

MGMT 935 -- NETWORK THEORY AND APPLICATIONS -- FALL 2006

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Office hours by appointment

Class meets Wed 1:30-4:30, SH-DH 2034

This course explores network analysis models and their applications to organizational phenomena. By examining the structure of relations among actors, network approaches seek to explain variations in beliefs, behaviors, and outcomes. The beauty of network analysis is its underlying mathematical nature – network ideas and measures apply equally well at micro and macro levels of analysis. In this course, then, we will read and discuss articles both at the micro level (where the network actors are individuals within organizations) and at the macro level (where the network actors are organizations within larger communities) that utilize network constructs such as cohesion, structural equivalence, centrality, autonomy, and small worlds. There will also be a demonstration of network software to assist you with empirical analyses.

The course has several themes. After an introductory session, part 1 addresses contagion models, which explore the spread of information and behaviors. Part 2 addresses power and influence models, which explore how actors' structural positions in networks influence their effectiveness. In part 3, we build on our two previous themes by addressing related topics on network antecedents, evolution and topology. Most readings are posted on webCafe. Please feel free to post any missing readings (or additional related readings) in the webCafe folders. I will provide copies of any articles not available through Penn's e-journals.

Evaluation is based on four components: article critiques, empirical analyses, final project, and class participation. For five of the sessions (not including the introductory session on the first day), you are expected to critique an article you select from the required readings assigned for that day (maximum 750 words). These critiques must be handed in at the beginning of the class, and you are free to choose the five sessions you prefer. For one of these five critiques, you will also lead the discussion around that article (we will coordinate selections for leading discussions on webCafé so that only one person will lead discussion of any particular article, and this opportunity is not available for our first two sessions). There will be two other written assignments which require empirical analysis using UCINET and associated graphics software. For the final project, you are expected to develop a proposal for a network study which you will present to the class and then write up. Detailed instructions for these assignments are posted on webCafe. As in any seminar, consistent attendance and high-quality participation will help your grade.

Sept 6 INTRODUCTION

Wasserman, S. and K. Faust (1994). Social Network Analysis: Methods and Applications. New York, Cambridge University Press. (Chapters 1-2)

Brass, D., J. Galaskiewicz, H. Greve and W. Tsai (2004). "Taking Stock of Networks and Organizations: A Multilevel Perspective." Academy of Management Journal **47**: 795-817.

Salancik, G. R. (1995). "Wanted: A Good Network Theory of Organization." Administrative Science Quarterly **40**: 345-349.

Recommended: Wasserman and Faust, Chapter 3.

Sept 13 CONTAGION I (and software demo by Andrew Knight)

Coleman, J., E. Katz, and H. Menzel (1957). "The Diffusion of an Innovation Among Physicians." Sociometry: 253-270.

Krackhardt, D. and L. Porter (1985). "When Friends Leave: A Structural Analysis of the Relationship between Turnover and Stayers' Attitudes." Administrative Science Quarterly **30**: 242-261.

Davis, G. and H. Greve (1997). "Corporate Elite Networks and Governance Changes in the 1980s." American Journal of Sociology **103**(1): 1-37.

Recommended: Strang, D. and N. Tuma (1993). "Spatial and Temporal Heterogeneity in Diffusion." American Journal of Sociology **103**(3): 614-639.

Sept 20 CONTAGION II

Burt, R. S. (1987). "Social Contagion and Innovation: Cohesion versus Structural Equivalence." American Journal of Sociology **92**: 1287-1335.

Westphal, J., R. Gulati, and S. Shortell (1997). "Customization or Conformity: An Institutional and Network Perspective on the Content and Consequences of TQM Adoption." Administrative Science Quarterly **42**(2): 366-394.

Shah, P. (1998). "Who are Employees' Social Referents? Using a Network Perspective to Determine Referent Others." Academy of Management Journal **41**(3): 249-268.

Recommended: Galaskiewicz, J. and R. S. Burt (1991). "Interorganization Contagion in Corporate Philanthropy." Administrative Science Quarterly **36**(1): 88-105.

Abrahamson, E. and L. Rosenkopf (1997). "Social Network Effects on the Extent of Innovation Diffusion: A Computer Simulation." Organizational Science **8**(3): 289-309

Sept 27 NETWORK POSITION I (NOTE: 1st Exercise Due)

Baker, W. and R. Faulkner (1993). "The Social Organization of Conspiracy: Illegal Networks in the Heavy Electrical Equipment Industry." American Sociological Review **58**: 837-860.

Podolny, J. M. (1993). "A Status-based Model of Market Competition." American Journal of Sociology **98**: 829-872.

Stuart, T., H. Hoang, and R. Hybels (1999). "Interorganizational Endorsements and the Performance of Entrepreneurial Ventures." Administrative Science Quarterly **44**: 315-349.

Recommended: Freeman, L. (1979). "Centrality in Social Networks: Conceptual Clarification." Social Networks **1**: 215-239.

Bonacich, P. (1987). "Power and Centrality: A Family of Measures." American Journal of Sociology **92**: 1170-82.

Burkhardt, M. and D. Brass (1990). "Changing Patterns or Patterns of Change: The Effects of a Change in Technology on Social Network Structure and Power." Administrative Science Quarterly **35**: 104-127.

Cook, K. and R. Emerson (1978). "Power, Equity and Commitment in Exchange Networks." American Sociological Review **43**: 721-739.

Ibarra, H. (1993). "Network Centrality, Power, and Innovation Involvement: Determinants of Technical and Administrative Roles." Academy of Management Journal **36**:471-501.

Oct 4 NETWORK POSITION II

Coleman, J. S. (1988). "Social Capital in the Creation of Human Capital." American Journal of Sociology **94**: S95-S120.

Burt, R. S. (1997). "The Contingent Value of Social Capital." Administrative Science Quarterly **42**: 339-365.

Uzzi, B. (1996). "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." American Sociological Review **61**(August): 674-698.

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

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

Fernandez, R., E. Castilla and P. Moore. (2000). "Social Capital at Work: Networks and Employment at a Phone Center." American Journal of Sociology **105**: 1288-1356.

Yakubovich, V. "Weak Ties, Information and Influence: How Workers Find Jobs in a Local Russian Labor Market." American Sociological Review **70**: 408-21.

Oct 11 NETWORK POSITION III

Podolny, J. and J. Baron (1997). "Resources and Relationships: Social Networks and Mobility in the Workplace." American Sociological Review **62**(October): 673-693.

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

Reagans, R. and W. McEvily (2003). "Network Structure and Knowledge Transfer: The Effects of Cohesion and Range." Administrative Science Quarterly **48**: 240-267.

Recommended: Putnam, R. (2000). Bowling Alone: The Collapse and Revival of American Community. Published by Simon and Schuster.

Oct 18 NETWORK ANTECEDENTS (NOTE: 2nd Exercise Due)

Hinds, P., K. Carley, D. Krackhardt and D. Wholey (2000). "Choosing Work Group Members: Balancing Similarity, Competence and Familiarity." Organizational Behavior and Human Decision Processes **81**: 226-251.

Moody, J. (2001). "Race, School Integration, and Friendship Segregation in America." American Journal of Sociology **107**(3): 679-716.

Reagans, R. (2005). "Preferences, Identity and Competition: Predicting Tie Strength from Demographic Data." Management Science, forthcoming.

Recommended: Mollica, K., B. Gray and L. Trevino (2003). "Racial Homophily and its Persistence in Newcomers' Social Networks," Organization Science **14**: 123-136.

Klein, K., B. Lim, J. Saltz and D. Mayer (2004). "How Do They Get There: An Examination of the Antecedents of Network Centrality in Team Networks." Academy of Management Journal **47**: 952-963.

Oct 25 NETWORK EVOLUTION

Powell, W., K. Koput, et al. (1996). "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology." Administrative Science Quarterly **41**: 116-145.

Podolny, J. and D. Phillips (1996). "The Dynamics of Organization Status," Industrial and Corporate Change **5**: 453-371.

Gulati, R. and M. Garguilo (1999). "Where do Interorganizational Networks Come From?" American Journal of Sociology **104**: 1439-1493.

Recommended: Walker, G., B. Kogut, and W. Shan (1997). "Social Capital, Structural Holes and the Formation of an Industry Network." Organization Science **8**(2): 109-125.

Chung, S., H. Singh and K. Lee (2000). "Complementarity, Status Similarity and Social Capital as Drivers of Alliance Formation." Strategic Management Journal **21**: 1-22.

Rosenkopf, L., Metiu, A. and V. George (2001). "From the Bottom Up: Technical Committee Activity and Alliance Formation." Administrative Science Quarterly **46**: 748-772.

Powell, W., D. White, K. Koput and J. Owen-Smith (2005). "Network dynamics and Field Evolution: The Growth of Interorganizational Collaboration in the Life Sciences." American Journal of Sociology **110**: 1132-1205.

Pomodoro, F., G. Ahuja and W. Mitchell (2006). "Embeddedness, Tie Dissolution and the Stability of Interorganizational Networks," University of Michigan working paper.

Rosenkopf, L. and G. Padula (2006). "The Microstructure of Network Evolution: An Empirical Examination of Alliance Formation in the Mobile Communications Industry," University of Pennsylvania working paper.

Nov 1 SMALL WORLDS

Travers, J. and S. Milgram (1969). "An Experimental Study of the Small World Problem." Sociometry **32**: 425-443.

Watts, D. (1999). "Networks, Dynamics and the Small-World Phenomenon." American Journal of Sociology **105**: 493-527.

Schilling, M. and C. Phelps (2006). "Interfirm Collaboration Networks: The Impact of Large Scale Network Structure on Firm Innovation," NYU working paper.

Recommended: Kogut, B., and G. Walker (2001). "The Small World of Germany and the Durability of National Networks." American Sociological Review **66**:317-355.

Davis, G., M. Yoo, and W. Baker (2003). "The Small World of the American Corporate Elite, 1982-2001." Strategic Organization **1**:301-326.

Rosenkopf, L. and P. Almeida (2003). "Overcoming Local Search through Alliances and Mobility." Management Science **49**: 751-766.

Uzzi, B. and J. Spiro (2005). "Collaboration and Creativity: The Small World Problem." American Journal of Sociology **111**: 447-504.

Canyon, M. and M. Muldoon (2006). "Ownership and Control: A Small-World Analysis," University of Pennsylvania working paper.

Nov 8 NETWORK TOPOLOGY

Nohria, N. and C. Garcia-Pont (1991). "Global Strategic Linkages and Industry Structure." Strategic Management Journal **12**(special issue):105-124.

Sorenson, O. and T. Stuart (2001). "Syndication Networks and the Spatial Distribution of Venture Capital Investments." American Journal of Sociology **106**: 1546-86.

Baum, J., A. Shipilov and T. Rowley (2003). "Where Do Small Worlds Come From?" Industrial and Corporate Change **12**:697-725.

Recommended: White, H., Boorman, S. and R. Breiger (1976). "Social Structure from Multiple Networks. I. Blockmodels of Roles and Positions." American Journal of Sociology **81**:730-780.

Nelson, R. (1989). "The Strength of Strong Ties: Social Networks and Intergroup Conflict in Organizations." Academy of Management Journal **32**:377-401.

Rosenkopf, L. and M. Tushman (1998). "The Coevolution of Community Networks and Technology: Lessons from the Flight Simulation Industry." Industrial and Corporate Change **7**(2):311-346.

Barabasi, A., R. Albert and H. Jeong (1999). "Mean-Field Theory of Scale-Free Random Networks." Physica A **272**:173-187.

**Nov 15/29/ Dec 6 PROJECT PRESENTATIONS INTERSPERSED WITH
VARIOUS ARTICLES (Details TBD, note no class Nov 22)**

The aim here is to expose ourselves to some interesting applications of network ideas in domains that haven't fit neatly into the previous categories. We will determine which articles to discuss by consensus. Examples of some articles we've discussed in past seminars follow, other suggestions are welcome:

Krackhardt, D. (1990). "Assessing the Political Landscape: Structure, Cognition, and Power in Organizations." Administrative Science Quarterly **35**: 342-369.

Ibarra, H. (1992). "Homophily and Differential Returns: Sex Differences and Network Structure and Access in an Advertising Firm." Administrative Science Quarterly **37**: 422-447.

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

Castilla, E. (2005). "Social Networks and Employee Performance in a Call Center." American Journal of Sociology **110**: 1243-83.

Dec 13 WRITTEN PROJECTS DUE