

Network Analysis II

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Office: Room 372 at Sociology Dept.
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Office Hours: TBA

Class: Tue 11am to 1pm

Location: Rm 240

(Sociology Dept, 725 Spadina Ave.)

Class website: TBA

Course Description and Aims

This seminar focuses on the theoretical, methodological, and substantive themes within social network analysis (SNA). The social networks perspective emphasizes the essential role of relationships among actors in shaping the social world. We will consider how different social relationships (and patterns of relationships) form and the consequences of this emergent social structure for individuals, groups, and society. The seminar is oriented by a sociological perspective on social networks, but network analysis is increasingly an interdisciplinary field and our reading list reflects this trend.

The social networks perspective is both a theoretical orientation and a set of methodological tools. These are inextricable elements in social networks research and the seminar will emphasize each in equal measure. The assigned readings include a mix of articles that highlight theoretical developments, methodological approaches, and substantive applications. We will cover classic and contemporary studies.

The course will center primarily on the discussion of ideas and approaches to social network research, but I will use one session to introduce the rudiments of network analysis with the *R* programming language. This is meant to get you started. Mastering any software package requires lots of self-directed practice and tinkering.

Course goals and learning objectives:

1. Students will be able to *describe* the major ideas in SNA and the major strategies for measuring and analyzing social networks.
2. Students will be able to *evaluate* contemporary research that uses social network ideas and/or methodological tools.
3. Students will be able to *propose* new research that uses social network ideas and/or methodological tools.
4. Students will begin to *create* new empirical research that advances social network research or the application of the networks perspective to other areas.

Prerequisite

There are no formal prerequisites for this course. You do not need to take Networks I before taking Networks II. You are, however, also welcome to enroll in this course if you took Networks I. Many of the assigned articles include quite a bit of math. Our focus will be on conceptual issues and not the mathematical models/definitions, however. Although there are no formal math/statistics prerequisites for this seminar, you will get the most out of this course if you have completed the sociology statistics sequence (SOC6302 & SOC6707) or equivalent.

Evaluation Components

Class participation (10% of final grade)

You are responsible for reading the assigned materials and coming to class prepared to discuss it. I expect everyone to participate in the discussion.

Discussion leadership (10% of final grade)

Within each week's reading list are one or more articles marked with three asterisks (***) . These are (usually) empirical articles that are (relatively) recent and apply one or more of the week's core ideas to a substantive topic. We will start each session (beginning in week 2) with a student presentation of these articles. This will allow us the opportunity to dig deeper into what goes into producing a piece of empirical networks research at the frontier of the field. We will allocate the articles in the first session.

Your presentation should be no longer than **15 minutes** and you should **prepare a series of questions** to help guide discussion following your presentation. You must use PowerPoint or another presentation software to prepare slides for your presentation. As you create your presentation, focus on the following questions:

- What is the research question? Is the contribution primarily empirical or theoretical? If theoretical, what are the key debates that the article is responding to?
- Describe the data. What are the strengths and limitations of the data?
- What methods did the author(s) use? What are the strengths and limitations?
- Are there any parts of the article that you found unclear or confusing?
- What conclusions can we draw from this research? Does it generate any new questions or puzzles?
- Which parts did you find convincing and which parts are you skeptical about?

I anticipate the discussion of these articles will take 30-45 minutes total (including the presentation).

Response memos (30% of final grade)

For six of the class meetings (of your choosing), you will prepare a short response memo (max 1.5 pages, single-spaced pages). These are not meant to be polished documents. The main goal of these memos is to help you organize your thoughts about the week's material. The memos should contain two parts. First, you should briefly summarize how the readings relate to one another. Avoid summarizing each article individually, but rather aim to extract the "big picture." Second, briefly present at least one research idea that the readings generated for you. How much space you spend on each part is up to you and may vary by week.

Present final project (5% of final grade)

On the last day of the semester, each student will present the preliminary version of their project to the class. The goal is to share what you've been working on with the class and get feedback. We will divide the time allocated to each presentation based on enrollment. Like with discussion leadership, you should prepare a few slides to help us follow along.

Final project (45% of final grade) — Due December 14th

As the final project, you will write a paper related to the material covered during the semester. This paper can take one of two forms: (1) an original empirical analysis using quantitative or qualitative data; (2) a research proposal for a study which defines a specific research question as informed by relevant literature, describes, in detail, the data needed to conduct such a study, anticipates the expected outcomes and likely complexities of carrying out the research, and (this is optional) includes preliminary results.

Course Texts and Other Resources

Texts:

Most readings for this class are journal articles, which I will post on the course website. You are responsible for the articles under the "Required" heading. I also include a list of "Supplementary" articles. These are pieces that touch on some element of the week's discussion, but I did not have space to include. You are not responsible for these articles, but they're there if you want to delve deeper.

Besides articles, **the main text for this class is:**

- **Wasserman and Faust. 1994. *Social Network Analysis*. Cambridge University Press.**

Wasserman and Faust provides the Main methodological background reading for the course. Despite its age, this is still *the* methods textbook of choice for sociologists. A new edition has been rumored for years, but I'm yet to see a timeline for it.

There are other good methods texts that take more of a "network science" perspective. These include:

- Easley and Kleinberg. 2010. *Networks, Crowds, and Markets: Reasoning About a Highly Connected World*. Cambridge University Press. (Free version here: <https://www.cs.cornell.edu/home/kleinber/networks-book/>)
- Newman. 2010. *Networks: An Introduction*. Oxford University Press. (*New edition due to come out in Sept. 2018).
- Jackson. 2010. *Social and Economic Networks*. Princeton University Press.

I will not assign readings from these latter three books, but you may find them useful in your work.

Software:

Instruction on SNA software will be limited to a single session during Week 6. Unfortunately, there's simply not enough time to cover all of the material and also provide comprehensive software training. Besides, I believe that such skills are not learned in the classroom, but rather through experimenting on your own and trying to solve practical problems in your specific research project. Nonetheless, to get you started on your own projects I will introduce the basics of doing SNA in the R programming language. I will provide instructions on how to install R and related software on your machine.

We will use R because its suite of SNA tools is most advanced and the newest methods tend to appear in R first. It is also quickly becoming the software of choice for applied statistics of every variety. There are several other software options, however. Below is a *partial list* of software that implements SNA:

1. **R** is a general programming language that has gained increasing use in the statistics community. It has a well-developed suite of SNA libraries, including *sna*, *network*, *iGraph* and *statnet* being the most popular. Anything you might want to do with network data, you can do with R. The drawback to R is that the learning curve is quite steep.
2. **Python** is another general programming language that offers a set of tools for SNA. In recent years Python has pretty much caught up to R in terms of SNA packages, including implementing the popular *iGraph* package. Another great Python package is NetworkX. The learning curve here is also steep.
3. **UCI-NET**: This is software with a much less steep learning curve. No programming knowledge is necessary, as it comes with a graphic user interface (you can compute many network metrics with simple drop down menus). It is only available for Windows. Compared to the SNA packages available in R and Python, UCI-NET's capabilities are more limited. A student can purchase a license for UCI-NET for \$40 (USD).
4. **Gephi** and **Pajek** are two popular software packages used primarily for visualizing networks.

Accessibility Needs

If you require accommodations or have any accessibility concerns, please visit <http://studentlife.utoronto.ca/accessibility> as soon as possible.

Course Schedule

Week	Date	Topic & Reading
1	11-Sep	<p>Introduction and Basics</p> <p><u>Required:</u></p> <p>Wasserman & Faust, Chapter 1.</p> <p>Emirbayer. 1997. "Manifesto for Relational Sociology." <i>American Journal of Sociology</i> 103:281-317.</p> <p>DellaPosta, Shi, and Macy. 2015. "Why Do Liberals Drink Lattes?" <i>American Journal of Sociology</i>.</p> <p><u>Supplementary:</u></p> <p>Borgatti et al. 2009. "Network Analysis in the Social Sciences." <i>Science</i> 323:892-895.</p> <p>Blau. 1977. "A Macrosociological Theory of Social Structure." <i>American Journal of Sociology</i> 83(1):26-54.</p>
2	18-Sep	<p>Data collection and data accuracy</p> <p><u>Required:</u></p> <p>Wasserman & Faust, Chapter 2.</p> <p>***Bearman and Parigi. 2004. "Cloning Headless Frogs and Other Important Matters: Conversation Topics and Network Structure." <i>Social Forces</i> 83(2):535-557.</p> <p>Marin, Alexandra. 2004. "Are Respondents More Likely to List Alters with Certain Characteristics? Implications for Name Generator Data." <i>Social Networks</i> 26: 289-307.</p> <p>Breiger. 2005. "Introduction to special issue: ethical dilemmas in social network research" <i>Social Networks</i> 27:89-93.</p> <p>Lazer et al. 2009. "Computational Social Science." <i>Science</i> 323:721-723.</p> <p>***Brashears and Quintane. 2015. "The Microstructures of Network Recall: How Social Networks are Encoded and Represented in Human Memory." <i>Social Networks</i> 41:113-126.</p> <p><u>Supplementary:</u></p> <p>Marsden, Peter. 2005. "Recent Developments in Network Measurement." in Peter J. Carrington, John Scott, and Stanley Wasserman (eds.) <i>Advances in Social Network Analysis</i>. Cambridge: Cambridge University Press. Pp. 8-30.</p> <p>Brashears. 2014. "'Trivial' Topics and Rich Ties: The Relationship Between Discussion Topic, Alter Role, and Resource Availability Using the 'Important Matters' Name Generator." <i>Sociological Science</i> 1: 493-511.</p> <p>Kadushin. "Who benefits from network analysis: ethics of social network research" <i>Social Networks</i> 27:139-153.</p> <p>Fischer, Claude S. 1982. "What do we mean by 'friend'? An inductive study of social networks." <i>Social Networks</i> 3: 287-306.</p>
3	25-Sep	<p>Network concepts and measures (global)</p> <p><u>Required:</u></p> <p>Wasserman & Faust, Chapter 3 & 4. (skip sections marked with O or ⊗)</p>

Week	Date	Topic & Reading
		<p>Milgram. 1967. "The Small World Problem." <i>Psychology Today</i> 2:60-67.</p> <p>Watts, D.J. 1999. "Networks, dynamics, and the small world phenomenon." <i>American Journal of Sociology</i>.</p> <p>***Moody, James. 2004. "The Structure of a Social Scientific Collaboration Network." <i>American Sociological Review</i> 69:213-238.</p> <p>***Baldassarri and Diani. (2007). "The integrative power of civic networks." <i>American Journal of Sociology</i>, 113(3):735-780.</p> <p><u>Supplementary:</u></p> <p>Newman. 2006. "Modularity and Community Structure in Networks." <i>Proceedings of the National Academy of Sciences</i> 103, 8577-8582.</p> <p>Moody and Douglas. 2003. "Structural Cohesion and Embeddedness: A Hierarchical Conception of Social Groups." <i>American Sociological Review</i> 68:103-127</p> <p>"Dodds, Muhamad, and Watts. 2003. "An Experimental Study of Search in Global Social Networks." <i>Science</i>.</p> <p>Uzzi and Spiro. 2005. "Collaboration and Creativity: The Small World Problem." <i>American Journal of Sociology</i> 111:447-504.</p> <p>Watts and Strogatz. 1998. "Collective Dynamics of 'Small-World' Networks." <i>Nature</i> 393:440-442.</p>
4	02-Oct	<p>Key network concepts and measures (local)</p> <p><u>Required:</u></p> <p>Granovetter. 1973. "The Strength of Weak Ties." <i>American Journal of Sociology</i> 78:1360-80.</p> <p>Brashears and Quintane. 2018. "The Weakness of Tie Strength." <i>Social Networks</i> 55:104-115.</p> <p>Wasserman & Faust. Read Chapter 5. <i>Skim</i> Chapter 6.</p> <p>***Papachristos. 2009. "Murder by Structure: Dominance Relations and the Social Structure of Gang Homicide." <i>American Journal of Sociology</i> 115:74-128.</p> <p><u>Supplementary:</u></p> <p>Bonacich, Phillip. 1987. Power and Centrality: A Family of Measures." <i>American Journal of Sociology</i> 92:1170-1182.</p> <p>Gould. 2002. "The Origins of Status Hierarchies: A Formal Theory and Empirical Test." <i>American Journal of Sociology</i> 107:1143-78.</p>
5	09-Oct	<p>Ego networks</p> <p><u>Required:</u></p> <p>Dunbar. 2018. "The Anatomy of Friendship." <i>Trends in Cognitive Science</i> 22:51</p> <p>Burt. 1992. <i>Structural Holes: The Social Structure of Competition</i>. Chapter 1 & Chapter 2.</p> <p>***Young and Lim. 2014. "Time as a Network Good: Evidence from Unemployment and the Standard Workweek." <i>Sociological Science</i>.</p>

Week	Date	Topic & Reading
		<p>***Offer and Fischer. 2017. "Difficult People: Who is Perceived to be Demanding in Personal Networks and Why are They There?" <i>American Sociological Review</i>.</p> <p><u>Supplementary:</u></p> <p>DiPrete, Thomas A., Andrew Gelman Tyler McCormic Julien Teitler & Tian Zheng. 2011. "Segregation in Social Networks based on Acquaintanceship and Trust" <i>American Journal of Sociology</i> 116: 1234-1283</p> <p>Saramaki et al. "Persistence of Social Signatures in Human Communication." <i>PNAS</i>.</p>
6	23-Oct	Workshop: Social network analysis with R
7	16-Oct	<p>Two-mode networks</p> <p><u>Required:</u></p> <p>Wasserman & Faust. Chapter 8 (stop at pg. 326)</p> <p>Breiger. 1974. "The Duality of Persons and Groups." <i>Social Forces</i> 53:181-190.</p> <p>***Moody, James. 2004. "The Structure of a Social Scientific Collaboration Network." <i>American Sociological Review</i> 69:213-238.</p> <p>***Ghaziani and Baldassarri. 2009. "Cultural Anchors and the Organizations of Differences." <i>American Sociological Review</i> 76:179-206.</p> <p><u>Supplementary:</u></p> <p>Shi, Shi, Dokshin, Evans, and Macy. 2017. "Millions of online book co-purchases reveal partisan differences in the consumption of science." <i>Nature Human Behaviour</i></p>
8	30-Oct	<p>Where do networks come from?</p> <p><u>Required:</u></p> <p>Feld. 1981. "The Focused Organizations of Social Ties." <i>American Journal of Sociology</i> 86:1015-1035.</p> <p>McPherson, Smith-Lovin, and Cook. 2001. "Birds of a Feather: Homophily in Social Networks." <i>Annual Review of Sociology</i> 27:415-444.</p> <p>Pattison and Robins. 2002. "Neighborhood-Based Models for Social Networks." <i>Sociological Methodology</i> 32:301-337.</p> <p>***Lewis. 2016. "Preferences in the Early Stages of Mate Choice." <i>Social Forces</i> 95:283-320.</p> <p><u>Supplementary:</u></p> <p>Kossinets and Watts. 2006. "Empirical Analysis of an Evolving Social Network." <i>Science</i>.</p>
	06-Nov	No class
9	13-Nov	<p>Diffusion/contagion/influence (models)</p> <p><u>Required:</u></p> <p>Centola and Macy. 2007. "Complex Contagions and the Weakness of Long Ties." <i>American Journal of Sociology</i>.</p>

Week	Date	Topic & Reading
		<p>Watts and Dodds. 2007. "Influentials, networks, and public opinion formation." <i>Journal of Consumer Research</i>.</p> <p>***Gondal. 2015. "Inequality Preservation through Uneven Diffusion of Cultural Materials across Stratified Groups." <i>Social Forces</i> 93: 1109-1137.</p> <p>***Garip and DiMaggio. 2011. "How Network Externalities Can Exacerbate Intergroup Inequality." <i>American Journal of Sociology</i> 116:1887-1933.</p> <p><u>Supplementary:</u></p> <p>Granovetter. 1978. "Threshold Models of Collective Behavior." <i>American Journal of Sociology</i>.</p>
10	20-Nov	<p>Diffusion/contagion/influence (empirical approaches)</p> <p><u>Required:</u></p> <p>Christakis and Fowler. 2007. "The Spread of Obesity in a Large Social Network over 32 Years." <i>The New England Journal of Medicine</i>.</p> <p>Cohen-Cole and Fletcher. 2008. "Is Obesity Contagious? Social Networks vs. Environmental Factors in the Obesity Epidemic."</p> <p>Burt, Ronald S. 1987. "Social contagion and innovation: cohesion versus structural equivalence." <i>American Journal of Sociology</i> 92: 1287–1335.</p> <p>***Centola. 2010. "The Spread of Behavior in an Online Social Network Experiment." <i>Science</i>.</p> <p>***Bearman, Moody, and Stovel. 2004. "Chains of Affection: The Structure of Adolescent Romantic and Sexual Networks." <i>American Journal of Sociology</i> 110:44-91.</p> <p><u>Supplementary:</u></p> <p>Shalizi and Thomas. 2011. "Homophily and Contagion Are Generically Confounded in Observational Social Network Studies." <i>Sociological Methods & Research</i> 40(2): 211–239.</p> <p>Aral and Nicolaides. 2017. "Exercise Contagion in a Global Social Network." <i>Nature Communications</i> 8(14753).</p>
11	27-Nov	<p>Culture and networks</p> <p><u>Required:</u></p> <p>Pachucki and Breiger. 2011. "Cultural Holes: Beyond Relationality in Social Networks and Culture." <i>Annual Review of Sociology</i> 36:205-24.</p> <p>Salganik, Dodds, and Watts. 2006. "Experimental Study of Inequality and Unpredictability in an Artificial Cultural Market." <i>Science</i> 311:854-856.</p> <p>***Goldberg and Stein. <i>Forthcoming</i>. "Beyond 'Social Contagion': Associative Diffusion and the Emergence of Cultural Variation." <i>American Sociological Review</i>.</p> <p>***Childress and Friedkin. 2011. "Cultural Reception and Production: The Social Construction of Meaning in Book Clubs." <i>American Sociological Review</i> 77:45-68.</p> <p><u>Supplementary:</u></p>

Week	Date	Topic & Reading
		Erickson, Bonnie H. 1996. "Culture, Class, and Connections." <i>American Journal of Sociology</i> 102:217-251. Lizardo. 2006. "How Cultural Tastes Shape Personal Networks." <i>American Sociological Review</i> 71:778-807. Mark. 1998. "Birds of a Feather Sing Together." <i>Social Forces</i> 77:453-485. Bachrach. 2014. "Culture and Demography: From Reluctant Bedfellows to Committed Partners." <i>Demography</i> 51:3-25.
12	04-Dec	Final Project Presentations
<i>Final projects due by email on Friday, December 14th.</i>		