

Draft: February 23, 2016

Syllabus

Social Network Analysis

Spring 2016: Sociology 901

Instructor: Jason Fletcher

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Course Time: 9:00-11:30 AM, Wednesdays

Place: B223 Van Vleck Hall

Office Hours: Tuesdays 2-330 PM in Social Science 4430

Course Overview:

Social networks affect many important outcomes—health behaviors, labor market opportunities, romantic relationships, and the spread of information. They are also a source of resources and insurance against negative shocks. Understanding social networks have important policy implications on whether we should target resources or spread them over the entire network and how best to spread the effects of intervention efforts through a network.

This course reviews current research on social networks from sociology and economics as well as associated disciplines (computer science, and epidemiology). We will have a brief exploration of theoretical models but focus much of our time on empirical applications, including opportunities to learn how to use social network analysis software.

The course begins with an overview of basic facts and concepts. We will focus some time on early models of network formation and applications of peer effects and the social multiplier. We will also use network data to generate graphs and figures describing the networks

Requirements: homework assignments, two presentations, and a short paper on a topic relating to social networks

Pre-requisites: there are no formal prerequisites, but students who have not had prior courses in data analysis and statistical methods may struggle.

Course Objectives:

Students will be able to understand and formulate research questions relevant to social network analysis

Students will understand the sources, advantages, and disadvantages of alternative types of social network data

Students will be able to describe a social network and compare attributes across different social networks

Students will understand theoretical and empirical issues in current research on social network analysis

Grades

Your grades will include of four parts

1. Class participation (10%)
This is a seminar; you are required to attend each class prepared to discuss the assigned readings.
2. Homework/Data Analysis (10%)
The seminar will include a few homework assignments, where each student will create and manipulate social network figures using provided data.
3. Student Presentation (40%)
Each student will make a short presentation on a social network paper (from those marked # in the syllabus), discussing the research question, the data, the empirical approach, the limitations, and key findings. Second, each student will also be a “discussant” on one of the social network paper presentations. Finally, each student will make a presentation of his/her short paper topic.
4. Short Paper (40%)
Each student will prepare a 5-10 page paper that either (1) surveys a specific part of the empirical literature on social networks or (2) outlines a potential research project on social networks, discussing data, empirical approach and main hypothesis.

The textbooks for the course are:

Wasserman, S. & Faust, K. (1994). Social network analysis: Methods and applications. New York: Cambridge University Press.

Matthew O. Jackson (2008) Social and Economic Networks, Princeton University

Duncan Watts. Six Degrees

Hanneman, Robert A. and Mark Riddle. 2005. Introduction to social network methods. Riverside, CA: University of California, Riverside (published in digital form at <http://faculty.ucr.edu/~hanneman/>)

Recommended

Valente (2010). Social Networks and Health: Models, Methods, and Applications

THE ONLY BOOK FOR YOU TO PURCHASE IS WATTS

Data Opportunities

<http://www.stanford.edu/~jacksonm/Data.html>

<http://www.brianckeegan.com/network-resources/>

Software/Tutorials

SNA in R:

https://www.youtube.com/watch?v=-LgfBoKO_RI

Class Schedule

Week 1 (Jan 20)

Theoretical and empirical background; Classroom examples

Required:

Wasserman and Faust, Chapters 1, 2, 4

Watts, Duncan J. "The" new" science of networks." *Annual review of sociology* (2004): 243-270.

Recommended:

Wasserman and Faust, Chapter 5 (Centrality)

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

Valente Chapter 1

Granovetter, M. [2005]. "The impact of social structure on economic outcomes", *Journal of Economic Perspectives*.

Moody, James. "The structure of a social science collaboration network: Disciplinary cohesion from 1963 to 1999." *American sociological review* 69, no. 2 (2004): 213-238.

TED Talk: [Christakis](#)

Week 2 (Jan 27)

Data and Concepts: Network Formation

Required:

*Hanneman Chapter 1, 8-10

Network Formation I: Random Networks

Required:

Watts. *A Theory of Random Graphs*. Chapter 2

Jackson Chapters 4-5

Scale Free Networks

Required:

Watts Chapter 4

Barabasi, A.L. and Bonabeau, E. (2003) Scale-free networks. *Scientific American*, 50-59.

Recommended

*Valente Chapters 3-5

Barabasi, A.L. and Albert, R. (1999) The emergence of scaling in random networks. *Science*, 286:509-512

Week 3 (Feb 3)

Homophily, Small Worlds, Structural Holes

Required:

McPherson, Miller, Lynn Smith-Lovin and James M. Cook. 2001. "Birds of a Feather? Homophily in Social Networks." *Annual Review of Sociology* 27: 415-444.
Watts "Small World Problem" in Chapter 1
Watts Chapter 3
Milgram, S. (1967). The small world problem. *Psychology Today*, 1:62-67.
Burt, R. S. (2004). Structural holes and good ideas. *American Journal of Sociology*. 110(2) : 349-399.

Recommended

Kossinets, G. and Watts, D.J. (2009). Origins of homophily in an evolving social network. *American Journal of Sociology*, 115(2)405-450
Watts Chapter 5
#Watts, Duncan J. 1999. "Networks, Dynamics, and the Small World Phenomenon." *American Journal of Sociology* 105: 493-527.
Watts and Strogatz (1998): Collective Dynamics of 'Small-World' Networks, *Nature*, 393 , pp. 440-442.
#Moody, Race, School Integration, and Friendship Segregation in America, *AJS* 2001
Travers, J. and Milgram, S. (1969). [An experimental study of the small world problem](#). *Sociometry*, 32(4):425-443.
#Alberich et al. Marvel Universe Looks Almost Like A Real Social Network. 2002
#Massen and Koski. Chimps of a feather sit together: chimpanzee friendships are based on homophily in personality. *Evolution and Human Biology*. 2014

Week 4 (Feb 10)

Time, Sub-groups, Blockmodels and Strategic Network Formation

Required:

Wasserman and Faust, Chapter 9-10
Hanneman Chapters 4-6, 18
Bearman, Peter. "Generalized Exchange." *American Journal of Sociology*. 102(5): 1383-1415.

Strategic Network Formation II:

Required:

Jackson Chapter 6 (skim)

Recommended

Wasserman and Faust, Chapter 7-8
Valente Chapter 7, 9
*Jackson, Chapters 1-3.
Jackson Chapter 11

#Padgett, John F., and Christopher K. Ansell. "Robust Action and the Rise of the Medici, 1400-1434." *American journal of sociology* (1993): 1259-1319.

#Buskens and van de Rijt. Dynamics of Networks if Everyone Strives for Structural Holes. *AJS* 2008

Rauch, J. E. [2010]. Does Network Theory Connect to the Rest of Us? A Review of Matthew O. Jackson's *Social and Economic Networks*" *Journal of Economic Literature* 48, 980-986.

#Currarini, Jackson and Pin (2010): Identifying the Roles of Choice and Chance in Network Formation: Racial Biases in High School Friendships, *Proceedings of the National Academy of Sciences*.

#Saramaki et al. Persistence of social signatures in human communication, *PNAS* 2014

Week 5 (Feb 17)

Empirical Models of Network Formation

Required

Robins, Garry, et al. "An introduction to exponential random graph (p^*) models for social networks." *Social networks* 29.2 (2007): 173-191

Fletcher, Ross, and Zhang (2013), Determinants and Consequences of Friendships. NBER Working Paper

Recommended

#Marmaros and Sacerdote (2006): How Do Friendships Form?, *Quarterly Journal of Economics* , 121 (1) , pp. 79-119.

#Wimmer, A. and Lewis, K. (2010). Beyond and below racial homophily: ERG models of a friendship network documented on Facebook. *American Journal of Sociology*, 116(2):583-642

#Mayer and Puller (2008). Old Boys Network. *Journal of Public Economics*

#Goodreau et al. Birds of a Feather or Friend of a Friend? *Demography* 2009

Week 6 (Feb 24)

Empirical Effects of Social Networks: Problems and Solutions

Required:

Jackson Chapter 8, 13

Sacerdote (2014). Experimental and Quasi-Experimental Analysis of Peer Effects: Two Steps Forward? *Annual Review of Economics*

Christakis, Nicholas A. and James H. Fowler. 2007. "The Spread of Obesity in a Large Social Network Over 32 Years." *New England Journal of Medicine* 357(4): 370-379.

Cohen-Cole, Ethan and Jason M. Fletcher, 2008. "Is Obesity Contagious? Social Networks vs. Environmental Factors in the Obesity Epidemic." *Journal of Health Economics* 27: 1382-1387.

Shalizi, Cosma Rohilla and Andrew C. Thomas. 2011. "Homophily and Contagion Are Generically Confounded in Observational Social Network Studies." *Sociological Methods & Research* 40(2): 211-239.

Recommended

Manski (1993): Identification of Endogenous Social Effects: The Reflection Problem, *Review of Economic Studies*, 60, pp. 531-542.

#Mas, A. And E. Moretti (2009), Peers at work," *American Economic Review* 99, 112-145.

Sacerdote (2001): Peer Effects with Random Assignment: Results for Dartmouth Roommates, *Quarterly Journal of Economics*, 116 (2), pp. 681-704

Centola, Damon. 2010. "The Spread of Behavior in an Online Social Network Experiment." *Science* 329: 1194-1197.

Fletcher (2010). Social Interactions and Smoking. *Health Economics*

#Aral, Sinan, Lev Muchnik, and Arun Sundararaja. 2009. "Distinguishing Influence based Contagion from Homophily-driven Diffusion in Dynamic Networks." *PNAS* 106(51): 21544-21549.

#Frank, Muller, Mueller. The Embeddedness of Adolescent Friendship Nominations: The Formation of Social Capital in Emergent Network Structures, *AJS* 2013

Lyons, R. (2011). The spread of evidence-poor medicine via flawed social-network analysis. *Statistics, Politics and Policy*, 2(1): Article 2

Chuang and Schechter (2015) Social Networks in Developing Countries. *Annual Review of Economics*.

Week 7 (March 2)

Policy: Social Multiplier, Aggregation and Key Player
Maybe: experiments on networks

Required:

Jackson Chapter 9

Glaeser, Sacerdote and Scheinkman (2003): The Social Multiplier, *Journal of the European Economic Association*, 1 (2-3), pp. 345-353.

Carrell, Scott E., Bruce I. Sacerdote, and James E. West. "From Natural Variation to Optimal Policy? The Importance of Endogenous Peer Group Formation." *Econometrica* 81, no. 3 (2013): 855-882.

Ballester C, A. Calvo-Armengol and Y. Zenou (2006), Who's who in networks. Wanted: the key player", *Econometrica*, 74, 1403-1417.

Recommended

#Valente, Thomas W. and Patchareeya Pumpuang. 2007. "Identifying Opinion Leaders to Promote Behavior Change." *Health Education and Behavior* 34: 881-896.

#Glaeser, Sacerdote and Scheinkman (1996): Crime and Social Interactions, *Quarterly Journal of Economics*, 111 (2), pp. 507-548

#David Card Multiple Equilibria

#Angrist, Joshua. The Perils of Peer Effects. No. w19774. National Bureau of Economic Research, 2013.

Week 8 (March 9)

One-on-One meetings

Week 9 (March 16)

Applications: Labor Markets, Weak Ties

Required:

Jackson Chapter 10

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

Centola, D. and Macy, M.W. (2007). Complex contagion and the weakness of long ties. American Journal of Sociology, 113(3):702-734

Montgomery (1991): Social Networks and Labor-Market Outcomes: Toward an Economic Analysis, American Economic Review, 81 (5), pp. 1407-18.

Recommended

#Moneyball for Academics: Network Analysis for Predicting Research Impact

Bayer, Ross, and Topa

Lehrer Labor Markets and Networks

#Schmutte. Free to Move? A Network Analytic Approach for Learning Limits to Job Mobility. Labour Economics

Spring Recess: March 23

March 30—Class Cancelled

Week 10 (April 6)

Applications: Epidemics, Diffusion and Transmission

Required

Kleinberg Book Chapter: Epidemics

Jackson Chapter 7

Valente Chapter 10

Recommended:

Christakis, Nicholas A. and James H. Fowler. 2010. "Social Network Sensors for Early Detection of Contagious Outbreaks." *PLoS ONE* 5(9).

Lazar et al. Google Flu Trends Still Appears Sick

Watch:

Diffusion of Innovations by Dr. Tom Valente

<https://www.youtube.com/watch?v=ZG9dAIBd4xQ>

<https://www.youtube.com/watch?v=mVVGGe2bJM>

<https://www.youtube.com/watch?v=ZG9dAIBd4xQ>

Nicholas Christakis: How social networks predict epidemics

http://www.ted.com/talks/nicholas_christakis_how_social_networks_predict_epidemics

Week 11 (April 13)

Applications: Sexual Networks

Required:

Bearman, P.S., Moody, J.M., and Stovel, K. (2004). [Chains of affection: The structure of adolescent romantic and sexual networks](#). *American Journal of Sociology*, 110(1):44-91

Fletcher and Yakusheva ReStat 2015

Recommended:

#Backstrom, Lars, and Jon Kleinberg. "Romantic Partnerships and the Dispersion of Social Ties: A Network Analysis of Relationship Status on Facebook." arXiv preprint arXiv:1310.6753 (2013).

Watts Chapter 6

Week 12/Week 13 (April 20, April 27)

Student Presentations

May 4: Class Cancelled

Final Paper Due: May 4, email to instructor by 5pm.

COURSE ENVIRONMENT AND ACADEMIC INTEGRITY/MISCONDUCT

Students are encouraged to discuss course material and content with each other. However, unless otherwise indicated, assignments should be representative of their own work. Please refer to this website on student misconduct:

<http://www.wisc.edu/students/saja/misconduct/misconduct.html>

Policy on Non-Discrimination

The UW–Madison is committed to creating a dynamic, diverse and welcoming learning environment for all students and has a non-discrimination policy that reflects this philosophy. Disrespectful behaviors or comments addressed towards any group or individual, regardless of race/ethnicity, sexuality, gender, religion, ability, or any other difference is deemed unacceptable in this class.

Policy on Special Needs or Disabilities

I wish to fully include persons with special needs or disabilities in this course. Please let the instructor know if you need any special accommodations in the curriculum, instruction, or assessments of this course to enable you to fully participate.

Civility Policy

Members of the University of Wisconsin-Madison community are expected to deal with each other with respect and consideration. The civility policy for this course promotes mutual respect, civility and orderly conduct among the faculty, teaching assistants, and students. We do not intend this policy to deprive any person of his or her right to freedom of expression. Rather, we seek to maintain a safe, harassment-free work-place for the students, faculty, and teaching assistants. Positive communication is encouraged and volatile, hostile, or aggressive actions and language will not be tolerated. If the civility policy for this course is violated, then the individual is subject to removal from the class and possibly the course altogether. In addition, the proper authorities at the UW Departmental, School, and University levels will be notified of such behavior accordingly and further action may be taken if necessary.