamental network tools.
"http://www.msu.edu/~kenfrank/resources.htm#general_materials\workshop materials"
Unzip "new work shop" then see "Introduction to the Models and Tools for Social 2.ppt"

See also: Carrington et al chapter 8(selection model); chapter 12 (Graphical)

Applications of Network Models and Tools (Weeks 8-9: 10-25-11-1)

Influence Mode (http://www.msu.edu/~kenfrank/resources.htm#influence)

Frank, K. A., Zhao, Y., and Borman (2004). Social Capital and the Diffusion of Innovations within Organizations: Application to the Implementation of Computer Technology in Schools."*Sociology of Education,* 77: 148-171
How access to expertise of others helps teachers. Examples of Influence Models.

Selection Model (http://www.msu.edu/~kenfrank/resources.htm#p2)

Frank, K.A. "Theory and Empirical Test of Identification with the Collective as a Quasi-Tie (forthcoming). Special issue of *American Behavioral Scientist*, guest edited by Pamela Paxton and James Moody. On Angel.

Teachers who identify with the collectives of their schools will help everyone, not just colleagues. Application of selection models.

Graphical Representations (http://www.msu.edu/~kenfrank/resources.htm#KliqueFinder)
Frank, K. A. and Zhao, Y. (2005). "Subgroups as a Meso-Level Entity in the Social Organization of Schools. Chapter 10, pages 279-318. Book honoring Charles Bidwell's retirement, edited by Larry Hedges and Barbara Schneider. New York: Sage publications. On my web site.

Uses subgroups to integrate organizational theories (multilevels, loose coupling, school decision-making, open systems). *Example of Graphical Representation*

Responds to:Bidwell, Charles (2001). "Analyzing Schools as Organizations: Long term Permanence and Short-term Change." *Sociology of Education*, *Extra Issue*, 100-114.

Affiliation Networks

*Field, S. *Frank, K.A., Schiller, K, Riegle-Crumb, C, and Muller, C. (2006) "Identifying Social Contexts in Affiliation Networks: Preserving the Duality of People and Events. *Social Networks* 28:97-123.

* co first authors. On Angel.

Articles for Review (Weeks 10-12: 11-8 through 11-29)

Burt, R (2002). **"The Network Structure of Social Capital,"** (Pre-print of a chapter in *Research in Organizational Behavior*, Volume 22, edited by Robert I. Sutton and Barry M. Staw. Elsevier Science, 2000) . http://gsbwww.uchicago.edu/fac/ronald.burt/research/NSSC.pdf

Building on Burt's distinction between structural equivalence and cohesion, translated into social capital

Matsueda, R. and Anderson, K. (1998). "The Dynamics of Delinquent Peers and Delinquent Behavior." *Criminology*, Vol 36 (2). 269-308.
Combination of selection and influence, taking into account school organizational effects

Extended by Crosnoe, Robert (2002). "High School Curriculum Track and Adolescent Association with Delinquent Friends." *Journal of Adolescent Research*, Vol 17, 144-168.

Delpit, L. D. (1988). The silence dialogue: Power and pedagogy in educating other people's children. *Harvard Educational Review, 58*(3).
Relationship of teachers and students in social context

Bendor, Jonathan and Swastik, Piotr. 2001. "The Evolution of Norms." *American Journal of Sociology* 106(6, May):1493_545.
Example of Game Theory as it relates to social capital.

Bearman, P. 1997. "Generalized Exchange." *American Journal of Sociology*, 102 (5): 1383-1415.
Full, recent theory of generalized exchange

Moody, James. 2001. "Race, school, integration and friendship formation in America." AJS, vol 107(3) 679:716

Great example of use of Add Health data

Kenny, D. A.(1996).The design and analysis of social-interaction research".Annual review of psychology.47: 59-86.

""Does ethnicity matter? Social categories and personal networks in three Swiss immigrant neighborhoods"", in Ethnic and Racial Studies 27(1):1-36, 2004 (enlarged version of B46).

Matthew S Kratz. (1998). Learning by association? interorganizational networks and adpatation to environmental change *Academy of Management journal*. 41(6). 621-643

Literacy and the other: A sociological approach to literacy research and policy in multilingual societies Allan Luke. Reading Research Quarterly. Newark: Jan-Mar 2003.Vol.38, Iss. 1; pg. 132, 10 pgs

Networks, diversity, and productivity: The social capital of corporate R&D teams Ray Reagans, Ezra W Zuckerman. Organization Science. Linthicum: Jul/Aug 2001. Vol. 12, Iss. 4; p. 502

The Strength of Strong Ties: Social Networks and Intergroup Conflict in Organizations Reed E. Nelson The Academy of Management Journal, Vol. 32, No. 2. (Jun., 1989), pp. 377-401.

Cristina Bondavalli, Robert E. Ulanowicz and Antonio Bodini
Insights into the processing of carbon in the South Florida Cypress Wetlands: a whole-ecosystem
approach using network analysis. Journal of Biogeography,**27**, 697–710

Akerlof and Kranton (2002). Identity and schooling
http://ideas.repec.org/a/aea/jeclit/v40y2002i4p1167_1201.html

More on Identifying Cohesive Subgroups (Week 14)

{214-229}Frank, 2000. *Introduction to KliqueFinder.* Unpublished, based on published articles.

* This syllabus has been shortened by the editors.

James Moody
Department of Sociology
Duke University

Soc 712 Seminar on Social Networks
Professor: James Moody

Meeting Time: M W, 1:30 – 3:18
Office Hours: W 3:30 – 5:30
Place: Derby 70 (SIL).

"To speak of social life is to speak of the association between people – their associating in work and in play, in love and in war, to trade or to worship, to help or to hinder. It is in the social relations men establish that their interests find expression and their desires become realized."
-- Peter M. Blau, 1964

Overview:
This seminar focuses on theoretical and substantive themes within social network analysis. The theoretical heart of this approach to social science is that actors are interdependent, and that social structure emerges from regularities in this interdependence. In this seminar, we will couple the substantive and theoretical development of social network analysis with methodological tools to implement network research. By the end of the course, you should (1) know the major theoretical ideas supporting network research, (2) be able to collect social network data and, (3) be able to analyze and interpret social network data.

Social network research is unique in the extent to which methodological tools derive directly from substantive theories. As such, class time will be split almost 50-50 on methodological and substantive (theory, application, and examples) issues, with each substantive topic tied to a new method or analysis strategy. Substantive topics will include work on sexual behavior, organizational performance, delinquency, power, friendship, and much more.

Requirements:
The main requirement of this seminar is a research paper that uses the methods or ideas of social network analysis. This may be a revision of previous work (an MA paper, another course paper, etc.) or a new paper. If this is a revision of a previous paper, you need to show that the addition of network ideas or methods significantly contributes to the revision. You may collaborate with up to 2 other students (3-authors total) on your final paper. The second requirement for the class is a set of homework assignments designed to build familiarity with the software and analysis techniques. Assignments will be largely self-graded, with the solutions posted on the web page. Finally, since this is a seminar, in-class participation is necessary. The requirement breakdown will be roughly as follows:

- Final paper: 65%
- Homework: 30%
- Class Participation: 5%

Texts:
The main text for the class is Wasserman and Faust (1994): *Social Network Analysis*. Cambridge University Press. This book will provide the main methodological and background reading for the course. You should also read **either:** *Linked: The New Science of Networks* by Albert-László Barabási, as an introduction to the science of networks or *The Development of Social Network Analysis* by Linton Freeman, on the history of SNA **(read one of these by the first class meeting)**.

Most papers we are reading will be linked to on-line sources from the class web-page version of this syllabus. Any that we cannot get on-line will be available for copy in a folder outside my office door (372 Bricker).

Software:
You will need access to three pieces of software:

1) UCI-NET. This is the industry standard network analysis program. The most recent version (6) is available for about $40 from Analytic technologies. Orders may be placed by web, mail, telephone, fax, or e-mail. The newest version of the program also includes NETDRAW, a great new program for drawing sociograms.
Analytic Technologies
11 Ohlin Lane
Harvard, MA 01451
USA
Tel: +1 978.456.7372
Fax: +1 978.456.7373
Web: www.analytictech.com
E-mail: sales@analytictech.com

2) Access to SAS, including IML, and a set of programs I have written called SPAN (**S**as **P**rograms for **A**nalyzing **N**etworks), which contains a set of useful routines. The program is free, and can be downloaded at my website (http://www.soc.duke.edu/~jmoody77/span/span.zip).

3) PAJEK. A program for analyzing large networks, and arguably the best drawing program on the market. It is free. You can download the most recent version of PAJEK at: http://vlado.fmf.uni-lj.si/pub/networks/pajek/default.htm

Online resources
1. Class web page: http://www.soc.duke.edu/~jmoody77/s884/index.htm

2. International Network for Social Network Analysis (INSNA) home page

http://www.heinz.cmu.edu/project/INSNA/

3. Steve Borgotti's network Page http://www.analytictech.com/networks/

Schedule:

By clicking on each of the days, you will be taken to any notes/handouts for that day.

Class 1. Introduction to Social Network Analysis
Summary: First day of class. Discuss syllabus, go over the history of social network research, general trends in the field and some basic elements of how social network data differ from data social scientists are used to collecting.
Reading: Barabasi: *Linked* or Freeman Development of SNA
Assignments: Family as Social Network & Substantive implications
Background Reading: None

Class 2. Foundations of network analysis
Summary: Continue discussion of elementary theory, introduce data structures for organizing social network data. Distinctions between directed, undirected, valued, local and global networks. Basics of Graph Theory.
Reading: Wasserman & Faust, Chapter 1 & 2 (focus on 1st half of chap 2).
(a) Emirbayer, M. 1997. "Manifesto for Relational Sociology." *American Journal of Sociology* 103:281-317.

or

(b) Wellman, Barry: "Structural Analysis: From method and metaphor to theory and substance" (**MoodyOffice**)
Assignment: HW2: Matrix manipulations, graph translation exercise, network drawing.
Background Reading: Borgatti, S.P. "A quorum of graph theoretic concepts" *Connections* 1994

Class 3. Local Networks
Summary: The building blocks of a network are the sets of relations each person is embedded within. Today we discuss how positions can be defined in terms of the pattern and composition of network alters. We identify sources of such data in the literature and how to manipulate them.
Reading:
*M*arsden, Peter: "Core discussion networks of Americans" *American Sociological Review* Vol. 52, No. 1. (Feb., 1987), pp. 122-131
Mizruchi, Mark & Linda Brewster Stearns "Getting Deals Done: The Use of Social Networks in Bank Decision-Making" *American Sociological Review* 2001 66:647-671
Bearman & Parigi "Cloning Headless Frogs and Other Important Matters: Conversation Topics and Network Structure" Forthcoming in *Social Forces*

Assignments: HW2: Matrix manipulations, graph translation exercise, network drawing.

Background Reading:
Fischer, Claude: *To Dwell Among Friends*
Moore, G. 1990. "Structural Determinants of Men's and Women's Personal Networks." *American Sociological Review* 55:726-35.
Renzulli, L. A., H. Aldrich, and J. Moody. 2000. "Family Matters: Gender, Networks, and Entrepreneurial Outcomes." *Social Forces*.
van Duijn, M. A. J., J. T. ban Busschbach, and T. A. B. Snijders. 1999. "Multilevel Analysis of Personal Networks As Dependent Variables." *Social Networks* 21:187-209.
Wellman, B., R. Y. Wong, D. Tindall, and N. Nazer. 1997. "A Decade of Network Change: Turnover, Persistence and Stability in Personal Communities." *Social Networks* 19(1):27-50.
Wellman, B. and S. Wortley. 1990. "Different Strokes From Different Folks: Community Ties and Social Support." *American Journal of Sociology* 96:558-88.
(There are hosts of other good pieces using local networks. Most articles in the health field, for example, use local networks, since the data are easy to collect).

Class 4. Local Networks Continued
Summary: The structural patterns in local networks affect the distribution of information and power in that network. Today we focus on identifying the effects of local network configurations and how those configurations fit into wider patterns of relations.

Reading:
Burt, R. Structural Holes, Chapter 1. (**MoodyOffice**)
Burt, R. 2004. "Structural Holes and Good Ideas" *American Journal of Sociology* 110:349-400
Granovetter, Mark. "The Strength of Weak Ties." *The American Journal of Sociology*, Vol. 78, No. 6. (May, 1973), pp. 1360-1380.
Assignments: Ego-network Characteristics + Calculate Burt's Measures for the example data.
Background Reading:
Lee, Nancy Howell (1969) *The search for an abortionist.* University of Chicago Press
Granovetter, Mark. (1974) *Getting a job; a study of contacts and careers.* Harvard University Press

Class 5. Relations through associations.
Summary: People form relations through overlapping associations. In so doing, they not only create a network of people, but also a network of associations. This is captured through the duality of persons and groups, and provides a very powerful way to identify network processes through commonly available data.

Reading:
Breiger, R. L. "The Duality of Persons and Groups." *Social Forces*, Vol. 53 :181-190.
Moody, James. 2004. "The Structure of a Social Science Collaboration Network" American Sociological Review 69:213-264
W&F Chapter 8 (skim).

Assignments: Construct a person-through-groups network, provide basic descriptive statistics for the network.
Background Reading:
Bearman, P. and K. Everett. 1993. "The Structure of Social Protest." *Social Networks* 15:171-200. Lots of great work on director interlocks, such as that by Mizruchi.

Class 6. Centrality.
Summary: Another conception of "position" in a social network deals with where an actor resides within a network. Falling under the broad heading of centrality, a series of measures are identified that highlight individuals positions in the network.
Reading: W&F Chap. 5.
Bonacich, P. 1987. "Power and Centrality: A Family of Measures." *American Journal of Sociology* 92:1170-1182.
Assignments: Calculate and compare different measures of centrality on the same network.
Background Reading:
Bell, D. C., J. S. Atkinson, and J. W. Carlson. 1999. "Centrality Measures for Disease Transmission Networks." *Social Networks* 21:1-21.
Bolland, J. M. 1988. "Sorting Out Centrality: An Analysis of the Performance of Four Centrality Models In Real and Simulated Networks." *Social Networks* 10:233-53.
Freeman, L. C. 1977. "A Set of Measures of Centrality Based on Betweenness." *Sociometry* 40:35-41.
———. 1978-1979. "Centrality in Social Networks." *Social Networks* 1:215-39.
Friedkin, N. E. 1991. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology* 96:1478-504.
Rothenberg, R. B., J. J. Potterat, W. W. Woodhouse, S. Q. Darrow, S. Q. Muth, and A. S. Klovdahl. 1995. "Choosing a Centrality Measure: Epidemiologic Correlates in the Colorado Springs Study of Social Networks." *Social Networks: Special Edition on Social Networks and Infectious Disease: HIV/AIDS* 17:273-97.

Class 7. Centrality (continued)
Summary: Continue our work on centrality, focusing on processes of information and disease diffusion.

Reading:
Friedkin, N. E. 1993. "Structural Basis of Interpersonal Influence in Groups: A Longitudinal Case Study." *American Sociological Review* 58:861-72.
or
Aldersen and Beckfield 2004. "Power and Position in the World City System" *American Journal of Sociology* 109:811-851

Assignments:
Background Reading:
Baker, W. E. and R. R. Faulkner. 1993. "The Social Organization of Conspiracy: Illegal Networks in the Heavy Electrical Equipment Industry." *American Sociological Review* 58:837-60.

Bell, D. C., J. S. Atkinson, and J. W. Carlson. 1999. "Centrality Measures for Disease Transmission Networks." *Social Networks* 21:1-21.
Bolland, J. M. 1988. "Sorting Out Centrality: An Analysis of the Performance of Four Centrality Models In Real and Simulated Networks." *Social Networks* 10:233-53.
Bonacich, P. 1987. "Power and Centrality: A Family of Measures." *American Journal of Sociology* 92:1170-1182.
Freeman, L. C. 1977. "A Set of Measures of Centrality Based on Betweenness." *Sociometry* 40:35-41.
———. 1978-1979. "Centrality in Social Networks." *Social Networks* 1:215-39.
Friedkin, N. E. 1991. "Theoretical Foundations for Centrality Measures." *American Journal of Sociology* 96:1478-504.
Rothenberg, R. B., J. J. Potterat, W. W. Woodhouse, S. Q. Darrow, S. Q. Muth, and A. S. Klovdahl. 1995. "Choosing a Centrality Measure: Epidemiologic Correlates in the Colorado Springs Study of Social Networks." *Social Networks: Special Edition on Social Networks and Infectious Disease: HIV/AIDS* 17:273-97.

Class 8. Connectivity 1. The Small World Problem.

Summary: Much of the power of networks comes from the inter-connection of local networks into wider populations. Based on what we know of local networks and people's involvement in activities, what should networks look like at the global level?

Reading:

Travers, J. and S. Milgram. "An experimental study of the small world Problem" *Sociometry* 32:425-443
Watts, Duncan J. "Networks, Dynamics, and the Small-World Phenomenon" *American Journal of Sociology*. v.1999, 105, 2, Sept, 493-527.

Assignments: Small-world connectivity test. How many people do you know?
Identifying components, reachability, distance.
Calculating biased network statistics.

Background Reading:

Pool, I. d. S. and M. Kochen. 1978. "Contacts and Influence." *Social Networks* 1:5-51.
Rapoport, A. and W. J. Horvath. 1961. "A Study of a Large Sociogram." *Behavioral Science* 6:279-91.
Fararo, T. J. 1981. "Biased Networks and Social Structure Theorems." *Social Networks* 3:137-59.
Fararo, T. J. and J. Skvoretz. 1987. "Unification Research Programs: Integrating Two Structural Theories." *American Journal of Sociology* 92:1183-209.
Newmann, M. E. J. 1999. Models of the Small World. Online at: http://www.arxiv.org/format/cond-mat/0001118
M. E. J. Newman (2000) Who is the best connected scientist? A study of scientific coauthorship networks. Santa Fe Institute working paper 00-12-064. (online as well).
Watts, Duncan J. 1999. *Small Worlds: The Dynamics of Networks between Order and Randomness.* Princeton University Press

Class 9. Connectivity II: Social cohesion in diffuse settings

Summary: The power of networks to draw communities together rests on the redundancy of social relations. Today we dig deeper into the sources of connectivity and cohesion.
Reading: Moody, James & Douglas R. White (2003) "Structural Cohesion and Embeddedness" *American Sociological Review* 68:103-127
Bearman, Faris, & Moody, "Blocking the Future" *Social Science History* 23:501-533
Assignments: Identify cohesion in particular networks, plot components and bi-components from test networks. Describe how cohesion would operate in the substantive area you are working in.

Background Reading:
Klovdahl, A. S. 1985. "Social Networks and the Spread of Infectious Diseases: The AIDS Example." *Social Science Medicine* 21:1203-16.

Class 10. Building Nets from Local Action 1: Social Balance.
Summary: We have now seen the basic structures of informal networks and details of local networks. What interpersonal process could be consistent with both of these features? More important, can we identify a local level mechanism that would generate such structures? Will also introduce the problem of statistical measurement of network attributes.

Reading:
Davis, J. A. 1963. "Structural Balance, Mechanical Solidarity, and Interpersonal Relations." *American Journal of Sociology* 68:444-62.
Doreian, P., R. Kapuscinski, D. Krackhardt, and J. Szczypula. 1996. "A Brief History of Balance Through Time." *Journal of Mathematical Sociology* 21(1-2):113-31. **(MoodyOffice)**
W&F chap 6 & 14 (skim 14)
Assignments: Identify transitivity levels in a network, triad distribution.
Background Reading:
Johnsen, E. C. 1985. "Network Macrostructure Models for the Davis-Leinhardt Set of Empirical Sociomatrices." *Social Networks* 7:203-24.
———. 1986. "Structure and Process: Agreement Models for Friendship Formation." *Social Networks* 8:257-306.

Class 11. Building nets from local action 2: Hierarchy
Summary: Consistent local action can have dramatic global effects. Today we continue our discussion of local balance, focusing on the development of hierarchy and the dynamics of social groups.

Reading: Chase, Ivan. "Social process and hierarchy formation in small groups: A comparative perspective." *American Sociological Review* 45:905-924
Gould, Rodger (2002). "The Origins of Status Hierarchies: A formal Theory and Empirical Test" *American Journal of Sociology. 107:1143-1178*
Krackhardt, D. 1994. "Graph Theoretical Dimensions of Informal Organizations." *Computational Organizational Theory*, Editor Kathleen Carley and Michael Prietula. Hillsdale, N.J: Lawrence Erlbaum Associates. (**MoodyOffice**)

Assignments: Calculate hierarchy measures for a network.

Background Reading:
Moody, James. "High School Hierarchy: Stable balance in a dynamic setting" (manuscript available)

Class 12. Sub-Groups 1

Summary: Primary groups are common in social interaction. How important are these groups and how do we identify them? We will go over multiple methods for identifying a primary group.

Reading: Freeman, L. C. 1992. "The Sociological Concept of "Group": An Empirical Test of Two Models." *American Journal of Sociology* 98:152-66.
Frank, K. A. and J. Y. Yasumoto. 1998. "Linking Action to Social Structure Within a System: Social Capital Within and Between Subgroups." *American Journal of Sociology* 104:642-86.
Moody, James. (2001) "Peer Influence Groups: Identifying dense clusters in large networks." *Social Networks 23:261-283*

Assignments: Identify cohesive groups in test data.

Background Reading:
Alba, R. D. 1973. "A Graph-Theoretic Definition of a Sociometric Clique." *Journal of Mathematical Sociology* 3:113-26.
Burt, R. S. 1987. "Social Contagion and Innovation: Cohesion Versus Structural Equivalence." *American Journal of Sociology* 92:1287-335.
Fershtman, M. 1997. "Cohesive Group Detection in a Social Network by the Segregation Matrix Index." *Social Networks* 19:193-207.
Frank, K. A. 1995. "Identifying Cohesive Subgroups." *Social Networks* 17:27-56.
———. 1996. "Mapping Interactions Within and Between Cohesive Subgroups." *Social Networks* 18:93-119.
Freeman, L. C. 1972. "Segregation in Social Networks." *Sociological Methods and Research* 6:411-30.
Friedkin, N. E. 1984. "Structural Cohesion and Equivalence Explanations of Social Homogeneity." *Sociological Methods and Research* 12:235-61.
Mizruchi, M. S. 1992. *The Structure of Corporate Political Action*. Cambridge, MA and London, England: Harvard University Press.
———. 1993. "Cohesion, Equivalence and Similarity of Behavior: a Theoretical and Empirical Assessment." *Social Networks* 15:275-307.

Class 13. Primary Groups continued.

Summary: (Continuation of last session)

Reading: Baker, Wayne. "The Social Structure of a National Securities Market." *American Journal of Sociology* 89:775-811

Feld, S. L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86:1015-35.

Assignments: None

Background Reading:
Baker, W. E. and R. R. Faulkner. 1993. "The Social Organization of Conspiracy: Illegal Networks in the Heavy Electrical Equipment Industry." *American Sociological Review* 58:837-60.
Feld. 1991. "Why Your Friends Have More Friends Than You Do." *American Journal of Sociology* 96:1464-77.

Class 14. Roles and Positions

Summary: Cohesive subgroups are only the most obvious structural form that results from interconnected relations. The pattern of ties across relations can be used to induce social roles based on structural equivalence.

Reading:
W&F chapter 10. Blockmodeling
White, H. C., S. A. Boorman, and R. L. Breiger. 1976. "Social Structure From Multiple Networks I." *American Journal of Sociology* 81:730-780.
Padgett, J. F. and C. K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." *American Journal of Sociology* 98:1259-319.

A*ssignments: Blockmodel Assignment*

Background Reading:
Borgatti, S. P. 1999. "Models of Core / Periphery Structures." *Social Networks* 21:375-95.
Burt, R. S. 1978. "Cohesion Versus Structural Equivalence As a Basis for Network Sub-Groups." *Sociological Methods and Research* 7:189-212.
———. "Social Contagion and Innovation: Cohesion Versus Structural Equivalence." *American Journal of Sociology* 92:1287-335.
———. 1990. "Detecting Role Equivalence." *Social Networks* 12:83-97.
Brieger, Ronald L. 1976. Career Attributes and Network Structure: A Blockmodel Study of a Biomedical Research Specialty *American Sociological Review*, Vol. 41: 117-135.
Friedkin, N. E. 1984. "Structural Cohesion and Equivalence Explanations of Social Homogeneity." *Sociological Methods and Research* 12:235-61.
Lorrain, F. and H. C. White. 1971. "Structural Equivalence of Individuals in Social Networks." *Journal of Mathematical Sociology* 1:49-80.
Mandel, M. 1983. "Local Roles and Social Networks." *American Sociological Review* 48:376-86.
Mizruchi, M. S. 1993. "Cohesion, Equivalence and Similarity of Behavior: a Theoretical and Empirical Assessment." *Social Networks* 15:275-307.
Nadel, *A Theory of Social Structure*, particularly Chapter 4.
Rossem, R. V. 1996. "The World System Paradigm As General Theory of Development: A Cross-National Test." *American Sociological Review* 61:508-27.

Smith, D. A. and D. R. White. 1992. "Structure and Dynamics of the Global Economy: Network Analysis of International Trade 1965-1980." *Social Forces* 70:857-93.
White, D. R. and K. P. Reitz. 1989. "Re-Thinking the Role Concept: Homomorphisms on Social Networks." Pp. 429-88 in *Research Methods in Social Network Analysis*, Editors L. C. Freeman, D. R. White, and A. K. Romnet. Fairfax, VA: George Mason University Press.

Class 15. Peer Influence

Summary: Networks are conduits for the flow of information and influence. Thus, the behavior of individuals is often a complex interaction of individual and interpersonal effects.
Reading:
Friedkin, N. E. and K. S. Cook. 1990. "Peer Group Influence." *Sociological Methods and Research* 19(1):122-43.
Haynie, Dana. "Delinquent Peers Revisited: Does Network Structure Matter?"
Cohen, J. M. 1983. "Peer Influence on College Aspirations." *Sociology of Education* 50:227-241.

A*ssignments:* Calculate peer influence measures for example data.
Background Reading:
Kandel, D. B. "On Processes of Peer Influences in Adolescent Drug Use." *Alcohol and Substance Abuse in Adolescence*, Editor B. Stimmel. New York: Haworth Press.
Friedkin, N.E. *A Structural Theory of Social Influence*

Class 16. Network Diffusion

Summary: What network features control diffusion? What types of networks have the most rapid diffusion?

Reading:
Moody, James. "Network Structure and Diffusion" Draft manuscript
Valente, Thomas W. "Network Models and Methods for Studying the Diffusion of Innovations" in Models and Methods in Social Network Analysis, 2005, Cambridge University Press.
Gerald F. Davis; Henrich R. Greve "**Corporate Elite Networks and Governance Changes in the 1980s**" *The American Journal of Sociology*, 103:1-37.

Assignments: TBA
Background Reading:
Rogers, Evertt M. 2003 *Diffusion of innovations*. Free Press New York
Morris, Martina. Epidemiology and Social Networks: Modeling Structured Diffusion. Sociological Methods and Research. 1993; 22:99-126
Morris, Martina. Sexual Networks and HIV. AIDS 97: Year in Review. 1997; 11(Suppl A):S209-S216.

Class 17. Social Exchange

Summary: Networks provide constraints and opportunities for actors. In an exchange setting, this structure will lead to differences in power. We examine both direct exchange between pairs and indirect 'generalized' exchange.

Reading:
Cook, K. S., R. M. Emerson, M. R. Gillmore, and T. Yamagishi. 1983. "The Distribution of Power in Exchange Networks: Theory and Experimental Evidence." *American Journal of Sociology* :275-305.
Bearman, P. 1997. "Generalized Exchange." *American Journal of Sociology* 102(5):1383-415.

Assignments: Identify power status of a set of example networks.

Background Reading:
Blau, Peter s. *Exchange and power in Social Life*
Ekeh, P. P. 1974. *Social Exchange Theory: The Two Traditions*. Cambridge MA: Harvard University Press.
Lawler, E. J. and J. Yoon. 1993. "Power and the Emergence of Commitment Behavior in Negotiated Exchange." *American Sociological Review* 58:465-81. (*optional*)
Takahashi, N. 2000. "The Emergence of Generalized Exchange." *American Journal of Sociology* 105:1105-034
Willer, D. 1999. *Network Exchange Theory*. Westport, Connecticut: Praeger.

Class 18. Statistical Modeling of Social Networks
Summary: Recent statistical developments have made it possible to model networks statistically, allowing us to incorporate uncertainty from measurement and sampling. In this session we discuss the frame for statistical modeling networks and identify the p* method for doing so.

Reading:
Anderson, C., Wasserman, S., and Crouch, B. (1999). A p* primer: Logit models for social networks. *Social Networks*. 21,37-66
Koehly, Laura M., Steven M. Goodreau, and Martina Morris. "Exponential Family Models for Sampled and Census Network Data" Sociological Methodology34: 241-271

Assignments: Calculate p* on an example graph.

Background Reading:
Robins, G., P. Pattison, and S. Wasserman. 1997. "Logit Models and Logistic Regressions for Social Networks: III. Valued Relations." Manuscript .
Pattison, P., and Wasserman, S. 1999. Logit models and logistic regressions for social networks: II. Multivariate relations. *British Journal of Mathematical and Statistical Psychology*. 52, 169-193
Wasserman, S. and P. Pattison. 1996. "Logit Modles and Logitic Regressions for Social Networks: I. An Introduction to Markov Graphs and P*." *Psychometrika* 61:401-25.

Class 19. Dynamic Properties of social networks
Summary: In this class, we go over two kinds of dynamics in networks: how the network structure changes and how relationship timing affects diffusion through the networks. We also have some fun with visualizations.

Reading:
Moody, J. 2000. "The Importance of Relationship Timing for STD Diffusion." *Social Forces* 81:25-56
Moody, J. Daniel McFarland and Skye Bender-deMoll "Dynamic Network Visualizations" Forthcoming, *American Journal of Sociology.*

Assignments: None

Background Reading:
Doreian, P., R. Kapuscinski, D. Krackhardt, and J. Szczypula. 1996. "A Brief History of Balance Through Time." *Journal of Mathematical Sociology* 21(1-2):113-31.
Hummell, H. J. and W. Sodeur. 1990. "Evaluating Models of Change in Triadic Sociometric Structures." Pp. 281-305 in *Social Networks Through Time*, Eds Jeroen Weesie and Henk Flap. Utrecht, Netherlands: ISOR.
Morgan, D. L., M. B. Neal, and P. Carder. 1997. "The Stability of Core and Peripheral Networks Over Time." *Social Networks* 19(1):9-25.
Suitor, J. J., B. Wellman, and D. L. Morgan. 1997. "It's About Time: How, Why and When Networks Change." *Social Networks* 19(1).
Weesie, J. and H. Flap. 1990. *Social Networks Through Time*. Utrecht, Netherlannds: ISOR.

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LIS 590 SN: Social Networks and Information
Course given in Fall 2005

Date	**Topic**
August 30	1. Information and Networks
Sept. 6	2. Introduction to SNA approach I: The social network perspective
Sept. 13	3. Introduction to SNA approach II: Theoretical foundations
Sept. 20	4. Ties and Relations: Information access through strong and weak ties
Sept. 27	5. Social mobility and access to resources
Oct. 4	6. Homophily & Social Support
Oct. 11	7. Social Capital
Oct. 18	8. Social Conditions
Oct. 25	9. Online Social Networks and Community
Nov. 1	10. Technology and the Evolution of Networks
Nov. 8	11. Diffusion, Influence and Contagion
Nov. 15	12. Knowledge Sharing
Nov. 22	***13. Thanksgiving***
Nov. 29	14. Collaboration and Innovation
Dec. 6	15. Student presentations

LIS 590 SN Topic: Social Networks and Information

LIS 590 SN is a graduate seminar in Social Networks and Information offered by the Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign. The course is a non-mathematical introduction to the social network perspective and its potential for exploring social phenomena, with an emphasis on information processes. The social network approach considers the interactions that occur between people as the building blocks that determine social behavior. It is not an individual's behavior, but rather their behavior with others that is the important unit of analysis. Thus, to understand how people gain access to and distribute information, it is necessary to examine the types of interactions they engage in with others. The interactions show us patterns, and the patterns reveal how social groups organize themselves to accomplish certain goals. Such patterns reveal information effects in the way information circulates among members of a social group, its impact in disseminating knowledge, providing social support, and creating community. This course will examine structural aspects of information exchange in networks and their social effects, and what kinds of exchanges need to be supported to create social outcomes such as trust and community.

Topics include:

- social network approaches, principles, and basic techniques
- the meaning of relations, ties and networks

- the importance and role of strong and weak ties in information exchange
- network effects on information access, control and flow
- network effects in the diffusion and adoption of innovations
- formal and informal information exchange
- impact on social networks of changes in technology
- social networks and the web

Objectives

While the course will focus on issues relating to information (broadly defined), all students will gain familiarity with basic concepts of social network analysis and those from other areas of inquiry will gain an understanding of the social network perspective that can be applied to problems in their own area.

Texts

Degenne, A. & Forsé, M. (1999). *Introducing Social Networks*. London: Sage.

Monge, Peter R. & Contractor, Noshir S. (2003). *Theories of Communication Networks*. Oxford, UK: Oxford University Press.

Recommended

Wasserman, S. & Faust, K. (1994). *Social Network Analysis*. Cambridge, MA: Cambridge University Press.

Readings

Other readings for each week are organized by topic and are drawn from various sources. Many of these will be available via the UIUC gateway or online in other forms.

INSNA

INSNA – the International Network for Social Network Analysis – is the major professional organization for social network researchers. Each year this group sponsors the International Sunbelt Social Network Conference, usually held somewhere warm during the month of February. Explore the INSNA site for information on journals and social network analysis software. Those with interest in conducting a social network project should obtain one of the software packages, e.g., UCINET.

Evaluation

Class Participation (20%)

Reading and participating in class in an essential part of this seminar. Students are required to come to class prepared to discuss each weeks readings.

Glossary of Social Network Terms (15%)

By mid-semester each class member will have built their own glossary of social network terms. Terms will be set each week based on the week's readings. Definitions will be brought to class each week and examined and refined in class. Your definitions should be refined to reflect their application to your own interests. Full glossary of terms is due

The Social Network Approach and Your Own Interests (15%)

This short assignment (5 pages; 1000 words) describes how you could apply a social network approach to a problem of your own choosing. The assignment should give a description of the problem and how a social network approach could be used to illuminate some aspect of the problem, provide a set of social network questions you might ask to elicit the information you need for this problem, and suggest types of social network constructs that might be explored to examine this data and this problem.

Major Paper (40%)
Again, pursuing an area of your own interest, review the social network literature pertaining to the problem. This can be an extended version of the short assignment or it can concentrate on reviewing the literature on another topic. You may also carry out a network study as part or all of this assignment.
Class Presentation (10%)
In the last weeks of class students will give an 15 minute in-class presentation on how to apply social network analysis to their own interests (e.g., a presentation based on the short assignment) or on the area they are reviewing (e.g., based on the literature review).
Course Outline
Readings
In general, each week we will explore some social network principles and readings on a particular topic. These are tied together as much as possible. Students will take turns being responsible for summarizing readings. In the early weeks, part of each class will include a lecture portion exploring social network analytic techniques, with rest of the class used for discussing readings. Discussion time will be greater as the semester progresses.
Weekly Schedule
Note: This is the original long list shortened to what is above for the course
Depending on what texts you have, you can read the Degenne & Forse chapters and/or the Wasserman & Faust chapters. The latter is a more statistically intensive read, but is the major reference for social network analysis.
1. INFORMATION AND NETWORKS
Introduction
- Haythornthwaite, C. (1996). Social network analysis: An approach and technique for the study of information exchange. *Library and Information Science Research*, *18*, 323-342.

2. INTRODUCTION TO SNA APPROACH I
The Social Network Perspective
- D&F, Introduction: The paradigm of structural analysis
- Wellman, B. (1997). Structural analysis: From method and metaphor to theory and substance. *Social Structures: A Network Approach* (updated edition) (pp. 19-61). Greenwich, CT: JAI Press.
- Monge, P. & Contractor, N. S. (1997). Emergence of Communication Networks. In F.M. Jablin & L.L. Putnam (Eds.) *Handbook of Organizational Communication* (2nd Ed.). Thousand Oaks, CA: Sage. http:/www.tec.spcomm.uiuc.edu/nosh/HOCNets.html
- Watts, D.J. (2004). The "new" science of network. *Annual Review of Sociology*, *30*, 243-270.

Network Concepts I: Introduction to social network concepts and social network data
- D&F, Chpt 1, Social relationships and networks
- W&F, Chapter 1, Social network analysis in the social and behavioral sciences, pp. 1-22; and Chapter 2, Social Network Data, pp.28-59

3. INTRODUCTION TO SNA APPROACH II
Theoretical foundations
- Monge & Contractor, chpt 1, Networks and flows in organizational communication, pp. 3-25.
- Kilduff & Tsai, chpt 3 Is there social network theory? A critical examination of theoretical

foundations, p. 66-86.
Personal networks
- D&F, Chpt 2: Personal networks and circles
- Wellman, B., Carrington, P. & Hall, A. (1997). Networks as personal communities. In B. Wellman & S.D. Berkowitz (Eds.), *Social Structures: A Network Approach* (pp. 130-84). Greenwich, CT: JAI Press.

Network Concepts II: Network concepts & measures
- Monge & Contractor, p. 29-45
- Kilduff, M. & Tasi, W. (2003). *Social networks and organizations*. London: Sage. chpt 2, Understanding social network research, p. 13-34.

4. TIES AND RELATIONS: STRONG TIES & WEAK TIES

Information access through strong and weak ties
- Granovetter, M.S. (1973). The strength of weak ties. *American Journal of Sociology*, *78*, 1360-1380.
- Granovetter, M.S. (1982). The strength of weak ties: A network theory revisited. In P.V. Marsden & N. Lin (Eds.), *Social Structure and Network Analysis* (pp. 105-130). Beverly Hills: Sage.
- Krackhardt, D. (1999). The ties that torture: Simmelian tie analysis in organizations. *Research in the Sociology of Organizations.* 16, 183-210. **OR** Krackhardt, C. (1998). Simmelian ties: Super strong and sticky. In R. Kramer and M. Neale (eds.), *Power and influence in organizations*, pp. 21-38. Thousand Oaks, CA: Sage.
- Levin, D. & Cross, R. (in press, 2004) The strength of weak ties you can trust. *Management Science*.

Negative ties
- Labianca, B., Brass, D.J., & Gray, B.L. (1998). Social networks and perceptions of intergroup conflict: The role of negative relationships and third parties. *Academy of Management Journal, 41*, 55-67.
- Labianca, B. & Brass, D.J. (2004, in press). Exploring the social ledger: Negative relationships and negative asymmetries in social networks in organizations. *Academy of Management Review.*

Graph theory
- D&F, Chpt 3, Graph Theory, p. 63-77.
- W&F, Chpt 4, Graphs and Matrices, p 92-121

Visualizations of networks

Glossary Terms

Actors, actor attributes, relations, ties (strong, weak), dyads, triads, social networks (personal, ego-centric, and whole)

5. SOCIAL MOBILITY AND ACCESS TO RESOURCES
- Podolny, Joel M. & Baron, James N. (1997). Resources and relationships: Social networks and mobility in the workplace. *Amercian Sociological Review*, 62, 673-693.
- Lin, N. (1999). Social networks and status attainment. *Annual Review of Sociology, 25*, 467-487. Available online at http://soc.AnnualReviews.org/cgi/content/full/25/1/467
- Milgram, S. (1967). The small world problem. *Psychology Today*, *1*: 62-7.

Roles and positions

- D&F, Chpt 4, Equivalence and Cohesion
- W&F, Chpt 9, Structural Equivalence

Glossary Terms

Roles (e.g., brokers, gurus) and positions (stars, cutpoints), structural holes, density, centrality and centralization, cliques

6. HOMOPHILY & SOCIAL SUPPORT

- Miller McPherson, Lynn Smith-Lovin, James M Cook (2001). Birds of a feather: Homophily in social networks, *Annual Review of Sociology*, *27*, 415-444.
- Haines, Valerie A, Hurlbert, Jeanne, S., & Beggs, John J. (1996) Exploring the determinants of support provision: Provider characteristics, personal networks, community contexts, and support following life events. *Journal of Health & Social Behavior*, *37*(3), 252-264.
- Wellman, B. & Gulia, M. (1999b). The network basis of social support: A network is more than the sum of its ties. In B. Wellman (Ed.). *Networks in the Global Village* (pp. 83-118). Boulder, CO: Westview Press.
- Pugliesi, Karen. Shook, Scott L. (1998) Gender, ethnicity, and network characteristics: Variation in social support resources. *Sex Roles*, *38(3-4),* 215-38.
- Monge & Contractor, chpt 8. Homophily, proximity and social support, pp. 223-239.

Network statistics I: actor level

- D&F, Chpt 6, Power and Centrality
- W&F, Chpt 5, Centrality and Prestige

Glossary Terms

Homophily, heterophily; multiplexity

7. SOCIAL CAPITAL

- D&F, Chpt 5: Social capital
- Lin, N. (1999). Building a network theory of social capital. Connections. http://www.insna.org/Connections-Web/Volume22-1/V22(1)-28-51.pdf

[OR Lin, N. (2004, forthcoming). Social capital. Encyclopedia of Economic Sociology. OR Lin, N. (2005, forthcoming). A network theory of social capital. In Castigline, van Deth, & Wolleb, Handbook of Social Capital. Oxford Univ. Press.]

- Burt, R.S. The social structure of competition http://tucnak.fsv.cuni.cz/~kabele/2004_Construction/Readings/CON5_Burt_Ch1_cel%E9.pdf

[OR Burt, R.S. (2000). The network structure of social capital. Research in Organizational Behavior, 22, 345-423. *Pre-print available here:* http://gsbwww.uchicago.edu/fac/ronald.burt/research/NSSC.pdf]

- Kavanaugh A.L., & Patterson S.J. (2001).The impact of community computer networks on social capital and community involvement. *American Behavioral Scientist*, 45(3), 496-509. **OR** Putnam, R.D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy, 6(1),* 65-78.

Network statistics II: network level

Glossary Terms

Reciprocity, structural equivalence

8. SOCIAL CONDITIONS

- Hersberger, J. (2004). *A qualitative approach to examining information transfer via social networks among homeless populations*. Paper presented at the ASIST conference. Online at http://leep.lis.uiuc.edu/fall05/lis590sn/Herschberger_homeless.doc
- Uehara, E. (1990). Dual exchange theory, social networks, and informal social support. *American Journal of Sociology, 96(3),* 521-557.
- van Tilburg, T. (1998). Losing and gaining in old age: changes in personal network size and social support in a four-year longitudinal study. *Journals of Gerontology Series B-Psychological Sciences & Social Sciences*, 53B(6), S313-S323.

Conducting network studies: questions and questionnaires

- D&F, How many people do you know? pp. 16-21.

Glossary Terms

Network size, reach, reachability

9. ONLINE SOCIAL NETWORKS AND COMMUNITY

- Wellman, B., Salaff, J., Dimitrova, D., Garton, L., Gulia, M., & Haythornthwaite, C. (1996). Computer networks as social networks: Collaborative work, telework, and virtual community. *Annual Review of Sociology, 22*, 213-238.
- Wellman, B., Boase, J. & Chen, W. (2002). The networked nature of community: Online and offline. *IT & Society*, *1*(1), 151-165. Available online at: http://www.stanford.edu/group/siqss/itandsociety/v01i01/v01i01a10.pdf
- Haythornthwaite, C. (forthcoming). Social networks and online community.
- Haythornthwaite, C. & Wellman, B. (1998).Work, friendship and media use for information exchange in a networked organization. *Journal of the American Society for Information Science*, *49*(12), 1101-1114.

10. TECHNOLOGY AND THE EVOLUTION OF NETWORKS

- Burkhardt, M.E. & Brass, D.J. (1990). Changing patterns and patterns of change - The effects of a change in technology on social network structure and power. *ASQ, 35(1)*, 104-127. **OR** Burkhardt, M.E. (1994). Social interaction effects following a technological change: A longitudinal investigation. *Academy of Management Journal, 37* (4), 104-127.
- Barley, Stephen R. (1990). The alignment of technology and structure through roles and networks. *Administrative Science Quarterly*, *35* (March), 61-103.
- Haythornthwaite, C. (2001). Exploring multiplexity: Social network structures in a computer-supported distance learning class. *The Information Society, 17*(3), 211-226.
- Carley, K.M. (1999). On the evolution of social and organizational networks. *Research in the Sociology of Organizations, 16,* 3-30.

11. DIFFUSION, INFLUENCE AND CONTAGION

- D&F, chpt 7: Dynamics
- Gladwell, M. (1999) The Science of the Sleeper: How the Information Age could blow away the blockbuster. The New Yorker, October 4, 1999. http://www.gladwell.com/1999/1999_10_04_a_sleeper.htm

- Rogers, E.M. (1995). Diffusion of Innovation. Free Press. Chapter 8
- Monge & Contractor, chpt 6, Contagion, semantic and cognitive theories

12. LEARNING AND KNOWLEDGE SHARING

- Borgatti, S. & Cross, R. (2003). A social network view of organizational learning: relational and structural dimensions of 'know who.' *Management Science, 49*, 432-445.
- Cross, R., Parker, A., Prusak, L. & Borgatti, S.P. (2001). Knowing what we know: Supporting knowledge creation and sharing in social networks. *Organizational Dynamics, 30*(2), 100-120.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly, 44*, 82-111.
- Argote, L. McEvily, B., & Reagans, R. (2003). Introduction to the special issue on managing knowledge in organizations: Creating, retaining,and transferring knowledge. *Management Science, 49*(4), v-viii.
- Borgatti, S.P. & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science, 49*(4), 432-445.

Other

- Moreland, R.L. (1999). Transactive memory: Learning who knows what in work groups and organizations. In L. Thompson, D. Messick, & J. Levine (eds). *Sharing knowledge in organizations* (pp.3-31). Mahwah, NJ: Erlbaum.
- Hollingshead, A.B., Fulk, J., & Monge, P. (2002). Fostering intranet knowledge-sharing: An integration of transactive memory and public goods approaches. In S. Kiesler & R. Hines (eds). *Distributed work: New research on working across distance using technology* (pp. 335-355). Cambridge, MA: MIT Press.

13. COLLABORATION AND INNOVATION

- Ahuja, G. (2000). Collaboration networks, structural holes, and innovation: A longitudinal study. *ASQ*, *45*(3), 425-455.
- Haythornthwaite, C. (2002). Building social networks via computer networks: Creating and sustaining distributed learning communities. In K.A. Renninger & W. Shumar, *Building Virtual Communities: Learning and Change in Cyberspace* (pp.159-190). Cambridge: Cambridge University Press.
- Cross, R., Borgatti, S. & Parker, A. (2002). Making invisible work visible: Using social network analysis to support strategic collaboration. *California Management Review, 44*(2), 25-46. [see also *The Hidden Power of Social Networks*]
- Teigland, R. (2000). Communities of practice at an Internet firm: Netovation vs. on-time performance. In E.L. Lesser, M.A. Fontaine & J.A. Slusher (Eds.). *Knowledge and Communities* (pp.151-178). Boston, MA: Butterworth Heinemann.

14. STUDENT PRESENTATIONS

15. STUDENT PRESENTATIONS

Christina Prell
Department of Sociological Studies
The University of Sheffield

Social Networks, SCS6345
Christina Prell (c.prell@shef.ac.uk)

Aims and objectives:
This is considered an introduction to social networks as a methodological approach to perceiving and studying the social world and to social network analysis, a method of gathering and analyzing data on social networks. Students will be introduced to main concepts and readings within the social network literature, methods for gathering, organizing and analyzing data.

Readings:
This module will draw on four main texts. These include the following:

- Kilduff, M. & Tsai, W. (2003). Social networks and organizations. SAGE
- Wasserman & Faust (1994). Social network analysis: methods and applications. University of Cambridge Press.
- Scott, J. (2000). Social network analysis: a handbook. SAGE.
- Knoke, D. & Kuklinski, J. (1982). Network analysis. SAGE

In addition to these readings, I will have other articles and readings listed, including relevant websites, etc. for each week.

Two journals that you should becoming familiar with include the following:

- **Connections**, which can be found online by going to http://www.insna.org/indexConnect.html
- **Social networks**, which can be located through the EJournals link on our Library's website.

Finally, here is a web site I encourage you to look at:

- INSNA site: http://www.sfu.ca/~insna/

Assessment
see attached document.

Calendar

Part One: Getting acquainted with Social Networks and SNA

Week One: What is SNA? basic concepts

- Borgatti's "What is?" Social networks site: http://www.analytictech.com/networks/whatis.htm
- Scott, Chapter 1 and 2
- Wasserman and Faust, Chapter 1
- Knoke: Chapter 2
- Kilduff and Tsai, Chapter 2

LAB: Lab 1 on Introduction to UCINET

Week Two: Famous studies (strength of weak ties and small world)

- Granovetter, Mark. 1973. The Strength of Weak Ties. *American Journal of Sociology* 78(6): 1360-1380.
- Milgram, Stanley. 1967. The Small-World Problem. *Psychology Today 1*:
- Granovetter, Mark. 1982. The Strength of Weak Ties: A Network Theory Revisited. Pp. 105-130 in, *Social Structure and Network Analysis*, edited by Peter Marsden and Nan Lin. Beverly Hills: Sage.
- Watts, D.J. 1999. Networks, dynamics and the small world phenomenon. American Journal of Sociology 105:493-527
- Travers, J. and Milgram, S. (1967). An experimental study of the small world problem. Sociometry, 32, pp. 425-443.

LAB: Finish Lab 1

Week three: Common Applications (may extend into Week 4)

Computer networks as social networks:

- Wellman, Barry and Milena Gulia. 1999. Net-Surfers Don't Ride Alone: Virtual Communities as Communities. Pp. 331-366 in *Networks in the Global Village*, edited by Barry Wellman.
    - http://www.chass.utoronto.ca/~wellman/publications/
- Haythornthwaite, Caroline. 2002. Strong, Weak, and Latent Ties and the Impact of New Media. *The Information Society 18*(5): 385-401.

Social capital:

- Putnam, Robert. 2001. Social Capital Measurement and Consequences. *Canadian Journal of Policy Research 2*(1):41-51.
- Borgatti, S.P., C. Jones, and M.G. Everett. 1998. Network measures of social capital. Connections 21:1-36.
    - http://www.insna.org/indexConnect.html
- Burt, R.S. 1997. A note on social capital and network content. *Social networks* 19:355-373.

Organizations:

- Uzzi, B. 1996. The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. *American Sociological Review 61*(4)*:* 674-698.
- David Krackhardt. 1993. Informal Networks: The Company behind the Chart. *Harvard Business Review* July: 105-111.
- Krackhardt, D. 1992. The Strength of Strong Ties: The Importance of Philos in Organisations, p. 216-239, *In* N. N, and Eccles, R.C., (eds.), ed. Networks and Organisations: Structure, Form, and Action. Boston. Harvard Business School Press.
    - http://www.andrew.cmu.edu/user/krack/publications.shtml

Community:

- Fischer, Claude. 1982. *To Dwell Among Friends*. Berkeley: University of California Press. [Ch. 1-3, 7-10].
- Wellman, Barry, and Scot Wortley. 1990. Different Strokes From Different Folks: Community Ties and Social Support. *American Journal of Sociology 96*(3):558-88.

Week four: gathering data

Sampling, methods for gathering data, organizing data, etc.

- Erickson, Bonnie, and T.A. Nosanchuk. 1983. Applied Network Sampling. *Social Network, 5*:367-82.
- Borgatti, S.P. and Molina, J-L. (2003). Ethical and strategic issues in organizational network analysis. *Journal of Applied Behavioral Science*, 39(3), pp. 337-350.
    - http://www.analytictech.com/borgatti/publications.htm
- Knoke, Chapter 3, Chapter 4 (pp. 35-50)
- Scott, Chapters 3
- Wasserman & Faust, Chapter 2
- Marsden, Peter V. (1990). Network data and measurement. *Annual Review of Sociology*, 16, pp. 435-463.

LAB 2: entering data into UCINET.

Part two: SNA concepts and analyses
Week five: cohesion

- Scott, Chapter 6; Chapter 4 (pp. 69-81)
- Wasserman & Faust, Chapter 7
- Knoke & Kuklinski, 'Clique detection'
- Borgatti, S.P., Jones, C., & Everett, M.G. (1998). Network measures of social capital. *Connections*, 21, 1-36. http://www.analytictech.com/borgatti/borg_social_capital_measures.htm
- Coleman, J.S. (1990). Foundations of Social Theory. Cambridge: Harvard University Press
- Borgatti's summary of subgroups http://www.analytictech.com/networks/subgroup.htm

LAB3: Cohesion and cohesive subgroups

Week six: Centrality and centralization

Centrality & Centralization

- Scott, Chapter 5
- Wasserman & Faust: Chapter 5
- Freeman, L.C. (1979). Centrality in social networks: conceptual clarification. Social networks, 1, pp. 215-239.
- Summary of centrality: http://www.analytictech.com/networks/centrali.htm
- Brass, D & Burkhardts, M. (1992). Centrality and power in organizations. N. Nohria and R. Eccles (Eds.), Networks and organizations, pp. 191-215. Boston: Harvard Business School Press.
- Brass, D.J. (1992). Power in organizations: a social network perspective. In G. Moore and J.A. Whitt (Eds.) Research in politics and society, (pp. 295-323). Greenwich, CT: JAI Press.
- Bonacich, P. (1987). Power and centrality: A family of measures. American Journal of Sociology, 92, pp. 1170-1182.
- Friedkin, N. E. (1991). Theoretical foundations for centrality measures. American Journal of Sociology, 96, pp. 1478-504.

LAB 4: Centrality

Week Seven: Brokerage and Weak Ties

- Kilduff & Tsai, Chapter 3
- Burt, R. (2004). Structural holes and good ideas. American journal of sociology, 110(2), pp. 349-99.
- Granovetter, M. (1973). The strength of weak ties. American journal of sociology, 78, 4, pp. 1360-1380.
- Granovetter, M. (1982). The strength of weak ties: A network theory revisited, In Marsden and Lin, pp. 105 – 130.
- Borgatti's summary of Granovetter: http://www.analytictech.com/networks/weakties.htm
- Burt, R.S. (1992). Structural holes: The social structure of competition. Cambridge, MA: Harvard University Press.
- Borgatti, S.P., Jones, C. and Everett, M.G. (1998). Network measures of social capital. Connections, 21(2), pp. 1-36.
- Constant, D., Sproull, L., & Kiesler, S. (1997). The kindness of strangers: On the usefulness of electronic weak ties for technical advice. In S. Kiesler (Ed.,) Culture of the internet (pp. 303 - 323). Mahwah, MJ: Lawrence Erlbaum Associates, Inc.

LAB 5: Brokerage

Week eight: triads, biased nets and transitivity (time permitting)

- Wasserman and Faust, Chapter 6 and 14
- Skvoretz, J. 1985. Random and biased networks: simulations and approximations. Social Networks 7:225-261.
- Skvoretz, J. 1990. Biased net theory: Approximations, simulations and observations. Social Networks 12:217-238.

Lab 6: TBA

Week nine: catch-up and discussion of assessment

Week 10: catch-up, review and final remarks

George Barnett
Department of Communication
University of Buffalo

COMMUNICATION AND SOCIAL NETWORKS

Communication 629
Communication and Social Networks
Professor George A. Barnett

Network analysis is a set of research methods for the examination of social structure based on the patterns of the relations among the components (individuals or higher-level social or information systems). In Communication research, this relation is usually the frequency of information exchanged among the components. In other social sciences the relation may be power, conflict, friendship, joint activities or affiliations, shared language and cognitions, or the spread of diseases. Recently, it has been applied to natural systems (biological and physical) as well. This course will: 1) provide an overview of structural and network theory; 2) present methods for the collection of network data; 3) examine a variety of mathematical and statistical indicators or network properties; 4) introduce software (UCINET, MULTINET, GALILEO and CATPAC) for the analysis of social networks; and 5) offer a series of examples of its application from a variety of substantive areas.

The readings for the course are listed below. The required readings are indicated. They should be on sale at the University Bookstore. The articles will be made available on the course's UB Learns website. Also on the website are sections from two different matrix algebra textbooks to help you become familiar with the terminology used to discuss social networks.

Barnett, G.A. (2001). A longitudinal analysis of the international telecommunications network: 1978-1996. American Behavioral Scientist, 44, 1638-1655.

Barnett, G.A., & Park, H.W. (2005). The structure of international Internet hyperlinks and bilateral bandwidth. Annals of Telecommunication, 60, 1115-1132.

Doerfel, M.L. & G.A. Barnett, (1999). A comparison of the semantic and affiliation networks of the International Communication Association. Human Communication Research, 25 (4), 589-603.

Monge, P.R., & Contractor, N.S. (2003). Theories of communication networks. Oxford: Oxford University Press.

Richards, W.D. & Barnett, G.A. (Eds.)(1996). Progress in Communication Sciences Vol. XII (Advances in network analysis). Norwood, NJ: Ablex.

Rogers, E.M., & Kincaid, D.L. (1981). Communication networks: Toward a new paradigm for research. New York: Free Press.

Wasserman, S. & Faust, K. (1994). Social network analysis: Methods and applications. Cambridge: Cambridge University Press. **required**

Wellman, B., & Berkowitz, S.D. (Eds.) (1988). Social Structures: A network approach. Cambridge: Cambridge University Press.

All students should purchase **UCINET 6** from Analytic Technologies,

http://www.analytictech.com/

and **MultiNet** from Professor William D. Richards.

http://www.sfu.ca/~richards/Multinet/Pages/multinet.htm

Further, all participants are encourage to join **INSNA** (International Network for Social Network Analysis) and to participate on **SOCNET**, INSNA's ListServ, a electronic discussion forum on network theory and analysis.

All students in the class are required to conduct a network analysis. As part of the requirement, they must:

1. preset a research proposal to the class,
2. gather a set of network data (or obtain data from a secondary source),
3. analyze the data using the appropriate software to evaluate the proposed theoretical hypotheses or research question,
4. write up a formal research paper, appropriate for submission to a professional journal or conference
5. present that paper to the class.

The class is designed as a seminar and as such, student participation is mandatory. There is no formal schedule for the class. I will begin with a series of lectures about network analysis theory, methods and software applications. The lectures will depend on the interests of the students. Then, the students will present their research proposals. Feedback from the class members to these proposals is an essential part of the learning process. Once data is available for analysis, the class will collectively analyze each student's data. Because each research question is unique, the analysis of network data is somewhat of an art and much can be learned from working with and observing the analysis of a variety of different networks. Finally, during the last couple of classes students formally present their final paper.

Thomas W Valente
Department of Preventitive Medicine, Keck School of Medicine
University of Southern California

PM 542: Social Network Analysis

Department of Preventive Medicine
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Time: Wednesdays, 10:00-2:00 pm
Location: Alhambra campus Room 7059
Office Hours: Virtual office hours (24/7)

Course Description

This course is an introduction to the theory, methods and procedures of network analysis with emphasis on applications to public health programs. The goal of the course is to provide a working knowledge of the concepts and methods used to describe and analyze networks so that professionals and researchers can understand the results and implications of this body of research. The course also provides the training necessary for scholars to conduct network analysis in their own research careers.

The course consists of readings, class discussions, computer and data analysis assignments, and a final paper. The data analysis assignments will be conducted using the UCINET V network analysis software available to students in the class. Individual student papers will use data that the student collects him/herself. The data collection and entry process will be quite simple and consist of identifying a group (a class, club, organization, etc.) that students can meet and then ask to complete a simple one page questionnaire.

Student Learning Objectives

Students who complete this course will be able to:

1. Read and comprehend concepts presented in the social network literature

2. Use network analysis as a research technique in their own research including knowledge of what concepts are applicable and how to collect and analyze this type of data.

3. Explain how network analysis contributes to theories or areas of study of interest to the student.

4. Develop a deeper understanding of how interpersonal and mass communication contribute to the formation of norms, social structure and decision-making, and hence an understanding of the essential elements necessary to launch community development, communication campaigns and/or health promotion projects.

Required Texts

1. Scott, J. (2000). Social network analysis: A handbook (2nd Ed.). Newbury Park, CA: Sage.

2. Valente, T. W. (1995). Network models of the diffusion of innovations. Cresskill, NJ: Hampton Press.

3. Valente, T. W. (In Process). Modeling influence: Social networks, behavior & health. New York: Oxford University Press.

4. Supplementary readings.

Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be certain the letter is delivered to me as early in the semester as possible. DSP is located in on the University Park campus in STU 301 and is open 8:30 a.m. – 5:00 p.m., Monday through Friday. The phone number is (213) 740-0776.

Electronic Course Management

TOTALe (also known as BlackBoard) is the online learning portal through which many USC professors provide electronic copies of their course materials, including syllabuses, readings, and handouts. Students may obtain access TOTALe at learn.usc.edu and use their USC computer user name and password to access the "MyUSC" portal page. All courses that students are enrolled in that are using TOTALe will appear on the page as a link. Simply follow the link to access online course materials and grades.

Assignments **Proportion of Grade & due date**

Week	Title	Grade Pct.	Due Date
3	Assignment 1: Matrix Calculation	5	9/12
4	Assignment 2: Netdraw Graph	5	9/26
5	Assignment 3: UCINET Centrality	10	10/3
6	Assignment 4: UCINET Groups	10	10/10
7	Assignment 5: UCINET Positions	10	10/17
8	Assignment 6: UCINET Networks	10	10/24
9	Assignment 7: Diffusion Network Modeling	10	10/31
10	Assignment 8: Data Analysis of Class Project 1	5	11/7
11	Assignment 9: Data Analysis of Class Project 2	5	11/14
15	Final Paper	30	12/5

Week by Week Outline

Week 1. Introduction & History (8/29/07): The first week is devoted to an overview and history of the development of network analysis as a field of study. Students will gain an understanding of the history of network research with discussions of (1) which academic disciplines fostered its early growth, how and why; (2) who are some of the major contributors to network analysis; and (3) where is network analysis today and in the future. The first week is also devoted to introducing the basic language of networks and providing an overview of the course.

Required Readings:

Scott: Chapters 1 & 2, pages 1-38

Valente (in process): Chapters 1 & 2

Knoke & Kuklinski: 7-21

Christakis, N. A. & Fowler, J. H. (2007). The Spread of Obesity in a Large Social Network over 32 Years. New England Journal of Medicine, 357, 370-379.

Recommended Readings:

Wellman, B. (1988). Chapters 1 & 2. In B. Wellman & S. D. Berkowitz (1988) Social structures: A network approach. Cambridge: Cambridge University Press.

Week 2. Diffusion & Behavior Change (9/5/07): Network analysis has been a core methodology used to understand the diffusion of innovations including the diffusion of health behaviors such as smoking, family planning, substance abuse, and so on. These lectures provide the student a basic understanding of how networks structure the diffusion of innovations and how network analysis has contributed to the understanding of diffusion.

Required Reading:

Valence (in process): Chapter 3

Valente 1995: Chapter 1

Granovetter, M. (1973). The strength of weak ties. American Journal of Sociology, 78:1360-1380

Klovdahl, A. S. (1985). Social networks and the spread of infectious diseases: The AIDS example. Social Science Medicine, 21(11), 1203-1216.

Valente, T. W. (1996). The diffusion network game. Connections, 19(2), 30-37.

Valente, T. W (2005). Models and methods for innovation diffusion. In P. Carrington, J. Scott & S. Wasserman (Eds.) Models and Methods in Social Network Analysis. New York: Cambridge University Press.

Week 3. Models (9/12/07): What is a network? What is network analysis? The second week consists of an explanation of how a network is described. The lectures discuss how to create a sociogram, how matrices are used to represent networks and how network indices are computed from matrices.

Required Reading:

Valente (in process): Chapter 4

Scott: Chapter 3 & 4 , pages 39--84

Namboodiri, (1982). Matrix Algebra. Newbury Park, CA: Sage. Chapter 1.

Marsden, P. V. (1990). Network data and measurement. Annual Review of Sociology, 16, 435-463.

Recommended Reading:

Burt, R. S. (1980). Models of network structure. Annual Review of Sociology, 6, 79-141.

Week 4. (9/19/07): Class Canceled.

Week 4. Centrality (9/26/07): Centrality is one of the most useful concepts in network analysis. Week 4 is devoted to discussing various centrality measures and the differences in their computation and application.

Required Reading:

Valence (in process): Chapter 5

Scott: Chapter 5, pages 85-99

Freeman, L. (1979). Centrality in social networks: Conceptual clarification. Social Networks. 1, 215-239.

Costenbader, E. & Valente, T. W. (2004). The stability of centrality when networks are sampled. Social Networks.

Recommended Reading:

Valente, T. W., & Foreman, R. K., (1998) Integration and radiality: Measuring the extent of an individual=s connectedness and reachability in a network. Social Networks, 20, 89-105.

Wasserman, S., & Faust, K. (1994). Chapter 6: Centrality and Prestige. In Social Network Analysis: Methods and Applications. Cambridge, UK: Cambridge University Press.

Week 5. Groups & Relational Models (10/3/07): A group is common term used casually but also containing formal mathematical descriptions. What is a group and what does it mean to belong to a group. Groups are most frequently defined on direct relational network models.

Required Reading:

Valente (in process): Chapter 6

Scott: Chapter 6, pages 103-125

Valente (1995): Chapters 2 & 3

Valente, T. W., Watkins, S., Jato, M. N., Van der Straten, A., & Tsitsol, L. M. (1997). Social network associations with contraceptive use among Cameroonian women in voluntary associations. Social Science and Medicine, 45, 677-687.

Week 6. Positions (10/10/07): A defining characteristic of network research is the ability to identify positions in a network. Positions can be thought of as roles. Positions are defined by grouping together nodes that have the same sets or links to other nodes. Nodes can occupy the same position without necessarily being directly connected to one another (in contrast to groups).

Required Reading:

Valente (in process): Chapter 7

Scott: Chapter 7, pages 126-148

Burt, R. (1987). Social contagion and innovation: Cohesion versus structural equivalence. American Journal of Sociology, 92, 1287-1335.

Valente (1995): Chapter 4

Week 7. Network Level (10/17/07): Many network measures are individual ones, they indicate a node's connectivity or position. Network analysis occurs at the network or macro level as well. Basic network measures include size and density, however, there are many more. Network level measures can be used to compare networks and understand their overall structure.

Required Reading:

Valente (in process): Chapter 8

Borgatti, S. P. & Everett, M. G. (1999). Models of core/periphery structures. Social Networks, 21, 375-395.

Triad census paper

Valente, T. W., Chou, C. P., & Pentz, M. A. (2007). Community coalition networks as systems: Effects of network change on adoption of evidence-based prevention. American Journal of Public Health, 97, 880-886.

Week 8. Graphics & Program Demonstration (10/24/07): Viewing networks represents a major attribute of network analysis, just being able to see the structure. Tremendous advances in network graphing have occurred and are occurring given improvements in computer technology. This week we will also learn how to use Visualizer and Pajek which provide alternative analysis and display programs.

Required Reading:

Freeman, L. C. (2000). Visualizing Social Networks Journal of Social Structure. Available at: http://www.cmu.edu/joss/content/articles/volume1/Freeman.html

McGrath, C., Krackhardt, D., & Blythe, J. (2003). Visualizing Complexity in networks: Seing both the forest and the trees. Connections.

Mrvar, A., & Batagelj, V. (No Date). *PAJEK* software for network visualization. Available at:

http://vlado.fmf.uni-lj.si/pub/networks/pajek/default.htm

Week 9. Social Capital 10/31/07): The connections, norms and trust that bind individuals and community have been referred to as social capital. Social capital has become a hotly debated topic in social sciences for its seeming ubiquity and importance to all aspects of life. Social network analysis provides the tools to measure social capital.

Required Readings:

Lin, N. (1999). Building a network theory of social capital. Connections, 22(1), 28-51.

Burt, R. S. (in press) The network structure of social capital. In R. I. Sutton & B. Staw (Eds.) Research in organizational Behavior. Greenwich, CT: JAI Press.

Van Meter, Karl M. 1999. Social Capital Research Literature: Analysis of Keyword Content Structure and the Comparative Contribution of Author Names. 22(1):62-84.

Lomas, J. (1998). Social capital and health: Implications for public health and epidemiology. Social Science and Medicine, 47, 1181-1188.

Moore, S., Shiell, A., Hawe, P., & Haines, V. A. (2005). The privileging of communitarian ideas: Citation practices and the translation of social capital into public health research. American Journal of Public Health, 95, 1330-1337.

Week 10. The Small World (11/7/07): One of the most popular uses of social network analysis has been the study of the "small world" phenomenon. People are always surprised when the know someone in common or having a connection with someone from seemingly disconnected means. This week we discuss research conducted to understand global connectivity and models used to explain the small world phenomenon.

Required Readings:

Milgram, Stanley. 1967. "The small world problem." *Psychology Today*, 22:561-67.

Pool, Ithiel de Sola and Manfred Kochen. 1978. "Contacts and influence." *Social Networks* 1: 5-51. (only read pages 5 to 29 and 49-51).

Travers, Jeffrey and Stanley Milgram. 1969. "An experimental study of the small world problem." *Sociometry* 32(4):425-443.

Watts, D. (2002). The Small World, pages 1-45.

Recommended Readings:

Killworth, Peter D. and H. Russell Bernard. 1978/79. "The reverse small-world experiment." *Social Networks*, 1:159-192.

Week 11. Ego-centric Networks (11/14/07): How do you measure ego-centric networks? What are some common instruments used and common measures created from ego-centric data such that one gets a sense of structure generalizable from sampled units?

Required Readings:

Valente (in process): Chapter 9

Marsden, P. V. (1987). Core discussion networks of Americans. American Sociological Review, 52, 122-131.

Campbell, K. E. and Lee, B. A. (1991). Name generators in surveys of personal networks. Social Networks, 13, 203-221.

Valente, T. W., & Vlahov, D. (2001). Selective risk taking among needle exchange participants in Baltimore: Implications for supplemental interventions. American Journal of Public Health, 91, 406-411.

Valente, T.W., & Saba, W. (1998). Mass media and interpersonal influence in a reproductive health communication campaign in Bolivia. Communication Research, 25, 96-124.

Week 12. P* Exponential Random Graph Models (ERGM) (11/21/07): The past few years has seen tremendous development in the implementation of statistical procedures for testing network properties. ERGM enable researchers to test hypotheses about network evolution and behavior that explicitly account for the non-independence and structural dependence of social networks. Programs are in their infancy, and application just growing.

Required Readings:

Valente (in process): Chapter 10

Robins, G., Pattison, P. Kalish, Y. & Lusher, D., An introduction to exponential random graph (p*) models for social networks. Social Networks, 2007. 29: p. 173-191

Snijders, T. A. (2005). Models for longitudinal data. In P. J. Carrington, J. Scott, & S. Wasserman (Eds.) Models and Methods in Social Network Analysis. Cambridge, UK: Cambridge University Press.

Recommended Readings:

Burt, R. (1984). Network items and the general social survey. Social Networks, 6, 293-339.

Brewer, D. D. (1991). Forgetting as a Cause of Incomplete Reporting of Sexual and Drug Injection Partners. Sexually Transmitted Diseases, 26, 166-176.

Week 13. Thresholds, Critical Mass, & Tipping Points (11/28/07): Thresholds models were first postulated by Granovetter in 1978 as a possible means to understand why collective behavior occurred in some situations but not others. Granovetter encouraged application of threshold theory to the diffusion of innovations and threshold theory provides a parsimonious explanation of how networks structure diffusion of innovations.

Required Readings:

Valente: Chapters 5, 7, & 8

Recommended Readings:

Granovetter, M. (1978). Threshold models of collective behavior. American Journal of Sociology, 83(6), 1420-1443.

Week 14. Interventions (12/5/07): Networks are important for understanding system and organizational functioning, but can they be used to improve it? Several teams have conducted using networks as interventionists. Who delivers the message, and how, may be more important than its content.

Required Readings:

Valente (in process): Chapter 11

Valente, T. W., Hoffman, B. R., Ritt-Olson, A., Lichtman, K., & Johnson, C. A. (2003). The effects of a social network method for group assignment strategies on peer led tobacco prevention programs in schools. American Journal of Public Health, 93, 1837-1843.

Valente, T. W., Sussman, S., Unger, J., Ritt-Olson, A., Okamoto, J. & Stacey, A., (in press). Peer acceleration: Effects of a Network Tailored Substance Abuse Prevention Program among High Risk Adolescents. Addiction.

Recommended Readings:

Buller, D., Buller, M.K., Larkey, L., Sennott-Miller, L., Taren, D., Aickin, M., Wentzel, T.M. & Morrill, C. (2000). Implementing a 5-a-day peer health educator program for public sector labor and trades employees. Health Education & Behavior, 27 (2), 232-240.

Valente, T.W., Unger, J., Ritt-Olson, A., Cen, S. Y. & Johnson, A. C. (2006). The interaction of curriculum and implementation method on 1 year smoking outcomes. Health Education Research: Theory & Practice, 21, 315-324.

Week 15. Paper presentations (12/12/07)

Valente (1995): Chapters 6 & 9

Valente, T.W., Unger, J., & Johnson, A. C. (2005). Do popular students smoke? The association between popularity and smoking among middle school students. Journal of Adolescent Health, 37, 323-329.

Klovdahl, A. S., Potterat, J. J., Woodhouse, D. E., Muth, J. B., Muth, S. Q., and Darrow W. W. (1994). Social networks and infectious disease: The Colorado Springs study. Social Science Medicine, 38(1), 79-88.

Week 16. Paper presentations (cont.) (12/12/07)

Guidelines for Group Identification/Selection

In this class you are expected to collect some data from a small group in order to complete network analysis computations for the final paper. The group can be any collection of people as long as they seem like a group. Groups should have at least 15 members and no more than 50. Groups of about 20-30 are ideal from a practical standpoint. You will only need to interview the group once and the questionnaire will take less than 3-4 minutes to complete.

Examples of groups that have been used in the past:
1. A seminar class at the school
2. A dance or exercise class
3. A religious group
4. A school cooperative group
5. A dormitory hall
6. A school-based interest group

Students are encouraged to consult with the professor or TA for advice about their group identification/selection process. Students are required to submit a draft of their questionnaire to the professor before administering it.

Students should solicit the group's approval to interview them.

Guidelines for the Final Project

1. The paper you are expected to write should be no more than 20 pages including tables, figures, references and appendices (should you have any such as a copy of your questionnaire). The paper should be double-spaced throughout with font sizes no smaller than 10 pt.

2. The paper should consist of a scaled-down version of a journal submission. In other words, the paper should have the following sections: introduction, theory or literature review (this can be brief and lightly referenced); methodology and data; results; discussion; and conclusion; and references, tables, figures and appendices.

3. Your questionnaires should be short - no more than five or six questions which basically gather information on a couple of different networks such as friendship and advice and perhaps a demographic question or two to measure gender, or departmental affiliation. You can also collect the same network data with both nominations and roster techniques so that you can compare networks.

Typically your paper will consist of descriptive analysis of the networks you have measured and then an analysis of the centrality, group structure and positional structure of the networks. Optionally you may compare different networks that you have measured (advice versus friendship for example or roster versus nominations). You may then analyze your networks in terms of demographic data that you have collected: For example, does the network breakdown into groups based on gender or department affiliation? Finally, you may write on the potential for diffusion or behavior change to occur within the network or from outside the network.

For your questionnaires remember to:

a. Include a disclaimer clause such as the following:

This questionnaire is completely voluntary and your participation is optional. Your responses will be kept strictly confidential and the responses will be converted to numeric form and not individually analyzed by anyone in this group. You may have the results presented back to you in one month in a manner which will not permit the identification of individual respondents in any way.

b. Remember to include a space for the respondents to write their own names on the questionnaire so that you can identify them.

Kathleen Carley
Institute for Software Research, School of Computer Science
Carnegie Mellon University

Kathleen Carley
Course Name: Dynamic Network Analysis

Course Number: 17-700
Number of units: 12

Description: Individuals and technology shape and are shaped by organizations. Individuals and organizations are also affected by sets of interlinked networks linking people, technology, organizations, knowledge and resources. In this world of networks and organizations, how do coordination, communication, power, tasks, goals, and information interact to affect group and organizational behavior and the impact of information technology on this behavior? How do we conceptualize, measure, and evaluate organizations and networks? How do we evaluate the impact of policies and technology on these organizations and networks especially given the fact that organizations and networks are dynamic?

This course provides an overview of the dominant perspectives on organizations and networks from a macro perspective. Topics covered include knowledge management, organizational design, organizational learning, organizational evolution and population ecology, organizational culture, organizations as complex systems, social and organizational networks, and dynamic network analysis.

Organizational and network theory covers a wide range of perspectives on organizations and organizing each of which defines organizations differently. For example, for some theorists organizations are collections of people, while for others they are goal-oriented systems, and for still others they are collections of processes. For some the network exists for others it is only perceived. This course contrasts these perspectives and explores the ramifications and limitations of these different perspectives on organizations under normal and stress conditions. Historical trends in the examination of organizations and networks are discussed. Particular attention is paid to the role of cognition, knowledge and tasks as they impact social networks within and between organizations, and computational theories of organizations. This course provides an overview of the dominant theories and an introduction to several topics that currently under debate. Current topics include – transactive memory, computational organization theory, organizational learning, and organizational adaptation.

* 1-15: Introduction – What is Dynamic Network Analysis

Wasserman, S. & Faust, K. Chapters 1(1.1,1.2,1.3,1.4), 2 (2.1, 2.2, 2.3) and 3.1 and 3.2
National Research Council, Chapters 1,2,4,5
Carley, K. M., 2004, Dynamic Network Analysis. In R. Breiger, K. M. Carley & P. Pattison (Eds.), *Dynamic Social Network Modeling and Analysis: 2002 Workshop Summary and Papers* (pp. 133-45). Washington, DC: National Academies Press.
Kathleen M. Carley, 2002, "Smart Agents and Organizations of the Future" The Handbook of New Media. Edited by Leah Lievrouw and Sonia Livingstone, Ch. 12, pp. 206-220, Thousand Oaks, CA, Sage.

Additional on line resources
This is a reasonable high level primer for social networks
http://faculty.ucr.edu/~hanneman/nettext/
This is a more indepth tutorial on social networks
http://www.analytictech.com/networks/
Good cumulative list of references - http://www.socialnetworks.org/
Introduction for managers http://www.orgnet.com/sna.html

* 1-15: Network Elite

Wasserman & Faust, Chapter 5
Borgatti, S. P. (2004). The Key Player Problem. In R. Breiger, K. M. Carley & P. Pattison (Eds.), *Dynamic Social Network Modeling and Analysis: 2002 Workshop Summary and Papers* (pp. 241-52). Washington, DC: National Academies Press.
Philip Bonaich, Power and Centrality: A Family of Measures, American Journal of Sociology, 1987, 92(5):1170-82.
Martin Kilduff and David Krackhardt, Bringing the Individual Back In: A Structural Analysis of the Internal Market foe Reputation in Organizations, Academy of Management Journal, 1994, 37:87-108.
Freeman, Lin, 1979 "Centrality in Social Networks I". *Social Networks,* pp. 119-141.

* 1-22: Groups

Wasserman & Faust, Chapter 7,8,9,10,12
M. E. J. Newman, 2004, "Detecting community structure in networks" , Eur. Phys. J. B 38, 321-330.
Aaron Clauset, M. E. J. Newman and Christopher Moore, 2005, Finding Community Structure in Very Large Networks
R.L Breiger, S. A. Boorman, and P. Arabie. 1975, An Algorithm for Clustering Relational Data with Applications to Social Network Analysis and Comparison with Multidimensional Scaling. Journal Mathematical Psychology, 12, 328-383.
Lorrain, Francois and Harrison White, 1971 "Structural Equivalence of Individuals in Social Networks." *Journal of Mathematical Sociology*, pp. 49-80.

George B. Davis, Kathleen M. Carley, 2006, Clearing the FOG : Fuzzy, Overlapping Groups for Social Networks, CASOS Working Paper

Jeremy Kubica, Andrew Moore, Jeff Schneider,Tractable Group Detection on Large Link Data Sets,The Third IEEE International Conference on Data Mining, 2003.

Lu Q and Getoor L. Link-based classification. In Proceedings of the 20th International Conference on Machine Learning (ICML). Washington, DC. 2003. http://www.cs.umd.edu/~getoor/Publications/icml03.pdf

Jennifer Neville, Micah Adler, David Jensen. Clustering Relational Data Using Attribute and Link Information. Proc. Text Mining and Link Analysis Workshop, Eighteenth International Joint Conference on Artificial Intelligence. 2003.

Note: This paper provides evidence into why spectral methods and normalized cuts are useful for social networks.

* 1-29: From Links to Networks

D. Skillicorn, 2006, Understanding Complex Datasets: Data Mining with Matrix Decompositions

D. Skillicorn, 2006, Detecting Anomalies in Graphs, working paper

Park, H. W. & Thelwall, M. (2003). Hyperlink analyses of the World Wide Web: A review, Journal of Computer-Mediated Communication, 8(4).

S. Lehman and A.D. Jackson, 2005, Live and Dead Nodes. Computational and Mathematical Organization Theory. 11(2): 161-170.

Y. Zhang, M. Roughan, C. Lund, and D. Donoho. An information-theoretic approach to traffic matrix estimation. In Proceedings of SIGCOMM, 2003

Jennifer Neville, David Jensen, Dependency Networks for Relational Data. Proc. IEEE International Conference on Data Mining (ICDM). 2004:170-177.

L. Getoor, N. Friedman, D. Koller, B. Taskar, Learning Probabilistic Models of Link Structure. Journal of Machine Learning Research 3: 679-707 (2002)

* 2-5: Network Text Analysis and AutoMap

Required readings

Richard Klimoski and Susan Mohammed, 1994, Team Mental Model: Construct or Metaphor?, *Journal of Management*, 20(2):403-437.

Kathleen M.Carley, 1997, Network Text Analysis: the network position of concepts. In Carl W. Roberts (Ed.), Text Analysis for the Social Sciences, (pp. 79-102). Mahwah, NJ: Lawrence Erlbaum Associates.

Kathleen M.Carley, 1994, "Extracting Culture through Textual Analysis." Poetics, 22: 291-312.

Kathleen M. Carley, 1997, "Extracting Team Mental Models Through Textual Analysis." Journal of Organizational Behavior, 18: 533-538.

Kathleen M.Carley, 1993, "Coding Choices for Textual Analysis: A Comparison of Content Analysis and Map Analysis." In Marsden P. (Ed), Sociological Methodology, 23: 75-126. Oxford: Blackwell.

Jana Diesner and Kathleen M. Carley, 2005, "Revealing Social Structure from Texts:Meta-Matrix Text Analysis as a novel method for Network Text Analysis," In V.K. Narayanan & D.J. Armstrong (Eds.) Causal Mapping for Information Systems and Technology Research:

Approaches, Advances, and Illustrations, Chapter 4, Harrisburg, PA: Idea Group Publishing.

Kathleen M. Carley, Jana Diesner, Jeffrey Reminga, Maksim Tsvetovat, 2005-forthcoming, Toward an Interoperable Dynamic Network Analysis Toolkit, DSS Special Issue on Cyberinfrastructure for Homeland Security: Advances in Information Sharing, Data Mining, and Collaboration Systems.

Automap help files

* 2-12: Network Text Analysis and AutoMap

Landauer, T. K., Foltz, P. W., & Laham, D. (1998). Introduction to Latent Semantic Analysis. Discourse Processes, 25, 259-284.

Bradley Malin, Edoardo Airoldi, and Kathleen Carley. 2005, A social network analysis model for name disambiguation in lists. Computational and Mathematical Organization Theory. 11(2): 119-139.

Jana Diesner, Terril Frantz and Kathleen Carley. 2005, "Communication Networks from the Enron Email Corpus," Computational and Mathematical Organization Theory, 11(3):.

Corman, S., Kuhn, T., McPhee, R., and K. Dooley (in press). Studying Complex Discursive Systems: Centering Resonance Analysis of Organizational Communication. *Human Communication Research*, *28(2).*

Jeremy Kubica, Andrew Moore, David Cohn, Jeff Schneider,cGraph: A Fast Graph-Based Method for Link Analysis and Queries,Proceedings of the 2003 IJCAI Text-Mining & Link-Analysis Workshop, 2003.

Robert R. Hoffman, forthcoming, Eliciting and Representing Practitioner Knowledge, Crandall, B., Klein, G., & Hoffman, R. (2006). Minds at Work: A Practitioner's Guide to Cognitive Task Analysis. Cambridge MA: MIT Press.

David Skillicorn, 2005, "Large Structure in the Enron Email Dataset" and Mathematical Organization Theory. 11(3):

A. Chapanond, M. Krishnamoorthy and B. Yener, 2005, "Graph Theoretic and Spectral Analysis of Enron Email Data" and Mathematical Organization Theory. 11(3):

* 2-19: Network Topology

Borgatti, S. P., & Everett, M. G., 1999, Models of core / periphery structures. *Social Networks, 21,* 375-395.

Erdos, P. and Renyi, A. 1959. On random graphs. *I, Publ. Math. Debrecen* 6 (1959), 290-291.

Terrill Frantz and Kathleen M. Carley, 2005, "A Formal Characterization of Cellular Networks," Carnegie Mellon University, School of Computer Science, Institute for Software Research International, Technical Report CMU-ISRI-05-109.

Kleinberg, J., Watts, The Small World Phenomenon: an Algorithmic Perspective AND **D., & Strogatz, S.**, 1998, Collective dynamics of 'small-world' networks. Nature, 393, 440-442.

Barabasi, A-L., & Bonabeau, E., 2003, Scale-free networks. Scientifc American, 288(5), 50-59. AND **A.-L. Barabási, R. Albert, H. Jeong. 2000,**
Scale-free characteristics of random networks: The topology of the world wide web Physica A 281, 69-77.

Edo M. Airoldi and Kathleen M. Carley, 2005, "Sampling Algorithms for Pure Network Topologies: A Study on the Stability and the Separability of Metric Embeddings," SIGKKD Explorations: Special Issue on Link Mining. 7(2), 13-22, December 2005, http://www.acm.org/sigs/sigkdd/explorations/issues/7-2-2005-12/2-Airoldi.pdf.

Malone, T. W. (1987). Modeling coordination in organizations and markets. *Management Science*, *33*(10), 1317-1332.

M. E. J. Newman, 2003, The structure and function of complex networks, SIAM Review, 45, 167-25.

* 2-26: Compare and Contrast Networks

Wasserman and Faust, chapter 15

David Krackhardt, 1988, "Predicting with Networks: A Multiple Regression Approach to Analyzing Dyadic Data," Social Networks, 10 (December): 359-381.
See also David Krackhardt, 1987, "QAP Partialling as a Test of Spuriousness," Social Networks, 9 171-186.

Wasserman, S., & Pattison, P.E. 1996, Logit models and logistic regressions for social networks: I. An introduction to Markov random graphs and p∗. Psychometrika, 60, 401–425.

Anderson, C.J., Wasserman, S., & Crouch, B. 1999, A p∗ primer: Logit models for social networks. Social Networks, 21, 37–66.

David Dekker, David M. Krackhardt, Tom Snijders, 2005, "Sensitivity of MRQAP Tests to Collinearity and Autocorrelation" Heinz Working Paper Series

A.Kimball Romney and Susan C. Weller, Culture as Consensus: A Theory of Culture and Informant Accuracy, *American Anthropologist*, 1986, 88(2).

Vanessa Hill and Kathleen M. Carley, 1999, "An Approach to Identifying Consensus in a Subfield: The Case of Organizational Culture." Poetics, 27: 1-30.

Hoffman, D., & Franke, G. (1986). Correspondence analysis: Graphical representation of categorical data in marketing research. Journal of Marketing Research, 23, 213-227.

ASSIGNMENT DUE – VIA EMAIL - 2 page proposal for final paper and 2 pages of data analysis for final paper

3-12: MID-TERM BREAK - NO CLASS

* 3-5: Issues of Analysis and Inference

E. M. Airoldi, D. M. Blei, E. P. Xing, and S. E. Fienberg.A latent mixed-membership model for relational data. In Workshop on Link Discovery: Issues, Approaches and Applications, in conjunction with the 10th International ACM SIGKDD Conference, 2005.

Edoardo Airoldi, David Blei, Stephen Fienberg, and Eric Xin, Combining Stochastic Block Models and Mixed Membership for Statistical Network Analysis

Stephen Borgatti, Kathleen Carley, and David Krackhardt, 2006-forthcoming, "Robustness of Centrality Measures under Uncertainty," Social Networks.

Brigham S. Anderson, Carter Butts and Kathleen M. Carley, 1999, "The Interaction of Size and Density with Graph-Level Measures" to Social Networks. " Social Networks, 21: 239-267.

David Banks and Kathleen Carley, 1994, "Metric Inference for Social Networks." Journal of Classification, 11: 121-149.

Kathleen M.Carley and David Banks, 1993, "Nonparametric Inference for Network Data." Journal of Mathematical Sociology, 18(1): 1-26.

Tom A.B. Snijders, Philippa E. Pattison, Garry L. Robins, and Mark S. Handcock, 2004, *New specifications for exponential random graph models.* To be published, *Sociological Methodology*.

Costenbader, E. and Valente, T.W. 2003. The stability of centrality measures when networks are sampled. *Social Networks* 25 (2003) 283–307.

* 3-19: Data Discovery and Missing Data

Goldenberg A, Kubica J, Komarek P, Moore A, and Schneider J. 2003, A Comparison of Statistical and Machine Learning Algorithms on the Task of Link Completion. In Proceedings of the Workshop on Link Analysis for Detecting Complex Behavior, in conjunction with the 9th ACM SIGKDD Conference on Knowledge Discovery and Data Mining. Washington DC. 2003. http://citeseer.ist.psu.edu/688260.html

Hady W. Lauw, Ee-Peng Lim, HweeHwa Pang, Teck-Tim Tan, 2005, Social Network Discovery by Mining Spatio-Temporal Events, Computational and Mathematical Organization Theory. 11(2): 97-118.

Bradley Malin. 2005, Betrayed By My Shadow: Learning Data Identity via Trail Matching. 2005; 20050609001. http://www.jopt.org/publications/20050609001_malin.pdf

David Jensen, Jennifer Neville, Michael Hay. Avoiding Bias when Aggregating Relational Data with Degree Disparity. Proc. International Conference on Machine Learning (ICML). 2003: 274-281.

TBA

* 3-26: Network Dynamics

Friedkin, N.E and E.C. Johnsen. 1999. Social Influence Networks and Opinion Change. *Advances in Group Processes* 16: 1-29. see also **Friedkin, N. E.** 1998. *A Structural Theory of Social Influence*. New York: Cambridge University Press.

Wasserman and Faust, chapter 17.2.2

Monge, P. R. and Contractor, N. S., 2001, Emergence of communication networks. In F. M. Jablin & L. L. Putnam (Eds.), *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (2nd ed., pp. 440-502). Thousand Oaks, CA: Sage.

Macy, M. W., Kitts, J. A. and Flache, A., 2003, Culture wars and dynamic networks: A Hopfield model of emergent structure. Paper presented at the *First Conference of the European Social Simulation Association* (September 19, 2003).

Johnson, J., Palinkas, L. A., and Boster, J. S., 2004, Informal social roles and the evolution and stability of social networks. In R. Breiger, K. M. Carley & P. Pattison (Eds.), *Dynamic Social Network Modeling and Analysis: 2002 Workshop Summary and Papers* (pp. 121-32). Washington, DC: National Academies Press.

Watts, D. J. (1999). Networks, dynamics, and the small world phenomenon. *American Journal of Sociology*, *105*(2), 493-527. See also **Watts D. J. and Strogatz S. H.** 1998. Collective dynamics of 'small-world' networks. Nature 393, 440-442.

J. Leskovec, J. Kleinberg, and C. Faloutsos. Graphs over Time: Densification Laws, Shrinking Diameters and Possible Explanations. Proc. 11th ACM SIGKDD Intl. Conf. on Knowledge Discovery and Data Mining, 2005.

Carley, K. M., 1999, On the evolution of social and organizational networks. In S. B. Andrews & D. Knoke (Eds.), Research on the Sociology of Organizations (Vol. 16, pp. 3-30). Greenwich, CT: JAI Press.

* 4-2: Network Dynamics

Tom A.B. Snijders, Christian E.G. Steglich and Michael Schweinberger (2005). *Modeling the co-evolution of networks and behavior*. To appear in *Longitudinal models in the behavioral and related sciences*, edited by Kees van Montfort, Han Oud and Albert Satorra; Lawrence Erlbaum, 2006.

Christian E.G. Steglich, Tom A.B. Snijders and Michael Pearson, 2004, *Dynamic Networks and Behavior: Separating Selection from Influence*. Submitted for publication.

Jeffrey C. Johnson, James S. Boster and Lawrence Palinkas, The Evolution of Networks in Extreme and Isolated Environments

Il-Chul Moon and Kathleen M. Carley, 2006 Estimating the near-term changes of an organization with simulations, AAAI Fall Symposium, Arlington, VA, Oct 12-15, 2006

Cataldo, M., Wagstrom, P., Herbsleb, J. and Carley, K. 2006, Identification of Coordination Requirements: Implications for the Design of Collaboration and Awareness Tools. In Proceedings of the Conference on Computer Supported Cooperative Work (CSCW'06), Banff, Alberta, Canada

TBA

* Note: this syllabus has been edited. In particular, the original syllabus had an additional 10 pages of background readings.

Dr. Joerg Raab
Department of Organisation Studies
Faculty of Social and Behavioural Sciences
Tilburg University

INTERORGANIZATIONAL RELATIONSHIPS

Master Organisation Studies
Department of Organisation Studies
Tilburg University
400832
Research Master

Spring 2008

Syllabus

Instructors Jörg Raab (Course coordinator)
Room S 162
Phone: 013 466 3651
Email: j.raab@uvt.nl
Office Hours: No fix office hours. You can come into my office for short questions, if the door is open. Otherwise, please make an appointment with Gita Goekel or Saskia Boertien-Raterink (S 135, phone: –2069, G.Gokoel@uvt.nl)

General Setup:
The course will be taught as an independent study. We will meet approximately every two weeks for about 2 hours (about 8 times) to discuss the literature we agreed on. The goal is to write a review paper on a topic in the realm of inter-organizational relations and networks. In the social networks literature in general but also in the literature on inter-organizational relations and networks we often read about network theory. In the course and in the reviews we will critically evaluate to what extent such a theory has already been developed with regard to inter-organizational relations and networks. In this process students are asked to complete a 10 page paper by May19, 2008. After the first meeting, students can also suggest topics and literature in this field out of which together with the reading list below a common literature list will be developed.

Course objectives:
The aim of the Research Master course Inter-organizational relationships is to deepen the theoretical, methodological, and empirical knowledge and understanding of the ways organizations use inter-organizational relationships as a way to deal with complexity and environmental dynamics, which are basically the external problems of specialization, differentiation, coordination and integration. More specifically, after finishing the course students are:

- Able to relate practical inter-organizational phenomena to the scientific discourse in the field;
- Able to reflect upon existing and newly acquired knowledge in the field;
- Able to communicate in English (orally and in writing) on new (research) developments in inter-organizational studies and their consequences;
- Knowledgeable on the important concepts and models in the field of inter-organizational studies;
- Knowledgeable on the important explanations used on the theory set on inter-organizational relationships;
- Knowledgeable on the important quantitative and qualitative measurements and measurement models related to the theory set on inter-organizational relationships;
- Able to choose the most appropriate theory or combination of theories given a research problem in the field of inter-organizational relationships.

Course content:
Throughout the seminar, we will read and discuss literature in the field of IOR/ION, which deal with a specific theoretical, methodological, or empirical inter-organizational problem. The seminar focuses on the one hand what kind of research is conducted concerning IOR/ION and literature will be discussed with regard to the different steps in the research cycle. On the other hand, we will discuss to what extent a network theory has already been developed that can be used in analyzing inter-organizational relations and networks.

Required Readings
Students should be prepared heaving read the literature. All readings we jointly agree on will also be mandatory readings.

Course Requirements:

10 page research paper text max. 12 pt Times New Roman, 1,5 line spacing, default settings, due May 17, 2008**.** Students are further asked to hand in a one page statement with two questions and a short elaboration regarding the assigned literature two days before the meeting. At the end of May there will be an oral exam on the paper and the literature discussed in the course.
Grading
Paper 50%, Oral exam 50%.

Assignments

Part I: Theoretical and Methodological Foundations

Meeting 1: 21.2., 12.30 – 14.30

- Brass et al. 2004. Taking Stock of Networks and Organizations: A Multilevel Perspective. Academy of Management Journal 47 (6), 795 – 817.
- Borgatti, S. P.; Foster, P.C. (2003). "The network paradigm in organizational research: A review and typology. Journal of Management 29, 991 – 1013.
- Gulati, R. (1998). "Alliances and Networks". Strategic Management Journal 19 (4): 293 – 317.
- Provan, K. G./ Fish, A./ Sydow, J., (2007): Interorganizational Networks at the Network Level: A Review of the Empirical Literature on Whole Networks, Journal of Management 33, 479-516

Meeting 2: (Some) classics of network thinking: 4.3., 9.00 – 11.00

- Simmel, G. (1908/1971). On Individuality and Social Forms, Chicago, University of Chicago Press, pp. 23 – 69.
- Granovetter, M. S. (1973). "The Strength of Weak Ties." American Journal of Sociology 78(6): 1360-1380.
- Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology*, Vol. 91, No. 3. (Nov., 1985), pp. 481-510.
- Powell, W. W. (1990), Neither Market nor Hierarchy: Network Forms of Organization. Research in Organizational Behavior 12:295-336.

Meeting 3: Network Analysis: History and Method: 18.3, 15.00 – 17.00

- Wellmann, B. and Berkowitz, S.D. (1988). Social Structure. A Network Approach, Cambridge: Cambridge University Press (pp. 1-61) (self copying)
- Scott, J. (2000). Social Network Analysis. A handbook (2nd ed.). London: Sage Publications, ch. 3-6. (self copying)
- Freeman, L.C. 2004. The development of social network analysis : a study in the sociology of science, Vancouver: Empirical Press (self copying)

Meeting 4: Inter-organisational Relations: 1.4., 15.00 – 17.00

- Oliver, C. (1990). Determinants of Interorganizational Relationships: Integration and Future Directions. Academy of Management Review 15(2): 241-265.
- Gulati, R. (1995). Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances. Academy of Management Journal 38 (1): 85 – 112.
- Gulati, R. and Sytch, M. (2007). Dependence Asymmetry and Joint Dependence in Interorganizational Relationships: Effects of Embeddedness on a Manufacturer's Performance in Procurement Relationships. Administrative Science Quarterly 52: 32-69.

- Ring, P.S. and van de Ven, A.H. (1994). Developmental Processes of Cooperative Interorganizational Relationships. Academy of Management Review 19: 90 – 118.
- Isett, K. R. and Provan, K. (2005). The Evolution of Dyadic Inter-organizational Relationships in a Network of Publicly Funded Nonprofit Agencies. Journal of Public Administration Research and Theory 15: 149 – 165.

Part II: Practical Application of Relational Thinking

Meeting 5: Network Research in Action: IOR/ION in Industry: 17.4., 15.00 – 17.00

- Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*, Vol. 42, No. 1. pp. 35-67.
- Provan, K.G. and S. E. Human (2000). Legitimacy Building in the Evolution of Small-Firm Multilateral Networks: A Comparative Study of Success and Demise. *Administrative Science Quarterly*, Vol. 45, No. 2, pp. 327-365.
- Vankatraman, N. and Lee, C.-H.. 2005. Preferential Linkage and Network Evolution: A conceptual Model and Empirical Test in the U.S. Video Game Sector. *Academy of Management Journal* 47 (6), 876 – 892.
- Gulati, R. and M. Gargiulo (1999). "Where Do Interorganizational Networks Come From?" American Journal of Sociology 104(5): 1439-93.

Meeting 6: Social Capital in and through IOR/ION: 8.5., 15.00 – 17.00

- Burt, R.S. (2005). *Brokerage and Closure. An Introduction to Social Capital.* Oxford: Oxford University Press. (p. 1-23 and chapters 1, 2, 3) (self copying)
- Coleman, J. (1988). "Social Capital in the Creation of Human Capital". American Journal of Sociology 94: 95 – 120.
- Walker, G; Kogut, B.; and W. Shan. (1997) Social Capital, Structural Holes and the Formation of an Industry Network, Organization Science, Vol. 8 (2), pp. 109-125.

Meeting 7: Effectiveness and Management of Inter-organization Relations and Networks: 23.5. 9.00 – 11.00

- Provan, K. G. and H. B. Milward (1995). "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems." Administrative Science Quarterly 40: 1-33.
- Kenis, P. and K.G. Provan (2006): The Control of Public Networks. International Public Management Journal 9: 227 – 247.
- Van Raaij, D.P.A.M. (2006). Norms Network Members Use: An Alternative Perspective for Indicating Network Success or Failure. International Public Management Journal 9 (3), in press
- Provan, K. G., and P. N. Kenis. forthcoming. Modes of Network Governance: Structure, Management, and Effectiveness. Journal of Public Administration Research and Theory
- Miles, R. E., and C. C. Snow. (1992). Causes of Failure in Network Organizations. California Management Review 34:53-72.

Meeting 8: Intra-organizational networks: 3.6., 15.00 – 17.00

- Curseu, P.L.; Kenis, P.; Raab, J. and U. Brandes (2007). Composing Effective Teams Through Teamdating. Paper submitted to Organization Science
- Ibarra H, Kilduff M, Tsai W. (2005). Zooming in and out: Connecting individuals and collectivities at the frontiers of organizational network research. Organization Science 16(4): 359-371.
- Ibarra H, (1995). Race, Opportunity, and Diversity of Social Circles in Managerial Networks. Academy of Management Journal 38 (3): 673 - 703
- Reagans, R., E. Zuckerman and B. McEvily. (2004). How to make a team: Social networks vs. demography as criteria for designing effective teams. Adm. Sci. Quart. 49: 101-133.

Meeting 9: Oral Exam, Final Discussion: End of June, 1 week after handing in paper

Mark S. Handcock
Department of Statistics
University of Washington

Statistical Analysis of Networks
CS&SS/STAT/SOC 567

Motivation

This course is an introduction to the analysis of social structure, conceived in terms of social relationships.
Social structure is conceptualized as a system of social relations tieing distinct social entities to one another. Social network theory is the attempt to represent the structure in social relations via networks. It is then a theory pertaining to types of observable social spaces and their relation to individual and group behavior.
Observations on the social relations are of two forms:

- individual level information on the social entities
- relational data on pairs of entities

While both forms are important for the study of social relations, social network theory recognizes fundamental role of the relational information. It is based on the premise that social context is an important determinant of individual behavior. It seeks to understand individual and group behavior in terms of relational information rather than as solely the aggregation of individual characteristics.
The focus of the course are modern methods for the statistical analysis of social networks. The course covers the major concepts of social network theory and the mathematical representation of social concepts such as "role" and "position".
Visualization plays a central in social network analysis. With the development of high speed computing and graphical display tools, visualization has become a flexible and powerful tool in the exploration of social relations. Graphics exploit the power of our visual senses to convey information in a direct way. In this course we will emphasize the use of graphical representations of network information as much as possible.
The course will have an applied focus on the development of tools for research in the social sciences. The course will involve the practical application of the ideas and their implementation through statistical software, particularly R, to make them accessible to social scientists.
This course is part of the curriculum of the new Center for Statistics and the Social Sciences (CSSS), with funding from the University Initiatives Fund. The CSSS is includes faculty members from the Department of Statistics and a broad-range of social science disciplines including Anthropology, Economics, Geography, Political Science, and Sociology. This curriculum is been developed to complement and strengthen the quantitative methods course offerings for social science students at both the undergraduate and graduate levels.

Structure of the Course

There will be a two lectures per week. The lecture on Thursday will sometimes be a laboratory session.

Textbooks

[WF] Stanley Wasserman, Katherine Faust, with Dawn Iacobucci "Social Network Analysis: Theory and Methods" (1995). Cambridge University Press: Cambridge. *Required*.

[H] Robert A. Hanneman and Mark Riddle "Introduction to Social Network Methods" (2005). Riverside, CA: University of California, Riverside. ***Required and free online.***

Mailing list and Discussion Forum

I will be using a mailing list to provide discussion of issues in class and related questions. For questions that *might* be of interest to other students, please use the mailing list rather than solely emailing me. Example of questions are about interesting articles you have seen in the media, problems with access to resources, homework or computer questions. Enjoy!

Please regularly consult this class home page and archive of the mailing list. It will contain lecture notes, homework, solutions and course information.

Computer Usage and Software

The computer is the scientific laboratory of the applied researcher in quantitative fields. As such this course requires the student to develop a degree of comfort and competence "in the lab". If you want more background consult the lecture notes in CSSS 505.

Course Requirements and Grades

There will be weekly homeworks and exercises both the theory and real data analysis. Students will be graded on a scale of 1 to 10 for each homework. This will be 50% of the grade.

Discussion of homework problems is *encouraged*. However, each student is required to prepare and submit solutions (including computer work) to the assignments and project on their own; solutions prepared "in committee" are not acceptable. Duplication of homework solutions and computer output prepared in whole or in part by someone else is *not* acceptable and is considered plagiarism. If you receive assistance from anyone, you must give due credit in your report. (Example: "Since the data are all positive, and skewed to the right, a logarithmic transformation is clearly appropriate as a next step. I thank David Cox for pointing this out to me.")

There will be a final project worth 50% of the grade.

The project will be to undertake an analysis of a social network that you find interesting. You can select any network dataset you like, but preferable related to your graduate work or thesis area. I do not want a quick and routine analysis; a good job will show understanding of the problem and possible solutions and techniques to consider. The technical results should be stated clearly. The report must contain a clearly written conclusion section giving a non-technical summary that is concise and informative.

The data set should contain at least 20 nodes, and at least two variable measured for each node. Do *not* merely use data from a textbook – the world is an interesting

place! All data sources must be cited, and described.
I welcome comments or suggestions about the course at any time, either in person, by letter, or by anonymous email. *Please feel free* to use these ways make comments to me about any aspect of the course.

Syllabus

The table below lists topics and readings. It will be updated as the course goes along to keep track of where we are at.
WF stands for "Social Network Analysis: Theory and Methods" by Stanley Wasserman, Katherine Faust, with Dawn Iacobucci, 1995.
H stands for "Introduction to Social Network Methods" by Robert A. Hanneman and Riddle, Department of Sociology, UC-Riverside, 2005.

Date	Topic	Reading	Homework Due
Tuesday April 1	**Motivation** Overview of the use of social networks to model social structure important for understanding the spread of HIV.	Local Acts, Global Consequences: Networks and the Spread of HIV	
Thursday April 3	**Introduction** Social science is the study of relationships and relationships can be represented via social networks	Borgatti: Introduction to Social Networks Radcliffe-Brown(1940): On Social Structure	
Tuesday April 8	**Graph Theory and Notation** Nodes, ties (directed/undirected), degree, connectedness, cycles, centrality, betweenness, etc	W&F Chapter 3 H&R Chapter 3 Borgatti (1994) (suggested)	
Thursday April 10	**Data structures for representing graphs** Sociomatrix, edge list, R network data types, datasets, (bipartite, affiliation)	W&F Chapter 4 H&R Chapter 4	Homework 1 Find paper on networks, read and summarize
Tuesday April 15	**Introduction to R**	All about R notes	
Thursday April 17	**Introduction to Networks in R** sna and network	Sunbelt handout	Homework 2 Doing network descriptives by hand

	packages reading and manipulating data, plotting, computing descriptive statistics		
Tuesday **April 22**	**Stochastic Models of Networks (estimation and inference)** Model 1: Reney-Erdos: p(tie) is constant, independent: joint distribution model, logistic model Model 2: 2 different types of nodes with different probabilities of ties Model 3: Vertex covariates model (logistic regression)	W&F Chapter 13.1-13.5 Snijders (2003)	
Thursday **April 24**	**Modeling Cohesive Subgroups** arbitrary mixing groups known a priori likelihood inference	W&F Chapter 7 H&R Chapter 7	Homework 3 Use R (sna, network) to read data, descriptives, plots, centrality, etc.
Tuesday **April 29**	**Modeling Cohesive Subgroups continued** multiple groups unknown (latent class model) Model 2: 2 different types of nodes with different probabilities of ties Inference for models	Nowicki, K. & Snijders(2001). Estimation and prediction for stochastic block models. Journal of the American Statistical Association, 96, 1077-1087	
Thursday **May 1**	**Models for Fundamental Social Forces** 1. Centrality (degree centrality, eigenvalue centrality) 2. Sociality (undirected) 3. Prestige (directed)	W&F Chapter 5 H&R Chapter 6	Homework 4 Example Reney-Erdos, vertex attributes, mixing

	4. Mutuality (directed)		
Tuesday May 6 & Thursday May 8	**Modeling Cohesive Groups in Social Space** Network position (latent social space, probability of a tie proportional to distance) 1-dimensional continuous observed 2-dimensional continuous observed 2-dimensional continuous unobserved latent space cluster models	Hoff, Raftery, & Handcock (2001)	Homework 5 a) Latent class model b) centrality model
Tuesday May 13 & Thursday May 15	**Introduction to general ERGM framework** general form conditional independence models: Markov models, Hammersley-Clifford 1. Simulation of network via MCMC 2. Likelihood-based inference 3. Maximum likelihood and Bayesian inference	Hunter (2003)	Homework 6 Latent space models
Tuesday May 20	**Structure of triads: Triad Census (Davis-Holland-Leinhardt)** transitivity balance model (Heider) Simmel model	W&F Chapter 14	
Thursday May 22	**Mores sophisticated structural forms** cycles, triangles, gwsp, dsp, esp, stars	Snijders et al (2006)	Homework 7 ERGM theory and MCMC, simulation of graphs
Tuesday	**Goodness of fit of**	Hunter, Goodreau, &	

May 27	**ERGMs**	Handcock (2006)	
Thursday **May 29**	**Inference for partially observed networks**	Handcock and Gile (2007), Gile and Handcock (2008)	
Tuesday **June 3** **&** **Thursday** **June 5**	**Sampling of networks (design)** ego-centered, link tracing	Gile and Handcock (2008); Frank (2004) Chapter 4	Homework 8 Triad census Heider vs. Simmel More sophisticated models
Extra **June**	**Network Dynamics Summary**		Homework 9 Goodness of fit sampling examples

Assignments, Labs, and Exercises.

Selected Assignments Submitted by Keith Hampton
Annenberg School for Communication
University of Pennsylvania

Assignment #3: New Media Communication Diary

Comm 481: Social Networks
Prof. Keith Hampton

Instructions

Your assignment is to keep a diary of the interactions you have with people using "new media" (i.e. mobile phones and the Internet). You must record every interaction that you have with another person using new media over a full 7 day period (NOTE: Exclude any interactions with the subject of a university research project). Record your interactions in the attached diary shortly after they happen, do not wait and complete the diary retrospectively at the end of the day or week (make additional copies of the diary sheets as necessary).

For each interaction, record the date and time, the first name and last initial of the person (or enough information so that you will remember who they are), the type of support exchanged (*indicate gave and/or received*), the medium of communication used, your location at the time of the interaction, your best guess at how far away the person is (miles), your relationship to the person, the person's sex and age, how long you have known the person, and your tie strength. See the attached legend for a coding scheme that you can use to record "type of support," "medium," location," "relationship," and "tie strength". You may create new coding schemes or modify the current scheme, but you must maintain a similar level of detail.

Part I

After you have recorded your interactions for the full 7 days, analyze your diary and write a blog post answering the following questions. Your blog post should be 1250-1750 words, not including your answer to question 1. For question 2 and 3, be sure to discuss your answer with reference to the course readings. For example, are your observations consistent or inconsistent with the readings? Do they provide new evidence for or against existing hypotheses? Based on your observations can you formulate new hypotheses, theories, or conclusions that build or contrast with the literature you have read?

Questions

1) Who are the 5 people you interacted with the most often? Who are the 5 people you interacted with the most often for each of the communication mediums you used? Briefly describe each of these people and your relationship/tie. (NOTE: You need not refer to the course readings when answering this question).
2) Is there a relationship between the medium of communication used and the strength of the tie? The type of support exchanged? The type of relationship? Duration of relationship? Distance to the person? The person's age or gender? The similarity of age and gender to your own? What if anything does this say about the role of new media in our social networks?
3) What characteristics of the tie and person were most common for those interactions that took place inside your home? In public places? What if anything does this say about how new media may change the composition of our social networks?

Part II

Bring a copy of your diary to class (keep a backup copy for yourself). Print your full name and your blog username on the top of each page and staple them together. Meet with your small group, combine your results and discuss the questions from Part I. Make a short 10 minute group presentation explaining your observations. At the end of the class hand in your diary to the instructor.

Name______________________ Username_______ Page #____

DATE	TIME	NAME	TYPE OF SUPPORT	MEDIUM	YOUR LOCATION	DISTANCE	RELATIONSHIP	SEX	AGE	HOW LONG KNOWN	TIE STRENGTH
								☐Male ☐Female			
								☐Male ☐Female			
								☐Male ☐Female			
								☐Male ☐Female			
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LEGEND

Support
1. Emotional aid
2. Small services
3. Large services
4. Financial aid
5. Companionship
6. Job information
7. _____

Medium
1. Cell phone
2. SMS
3. Email
4. Instant messenger
5. Skype or VOIP
6. Facebook
7. _____

Location
1. Home
2. Classroom
3. Work
4. Street
5. Friend's House
6. Family's House
7. _____

Relationship
1. Spouse/Partner
2. Parent
3. Child
4. Sibling
5. Other relative
6. Friend
7. Neighbor
8. Co-worker
9. Classmate
10. Acquaintance
11. _____

Tie Strength
1. Close
2. Moderate
3. Not Close

Assignment #4: Network Measures
Comm 481: Social Networks
Prof. Keith Hampton

Instructions
Administer the attached survey to a minimum of 20 people. The survey consists of a small number of demographic questions, a position generator, and a name generator and interpreter. Half of your interviews must be with people between the age of 18 and 22, the other half must be over the age of 35. Within each age group half of your interviews must be with men, the other half with women.

After completing your surveys analyze and discuss your findings in relation to the course readings. At a minimum, your findings should include a discussion of the following course themes and topics: social support, network size, network density, community, privatization, network diversity, strong ties, weak ties, homophily, the role of new media (i.e. the Internet, mobile phones, and related technologies), and issues of measurement as they pertain to this survey. Some of these topics may be overlapping, you may address them point-by-point or you may integrate them into a more holistic or focused analysis. You may find it helpful to conduct your analysis as a comparison between different types of survey participants. For example, comparing men and women, young and old, big networks vs. small networks, those with diverse networks vs. those who are less diverse, etc. (there are many possibilities for comparison).

You must provide evidence and references from the course readings to substantiate your findings / conclusions.

Submit your findings in the form of a blog post of 1250-1750 words. Print your full name and your blog username on the top of each survey, staple them together and hand in to the course instructor at the end of class on December 7.

Note that the occupations listed in the position generator included in this survey are ranked in order of occupational prestige, highest at the top, lowest at the bottom.

Social Network Survey

A senior undergraduate class at the University of Pennsylvania (COMM 481) is studying the structure of people's social networks at different stages in their life. Please help us with this class project by completing this simple, short, anonymous survey. Your participation is purely voluntary. You are free to discontinue participation at any time. You are also free to decline to answer specific survey questions. Your participation is valued and by participating in this survey you will help build a better understanding of how social relationships vary over the life course.

1. Sex: □ Male □ Female

2. How old did you turn on your last birthday? _____

3. What is the highest level of education that you have completed?

□ < high school
□ High School or GED
□ Attended College, not complete
□ 2 year Associate's degree
□ 4 year Bachelor's degree
□ Some graduate training
□ Graduate or professional degree

4. Are you currently a full-time student? □ Yes □ No

5. Looking over the following list of occupations, place a check next to any occupation in which someone you know works. Consider anyone you know by first name, and know well enough that if you were to ask a favor they would be likely to help you:

□ Judge
□ Aircraft Pilot
□ Pharmacist
□ Professional Journalist
□ Nurse
□ Secretary
□ Flight Attendant
□ Mechanic
□ Police Officer
□ Truck Driver
□ Cook
□ Store Clerk
□ Hairdresser
□ Dry Cleaner
□ Laborer

6a. 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.

RECORD NAMES ON ATTACHED SHEET.

IF LESS THAN 5 NAMES MENTIONED, PROBE: Anyone else?

6b. Please think about the relations between the people you just mentioned. Some of them may be total strangers in the sense that they wouldn't recognize each other 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.

Are they especially close? PROBE: As close or closer to each other as they are to you?

	1				
2	□ Strangers □ Know each other □ Especially close	2			
3	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	3		
4	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	4	
5	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	5
6	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close	□ Strangers □ Know each other □ Especially close

6c. I am now going to ask you for some information about each of the people you mentioned. Please answer to the best of your ability.

READ EACH NAME AND ASK:

Are they male or female?

How old are they

What is the highest level of education they have completed?

How is (NAME) connected to you? PROBE: What other ways? : Spouse, Parent, Sibling, Child, Other family, Co-worker, Member of group, Neighbor, Friend, Advisor, Other.

How long have you known each other?

How far away does this person live?

In the last 30 days, on how many days did you: see them in person, talk on a land line telephone, cell phone, send or receive postal mail, send or receive an email, send or receive an instant message?

THANK YOU FOR YOUR PARTICICIPATION

	Name	SEX	AGE	EDUCATION	RELATIONSHIP	HOW LONG KNOWN	DISTANCE	COMMUNICATION IN THE LAST MONTH					
								IN PERSON	PHONE	CELL	POSTAL MAIL	EMAIL	IM
1	_____ Name	□ Male □ Female	_____ Years	□ < high school □ High school or GED □ Attended college, not complete □ 2 year Associate's degree □ 4 year Bachelor's degree □ Some graduate training □ Graduate or professional degree	□ Spouse □ Parent □ Sibling □ Child □ Other family □ Co-worker □ Member of group □ Neighbor □ Friend □ Advisor □ Other	_____ Years	□ Same house □ Same building / dorm □ Same neighborhood □ Same city □ Same State □ Same country □ Different country	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days
2	_____ Name	□ Male □ Female	_____ Years	□ < high school □ High school or GED □ Attended college, not complete □ 2 year Associate's degree □ 4 year Bachelor's degree □ Some graduate training □ Graduate or professional degree	□ Spouse □ Parent □ Sibling □ Child □ Other family □ Co-worker □ Member of group □ Neighbor □ Friend □ Advisor □ Other	_____ Years	□ Same house □ Same building / dorm □ Same neighborhood □ Same city □ Same State □ Same country □ Different country	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days
3	_____ Name	□ Male □ Female	_____ Years	□ < high school □ High school or GED □ Attended college, not complete □ 2 year Associate's degree □ 4 year Bachelor's degree □ Some graduate training □ Graduate or professional degree	□ Spouse □ Parent □ Sibling □ Child □ Other family □ Co-worker □ Member of group □ Neighbor □ Friend □ Advisor □ Other	_____ Years	□ Same house □ Same building / dorm □ Same neighborhood □ Same city □ Same State □ Same country □ Different country	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days
4	_____ Name	□ Male □ Female	_____ Years	□ < high school □ High school or GED □ Attended college, not complete □ 2 year Associate's degree □ 4 year Bachelor's degree □ Some graduate training □ Graduate or professional degree	□ Spouse □ Parent □ Sibling □ Child □ Other family □ Co-worker □ Member of group □ Neighbor □ Friend □ Advisor □ Other	_____ Years	□ Same house □ Same building / dorm □ Same neighborhood □ Same city □ Same State □ Same country □ Different country	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days	_____ Days

Note: original submission included six rows.

Selected Assignments Submitted by Alexandra Marin
Department of Sociology
University of Toronto

NETWORK OLYMPICS

Context and Objectives: The Network Olympics are held on the day students submit their final papers, a class for which no readings are due. The Olympics are intended to help students begin thinking over the material presented over the entire course in preparation for the final exam.

Materials Required: Blackboard or whiteboard, printed programs, one laptop per team. Students should bring their notes for the course and pens.
Setup: Students are divided into four teams that compete against one another. Students should be divided with strong and weak students on each team to ensure teams are relatively well-matched. TAs and/or previous years' students serve as judges. If previous years' students serve as judges, a TA serves as advisor to the judges, clarifying material that may have been forgotten or changed from one year to the next. Printed programs include a list of events, but do not include the final chance-based portion of the Network Showdown.
Before the event begins I divide the board into 4 sections (one per team) and add ten nodes (five in one colour and five in another) to each team's section. I do not add any ties.

Events

1. NETWORK BUILDING
Time: Throughout, 2 Minute Explanation)

Throughout the Network Olympics students add or subtract ties to their own team's graph and to their competitors' graphs. Opportunities to make changes to the graphs are won for each event. Ties can be directed or undirected, reciprocated or not, between or within node-types, etc. One change consists of adding a tie, removing a tie, or adding/removing ties to follow one rule (e.g. add/remove a tie to any forbidden triad, make all ties symmetric, change directed ties to undirected). Nodes may not be deleted or added and changes may not result in either removing every tie or adding every tie. During the final network showdown, each team will have 3 minutes to give a speech arguing that their team's network is "better" than their competitors' networks. They may define "better" however they choose and draw on whichever course readings they find most useful.

2. TEAM NAMES + ADD INITIAL TIES TO NETWORK
Time: 10 minutes *Points:* 10 points for
team names *Network Changes:* 3

Each team chooses a name. While some team members are discussing team names, one or more team members adds 10 ties to their own team's network, using whatever strategy they choose.
Names are assigned from 0-10 points by the judges. The winning team makes 3 changes to their own network and 3 changes to each other team's network. One team member works on each network, to move things along quickly.

3. NETWORK QUIZ (20 minutes)
Time: 7 minutes writing, 8 minutes guessing

Points: 5 per question answering (-10 for writing a question and not knowing the answer)
Network Changes: 5

Each team writes two network-related questions without consulting their notes. Each team asks their two questions to the following team, which has 1 minute to agree upon an answer. If they answer correctly, they receive 5 points. If they do not answer correctly, the asking team receives the 5 points. If the asking team does not know the correct answer, they lose 10 points.

The team that earns the most points gets to make 5 changes to their own network and 5 changes to each other team's network.

4. NETWORK HAIKU (25 minutes) *Time:* 10 minutes writing, 15 minutes reading *Points:* 20 possible points *Network Changes:* 5

Students write network-related haiku and read them outloud. Judges assign 0-20 points to each team based on the cleverness, elegance, and content of the haiku as well as the number of haiku written by each team.

5. SIX (OR FEWER!) DEGREES OF CANADA
Time: 10 minutes *Points:* 10 points - 1 point per link per successful connection. 10 point penalty for passing *Network Changes:* 4

One laptop with wireless internet connection is used for each team. Students begin on the English Wikipedia start page (http://en.wikipedia.org/wiki/Main_Page). Each team assigns one team member to monitor the progress of another team (i.e. count links).
At the "Go" signal, students click the "Random article" link on the left hand of the page. From whatever article is presented, students must click links to reach the Wikipedia article for Canada (http://en.wikipedia.org/wiki/Canada). Students can only click links. They may not type anything or enter any text by any method. When students reach the Canada article they click "Random Article" again and navigate back to Canada. Rinse and repeat for 10 minutes.
Teams receive 10 points - 1 point per click for each time they successfully navigate from a random page to the Canada link. For example, clicking 4 links to get to Canada scores 6 points. If a team "passes" by choosing to click "Random Article" again, without reaching the Canada article, they incur a 10 point penalty.
The team that earns the most points make 4 changes to their own network and each other team's network.

6. LIGHBULBS
Time: 10 minutes *Points:* 20 *Network Changes:* 2

Each time must come up with 2 answers to the question "How many network analysts does it take to change a lightbulb?" Answers are scored from 0-20 points based on humour, cleverness and accuracy (if time permits, real network analysts and lighbulbs may be brough in for empirical verification).

7. FINAL NETWORK SHOWDOWN
Time: 15 minutes
Points: 15 points Students get 5 minutes to consult with their teams and choose a strategy and a speaker. Then each team's speaker must give a 3 minute speach explaining why their

team's network is the best of the four networks created. Speeches are scored from 0-15 by the judges.

7.5 Secret Network Showdown

Time: 3 minutes *Points:* 20

This event is omitted from the program. 2 students from 2 different teams are chosen. One student flips a coin and one throws a die. Coin and die values are assigned as follows:

Heads:	Highest	1. Density
Tails:	Lowest	2. Maximum centrality
		3. Diameter
		4. Maximum degree centrality
		5. Number of isolates
		6. Number of homophilous dyads

For example, if students throw heads/3, the team with the highest network diameter wins 20 points.

8. Medal Ceremony and Prizes

(10 minutes) A variety of party favours (of the 5 toys for a dollar for kids' loot bags, available at the local dollar store) are used for prizes. Members of the first place team each choose one prize, then the second place team, then third, then fourth.

Selected Assignments Submitted by Katherine Faust
School of Social Science
University of California, Irvine

Lab 3: Centrality, Centralization, Ego-Centered Networks
April 23, 2007

Centrality and Centralization, Ego-Centered Networks

Non-directional Relations: A hypothetical network and Florentine Families marriage and business

1. Centrality for a graph (non-directional relation). Use the example network KITE.

a. In *NetDraw* draw a graph of the network (remove the arrowheads). Which node is most "central"?

b. In *UCINET* find the degree of each node.

Network → Centrality → Degree

c. Find the betweenness centrality of each node.

d. Look at the graph and trace the geodesics between pairs of nodes Find the geodesic distance between each pair of nodes

Network → Cohesion → Distance

e. Find the closeness centrality of each node.

f. Why do different centrality measures give different answers about which node is most central?

2. Centrality for Padgett's Florentine families business and marriage

Use the data on marriage and business relations for Padgett's Florentine families. There are two files: PADGM and PADGB. There are also two attribute variables: wealth and level of political activity of these families (in the file PADGA).

a. Find the degree, closeness, and betweenness centrality for the families on each relation (marriage and business).

b. What's happening with the closeness centralities?

Centralities for directed relations: World trade data

3. Use the data on trade and diplomatic relations among countries from W&F. There are several relations (trade in basic manufactured goods, food, crude materials, minerals, and presence of diplomatic ties) and four attributes (GNP growth, population growth, secondary school enrollment ratio, and energy consumption per capita).

a. Find indegree and outdegree centralities for trade of minerals (*WMINERAL*). *Be sure to specify that the data are not symmetric. Notice that UCINET saves the centrality measures in a file FreemanDegree.*

b. Look at the centralization measures for this mineral trade network. What does the difference in centralization for indegree and outdegree mean about the pattern of trade in minerals?

c. Investigate how centrality is associated with the attributes of the countries.

Calculate correlations between the centrality measures and the attributes.

i) First, merge the actor centrality measures and the actor attributes into a single data file. You can do this in *UCINET* using the "join" option to join several *UCINET* data files

Data → Join

Select the two files and use the "columns" option.
FreemanDegree
Wattributes

The new file is saved as JOINED, or you may give it a different name.

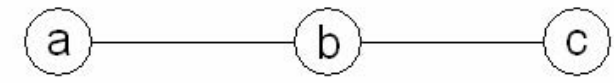
ii) Now, you can find correlations by using

Tools → Similarities

Choose correlation as the measure of profile similarity on the columns of your matrix of joined files (JOINED) from the previous step.

Eigenvector Centrality: hypothetical example

4. Find the eigenvector centrality for each point in the following graph.



	a	b	c
a		1	0
b	1		1
c	0	1	

Network → Centrality → Eigenvector

Optional : Verify the relationship between the centralities of the actors expressed in the equation:

$$C_i = \frac{1}{\lambda_1} \sum_{j \neq i}^{g} x_{ij} C_j$$

Eigenvector centrality for Zachary's Karate club (file ZACHE)

5. These data show associations (symmetric) between members of a university karate club. The club split into two separate groups shortly after the data were recorded. First draw a graph of the network. Which people seem to be most central?

a. Find the eigenvector centralities for this network. Is anyone more or less central than you expected from looking at the graph?

b. Compare the results using four different centrality measures Network → Centrality → Multiple measures Notice that *UCINET* saves the file CENTRALITIES. You can use this to get correlations between the different measures or to produce scatterplots for comparing pairs of measures

Tools → Similarities — *specify Columns*
Tools → Scatterplot → Draw — *specify the columns to plot*

c. Notice how similar the centrality measures are (especially degree and eigenvector). Also notice person 32 who is high on closeness centrality but not as high on degree centrality.

Ego-Centered Networks

6. Use one of the trade relations between countries.

a. In *NetDraw*, draw a graph of the network. Use the "Ego" option to look at different ego-centered networks. You can "step" through individual nodes.

b. In *UCINET* find the density of each ego-centered network

Network → Ego Networks → Density

c. What do you notice about countries with dense ego-centered networks?

Lab 4: Multidimensional Scaling and Hierarchical Clustering;
Affiliation Networks; Subgroups
May 7, 2007

Part I: Two Mode Networks (Affiliation Networks)

1. The data below are in a *UCINET* file kids_parties

	e1	e2	e3
allison	1	0	1
drew	0	1	0
eliot	0	1	1
keith	0	0	1
ross	1	1	1
sarah	1	1	0

a. Display the bipartite graph in *NetDraw*. be sure to read it as a 2 mode network

b. Find the one mode actor co-membership matrix

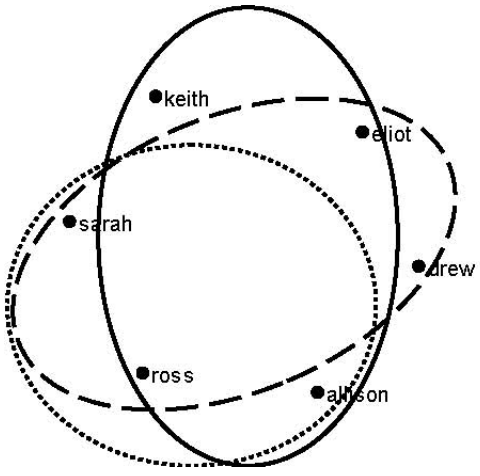
Data | → Affiliation

c. Find the one mode event overlap matrix

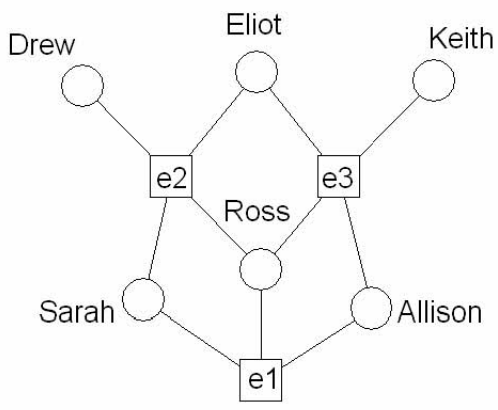
Data | → Affiliation

Interpret the numbers in the one mode matrices

Hypergraph



Bipartite graph



Part II: Multidimensional Scaling and Hierarchical Clustering

2. *Multidimensional scaling of airline distances between cities*

Use the data on airline distances between cities, in the file cityair. Use metric MDS to represent these distances in 2 dimensions. In UCINET use

Tools → MDS → Metric

Use metric MDS to represent these distances in 1 dimension, 2 dimensions, and 3 dimensions. *Be careful to specify that the input data are dissimilarities.* Note the stress in each number of dimensions. Which solution seems best?

Use Non-metric MDS to represent the distances between cities. Compare the result to the metric MDS solution.

Tools → MDS → non-Metric

3. *Multidimensional scaling of Davis, Gardner and Gardner's southern women.*

The original data are observations of 18 women's attendance at 14 social events in the file davis.

Find the one mode actor co-membership matrix. This person-by-person matrix has values that count the number of events each pair of women attended together.

Use either metric or non-metric MDS to represent the actor co-membership data. Represent the data in 2 dimensions. Are any subgroups apparent?

4. *Hierarchical Clustering using Davis, Gardner and Gardner's southern women.*

Use the person-by-person matrix of co-attendances. In UCINET use

Tools → Cluster → Hierarchical

Try each of the clustering options: Average link, complete link, and single link. Compare the results. Are any consistent subgroupings of women apparent in the results?

Compare the clusters from average link clustering to the two dimensional non-metric MDS configuration. How well do the alternative approaches correspond in identifying subgroups of women who tend to socialize together?

Homans (1950) observed of these data:

> "… the eighteen women were divided into two groups. The pattern is frayed at the edges, but there is a pattern. The first seven women, Evelyn through Eleanor *[Evelyn, Laura, Theresa, Brenda, Charlotte, Frances, Eleanor]*, were clearly members of one group; members 11 through 15, Myra through Helen *[Myra, Katherine, Sylvia, Nora, Helen]* were just as clearly members of another. Some women participated about equally with both groups but not very much with either; Pearl is an example. And some participated, though not very often, only with the second group. Pearl, Olivia, Flora and their like are marginal group members."

Are the MDS and clustering results consistent with Homans' description of this group of women?

Part III: Cohesive Subgroups: Cliques

Cohesive subgroups in Florentine Families Business and Marriage relations

5. First draw a graph of the business relation (file: PADGB). Identify the cliques in this graph. Repeat for the marriage relation (file: PADGM)

   How many cliques are there? How large are they? Notice that cliques overlap.

6. In *UCINET*, find the cliques in the business and marriage relations. Use

Network → Subgroups → Cliques

Check the graph to see that these are the cliques you previously identified.

Generalizations of Subgroups, alternatives to Cliques

Cohesive subgroups in Florentine Families Business and Marriage relations

7. **a.** In *UCINET*, find the 1-cliques in the business and marriage relations. Use

Network → Subgroups → N-Cliques

b. Compare these to the cliques you previously identified.

c. Increase N to 2, and find the 2-cliques in the business and marriage relations.

d. Compare these to the 1-cliques.

8. **a.** In *UCINET*, find the 1-plexes in the business and marriage relations. Use

Network → Subgroups → K-Plex

b. **C**ompare these to the cliques you previously identified.

c. Increase K to 2, and find the 2-plexes in the business relation. Notice what happens when the minimum size is 3. Increase the minimum size to 4 and re-run the program.

d. Locate the 2-plexes on the graph of this relation.

e. Compare the 2-plexes to the 2-cliques.

9. *Subgroups for Zachary's karate club* (file: ZACHE)

a. Find cliques in this network. Look at the clique overlap matrix (file: CliqueOverlap).

b. Block the clique overlap matrix using the results from the hierarchical clustering (file: CliquePart). This file has actors as the rows, and levels of the hierarchical clustering partitions in the columns.

c. You can also use the cluster assignments to color nodes in NetDraw if you open the file as an attribute file.

Cohesive subgroups for a directed relation, friendship for fifth graders

10. Find cliques in the friendship relation for fifth graders. In a directional relation a clique requires mutual ties between all members. You can "symmetrize" the relation to include only mutual ties, before finding the cliques.

How is gender related to clique memberships? Do any cliques include both boys and girls?

Repeat for third and fourth graders

11. In *UCINET* Use the "factions" routine to find a partition of the fifth grade network into two groups so that density is high within groups.

Network → Subgroups → Factions

a. How do the "factions" correspond to the gender of the children?

b. Repeat for the third and fourth grades.

Analysis of Social Network Data
Possible "Show and Tell" Projects

Each person is expected to give brief social network analysis "show and tell" presentations on four occasions during the quarter. These will take place during the first part of class and may be in any reasonable format. The list below gives some things you might do and approximate weeks when you might do them. You are welcome to do other kinds of network analyses that are not listed below.

Approximate time	**Project**
Week 2	• Draw a graph of your network
Week 3	• Draw a graph of your network and color or reshape the points
Week 4	• Recode your network data in some way and draw a graph of the new network, explain what you did • Find the density of your network • Find one or more centrality measures and interpret the result • Find one or more centralization measures and interpret the result
Week 5	• Relate one of the centrality measures to attributes of the nodes in your graph
Week 6	• Do something using cohesion, geodesic distance, multidimensional scaling, or clustering
Week 7	• Permute and block your matrix using an attribute and interpret the result • Find a blockmodel for your network • Use some sort of equivalence measure on your network and interpret the result
Week 8	• Find the dyad or triad census for your network • Use a matrix permutation test • Fit a statistical model to your network
Any week	• Show an interesting network example

Your "pet" network is at http://www.socsci.uci.edu/~kfaust/280s07/comm#.paj
where # is the number you were assigned on the first day of class.

Selected Assignments Submitted by Joerg Raab
Department of Organisation Studies
Faculty of Social and Behavioural Sciences
Tilburg University

EXERCISES COMPUTERLAB RANO 2008

1. Enter the following data in visone and choose the visualization that brings out the structure the best following the visualization principles discussed earlier in class.

0 1 1 1 0 0 0 0
1 0 1 1 1 0 0 0
1 1 0 1 0 0 0 0
1 1 1 0 0 0 0 0
0 1 0 0 0 1 1 0
0 0 0 0 1 0 1 0
0 0 0 0 1 1 0 1
0 0 0 0 0 0 1 0

2. Download the files "ex1comm", "ex1fund", "ex2comm", "ex2fund" from blackboard into a new folder on the desktop. Ex1 and Ex2 represent two systems of innovation. The data collected consists of the actors and their institutional background, as well as their relationships based on the type of tie "communication" (comm) and "funding" (fund).

Example 1:

1	Government ministry
2-5	Government R&D Labs
6	National Science Foundation
7-20	Universities

Example 2:

1	Government ministry
3,4,5,6,9,10,11,12,14,16,17	Universities
20	University spin-off
13,15,18	Private industrial companies
8	National Science Foundation
2,19	Private R&D Labs
7	Joint Venture Company

3. Use color and/or shapes to signal the institutional background of the actors in example 2. Save the two visualizations under a new name!

4. Calculate Degree centrality for the networks of the first system of innovation (ex1). Choose a layout that gives you a good overview of the structure of the networks. Save the documents under a new name.

5. Calculate closeness and betweenness centrality for ex1comm and choose the respective layout. Save the documents under a new name.

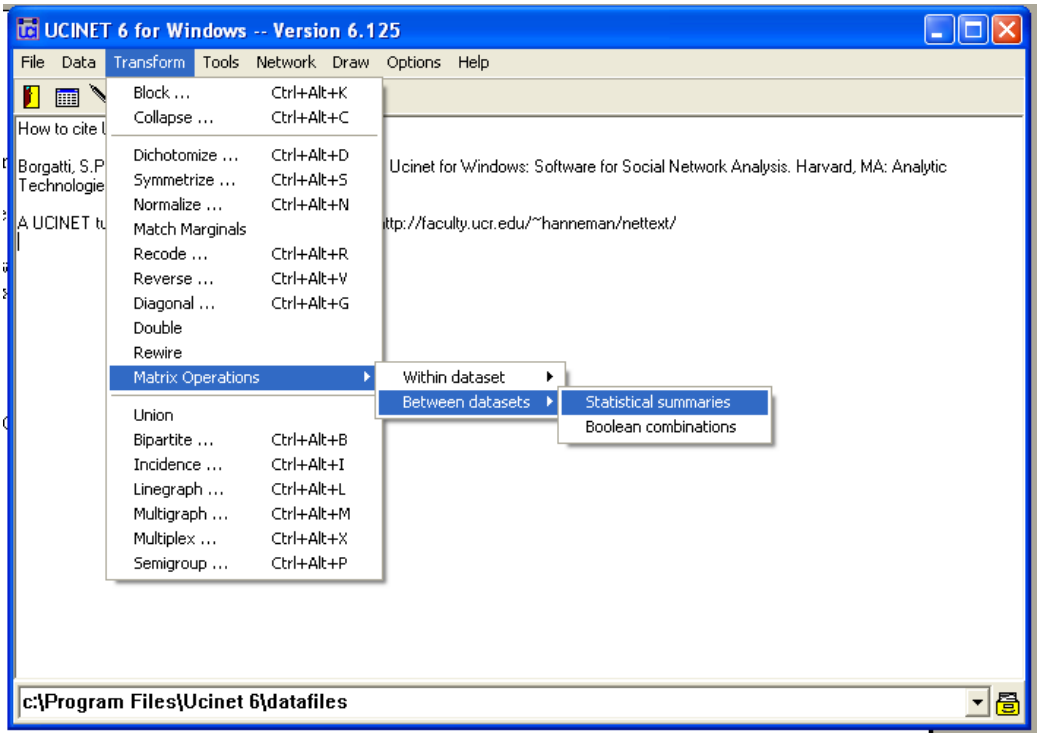
6. You have collected and entered the data on the second system of innovation:
   Think first about what you would like to know (research question) and how you will be going about analyzing the data.
   Use visone to analyze and interpret the data (use the documents with the colored nodes).
   Compare your findings with the analysis of example 1. Which similarities and differences can you detect? Which of the systems is more likely to resemble a current system of innovation? Why?

Selected Assignments Submitted by Christina Prell
Department of Sociological Studies
The University of Sheffield

New Strength of Weak Ties Exercise

We will use the Florentine Families dataset, which you are already familiar with.

1. Go to Transform > Matrix Operations > Between datasets > Statistical summaries:



You will be adding together the two relations in this dataset (marriage relation + business relation). Thus, you will be creating a new matrix out of two current matrices.

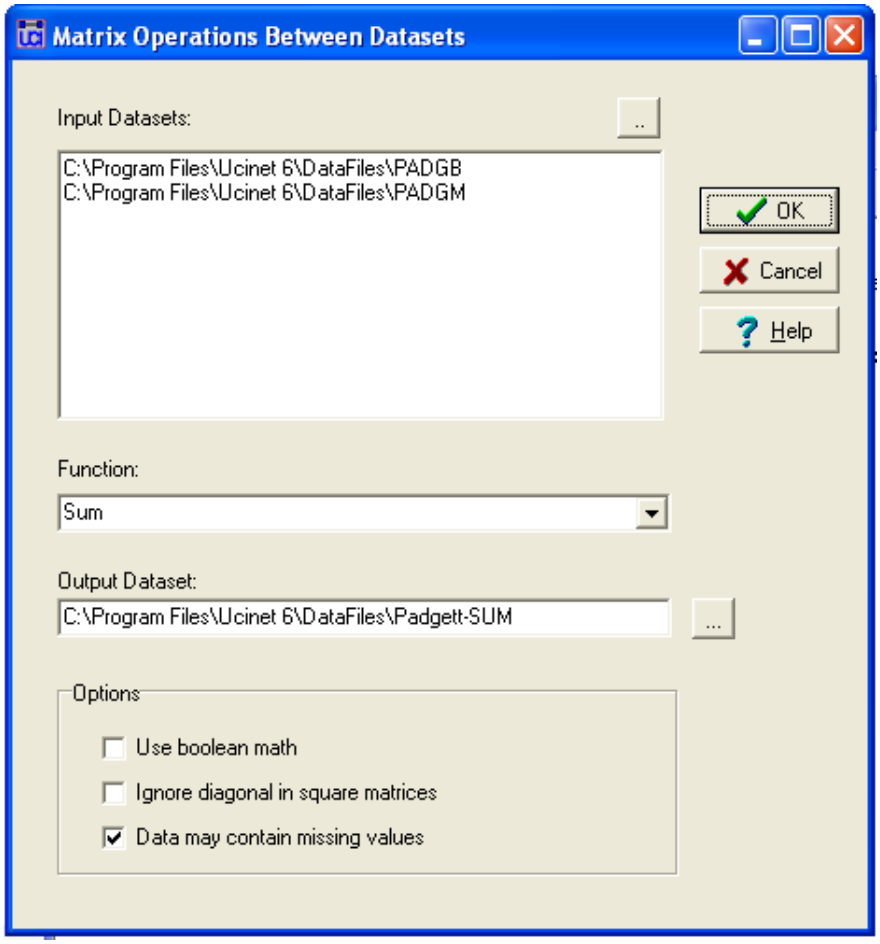
Remember, in each of the two relations (marriage and business), where there is a tie between 2 families, then there will be the value of 1. Where there is no tie, the value is 0. Thus, to add these two matrices together to create a new matrix, UCINET will be doing the following:

a. If two families have both a marriage tie (value = 1) and a business tie (value = 1), then the value in the new matrix shall be 2.

b. If two families share only one relational tie between them (either marriage or business, but not both), then the value in the new matrix shall be 1.

c. If two families do not share any relational tie between them (neither marriage nor business), then the value in the new matrix shall be 0.

To do this, fill in the window as is shown below:

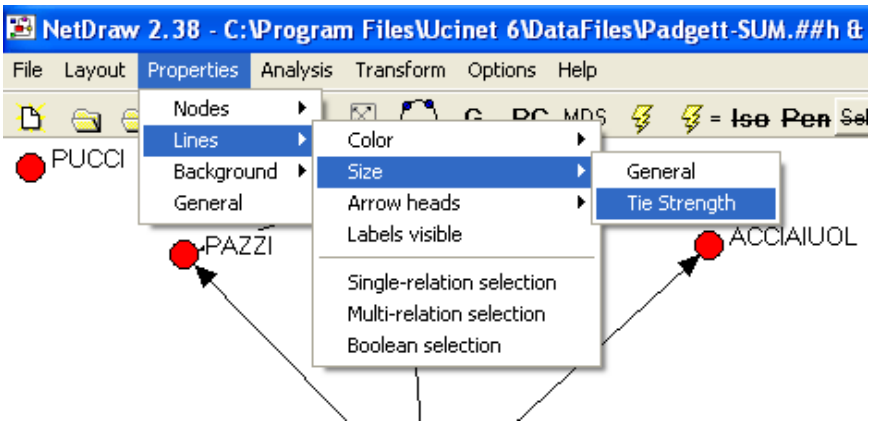


3. Select 'OK', and your output data matrix should look like this:

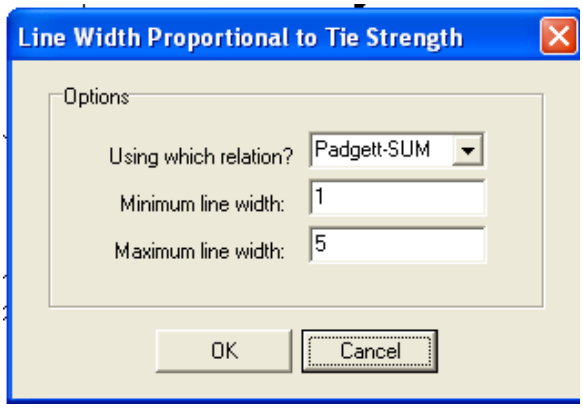
```
                          1 1 1 1 1 1 1
            1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6
            A A B B C G G L M P P P R S S T
            - - - - - - - - - - - - - - - -
 1 ACCIAIUOL  0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0
 2   ALBIZZI  0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 0
 3 BARBADORI  0 0 0 0 2 1 0 0 2 0 1 0 0 0 0 0
 4  BISCHERI  0 0 0 0 0 0 2 1 0 0 2 0 0 0 1 0
 5 CASTELLAN  0 0 2 0 0 0 0 1 0 0 2 0 0 0 1 0
 6    GINORI  0 1 1 0 0 0 0 0 1 0 0 0 0 0 0 0
 7  GUADAGNI  0 1 0 2 0 0 0 2 0 0 0 0 0 0 0 1
 8 LAMBERTES  0 0 0 1 1 0 2 0 0 0 1 0 0 0 0 0
 9    MEDICI  1 1 2 0 0 1 0 0 0 1 0 0 1 2 0 2
10     PAZZI  0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 0 0
11   PERUZZI  0 0 1 2 2 0 0 1 0 0 0 0 0 0 1 0
12     PUCCI  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
13   RIDOLFI  0 0 0 0 0 0 0 0 0 1 0 0 0 0 1 1
14  SALVIATI  0 0 0 0 0 0 0 0 0 2 1 0 0 0 0 0
15   STROZZI  0 0 0 1 1 0 0 0 0 0 1 0 1 0 0 0
16 TORNABUON  0 0 0 0 0 0 1 0 2 0 0 0 1 0 0 0

C:\Program Files\Ucinet 6\DataFiles\Padgett-SUM
```

4. Go to NetDraw and open up your new dataset Padgett-SUM.

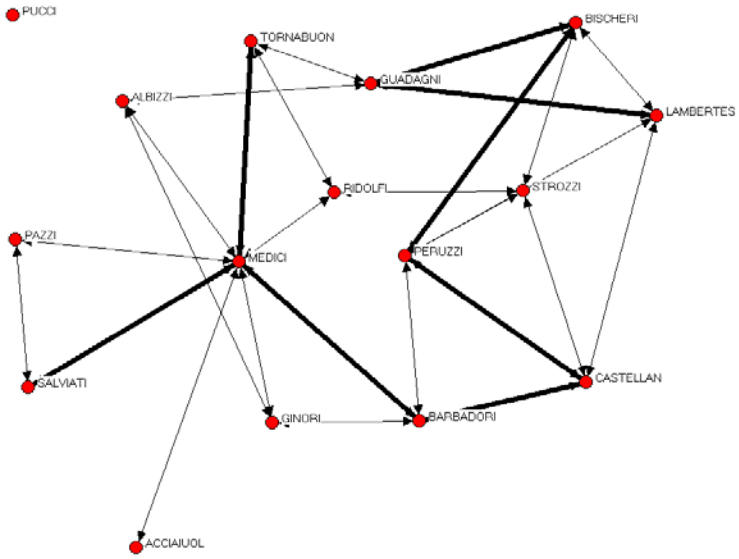
   a. Within NetDraw you will manipulate the graph so that the strength of ties get shown in the graph. To do this, Go to Properties > Lines > Size > Tie Strength:



   b. When the below window appears, make sure the below entries are also appearing in your window and select OK:



c. The graph that appears should look something like this:



…where thicker lines represent stronger ties. Some questions:

1. These data do not completely support our discussions re: SWT and Forbidden triangle, and there are some good reasons for this. Automatically, you should see that the 'strongest' ties, i.e. those with a value of 2, are not embedded in triangles. This goes against the Forbidden Triangle argument that Granovetter articulates. What might be some reasons for this? Go back and look at how UCINET describes this dataset and think a little bit about a) the size of this dataset; b) how we've conceptualized and measured tie strength here.

2. Now compare tie strength with wealth. In Ucinet, go to Data > Display. Select the PADW dataset, which gives attribute data for each family: (1) each family's net wealth in 1427 (in thousands of lira); (2) the number of priorates (seats on the civic council) held between 1282-1344; and (3) the total number of business or marriage ties in the total dataset of 116 families:

		1	2	3
		WEA	#PR	#TI
1	ACCIAIUOL	10	53	2
2	ALBIZZI	36	65	3
3	RIDOLFI	27	38	4
4	STROZZI	146	74	29
5	BARBADORI	55	0	14
6	BISCHERI	44	12	9
7	CASTELLAN	20	22	18
8	GUADAGNI	8	21	14
9	LAMBERTES	42	0	14
10	MEDICI	103	53	54
11	PAZZI	48	0	7
12	PERUZZI	49	42	32
13	SALVIATI	10	35	5
14	TORNABUON	48	0	7
15	GINORI	32	0	9
16	PUCCI	3	0	1

3. Look carefully at this second dataset. Who has the highest amount of ties now? How do the total amount of ties correspond to the amount of wealth and number of priorates? To what extent can we rethink our conclusions re: the role of strength of ties?

Cohesion Lab
(this has been adapted and expanded from a lab created by Steve Borgatti)

We'll be working with the Zackar and wiring datasets and exploring measures of cohesion and also looking at cohesive sub groups. These are data collected from the members of a university karate club by Wayne Zachary. The ZACHE matrix represents the presence or absence of ties among the members of the club; the ZACHC matrix indicates the relative strength of the associations (number of situations in and outside the club in which interactions occurred). Zachary (1977) used these data to explain the split-up of this group following disputes among the members.

1) First spend time familiarizing yourself with the dataset. Run Data| Display for Zackar dataset. Look at these two matrices. One of them is a binary matrix, the other valued.

2) Data| Unpack Zackar so that you have ZackE and ZackC.

3) Open each dataset in Netdraw and look at these graphs. Toggle back in forth between ZackE and ZackC. Why don't the graphs look different from one another?

    a) For ZackC: Go to Properties | Lines| Size | Tie Strength. You should see how the thickness of the lines correspond to the values of the ties. You won't be able to do this for ZackE (or shouldn't be able) as it does not contain valued data.

    b) From looking at this graph, how many components do you see?

    c) From glancing at this network, would you think it is a cohesive one? Or do you think there are cohesive subgroups within it?

Now we'll play around with some measure for cohesion on the network level and cohesive sub-groups. The purpose here is for you to become familiar with these measures, as well as compare them with one another so that you can get a feel for which ones are better at reflecting your conceptualization of the notion of cohesion.

Network level cohesion

1) Density
   Density is *similar* to a statistical mean (where you take the sum of values and divide by the number of values). Here you take the number of actual ties and divide by the total possible ties. Thus, it is a percentage of how connected (or dense) a network is. 100% would mean that everyone is connected to everyone else. 0% would mean an empty graph.

    a) Go to Network|Network Properties|Density
    b) Use zackar as input dataset. You'll find the density values for the two matrices and the standard deviation. Write them here:

c) Now run centralization. Centralization score is the extent to which one actor in the network holds the majority of the ties, and the others not having so many ties. Value of 0 means all actors are equal. Value of 1 means one actor has all the ties. Values in between suggest the extent to which the network leans towards the extreme where one actor is dominate.

   i) Network > Centrality > Degree. The centralization score appears at the bottom of the output. Write them here:

Now look at the graph(s) in Net draw. Compare the graphs with density and centralization score.

2) Components (a component = a connected subgraph of a network where all actors can reach each other)
   a) Run network|regions|components|simple graphs on zackar dataset.
   b) Count number of components and make note of the Fragmentation measure (or F measure)_____. Recall what this measure means: proportion of nodes that are unreachable from one another, with F = 1, all are isolates, and F = 0, graph is one component.

3) Distance
   a) Run Network|cohesion|distance on zackar dataset. What is meant by distance between two nodes? What is a geodesic?

   b) What is the distance between node 15 and node 1? Compare with the graph in NetDraw to see if this makes sense.

   c) Examine average distance among nodes: so do you think this is a pretty 'reachable' graph, based on this average? In what ways does this indicate cohesion?

Cohesive subgroups

1) K-core: Recall what k-core is…
   - A k-core is another way to conceptualize and measure a clique.
   - An actor is part of a clique if they are part of k number of members of this group.
   - So an actor can 'join' the clique if they are connected to k members, regardless of how many other members they may not be connected to.
   - By varying the value of k (that is, how many members of the group do you have to be connected to), different pictures can emerge.
   - As k becomes smaller, group sizes will increase
   - It is a way to look at sub-structure from the "top-down." Looking at the whole network, we can think of sub-structures as areas of the graph that seem to be locally dense, but separated to some degree, from the rest of the graph.

   a) Run Network|Regions|K-core on the rdgam dataset. Look at output and compare with rdgam in Netdraw:

```
K-CORE PARTITIONING

                    1     1 1 1   1
Degree   1 3 4 5 6 7 2 8 9 0 1 4 2 3
------   - - - - - - - - - - - - - -
     5   . . . . . . . . . . . . . .
     4   XXXXXXXXXXXXX . . . . . . .
     3   XXXXXXXXXXXXXXXXXXXXXXX . .
```

…so it seems, aside from the two isolates, all other actors have been placed into 1 of two cliques.

2) N-cliques: Recall what an n-clique is…
   - An n-clique of an undirected graph is a subgroups in which every pair of actors is connected by a path of length n or less.
   - We define an actor as a member of a clique if they are connected to every other member of the group at a distance greater than one. Usually, the path distance two is used. This corresponds to being "a friend of a friend." This approach to defining sub-structures is called N-clique, where N stands for the length of the path allowed to make a connection to all other members.
   - This approach emphasizes how dense connections are built-up from simpler dyads and triads to more extended dense clusters such as "cliques." This view focuses attention on how connection of large social structures can be built up out of small and tight components: a sort of "bottom up" approach.

   a) Run Network|Sub-groups|n-clique on the rdgam dataset. Allow n = 2 (this is the default). Look at output and compare with rdgam in Netdraw.

3 2-cliques found.

1: W1 W3 W4 W5 W7 S1
2: W5 W6 W7 W8 W9 S4
3: I1 W1 W2 W3 W4 W5 S1

…so in this way, there are 3 cliques found.

Questions:

1. When you compare these findings with the graph in Netdraw, do these findings seem to make sense?

2. Which clique-finding measure do you prefer? K-cores or 2-cliques? Why?

3. Time permitting, play around with k-cores and 2-cliques with another dataset. I suggest you always look at the graphs in NetDraw to help you get a better feel for how these operations are dividing up the social network into cliques.

Selected Assignment Submitted by David Gartrell
Department of Sociology
University of Victoria

Sociology 326 - Social Networks - David Gartrell
Lab - Cliques and Subgroups

As Scott tells us at the beginning of Ch. 6, network researchers have long been interested in the clustering and "clumping" of networks into highly cohesive subgroups. In the classic studies of the Western Electric plant and of "Yankee City", such subgroups were depicted as having great impact on the norms, attitudes, beliefs, and actions of their members. More recently, in "The Relational Basis of Attitudes", Bonnie Erickson presents a theoretical analysis of the role of network subgroups in attitude formation. In repeated, face-to-face contact occur the social psychological processes behind attitude formation – i.e., social comparison, conformity, and other forms of interpersonal influence.

As with last week's lab, a number of measures of subgrouping have evolved over time. Scott discusses a number of these, some of which we'll work with today. We begin with the oldest...

1. **Cliques**

A clique is defined formally as a "max imal complete subgraph of size 3 or greater". This means it must have:

- 3 or more nodes
- all nodes in direct contact with one another (or "adjacent" to one another, to use the graph theory lingo) ["complete"]
- and to which no other node can be added without making the subgraph "incomplete" (see previous bullet) ["maximal"]

In Fig 4a of KK, write down the subgroups that meet this definition.

1. _____ 2. _____ 3 _____

Is {N1, N2, N3} a clique? Why?

In UCINET, use the text editor to enter the data as a 'dl' file. Since KK Fig 4a is a symmetric matrix, we can enter only the lower half and leave out the diagonal.

```
dl n=7 format=lowerhalf diagonal=absent
labels:
n1,n2,n3,n4,n5,n6,n7
data:
1
1 1
1 1 1
0 0 0 1
0 0 0 1 1
0 0 0 0 1 1
```

Remember to use DATA>IMPORT>DL to create a UCINET datafile.

Then select NETWORK>SUBGROUPS>CLIQUES. All parameters can stay at defaults.

```
CLIQUES
------------------------------------------------------------------------------

Minimum Set Size:             3
Input dataset:                C:\Program Files\Ucinet 6\DataFiles\kk_fig4

3 cliques found.              The cliques are listed here. Compare with our
                              eyeballing of the sociogram.
   1:  n1 n2 n3 n4
   2:  n4 n5 n6
   3:  n5 n6 n7

Clique Proximities: Prop. of clique members adjacent that each node is
adjacent to

            1     2     3
        ----- ----- -----     Don't worry about this for now.
  1 n1  1.000 0.333 0.000
  2 n2  1.000 0.333 0.000
  3 n3  1.000 0.333 0.000
  4 n4  1.000 1.000 0.667
  5 n5  0.250 1.000 1.000
  6 n6  0.250 1.000 1.000
  7 n7  0.000 0.667 1.000


Actor-by-Actor Clique Co-Membership Matrix

        1 2 3 4 5 6 7
        n n n n n n n         This shows in how many cliques each node is
        - - - - - - -         involved with every other node
  1 n1  1 1 1 1 0 0 0
  2 n2  1 1 1 1 0 0 0         e.g., node n4 is involved with node n1 in one
  3 n3  1 1 1 1 0 0 0               clique {n1, n2, n3, n4}
  4 n4  1 1 1 2 1 1 0
  5 n5  0 0 0 1 2 2 1         The diagonal indicates in how many cliques any
  6 n6  0 0 0 1 2 2 1         node is involved (e.g., n4 is involved in 2
  7 n7  0 0 0 0 1 1 1         cliques)
```

```
HIERARCHICAL CLUSTERING OF OVERLAP MATRIX

        n n n n n n n
        1 2 3 4 5 6 7         The nodes are labelled here

Level   1 2 3 4 5 6 7         and here
-----   - - - - - - -
2.000   . . . . XXX .
1.000   XXXXXXX XXXXX
0.229   XXXXXXXXXXXXX
```

At Level 2, nodes n5 and n6 are involved in 2 cliques with one another (the cliques are {n4,n5,n6} and {n5,n6,n7}).
At level 1, nodes 1-4 are involved in a least one clique; nodes 5-7 are involved in one clique. Don't worry about the .229 level!

```
Clique-by-Clique Actor Co-membership matrix

     1 2 3        Clique numbers appear here
     - - -
  1  4 1 0        Cell entries indicate how many members are shared by
  2  1 3 2        any two cliques. E.g., cliques 2 and 3 share 2 nodes
  3  0 2 3        (n5,n6)

                  What's the diagonal?

HIERARCHICAL CLUSTERING OF OVERLAP MATRIX

Level   1 2 3
-----   - - -     Don't worry about this for now.
2.000   . XXX
0.333   XXXXX
```

This analysis assumes non-directional data, since mutuality is a key assumption. If the data are directional, UCINET will dichotomize them.

Researchers soon found the clique criteria to be too restrictive. A subgroup might be considered sufficiently 'clustered' for theoretical purposes if one or two links are missing. However, the clique definition doesn't allow this. Also, real network data often yield a large number of small cliques. So subgroup measures which allow for some missing links were devised.

2. **N-Cliques**

In and N-clique, every node must be able to reach every other node by at most N ties. So, e.g., in a 2-clique, all members must be able to reach all others within a distance of 2 (i.e., those not directly linked are connected by, at most, one intermediary).

In Fig 4a), could N1 and N7 be in a 2-clique together? Why?

In UCINET, NETWORK>SUBGROUPS>N-CLIQUES

- set N at whatever you want (larger N, looser subgroups)
- set min set size. Note "chains" can be included

e.g., A ------B------C is a 2-clique where set size is 3 or more

```
N-CLIQUES
------------------------------------------------------------------------

Max Distance (n-):            2
Minimum Set Size:             3
Input dataset:                C:\Program Files\Ucinet 6\DataFiles\kk_fig4

2 2-cliques found.

   1:  n1 n2 n3 n4 n5 n6       Explain why this is a 2-clique.
   2:  n4 n5 n6 n7



         1 2 3 4 5 6 7
         n n n n n n n
         - - - - - - -
  1 n1   1 1 1 1 1 1 0         Same as with cliques, except these are 2-
  2 n2   1 1 1 1 1 1 0         cliques
  3 n3   1 1 1 1 1 1 0
  4 n4   1 1 1 2 2 2 1
  5 n5   1 1 1 2 2 2 1
  6 n6   1 1 1 2 2 2 1
  7 n7   0 0 0 1 1 1 1

HIERARCHICAL CLUSTERING OF OVERLAP MATRIX

         n n n n n n n
         1 2 3 4 5 6 7

Level    1 2 3 4 5 6 7
-----    - - - - - - -
2.000    . . . XXXXX .      Same as before except these are 2-cliques
1.000    XXXXXXXXXXX .
0.667    XXXXXXXXXXXXX
```

One problem with n-cliques is depicted in Scott, Fig 6.12. In the first panel, A,B,C,D,E are in a 2-clique, but D and E are included only because they are connected via F. F itself is not included; it is an "outsider". Should D and E be included, if their 2-step connection to one another is not via the other members of the subgroup?

To correct this problem, **N-clans** were conceived. An **N-clan** is an N-clique with the added restriction that the diameter of the N-clique – the distance between its farthest points – must be less than or equal to N.
So in figure 6.12, D and E would not be included .

Try NETWORK>SUBGROUPS>N-CLAN on our example. Any difference?

3. **K-plex**

N-cliques are based on "reachability" – that is, nodes are included if they can reach one another by some minimum distance. Some have argued that the social processes in subgroups depend on direct connections, so that subgroup definitions should stress direct contacts through multiple, redundant channels, rather than reachability. K-plexes are designed to take this into account.

A k-plex is a maximal subgraph containing N nodes in which each node is directly connected to no fewer than N - k others. For instance, in a 2-plex where N = 6, every node is directly connected to all but 2 others (ie, to at least 4 others).

It's important to be careful about the relative sizes of k and N. For instance, if k=4 and N=5, then the chain graph

A — B --- C — D — E could be a 4-plex (Why?)

Scott suggests that, as a rule of thumb, N should be at least = k + 2.

Try this with UCINET: NETWORK>SUBGROUPS>K-PLEX

- with N=3, and k=2

```
K-PLEX
------------------------------------------------------------------------

Value of K:                    2 (each member of a K-plex of size N has N-K
ties to other members)
Minimum Set Size =             3
Input dataset:                 C:\Program Files\Ucinet 6\DataFiles\kk_fig4

8 k-plexes found.
```

```
K-PLEXES:                 You get a lot of k-plexes.
   1:  n1 n2 n3 n4
   2:  n1 n4 n5           Check this one in the graph (1-4-5).
   3:  n1 n4 n6           Such small chains may not function as
   4:  n2 n4 n5           subgroups.
   5:  n2 n4 n6
   6:  n3 n4 n5
   7:  n3 n4 n6
   8:  n4 n5 n6 n7
```

If we try this with k=2, N=4, we get

```
K-PLEX
------------------------------------------------------------------------

Value of K:                    2 (each member of a K-plex of size N has N-K
                                  ties to other members)
Minimum Set Size =             4
Input dataset:                 C:\Program Files\Ucinet 6\DataFiles\kk_fig4
2 k-plexes found.

K-PLEXES:                 We get a result closer to the groupings in the graph.
   1:  n1 n2 n3 n4        Note that N = 4 = k + 2 by the rule of thumb
   2:  n4 n5 n6 n7

         1 2 3 4 5 6 7
         n n n n n n n
         - - - - - - -
  1 n1   1 1 1 1 0 0 0         This is interpreted as before, except
  2 n2   1 1 1 1 0 0 0         that the matrix shows co-involvement
  3 n3   1 1 1 1 0 0 0         in 2-plexes
  4 n4   1 1 1 2 1 1 1
  5 n5   0 0 0 1 1 1 1
  6 n6   0 0 0 1 1 1 1
  7 n7   0 0 0 1 1 1 1


HIERARCHICAL CLUSTERING OF OVERLAP MATRIX

         n n n n n n n
         1 2 3 4 5 6 7

Level    1 2 3 4 5 6 7
-----    - - - - - - -
1.000    XXXXXXX XXXXX
0.571    XXXXXXXXXXXXX
```

Selected Assignments Submitted by Robert Hanneman
Department of Sociology
University of California, Riverside

Social network analysis: Sociology 157

Term paper assignment

During this quarter we will collect some social network data about our class, in class. At the first class meeting, at the first mid-term, and at the second mid-term, you will all be asked to list the names of the people in the class that you know. At the first class meeting, we will also ask people to report their gender and ethnicity.

We will compile your responses and make them available on the web site in the form of UCINET data files. You will need to download these data files, and use the UCINET software to perform some data analyses. These data analyses will be written up as a short empirical research paper.

Your research paper will seek to test the following two hypotheses about the formation of social network ties:

> Ties between actors tend to become reciprocated.
>
> The likelihood that two actors will form a tie is increased if they are homophilous.

Your research paper is not to exceed ten double-spaced pages, including references and graphics (it may be shorter). Like all scientific research papers, yours should contain the following sections:

> *Introduction and problem statement:* The introductory statement is usually one or two paragraphs that states what problem the research will address, and why this is a significant problem both for theory, and for application/policy.
>
> *Theory and hypotheses:* What sociological theories can be deduce the research hypotheses? Are there alternative or competing theories that would make different predictions?
>
> *Data and methods:* Describe the "who-what-when-where" aspects of how the observations were made that you are using to test your hypotheses. Describe how the data were collected, and the reliability and validity of the measurement. Describe how your are going to analyze the data to determine whether they support or reject the research hypotheses.
>
> *Results:* Provide a basic description of the data, overall, and their main features (e.g. network size, density, etc.). Provide the results of whatever tests or comparisons that you made to test the hypotheses.
>
> *Discussion/conclusion:* Do the results seem to support, or lead you to reject the hypotheses? What are this implications of your results for the theories that you used to justify the hypotheses? What might the implications of your research be for real-world problems? Did your research suggest any new questions to be explored in further research?

The paper will be due at the last regular class meeting. A discussion board will be provided in our class web-site where you can give and get advice in working on the term paper. You may work together doing the research for the term paper. However, each student must do their write-up independently (we will check closely, and plagiarism will result in no credit for the assignment).

Selected Assignments Submitted by Thomas W Valente
Department of Preventitive Medicine, Keck School of Medicine
University of Southern California

PM 542: Lab 2
Importing & Graphing a Dataset
Due Wednesday Feb. 1

This first exercise reads a simple dataset into UCINET and teaches you how to create a graph of the data. We then graph it using a vector of attributes to add more information to the display. At the end of the instructions are the ucinet import files included here for your convenience, but they'll also come separately as separate files.

1. Import the data into UCINET

Start UCINET
Go to Data\Import\DL
Open know06.txt

You have now created a UCINET dataset from the nominations in the KFP village 9 data.

2. Draw a graph:

In UCINET go to Draw
Open a new dataset and read in know06.##d
View the graph
Select "Layout\Graph theoretic layout\spring embedding
Click OK

This graph can now be saved as a windows metafile, or bitmap image and imported to Word.

File\Save diagram as\metafile

3. Save the graph, import it into an MS Word file by opening Word and selecting
Insert\Picture\from file
And type the name you used to save the graph.

Underneath the graph write a few sentences describing the network.

4. Now import the KFP9 attribute file “kfp9ado.uci”
Go to Data\Import\DL → Open kfp9ado.uci

5. Export kfp9ado to Pajek
Data\export\pajek\categorical variable
Click OK for “kfp9ado” to create the “cluster” files “id.clu” and “adopt.clu”
[these are 2 files that can be linked to the social network data and provide attribute information to those data]

6. Go to pajek and redraw the graph using the attribute data
Open Pajek
Make sure Network has KFP9 indicated
Open the file folder in the “Partition window”
Select adopt.clu

7. Go to Draw\draw-partition
If you have to redisplay the graph, do so by selecting “energy options as in #2 above.

8. Select Option\Mark Vertices Using\Partition Clusters

9. Save this graph as a bitmap and also import into the same word document with the other graph.

10. Write a few sentences describing this output. Print and hand in.

PM 542: Lab 5
Positions & Structural Equivalence
Due Wednesday Feb. 22

This lab assignment reviews positional analysis. You will create positions using the know06 network using a variety of techniques and answer the following questions.

1) First conduct structural equivalence measures by going to Network\roles and positions\structural\profile". For measure of profile similarity select matches. (for method of handling diagonal values, select ignore) What do the elements in the output matrix represent? How similar are persons 4 and 1?

2) Now redo structural equivalence and select "positive matches" What does each cell represent? How similar are persons 4 and 1?

3) At what level of positive matches (%) do nodes 16 1 & 17 become joined into one position?

4) Repeat the profile analysis this time requesting for "Euclidean distance" for the measure to use. This output indicates how far apart 2 nodes are from all other nodes in the network. What is SE (Euclidean distance) measure between nodes 4 and 1, how about between 4 and 2?

5) Based on the above analysis, is node 4 more like 1 or more like 2?

6) ConCor know06. How many positions are created?

7) Draw the image matrix and image diagram below and describe what the output show. (NB: You'll need to calculate overall density)

PM 542: Lab 7
Diffusion Network Modeling
Due Wednesday March 24

This lab assignment is designed to have you graph the know06 network by an attribute, a fictitious adoption of a behavior. I then ask you to do some matrix calculations to calculate personal network exposure to this use. You will need the following 2 files: know06 and know06_u.txt.

1) Read know06_u.txt into UCINET to create an attribute dataset.

2) Graph know06 by use. (Open the network using the network folder then open the attribute with attribute folder, then use the "color" icon on the top and select the attribute). Save this image and insert into an MS Word document.

3) Create a network exposure dataset by multiplying know06 by use (know06_u) and dividing by the number of nominations sent. Do this by opening Tools\Matrix algebra. In the dialog box type:

Know06ue = prod(know06, know06_u)
Know06sm =tot(know06, rows)
Know06ep=div(know06ue, know06sm)

4) Now display know06 and open know06ep as the attribute and display know06 by network exposure.

5) Which nodes have the highest exposure?

6) Which have the lowest exposure?

7) Who would you predict based only on network exposure, to adopt next?

Selected Assignments Submitted by Ed Collom
Department of Sociology
University of South Maine

Sociology 380: Social Network Analysis
Laboratory Exercises 4 (10 Points, 3% of Course Grade)

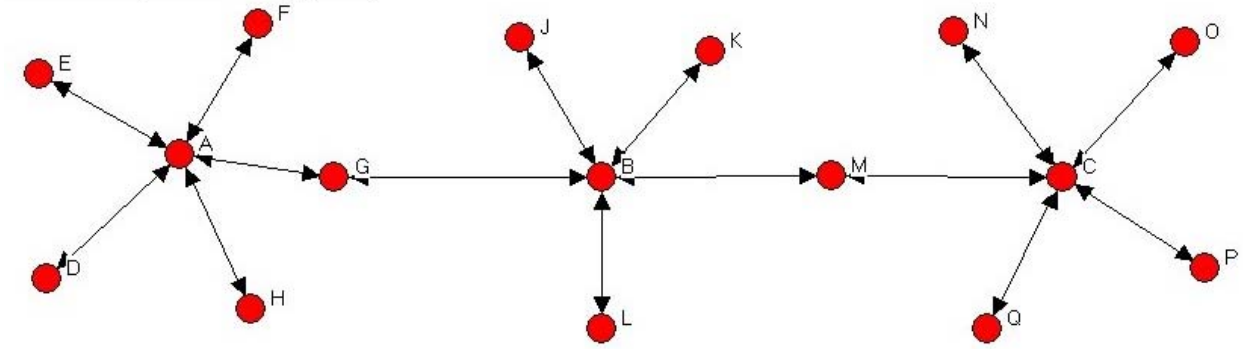
Complete the following exercises using UCINET VI. Turn in only your completed answer sheet (handwritten is OK). This assignment is due at the beginning of class on February 28, 2005.

This assignment is based on material covered in Scott's chapters 4 and 5. You need to be familiar with the following network measures: density, degree, closeness, and betweenness. If you do not understand these, refer back to Scott. Also, you will need to start getting used to using UCINET's help function. So, to begin this assignment, launch UCINET VI and then go to the Help Menu, then Help Topics. Click on Index at the top of the dialog box and then click the Find tab. In this field you can type in any key term. As an example, type in "betweenness." You should get three occurrences of the term in the second box and the third box allows you to display the topics. Click on the topic "Networks > Centrality > Betweenness > Nodes" and then click Display. This provides an overview of the Betweenness procedure in UCINET VI.

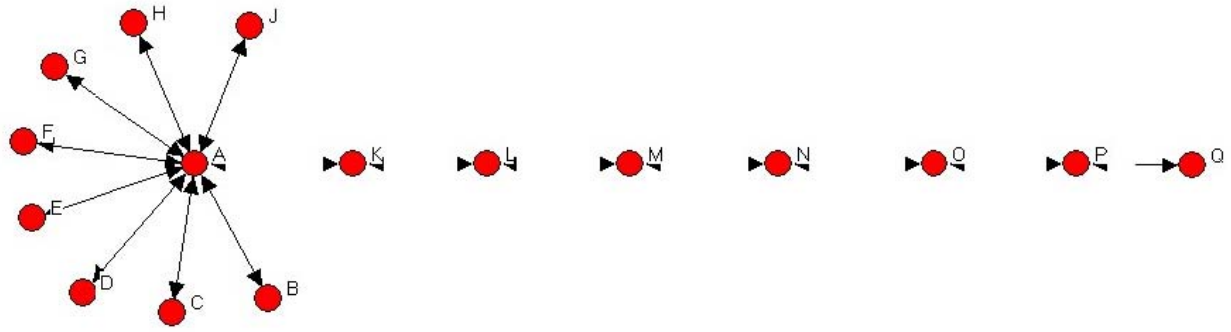
You will also need to get used to using the UCINET 6 User's Guide. You can access this from the Start menu in the same fashion that you launch UCINET. This is a Microsoft Word document and you may wish to save this to your own disk so that you can edit it. Open this up and go to pages 28-29 and read about the nodelist format for entering data.

We will be working with two datasets for this exercise. Use Notepad or UCINET's text editor and create data files for the datasets below using the nodelist format. Remember to save your data files using some meaningful name such as "lab4data1" and "lab4data2."

Dataset 1 (from Scott pg. 84)



Dataset 2 Import the DL files that you created and inspect the adjacency matrices to confirm that you have entered the data properly. Notice that both datasets are symmetrical. The first dataset comes from page 84 of Scott. You can check part of your results since he provides the degree, the relative (or "normed") degree, and the closeness.



After you have created your UCINET data files, you are ready to complete the assignment. You do not need to print any of the output, just fill in your answer sheet as you go along. You will need to request density, degree, closeness, betweenness, and reach centrality for each of the datasets. You will not need to change any of UCINET's default settings, they are all fine.

Go to the Network menu, then Network Properties, then Density to get the density of your datasets. The measures of centrality are all found under the Network menu, then Centrality. When requesting betweenness, we want it for nodes. Also, we have not read specifically about reach centrality, so you may want to use the Help function to learn more about it. The only part of that output that you will need is the "Node-by-Distance Proportion of Nodes Reached Matrix."

Now, use your answer sheet to guide you through this assignment, filling it in as you go along.

Sociology 380: Social Network Analysis Name_____

Laboratory Exercises 4 Answer Sheet

Density
Which dataset has the highest density?

Degree

In dataset 1, which node(s) have the highest degree?

In dataset 2, which node(s) have the highest degree?

Which dataset has the highest average degree?

In which dataset does the degree have the greatest variance?

Closeness

In dataset 1, which node is closest to all the other nodes?

In dataset 2, which node is closest to all the other nodes?

In which dataset are the actors closer to one another on average?

In which dataset does the closeness vary the most?

Betweenness

In dataset 1, which node has the greatest betweenness?

In dataset 2, which node has the greatest betweenness?

Reach Centrality

In dataset 1, which node has the lowest distance required to reach all of the other nodes? (Identify the node and the distance)

In dataset 2, which node has the lowest distance required to reach all of the other nodes? (Identify the node and the distance)

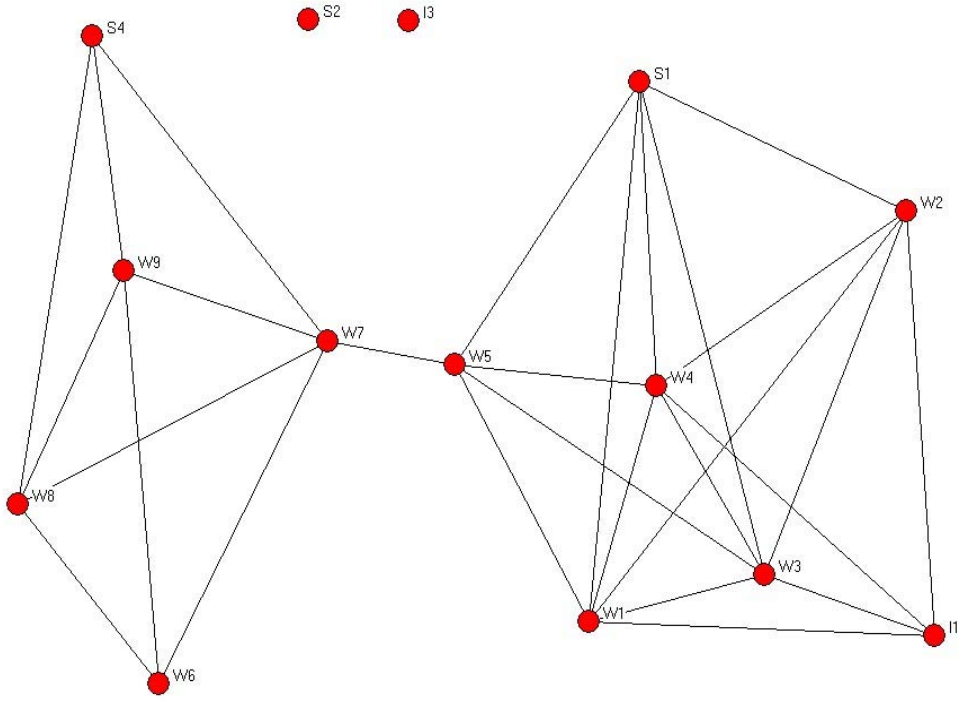
In dataset 1, what is the highest existing distance that connects the furthest nodes to one another?

In dataset 2, what is the highest existing distance that connects the furthest nodes to one another?

Sociology 380: Social Network Analysis
Laboratory Exercises 5 (10 Points, 3% of Course Grade)

Complete the following exercises using UCINET VI. This assignment is due at the beginning of class on March 7, 2005 and is based on material covered in Scott's Ch. 6.

In this lab we will be working with the Roethlisberger & Dickson Bank Wiring Room data concerning horseplay among 14 employees: two inspectors (I1 and I3), three solderers (S1, S2 and S3), and nine wiremen or assemblers (W1 to W9). The data files (RDGAM.##h and RDGAM.##d) are available to download from Blackboard. Here's the sociogram to help you visualize the relations:



In a typewritten paragraph:

1) Identify the density of this dataset

2) Identify the diameter of this dataset (use Network>Cohesion>Distance)

3) Identify how many components there are in this data (use Network> Regions>Components>Simple graphs)

4) Define the term "clique" and identify the number of cliques in this dataset (Use Network>Subgroups>Clique)

5) Define "n-cliques" and identify the number of 2-cliques in this dataset (Use Network>Subgroups>N-Cliques)

6) Define "cutpoints" and identify the actors in this dataset that are cutpoints
(Use Network>Regions>Bicomponents)

Additional Materials

Lecture Outlines for a Course on Social Network Analysis
by Robert Hanneman
Department of Sociology
University of California, Riverside

Lecture 1

Social Network Analysis
Lecture Outline: Networks everywhere

Sources: No assigned readings

Networks everywhere:

- **Introductions and Course Administration**
  - Blackboard course website
  - Requirements/syllabus
  - Schedule of activities
- **What is a network?**
  - Things and relations between things
  - Things as any discrete objects (symbolic or material)
  - Relations among things (material flows (conserved), informational (non-conserved))
  - Key terms: Nodes, Attributes, and Relations
- **Networks everywhere: Contemporary Structural Perspectives**
- **Physical sciences**
  - sub-atomic particles and strong and weak forces
  - molecular structures of atoms and electro-magnetic forces
  - macro-structure: bodies and gravitational forces
- **Life sciences**
  - genes and the stranded double helix

- cells as communities of organisms
- organs as networks of cells
- functional systems of organs
- organisms as bounded related functional systems
- ecosystems as networks: food chains
- environments as networks of communities and ecosystems

- **Social sciences**
  - The dual nature of the social sciences: material and cultural
  - The principles of co-evolution of human material and cultural structures
  - Cultural structures:
    - symbols
    - rituals
    - roles
    - institutions
    - cultures
  - Material structures:
    - dyads
    - triads
    - groups
    - communities
    - societies
    - global population
- **Summary: Structuralism in science and social science**

First data collection exercise

Review Questions

1. What is a "network?"

2. Explain the difference between a "material" and an "cultural or informational" relation at the abstract level. Think of examples networks that are defined by material relations among objects; by informational relations among objects.

3. The physical sciences organize their thinking using a hierarchy of objects and a hierarchy of forces (or relations) from micro to macro. Can you describe these hierarchies and show which relations are used to connect which kinds of objects?

4. The life sciences organize their thinking using a hierarchy of objects and a hierarchy of forces (or relations) from micro to macro. Can you describe these hierarchies and show which relations are used to connect which kinds of objects?

5. The social sciences have a "dual" character of material and cultural (or symbolic, or informational). What does this mean?

6. What does it mean to say that the material and cultural structures of human populations "co-evolve?"

7. The material side of social sciences uses a hierarchy of objects or "levels of analysis." Can you list this hierarchy, and give examples of the "objects" at each level of analysis?

8. The cultural or symbolic side of social sciences uses a hierarchy of objects or "levels of analysis." Can you list this hierarchy, and give examples of the "objects" at each level of analysis?

Application Questions

1. Pick up a novel. Open it to a page. Pick a paragraph, and pick a sentence within that paragraph. Sentences are often described as having "syntax" or "structure." Examine the sentence: what are the parts? what are the relations among the parts? Think about the paragraph -- what are it's parts? How might you describe the relations among these parts? How are the paragraphs connected into more "macro" structures that make up the novel?

2. Think about our class. What are the material objects relevant to understanding it? What are the kinds of relations that we might want to examine?

3. Think about your family -- what are the parts? What are the relations?

4. Think about an organizational chart -- is this a picture of a social network? What are the objects and the relations?

5. We are told that we are living in an era of "globalism." As a social scientist taking a structural perspective, can you try to be a bit more precise about what this term might actually mean (as opposed to the vague b.s. frequently used by commentators)?

Lectures 2 and 3

Social Network Analysis
Lecture Outline: The social network perspective I and II

Sources:

The social network perspective:

- **Introduction: Roots of the social network perspective**
    - British family studies and anthropology: Bott's different social networks by class and gender
    - Mathematics and mathematical sociology; Duncan Watts an example of a math type
    - Sociometry: small group and community studies - Scott's "Harvard synthesis"
- **What makes a network a social network?**
    - A network is a mathematical formalism of nodes and edges
    - Nodes are social actors - individuals and bounded constructs
    - Edges are social relations: culturally mediated interactional exchanges
    - Actors have "attributes" which are often group memberships (e.g. gender)
- **Watts' Chapter 1: The science of networks**
    - Graph theory has been here since 1736 - so what's new?
    - Dynamics on networks and dynamics of networks
    - The idea of "emergence": complexity and self-organization - "sychronization"
    - "Connection topology"
    - Random graphs, clustering and "small-worlds"
- **What is distinctive about the network approach to the social?**
    - Multi-level embeddedness, rather than macro or micro reductionism, holistic
    - Behavioral and empiricist bias: focus on observable behavior of individuals, not variables
    - Focus on relations, not attributes: the anti-categorical imperative
    - Focus on network positions and roles

- Focus on "partitions" of group membership

- **Social networks and the main sociological traditions**
  - Interactionism and symbolic interaction
  - Rational choice and exchange theory
  - Conflict theory and Marxism
  - Structural-Functionalist systems theory
- **Watts' Chapter 2: The Origins of a "New" Science**
  - Traditional social network analysis is comparative statics
  - New work in networks focuses on theories of causes - dynamics
  - Math and physical science developments from random graphs
  - Two key social science contributions: why social networks aren't random
    - "Homophily" -- groups and culture matter (reciplrocity)
    - "Clustering" (or triadic closure, or transitivity biased nets)

Review Questions

1. The contemporary field of social network studies has diverse roots in anthropology, mathematics, and community studies. Can you describe the main interests of each of these "pre-networks" fields of study?

2. Scott argues that there was a Harvard "synthesis" that brought these elements together. What does he mean?

3. Social networks study relations among "social" actors. What do we mean when we say an actor is a "social" actor?

4. Social network analysis studies social relations. What do we mean by a "social" relation?

5. What is a "random graph?" a "clustered graph?"

6. What's the difference between "dynamics on a network" and "dynamics of a network?"

7. Explain the idea of "emergence" and "self-organization." Provide some sociological examples.

8. What does the term "connection topology" mean?

9. What is the "anti-categorical imperative?" Why do some argue that this imperative makes social network analysis different from conventional sociology?

10. What does it mean to say that an actor is "embedded" in a network of relations, and that one network can be embedded in another? Why is the notion of "embedding" and multiple levels of analysis so important to the social network perspective?

11. What is macro reductionism? What is micro reductionism? How does the social network perspective seek to avoid reductionism?

12. Social network analysis is often said to be a "perspective" rather than a theory. That is, it can be used to interpret, and to study the ideas of the major theory groups. Review how network theory fits with interactionism, systems theory, conflict theory, and rational-choice/exchange theory.

13. Explain the difference between "comparative statics" and "dynamics."

14. What is the "largest connected component" of a graph, and why does it matter?

15. Explain the ideas of "critical point" and "phase transition." Give an example from physical science, give and example from social science to illustrate the concepts.

16. What is a "random graph?" How does a "biased random graph" differ?

17. What is "homophily?" What is it's significance in sociological network dynamics?

18. Explain the concepts of "transitivity" and "triadic closure." How do these relate to the idea of "clustering" in social networks?

Application Questions

1. Without invading anyone's privacy, or intruding, observe a small group of people interacting in a public place (like a cafeteria, a mall, etc. Notice which actors initiate interaction with which other actors, and whether these initiatives are reciprocated or not. Is everyone in the group equally likely to interact with everyone else? Are some persons more likely to initiate interaction than others?

2. Think about our class as a population of actors connected in pattern of regular and repeated interaction. Suppose you did not know that there were such social roles as "student" and "teacher," and could only observe interaction patterns. Do you think that you could conclude that there were distinctive differences among the actors, based on observing patterns of interaction? What might you notice that distinguishes "teachers" from "students?" How is this exercise an illustration of the "anti-categorical imperative?"

3. Think about our class again. A network analyst might insist that the interaction patterns in our class was "embedded" in a larger set of network relations. How would you describe this pattern of "embedding?" In what ways do the larger structures in which our interaction is embedded offer "opportunities" and "constraints" on what happens in the classroom?

4. Is the Internet a "social network?" who and/or what are the nodes? what are the relations? If we could study interaction on the internet, would it be "random" or would it display repeated and differentiated patterns?

Lecture 5

Social Network Analysis
Graphs and matrices

Sources:

Hanneman and Riddle chapters 3 through 5.

Graphs and matrices:

Introduction: Representing Networks with Graphs

- Graphs are simplest way of seeing patterns for small data sets
- Graphs have powerful mathematical theory
- Graphs can be translated easily into numerical form

Graphs and Sociograms

- First network diagrams were sociograms of who chose whom in a group; circles and arrows
- But many kinds of relations can be represented with graphs
- Basic tools: nodes and edges or actors and relations

Kinds of Graphs:

- Levels of Measurement: Binary, Signed, and Valued Graphs
- Directed or "Bonded" Ties in the Graph
- Simplex or Multiplex Relations in the Graph

What is a Matrix?

- Simple mathematical representation of a graph as a 2 dimensional numerical array.
- Useful because we can define precise operations (algorithms) to describe features
- Can use computers to calculate measures

The "Adjacency" Matrix

- Rows = sources; Columns = receivers
- Binary, can be adapted to ordinal or interval

Doing Mathematical Operations on Matrices

- Matrix Permutation, Blocks, and Images
- Transposing a matrix
- Taking the inverse of a matrix
- Matrix addition and matrix subtraction
- Matrix correlation and regression
- Matrix multiplication and Boolean matrix multiplication

Review Questions

1. What are "nodes" and "edges"? In a sociogram, what is used for nodes? for edges?

2. How do valued, binary, and signed graphs correspond to the "nominal" "ordinal" and "interval" levels of measurement?

3. Distinguish between directed relations or ties and "bonded" relations or ties.

4. How does a reciprocated directed relation differ from a "bonded" relation?

5. Give and example of a multi-plex relation. How can multi-plex relations be represented in graphs?

6. A matrix is "3 by 2." How many columns does it have? How many rows?

7. Adjacency matrices are "square" matrices. Why?

8. There is a "1" in cell 3,2 of an adjacency matrix representing a sociogram. What does this tell us?

9. What does it mean to "permute" a matrix, and to "block" it?

Application Questions

1. Think of the readings from the first part of the course. Did any studies present graphs or matricies? If they did, what kinds of graphs and/or matrices were they (that is, what is the technical description of the kind of graph or matrix).

2. Suppose that I was interested in drawing a graph of which large corporations were networked with one another by having the same persons on their boards of directors. Would it make more sense to use "directed" ties, or "bonded" ties for my graph? Can you think of a kind of relation among large corporations that would be better represented with directed ties?

3. Think of some small group of which you are a member (maybe a club, or a set of friends, or people living in the same apartment complex, etc.). What kinds of relations among them might tell us something about the social structures in this population? Try drawing a graph to represent one of the kinds of relations you chose. Can you extend this graph to also describe a second kind

of relation? (e.g. one might start with "who likes whom?" and add "who spends a lot of time with whom?").

4. Take one of the relations that you graphed from the previous question, and represent it as a matrix. Does it make sense to leave the diagonal "blank," or not, in your case? Try permuting your matrix, and blocking it.

5. Can you make an adjacency matrix to represent the "star" network? what about the "line" and "circle." Look at the ones and zeros in these matrices -- sometimes we can recognize the presence of certain kinds of social relations by these "digital" representations. What does a strict hierarchy look like? What does a population that is segregated into two groups look like?

Lecture 6

Social network analysis
Basic network measures

Sources:
Hanneman and Riddle, chapter 7.

Basic network measures

Basic properties of networks and actors

- Graphs and matrices describe individual embeddedness in network, aggregate distributions across individuals, and network itself, as a whole--three levels
- Key properties of individual's social position can be measured from graphs and matrices
- Key properties of distributions of individual's positions: central tendency and variance
- Key properties of the whole social structure can be measured from graphs and matrices

Connections: social integration

- Size:
    - numbers of actors, number of possible directed and undirected ties "potential"
    - measures "power" of community, size is a major cause of structural variation
- Density:
    - numbers of ties/potential, effects of size on density
    - measures solidarity, ability to respond, "complexity"
- Degree:
    - of a point: in and out degree, centrality and influence

    - of the whole: mean=connectedness, variance=presence of "holes"
- Reachability:
    - connected and disconnected graphs
    - components
    - pendants and isolates
- Reciprocity and Transitivity:
    - reciprocity and bonded ties as cohesion/integration
    - transitive triads as Simmelian "integrated" social structures

Distance: social differentiation

- Walks, trails, paths, etc.
    - "social distance" as "path length"
    - numbers of connections reduce vulnerability and dependency
- Geodesic distance and diameter
    - geodesic as "efficient" distance, number of geodesics
    - diameter as the largest geodesic distance in the (connected) graph
- Flow, cohesion, and influence
    - are social structures "efficient?" Influence and solidarity/cohesion
    - using all distances and connections, weighting schemes

Review Questions

1. Explain the differences among the "three levels of analysis" of graphs (individual, aggregate, whole).

2. How is the size of a network measured? Why is population size so important is sociological analysis?

3. You have a network of 5 actors, assuming no self-ties, what is the potential number of directed ties? what is the potential number of un-directed ties?

4. How is density measured? Why is density important is sociological analysis?

5. What is the "degree of a point?" Why might it be important, sociologically, if some actors have high degree and other actors have lower degree? What is the difference between "in-degree" and "out-degree?"

6. If actor "A" is reachable from actor "B" does that necessarily mean that actor "B" is reachable from actor "A?" Why or why not?

7. For pairs of actors with directed relations, there are four possible configurations of ties. Can you show these? Which configurations are "balanced?" For a triad with undirected relations, how many possible configurations of ties are there? which ones are balanced or transitive?

8. What are the differences among walks, trails, and paths? Why are "paths" the most commonly used approach to inter-actor distances in sociological analysis?

9. What is the "geodesic" distance between two actors? Many social network measures assume that the geodesic path is the most important path between actors -- why is this a plausible assumption?

10. I have two populations of ten actors each, one has a network diameter of 3, the other has a network diameter of 6. Can you explain this statement to someone who doesn't know social network analysis? Can you explain why this difference in diameter might be important in understanding differences between the two populations?

11. How do "weighted flow" approaches to social distance differ from "geodesic" approaches to social distance?

12. Why might it matter if two actors have more than one geodesic or other path between them?

Application Questions

1. Think of the studies discussed in Watts' book. Which studies used the ideas of connectedness and density? Which studies used the ideas of distance? What specific approaches did they use to measure these concepts?

2. Draw the graphs of a "star" a "circle" a "line" and a "hierarchy." Describe the size, potential, and density of each graph. Examine the degrees of points in each graph -- are there differences among actors? Do these differences tell us something about the "social roles" of the actors? Create a matrix for each graph that shows the geodesic distances between each pair of actors. Are there differences between the graphs in whether actors are connected by mulitple geodesic distances?

3. Think about a small group of people that you know well (maybe your family, neighbors, a study group, etc.). Who helps whom in this group? What is the density of the ties? Are ties reciprocated? Are triads transitive?

4. Daimler-Benz Corporation has called on you to be a consultant. Their research division is taking too long to generate new models of cars, and often the work of the "stylists" doesn't fit well with the work of the "manufacturing engineers" (the people who figure out how to actually build the car). Daimler's research division is organized as a classical hierarchical bureaucracy with two branches (stylists, manufacturing) coordinated through group managers and a division manager. Analyze the reasons why performance is poor. Suggest some alternative ways of organizing that might improve performance, and explain why they will help.

Lecture 7
Lecture period 7 is the first mid-term, no notes.

Lecture 8

Social network analysis
Making connections: Random graphs and network evolution

Sources:
Watts, chapter 3

Social structures are not random graphs

- Evolution of a random graph
- Emergence of a large component at the critical phase transition
- Degree distribution will resemble Poisson (independent connections with replacement)
- Average path length will be small until critical value
- Is this a good model for how individuals and social structures build networks?
- Many local neighborhoods with overlaps; bias for within-neighborhood; some randomness

The alpha model and small world networks

- Similar to Rappoport's transitivity.
- Actors are more likely to connect via existing connections
- Neighborhood bias as a variable "alpha"
- Alpha low = caves (clustered graph); alpha high = solarians (random graph)
- The small world phenomenon (figure 3.4)
- Path length within component and degree of clustering as randomness increases creates three regions: fragmented, small-world, and random

The beta model -- substrates and rewiring

- A minor revision -- rewiring
- Figure 3.6: lattice neighborhoods as clustering
- Rewiring: replace a local with a random long distance
- Same small-world emerges: high clustering and low path length

- Is this a better model? The lattice sub-strate as a picture of social structure.

Applying the random biased network model

- Wildly different types of networks display small worlds
- Why might this be from an evolutionary point of view?
- Why might this be from an agency point of view?

Lecture 9

Social network analysis
Making connections: Social contexts: Affiliation and Identity

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Sources:
Watts, chapter 4

Degree distribution and "scale free" networks

- Basic ideas
    - Normal, Poisson, and Exponential degree distributions
    - The rich get richer, but it's hard (cutoffs and local knowledge of new nodes)
- Evidence for scale-free networks
    - Boards of directors
    - Scientific collaboration
    - The internet
- Are social networks scale free?
    - Even very large networks have cut-offs
    - Clustering and random connection are not homogeneous

Re-introducing social structure - contexts (roles or identities) and groups

- The "connection topology" created by multi-role identities and multiple group memberships
- Affiliation or bi-partite networks
- Watts "final" theory: clustering by context with random re-wiring of contexts

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Lecture 10

Social network analysis
Connection: Search, collapse, robustness

Sources:
Watts, chapters 5 and 6

Demonstration/exercise

- Directed search for a person named "J"
- Directed search for a person by name (gender and ethnicity)

Milgram's results

Completion rate in a geographic partition (Boston) and in a context (investing) were moderate

Completion rate in truly random samples were 18%

People use identity and affiliation to make robust searches of large networks using only local information

Kleinberg's mathematical result

- Rewiring of lattices to make small worlds
- Rewiring of length 2 (make a new connection to a friend of a friend) is optimal

Search in Social networks

- Who am I? game
- The idea of "social distance" and "Blau space"
- Empirical results suggest that most use two-dimensional social space maps - often geography and occupation

Discussion: Why is AIDs a more significant problem in South Africa than in the U.S.?

- Laumann on American sexual networks; versus the South African case
- Why has intervention worked more effectively in the U.S.
- Early intervention before epidemic
- Closing "choke points" in the network

Watts' "percolation models"

- SIR model assumes a random network
- Random re-wiring of a lattice leads to epidemic threshold instead of logistic
- Percolation: occupied nodes and open pathways generate "correlation lengths"
- Percolating cluster: creates epidemic threshold; also assures robust transmission
- Scale-free networks are more robust against random failure, but less robust to failure proportional to load or centrality

Lecture 11

Social network analysis
Social movements and diffusion of innovation

Sources:

Watts, Chapters 7 and 8.

Movements and innovation:

- **Introduction**:
    - Social Change and Social Movements areas parallel "diffusion" and "contagion"
    - Many collective action problems - public goods problems have similar causes
    - Early explanations:
        - mania, collective hysteria, Collins' ritual rhythmic coordination
        - rational choice
- **Making rational choice into social choice: Externality**
    - Decision or information externality - uncertainty
    - Coercive externality - conformity to the group
    - Market externalities and complementarity - individual utility depends on the group
    - Coordination externality: organized collective action via incentives

    Quiz
- **Watts' theory of network structure, thresholds, and cascades**

- Individual's thresholds vary according to their externalities
- Vulnerability = low threshold and/or few (but some) neighbors
- The "percolating cluster of vulnerables" - phase space, and cascades
- Two types of cascades:
  - upper boundary - rare but large
  - lower boundary - more common but smaller
- Characteristics of the innovation and the innovator don't matter much
- Large scale social movements and crazes are not very predictable

Applications of Network Diffusion/Contagion/Mobilization Models

- Adoption of innovations:
  - Cancian's peasants and agricultural innovation
  - Coleman's doctors and penicillin
  - Bainbridge's creativity and learning in organizations
  - Laumann's sexual contact networks and AIDS
- Collective Action
  - Marwell's "critical mass" model of public goods provision
  - Gould on the Paris Commune: neighborhood versus class
  - Barkey on Ottoman Villages and trade networks

Lecture 12 and 13

Social network analysis
Ego networks

Sources:

Hanneman and Riddle, Chapters 8, 9.

Ego networks:

Opportunity and constraint; holes and embedding

- Wellman's social support

- Grannovetter's strength of weak ties

- **Three views of the "neighborhood"**
  - Individual's life-world
  - The distribution of neighborhood types (Bott's social class)
  - The overall connectivity of the population (clustering and reachability)
- **Describing embedding**
  - Netdraw demonstration: Knoke bureaucracies
  - UCINET demonstration: Ego Networks>Density
  - UCINET demonstration: Network>Cohesion>Clustering
  - Application: Ron Burt's The Social Structure of Competition
- **Crossing group boundaries**
  - UCINET demonstration: Network>Cohesion>EI Index
  - Application: Network>Ego Network>Brokerage (Gould and Fernandez)

Lecture 14
Lecture 14 is the second mid-term, no notes.

Lecture 15

Social network analysis
Centrality, centralization, and power

Sources:
Hanneman and Riddle, Chapter 10.

Centrality, centralization, and power:

- **Position, power, and influence**
  - The basic ideas in star, line, and circle graphs
  - Power at the macro level (centralization) and micro level (centrality)
- **Degree centralization and centrality**
  - Freeman's approach -- degree

- Bonacich's approach -- social capital as connections to the well connected; domination as connections to the less well connected
- Exercise/quiz

- **Closeness centralization and centrality**
  - Path distance
  - Reach
  - Eigenvector
  - All pathways
  - Exercise/quiz
- **Betweenness centralization and centrality**
  - Freeman's approach for binary data
  - Flow centrality for valued data
  - Exercise/quiz
- **Using power**
  - Exchange and influence in the net
  - "The smart rat jumps out of the maze"

Lecture 16

Social network analysis
Hierarchy, efficiency, and robustness

Sources:

Hanneman and Riddle, Chapter 8 (Krackhardt section); Watts, Chapter 9.

Hierarchy, efficiency, and robustness:

- **Differentiation and integration; specialization and coordination**
- **Evolutionary selection pressures on network organization -- structural/functionalist perspective**
  - Effectiveness
  - Efficiency

- Innovation
- Reliability/vulnerability

- **Evolutionary pressures on network organization -- conflict perspective**
  - control
  - unequal exchange
- **Segmental or clustered systems of production**
- **Craft production**
- **Markets and their failures**
  - Pure markets
  - Market imperfections
- **Hierarchy and its failures**
  - Pure hierarchy (Krackhardt)
  - Hierarchical failures
- **Beyond markets and hierarchies**
  - "Flexible specialization" and the "industrial group"
  - "Multi-scale" "Core-periphery" rewiring of hierarchy
- **Discussion: Other "systems of production"**
  - Government: organized coercion and coordination
  - Cultural production/art
  - Health/education/welfare

Lecture 17

Social network analysis
Cliques and groups

Sources:
Hanneman and Riddle, Chapter 11.

Cliques and groups:

Introduction: Groups and Sub-structures

- Most populations are more-or-less divided into sub-structures
- This creates structural holes and structural advantages
- Where an individual is located relative to sub-structures affects opportunities and constraints
- How the whole population is sub-structured affects diffusion, conflict, cohesion etc.

Bottom-up approaches: types of dyads, types of triads, the maximal complete sub-graph

Cliques - maximal complete sub-graphs, clique overlap

N-cliques - ties to all at distance LTE N

N-clans - ties at distance N, but all ties within the clan

K-plexes - direct ties to all but K others in the "plex"

K-cores - direct ties to K others in the core

F-group - valued data, transitive triads; strong = max value; weak = greater than a cutoff

Top-down approaches: strictly segregated sub-populations, degree of division, key positions and relations

Components - disconnected sub-graphs

Blocks and Cut-Points - "Bi-components" - connecting nodes

Lambda Sets and Bridges - connecting relations

Factions - "block model" of all within and no between ties

Summary: micro position, identity, and life chances; division and macro dynamics

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Review Questions

1. Can you explain the term "maximal complete sub-graph?"

2. How do N-cliques and N-clans "relax" the definition of a clique?

3. Give an example of when it might be more useful to use a N-clique or N-clan approach instead of a strict clique.

4. How do K-plexes and K-cores "relax" the definition of a clique?

5. Give and example of when it might be more useful to us a K-plex or K-core approach instead of a strict clique.

6. What is a component of a graph?

7. How does the idea of a "block" relax the strict definition of a component?

8. Are there any cut points in the "star" network? in the "line" network? in the "circle" network?

9. How does the idea of a lambda set relax the strict definition of a component?

10. Are there any "bridges" in a strict hierarchy network?

Application Questions

1. Think of the readings from the first part of the course. Which studies used the ideas of group sub-structures? What kinds of approaches were used: cliques, clans, plexes, etc.?

2. Try to apply the notion of group sub-structures at different levels of analysis. Are there sub-structures within the kinship group of which you are a part? How is the population of Riverside divided into sub-structures? Are there sub-structures in the population of Universities in the United States? Are the nations in the world system divided into sub-structures in some way?

3. How might the lives of persons who are "cut points" be affected by having this kind of a structural position? Can you think of an example?

4. Can you think of a real-world (or literary) example of a population with sub-structures? How might the sub-structures in your real world case be described using the formal concepts (are the sub structures "clans" or "factions" etc.).

Lecture 18

Social network analysis
Homophily and social segregation

Sources:
Hanneman and Riddle, Chapter 18 (optional)

Homophily and social segregation:

Introduction: Living together, but apart

- Residential segregation by race
- Occupational segregation by gender
- Sociable interaction by age

Why homophily?

- Homans' theory
- Segregation dynamics: Schelling's (*Micromotives and Macro Behavior*)
- Peter Blau: The mathematics of separation

Models of inter-group relations:

- General block model
- Constant homophily
- Variable homophily
- Core and periphery

So what?

- Individual identity and interpersonal conflict/competition
- Group identity/solidarity and group conflict/competition

Review Questions

1. Clustering in graphs of social networks is commonly found. Explain how homophily could account for such an outcome.
2. Briefly explain Homans' theory, and provide an example.
3. Schelling showed that residential segregation is the expected outcome, even when members of each group were quite tolerant of living in "mixed" neighborhoods. Explain why this occurs.
4. According to Blau's theory of group size and interaction, are the members of a small minority, or are the members of a large majority more likely to interact with members of the other group?
5. Sketch a blocked diagram for a matrix with three groups. Show expected block densities that would be consistent with the "constant homophily" model, the "variable homophily" model, and a model that showed no tendency toward homphily.
6. How do the pattern of ties within the group differ between the "core" and the "periphery" groups in a core-periphery block model of group interaction?

Application Questions

Find data on the patterns of residential segregation by ethnicity for the community you live in (try web searches, or see your government publications reference librarian). What theories might explain the pattern?

If interaction with others who you believe to be "different" from you strengthens your sense of how different you are, would we expect European Americans or African Americans to have a stronger sense of ethnic identity? Why?

The theory of homophily suggests that there is a stronger tendency to form social ties with others who are regarded as similar, than there is a tendency to form ties with others who are regarded as

different. Consider the relationships among business organizations. Does the theory seem to apply? If not, why not?

Some theorists describe the economic relationships among nations in the global economy as "unequal exchange" and "dependency" between "core" nations (rich, post-industrial), "semi-peripheral" nations (moderately wealthy, industrial), and "peripheral" nations (poor, raw material producing). Are these "World Systems" theorists using the terms "core" and "periphery" in the same way that network analysts do?

Lecture 19

Social network analysis
Equivalence: Positions

Sources:

Hanneman and Riddle, Chapters 12 and 13.

Equivalence of positions:

The idea of "equivalent" actors

- Sociology is about types or classes of similar actors, not individuals
- Equivalence (or similarity) can be based on attributes or on relations
- Attributes
  - E.g. age, sex, ethnicity, religion, geographic location, IQ, member of same family, social class.
  - Some attributes really describe social roles/identities or patterns of relations (e.g. class)
- Relations
  - E.g. Highly "central," member of the same clique, "broker"
  - Relational equivalence is based on similarity of pattern of ties to other actors

Kinds of "equivalence"

- Equivalence classes are "ideal types"
- different definitions of equivalence are possible
- equivalence, in the real world, is often only approximate
- Three main types (we will focus on two)

- Structural equivalence - same pattern of ties to same other actors, "substitutability"
- Automorphic equivalence (not examined further) - same distances from all other actors, "replicated sub-structures"
- Regular equivalence - same pattern of ties with same other types of actors, "social roles"

Structural equivalence -- same positions in a social structure

- Visualizing structural equivalence
  - Same "position" in a graph, or "re-label-able"
  - Same vectors in a matrix
- Measuring structural equivalence
  - Correlation
  - Euclidean distance
  - Hamming distance
  - Exact and positive matches
- Structural equivalence analysis
  - Old: Factor analysis, cluster analysis, CONCOR, MDS
  - New: Numeric optimization

So what?

- Structurally similar actors may be more likely to have similar attributes, identities, behaviors
- A network with structurally similar actors may be more institutionalized and robust
- Networks with many versus few structural equivalence classes reveal division/solidarity, and have different "textures" of everyday life

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Review Questions

1. How are network roles and social roles different from network "sub-structures" as ways of describing social networks?

2. Explain the difference between structural and regular equivalence.

3. Actors who are structurally equivalent have the same patterns of ties to the same other actors. How do correlation, distance, and match measures index this kind of equivalence or similarity?

4. If the adjacency matrix for a network can be blocked into perfect sets of structurally equivalent actors, all blocks will be filled with zeros or with ones. Why is this?

5. Are the actors in a clique structurally equivalent?

Application Questions

1. Think about friendship ties among students in a class. What would it mean to say that several students were "structurally equivalent?" Think about an ideal typical "market." Are there "structurally equivalent" sets of actors here?

2. Think about the star network. How many sets of structurally equivalent actors are there? What about the circle network?

3. Examine the line network carefully -- this one's a little more tricky. Describe the structural equivalence sets in a line network.

4. Consider our classical hierarchical bureaucracy, defined by a network of directed ties of "order giving" from the top to the bottom. Make an adjacency matrix for a simple bureaucracy like this. Block the matrix according to structural equivalence sets.

5. Consider world commodity markets -- for example, oil. Are there sets of structurally equivalent actors present?

Lecture 20

Social network analysis
Equivalence: Social roles

Sources:

Hanneman and Riddle, Chapter 15.

Social roles:

Social roles

- Basic building block - norm and sanctioned expectation sets
- Identities as the sum of social roles
- Social roles are relational
  - Describe norms governing relations among classes of actors
  - E.g. "worker-capitalist," "core-periphery," "banker-customer," "in-group member versus "stranger"

Regular equivalence

- Same pattern of relations with same other types of actors
- E.g. "A mother" versus "My mother"

Visualizing regular equivalence

- Graphically: The Wasserman-Faust network, complexity in "real" networks
- Numerically: Blocking and permutation

Two examples:

- Padgett's Florentine marriage alliances
- Knoke's information exchange

So what?

- Social roles define expectations, norms, and sanctions -- powerful predictors of individual behavior
- Patterns of social roles and their interconnections in a population define the differentiation and integration of the relations among roles -- not individuals. Abstract view of "society."
- Variability of individuals within roles may tell us something about conformity and deviance, the "flexibility" of social structure

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Review Questions

1. Define the concept of a social role, and provide an example.

2. What does it mean when we say that "regular equivalence" provides a "relational" approach to describing social roles?

3. Suppose two actors are regularly equivalent. Are they also structurally equivalent? Suppose that two actors are structurally equivalent. Are they also regularly equivalent? Explain.

4. Sketch an example of what a permuted adjacency matrix would look like if it were describing perfect regular equivalence among three sets of actors, with three actors in each role.

5. Are the actors in a clique regularly equivalent? What about the actors in a "star," a "line," and a "circle" network?

Application Questions

1. Think about friendship ties among students in a class. What would it mean to say that several students were "regularly equivalent?" Think about an ideal typical "market." Are there "regularly equivalent" sets of actors here?

2. Think about the labels that you use to describe members of your kinship group (family). What are the "kinds" of people? Describe the relation of "gives advice to" among the regular equivalence categories you identified.

3. Think about the labels that are used to describe some major stratification variables (e.g. gender, ethnic, "racial," religious, political, social class). To what extent are these labels describing relational "regular equivalence" classes? What are the relations that define the differences among the groups?

4. Consider our classical hierarchical bureaucracy, defined by a network of directed ties of "order giving" from the top to the bottom. Make an adjacency matrix for a simple bureaucracy like this. Block the matrix according to regular equivalence sets.

5. Consider world commodity markets -- for example, oil. Are there sets of regularly equivalent actors present?

WEB RESOURCES

INSNA Homepage:

http://www.insna.com/

This is the home page for the International Network for Social Network Analysis. There is a wealth of information on this page, including information about: publications, network URLs, conferences, software, bibliographies, data sets, and listserves.

Analytic Technologies Website:

http://www.analytictech.com/

Analytic Technologies is the premier software company producing social network software. Key programs include UCINET, and NetDraw, but other programs are also distributed by Analytic Technologies. There is also educational material on social network analysis on the site, including tutorials, handouts, information about courses, and workshops.

Robert Hanneman and Mark Riddle. 2005. Introduction to Social Network Methods. (free introductory textbook on social network analysis):

http://www.faculty.ucr.edu/~hanneman/

A free online textbook on social network analysis. (Read online, or download zip file version.) An excellent resource!

Ken Frank's Social Network Resource Website:

http://www.msu.edu/~kenfrank/resources.htm

This site contains: general materials, discussion exercise for software, survey materials, implementation of technology data sets and sas files, influence models, selection models: pstar, selection models:p2, kliquefinder, other visualization tools, ucinet, James Moody's Routines, data sets, other web resources.

Alan Reifman's Spider Website:

http://courses.ttu.edu/hdfs3317-reifman/spider.htm

This is a useful general resource site. It includes information on: concepts, network conferences, current events related to networks, sample network questionnaires, networks and health, networks (general), and network syllabi.

Tom Snijders Social Network Analysis Website:

http://stat.gamma.rug.nl/snijders/

Links to papers, journals, and software.

UBC Social Network Website:

http://socialnetworks.soci.ubc.ca/SocNets/Home/Home.html

Currently this website provides example social network survey instruments from other researchers, along with brief descriptions of the instruments, as well as some ciations and publications that stem from studies using the instruments.

SOFTWARE

This section briefly describes and provides links to the most commonly used software packages and resources for social network analysis.

Social Network Software Programs:

Analytic Technologies Website:

http://www.analytictech.com/

This is the host site for UCINET, the premier software package for social network analysis. UCINET can be used for many social network analysis tasks including matrix opertation, calculating a suite of social network measures, and working with one and two mode data. It also interfaces with several other social network analysis programs. Analytic Technologies also distributes NetDraw (which is both stand alone, and packaged with UCINET). Netdraw is a very useful graphics program for drawing and displaying social network graphs. Graphs can be exported into a number of different formats, and imported into word processing files, and other types of files.

Networks/Pajek Website:

http://vlado.fmf.uni-lj.si/pub/networks/pajek/

Pajek has been designed for the analysis of large network, and is also an excellent package for producing social network graphs. See the book by De Nooy, Wouter, Mrvar, Batagelj (2005) on using this program. The website provides various resources associated with the use of Pajek.

Siena Webpage:

http://stat.gamma.rug.nl/siena.html

Siena is a software package that is particularly useful for the analysis of longitudinal network data. It can also be used for the analysis of longitudinal data on networks and behaviour, and for cross-sectional network data. In particular, this program can be used for undertaking anlyses using exponential random graph models ("ERGMs'), also called P* models. Siena is affliated with the program StOCNET.

StOCNET:

http://stat.gamma.rug.nl/stocnet/

An open software system for the advanced statistical analysis of social networks

Multinet Webpage:

http://www.sfu.ca/~richards/Multinet/Pages/multinet.htm

MultiNet is an interactive menu-driven program for exploratory analysis and display of discrete and continuous multivariate network data. The program is described at the above weblink. The software can be downloaded from the following website:

http://www.sfu.ca/~seary/DstDsk507.zip

* Note: this program was developed by the late Bill Richards, and by Andrew Seary. If you have questions about the program, you should contact Andrew Seary.

Carter's Archive of S Routines for the R Statistical Computing Environment:

http://erzuli.ss.uci.edu/R.stuff/

This site has a variety of software tools for analyzing social networks developed by Carter Butts. The tools are written in R.

Netminer:

http://www.netminer.com/NetMiner/home_01.jsp

A tool for exploratory network data analysis and visualization.

Statnet:

http://www.stat.washington.edu/handcock/

Software tools for the analysis, simulation and visualization of network data.

Egonet Webpage:

http://survey.bebr.ufl.edu/EgoNet/

This is software for the analysis of egonetworks.

BIBLIOGRAPHY OF SOCIAL NETWORK TEXTS

Introductory and Basic Methods Texts:

Berkowitz, S.D. 1982. *An Introduction to Structural Analysis: The Network Approach to Social Research*. Toronto: Butterworth.

Degenne, Alain, and Michel Forsé. 1994. *Introducing Social Networks*. Thousand Oaks, CA: Sage.

De Nooy, Wouter, Andrej Mrvar and Vladimir Batagelj. 2005. *Exploratory Social Network Analysis with Pajek*. Cambridge: Cambridge University Press.

Freeman, Linton C., 2004. *The Development of Social Network Analysis: A Study in the Sociology of Science.* Vancouver, Canada: Empirical Press.

Hanneman, Robert, and Mark Riddle. 2005. *Introduction to Social Network Methods*. (free online introductory textbook on social network analysis):
http://www.faculty.ucr.edu/~hanneman/

Knoke, David, and Song Yang. 2008. *Social Network Analysis.* Los Angeles: Sage.

Scott, John. 2001. *Social Network Analysis: A Handbook Second Edition*. Thousand Oaks, Ca: Sage.

Wasserman, Stanley and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Wellman, Barry and S.D. Berkowitz (eds.). 1988. *Social Structures: A Network Approach*. Cambridge: Cambridge University Press.

General Advanced Texts:

Burt, Ronald S., and Michael J. Minor. 1983. *Applied Network Analysis : A Methodological Introduction.* Beverly Hills : Sage Publications, c1983.

Carrington, Peter J., John Scott, and Stanley Wasserman (Editors). *Models and Methods in Social Network Analysis.* 2005. Cambridge, U.K: Cambridge University Press.

Doreian, Patrick, Vladimir Batageli, and Anuška Ferligoj. 2005. *Generalized Blockmodeling.* Cambridge, U.K: Cambridge University Press.

Wasserman, Stanley, and Joseph Galaskiewicz. Editors. 1994. *Advances in Social Network Analysis : Research in the Social and Behavioral Sciences*. Thousand Oaks, Calif. : Sage Publications.

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