
POLI:7002:0001 Network Analysis

Tues & Thurs 9:30-10:45 am

143 Schaeffer Hall

Spring 2020

Course Outline¹

Often only selections from the listed chapter will be assigned; pay attention to the page numbers.

Introduction to Network Analysis

Week 1: January 21 & 23. Syllabus, introductions, history of SNA, & introduction to R

Articles:

- Bring your laptops!
- Borgatti, S.P., A. Mehra, D.J. Brass, and G. Labianca. 2009. Network analysis in the social sciences. *Science* 323:892–895.
- Butts, C.T. 2009. Revisiting the Foundations of Network Analysis. *Science* 325:414

Text:

- **Prell, ch. 1–2**

Supplemental:

- Emirbayer, M. 1997. Manifesto for a relational sociology. *American Journal of Sociology* 203:281–317.
- Fredericks, K.A. and M.M. Durland. 2005. The historical evolution and basic concepts of social network analysis. *New Directions for Evaluation* 107:15–23.
- Jackson, M.O. 2007. The study of social networks in economics. *The Missing Links: Formation and Decay of Economic Networks*.
- Laumann, E.O. 2006. A 45-year retrospective on doing networks. *Connections* 27(1):65–90.
- Lazer, D. 2011. Networks in Political Science: Back to the Future. *PS: Political Science & Politics*. 44:61–68.
- Vera, E.R. and T. Schupp. 2006. Network analysis in comparative social sciences. *Comparative Education* 42:405–429.

¹I reserve the right to make changes with respect to topics and pacing, but will try to stick to the schedule as much as possible. You will be notified of any changes through e-mail as well as an updated schedule posted to the course website.

Week 2: January 28 & 30. Network Theory, Unique Data Challenges, & Intro to Visualizing Networks

Articles:

- Breiger, R.L. 2005. Introduction to special issue: ethical dilemmas in social network research *Social Networks* (The whole special issue is interesting!)
- Fowler, J.H., M.T. Heaney, D.W. Nickerson, J.F. Padgett, and B. Sinclair. 2009. Causality in Political Networks. *American Politics Research* 39(2):437-480.
- Klofstad, C., S.D. McClurg, and M. Rolfe. 2009. Measurement of political discussion networks: A comparison of two 'name generator procedures.' *Public Opinion Quarterly*. 7(3):462–482.
- Marsden, P.V. 1990. Network data and measurement. *Annual Review of Sociology*. 16:435–463.
- Smith, J. and J. Moody. 2013. Network Measurement Error and Sampling Coverage I: Nodes missing at random. *Social Networks* 35:652-668.

Text:

- **Prell, ch. 3**

Supplemental:

- Adams, J. and J. Moody. 2006. To tell the truth: informant accuracy in sexual networks. *Social Networks* 29:44-58.
- Bello, J. and M. Rolfe. 2014. Is influence mightier than selection? Forging agreement in political discussion networks during a campaign. *Social Networks*. 36:134–146.
- Eveland, W.P., M.J. Hutchens, and A.C. Morey. 2013. Political Network Size and Its Antecedents and Consequences. *Political Communication*. 30:371–394.
- Killworth, P.D. and H.R. Bernard. 1976. Informant Accuracy in Social Network Data. *Human Organization*.. 35(3):269–286.
- Kossinets, G. 2006. Effects of missing data in social networks. *Social Networks*. 28(3):247–68.
- Marsden, P.V. and K.E. Campbell. 1984. Measuring tie strength. *Social Forces*. 63(2):482-501.
- McClurg, S.D. and J.K. Young. 2011. Political networks. *PS: Politics and Political Science* 44(1): 39–43.

Describing, Measuring, & (More) Visualizing Networks

Week 3: February 4 & 6. Local Network Structure & Ego-Nets

Articles:

- Erisen, E. and C. Erisen. 2012. The Effect of Social Networks on the Quality of Political Thinking. *Political Psychology*. 33(6):839-865.
- McPherson, M., L. Smith-Lovin, and J.M. Cook. 2001. Birds of a Feather: Homophily in Social Networks. *Annual Review of Sociology* 27:415-44.
- Moaz, Z. 2011. Security Egonets: Strategic Reference Groups and the Microfoundations of National Security Policy. in *Networks of Nations*. 109–144.
- Moody, J. and P. Paxton. 2009. Building Bridges: Linking Social Capital and Social Networks to Improve Theory and Research. *American Behavioral Scientist* 52:1491-1506.
- Roch, C.H. and J.T. Scholz. 2000. Social networks and citizen response to legal change. *American Journal of Political Science*. 44(4):777–791.

Text:

- **Prell, ch. 5**

Supplemental:

- Burt, S.H. 1992. *Structural Holes: The Social Structure of Competition*
- Finifter, A. 1974. The friendship group as a protective environment for political deviants. *American Political Science Review*. 68(2):607–624.
- Granovetter, M. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78:1360-80.
- Henry, A.D., P. Pralat and C. Zhang. 2011. Emergence of Segregation in evolving social networks *PNAS* 108:8650-8610
- Knoke, D. 1990. Networks of Political Action: Toward Theory Construction. *Social Forces*. 68(4):1041–1063.
- Moaz, Z. 2012. Preferential Attachment, Homophily, and the Structure of International Networks, 1816–2003. *Conflict Management and Peace Science*. 29(3): 341–369.
- Murphy, A.J. 1941. A Study of Leadership Process. *American Sociological Review*. 6(5):674–687.
- Sutor, J. and S. Keeton. 1997. Once a friend, always a friend? Effects of homophily on women's support networks across a decade. *Social Networks*. 19(1):51–62.
- Tindal. 2004. Social Movement Participation over Time: An Ego-Network Approach to Micro-Mobilization. *Sociological Focus*. 37(2):163-184
- 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):27–51.

Week 4: February 11 & 13. Density & Centrality

Articles:

- Box-Steffensmeier, J.M., D.P. Christenson, and M.P. Hitt. 2013. Quality Over Quantity: Amici Influence and Judicial Decision Making. *American Political Science Review*. 107(3):446–460.
- Fowler, J.H. 2006. Connecting the Congress: A Study of Cosponsorship Networks. *Political Analysis*. 14(4):456–487.
- Klein, K.J., B. Lim, J. Saltz, and D. Mayer. 2004. How Do They Get There? An Examination of the Antecedents of Centrality in Team Networks. *Academy of Management Journal*. 47(6):952-963.
- Rossman, G., N. Esparza, and P. Bonacich. 2010. I'd like to thank the Academy, Team Spillovers, and Network Centrality. *American Sociological Review* 75:31-51.

Text:

- **Prell, ch. 4, 8**
- **Newman, ch.7** See ICON.

Supplemental:

- 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(5):215–239.
- Borgatti, S.P. 2005. Centrality and network flow. *Social Networks*.
- Freeman, L.C. 1978. Centrality in social networks conceptual clarification. *Social Networks*. 1(3):215-239.
- Fowler, J.H. 2006. Legislative cosponsorship networks in the U.S. House and Senate. *Social Networks*. 28(4):454–465.
- Friedkin, N. 1991. Theoretical foundations for centrality measures. *American Journal of Sociology*. 96(6):1478–1504.
- Gomez, D., et al. 2003. Centrality and power in social networks: A game theoretic approach. *Mathematical Social Science*. 46(1):27–54.
- Hevenstone, D. 2008. Academic Employment Networks and Departmental Prestige. In *Why Context Matters: Applications of Social Network Analysis*. 119–140.
- Kenis, P. and D. Knoke. 2002. How Organizational Field Networks Shape Interorganizational Tie-Formation Rates. *The Academy of Management Review*. 27(2):275–293.
- Krackhardt, D. 1999. The ties that torture: Simmelian tie analysis in organizations. *Research in the Sociology of Organizations*. 16:183-210.

- Parker, S.L. 2008. Opinion taking within friendship networks. *American Journal of Political Science*. 42:412–420.
- Siegel, D.A. 2009. Social networks and collective action. *American Journal of Political Science*. 53(1):122-38.

Week 5: February 18 & 20. Subgroups: Balance, Hierarchy, Cohesion, Clusters, Cliques, and Communities

Articles:

- Corbetta, R. and K.A. Grant. 2012. Intervention in Conflicts from a Network Perspective. *Conflict Management and Peace Science*. 29(3): 314–340.
- Maoz Z., L.G. Terris, R.D. Kuperman, and I. Talmud. 2007. What is the enemy of my enemy? Causes and consequences of imbalanced international relations, 1816–2001. *Journal of Politics*. 69(1):100–115.
- Tamburrini, N., M. Cinnirella, V.A.A. Jansen, and J. Bryden. 2015. Twitter users change word usage according to conversation-partner social identity. *Social Networks*. 40:84–89.
- Cranmer, S.J., E.J. Menninga, P.J. Mucha. 2015. Kantian fractionalization predicts the conflict propensity of the international system. *Proceedings of the National Academy of Sciences*.
- Zhang, Y., A.J. Friend, A.L. Traud, M.A. Porter, J.H. Fowler, P.J. Mucha. 2008. Community structure in Congressional cosponsorship networks. *Physica A*. 387:1705-1712.

Text:

- **Prell, ch. 6 & 7**

Supplemental:

- Bernard, H.R., P.D. Killworth, and L. Sailer. 1979/80. Informant accuracy in social network data IV: a comparison of clique-level structure in behavioral and cognitive network data. *Social Networks*. 2:191–218.
- Doreian, P., R. Kapuscinski, D. Krackhardt, and J. Szczypula. 1996. A brief history of balance through time. *Journal of Mathematical Sociology*. 21(1-2):113–131.
- Fortunato, S. 2010. Community detection in graphs. *Physics Reports*. 486(3-5):75–174.
- Good, B.H., Y.A. de Montjoye, and A. Clauset. 2010. The performance of modularity maximization in practical contexts. *Physical Review E* 81:046106.
- Krackhardt, D. and M. Kilduff. 2002. Structure, culture and Simmelian ties in entrepreneurial firms. *Social Networks*. 24(3):279-290.
- Lancichinetti, A. and S. Fortunato. 2009. Limits of modularity maximization in community detection. *Phys. Rev. E*. 84:066122.
- Manger, M.S., M.A. Pickup, and T.A.B. Snijders. 2012. A Hierarchy of Preferences: A Longitudinal Network Analysis Approach to PTA Formation. *Journal of Conflict Resolution*. 56(5):853–878.

- Moody, J. 2001. Peer influence groups: identifying dense clusters in large networks. *Social Networks*. 23:261–283.
- Mucha, P.J., T. Richardson, K. Macon, M.A. Porter, and J. Onnela. 2010. Community Structure in Time-Dependent, Multiscale and Multiplex Networks. *Science* 328:876-878.
- Newman, M.E.J. and M. Girvan. 2004. Finding and evaluating community structure in networks. *Physical Review E*. 69, 026113.
- Newman, M. 2006. Modularity and community structure in networks. *Proceedings of the National Academy of Science*. 103(23):8577–8582.
- Poast, P. 2010. Mis-Using Dyadic Data to Analyze Multilateral Events. *Political Analysis*.
- Simpson, B. and D. Willer. 2005. The structural embeddedness of collective goods: Connection and coalitions in exchange networks. *Sociological Theory*. 23(4):386–407.

Week 6: February 25 & 27. Positions, Roles, and Equivalence

Articles:

- Borgatti, S. 1999. Models of Core-Periphery Structure. *Social Networks* 21:375-395.
- Burt, R.S. 1987. Social contagion and innovation: Cohesion versus structural equivalence. *The American Journal of Sociology*. 92(6):1287–1335.
- Hafner-Burton, E.M. and A.H. Montgomery. 2006. Power Positions: International Organizations, Social Networks, and Conflict. *The Journal of Conflict Resolution*. 50(1):3–27.
- Ansell, C., S. Reckhow, and A. Kelly. 2009. How to Reform a Reform Coalition: Outreach, Agenda Expansion, and Brokerage in Urban School Reform. *Policy Studies Journal*. 37(4):717–743.

Text:

- **Prell, ch. 9**

Supplemental:

- Burt, R.S. 1978. Cohesion Versus Structural Equivalence As a Basis for Network Sub-Groups. *Sociological Methods and Research* 7:189-212.
- Fujimoto, K. and T.W. Valente. 2012. Social network influences on adolescent substance use: Disentangling structural equivalence from cohesion. *Social Science & Medicine*. 74(12):1952–1960.
- Gil-Mendieta, J, S. Schmidt. 1996. The political network in Mexico. *Social Networks*. 18:355–381.
- Padgett, J.F., C.K. Ansell. 1993. Robust action and the Rise of the Medici, 1400–1434. *The American Journal of Sociology*. 98(6):1259–1319.
- Maoz, Z., R.D. Kuperman, L. Terris, and I. Talmud. 2006. Structural equivalence and international conflict: A social networks analysis. *Journal of Conflict Resolution*. 50(5):664–689.

- Wasserman, S., C. Anderson. 1987. Stochastic a posteriori blockmodels: construction and assessment. *Social Networks*. 9:1–36.
- White, H.C., S.A. Boorman, and R.L Breiger. 1976. Social structure from multiple networks. Blockmodels of roles and positions. *The American Journal of Sociology*. 81(4):730–780.
- Ziberna, A. 2007. Generalized blockmodeling of valued networks. *Social Networks*. 27(1):105–126.
- Znidarsic, A., A. Ferligoj, and P. Doreianc. 2012. Non-response in social networks: The impact of different non-response treatments on the stability of blockmodels. *Social Networks*. 34(4):438-50.

Week 7: March 3 & 5. Network Diffusion & Change

Articles:

- Aral, S., L. Muchnik, and A. Sundararajan 2009. Distinguishing influence-based contagion from homophily-driven diffusion in dynamic networks. *Proceedings of the National Academy of Sciences* 106:21544-21549.
- Christakis, N.A. and J. H. Fowler. 2007. The Spread of Obesity in a Large Network. *New England Journal of Medicine* 357:370-379
- Desmarais, B.A., J.J. Harden, and F.J. Boehmke. 2015. Persistent Policy Pathways: Inferring Diffusion Networks in the American States. *American Political Science Review*. 109(2):392–406.
- Valente, T.W. 1996. Social network thresholds in the diffusion of innovations. *Social Networks*. 18(1):69–89.

Supplemental:

- Centola, D. 2010. The Spread of Behavior in an Online Social Network. *Science* 2010:1194-1197.
- Childress, C.C. and N.E. Friedkin. 2012. Cultural Reception and Production: The Social Construction of Meaning in Book Clubs. *American Sociological Review*. 77:45-68.
- Fowler, J.H. and N.A. Christakis. 2010. Cooperative Behavior Cascades in Human Social Networks. *Proceedings of the National Academy of Sciences* 107:5334-5338.
- Lazer, D., B. Rubineau, C. Chetkovich, N. Katz, M. Neblo. 2010. The coevolution of networks and political attitudes. *Political Communication*. 27:248–274.
- Papachristos, A.V. 2009. Murder by Structure: Dominance Relations and the Social Structure of Gang Homicide. *American Journal of Sociology*. 115(1):74–128.
- Sinclair, B., M. McConnell, and D.P. Green. 2012. Detecting Spillover Effects: Design and Analysis of Multilevel Experiments. *American Journal of Political Science*. 56(4):1055–1069.
- Walker, J.L. 1969. The Diffusion of Innovations Among the American States. *American Political Science Review*. 63(3): 880-899.

Statistical Inference & Modeling Networks

Week 8: March 10 & 12. Intro to Statistical Inference on Networks: QAP & Baseline Models

Articles:

- Andrew, S.A., J.E. Short, K. Jung, and S. Arlikatti. 2015. Intergovernmental Cooperation in the Provision of Public Safety: Monitoring Mechanisms Embedded in Interlocal Agreements. *Public Administration Review* 75(3):401-410.
- Bochsler, D. 2008. A QAP Network Analysis of Intergovernmental Cooperation between Swiss Cantons. in *Why Context Matters Applications of Social Network Analysis*. 141–160.
- Heaney, M.T., S.E. Masket, J.M. Miller, and D.Z. Strolovitch. 2012. Polarized Networks: The Organizational Affiliations of National Party Convention Delegates. *American Behavioral Scientist*. 56:1654-1676.
- Jasny, L. 2012. Baseline models for two-mode social network data. *Policy Studies Journal*. 40(3):458-491.
- Krackhardt, D. 1987. QAP partialling as a test of spuriousness. *Social Networks*. 9(2):171–186.

Supplemental:

- Leenders, R.Th.A.J. 2002. Modeling social influence through network autocorrelation: constructing the weight matrix. *Social Networks*. 24(1):21–47.

Spring Break: March 17 & 19. No Class

ISA Conference: March 24 & 26. No Class

Week 9: March 31 & April 2. ERGM fundamentals

Articles:

- Cranmer, S.J., B. Desmarais. 2011. Inferential network analysis with exponential random graph models. *Political Analysis*. 19:66–86.
- Goodreau, S.M., J.A. Kitts, and M. Morris. 2009. Birds of a feather, or friend? Using exponential random graph models to investigate adolescent social networks. *Demography*. 46(1):103–125.
- Robins, G. P. Pattison, Y. Kalish., D. Lusher. 2007. An introduction to exponential random graph (p^*) models for social networks. *Social Networks*. 29:173–191.

Text:

- **Prell, ch. 10**

- **ERGM, ch.1–4**

Supplemental:

- Holland, P.W., S. Leinhardt. 1981. An exponential family of probability distributions for directed graphs. *Journal of the American Statistical Association*. 76(373):33–50.
- Morris, M. et al. 2009. Concurrent Partnerships and HIV Prevalence disparities by race: Linking science and public health. *American Journal of Public Health*. 99:1023-1031.

Week 10: April 7 & 9. ERGM (Cont.)

Articles:

- Box-Steffensmeier, J.M. and D.P. Christenson. 2014. The evolution and formation of amicus curiae networks. *Social Networks*. 36:82–96.
- Desmarais, B.A. and S.J. Cranmer. 2012. Micro-Level Interpretation of Exponential Random Graph Models with Application to Estuary Networks. *Policy Studies Journal*. 40(3):402–434.
- Heaney, M.T. 2014. Multiplex networks and interest group influence reputation: An exponential random graph model. *Social Networks*. 36:66–81.
- Kinne, B.J. 2013. Network Dynamics and the Evolution of International Cooperation. *American Political Science Review*. 107(4):766–785.

Text:

- **ERGM, ch.5–8**

Supplemental:

- Cranmer, S.J., B.A. Desmarais, and E.J. Menninga. 2012. Complex Dependencies in the Alliance Network. *Conflict Management and Peace Science*. 29(3): 279–313.
- Yang, D. and G. Yu. 2015. Static analysis and exponential random graph modelling for micro-blog network. *Journal of Information Science*. 23(5):409–413.

Week 11: April 14 & 16. Simulation Techniques & Diagnostics

Text:

- **ERGM, ch. 12 & 13**
- Bring your laptops! We'll run, interpret, and diagnose some ERGMs in class!

Week 12: April 21 & 23. Catch Up & Paper Workshop

Week 13: April 28 & 30. ERGM Extensions

Articles:

- Handcock, M.S. and K.J. Gile. 2010. Modeling Social Networks from Sampled Data. *The Annals of Applied Statistics* 4:5-25.
- Krivitsky, P.N. 2012. Exponential-family Random Graph Models for Valued Networks. *Electronic Journal of Statistics* 6:1010-1028.
- Wang, P. et al. 2013. Exponential random graph models for multilevel networks. *Social Networks* 35(1): 96-115.
- Wang, P., P. Pattison, and G. Robins. 2013. Exponential random graph model specifications for bipartite networks—A dependence hierarchy. *Social Networks* 35(2): 211-222.

Text:

- **ERGM, ch. 12 & 13**

Supplemental:

- Caimo, A., and N. Friel. 2013. Bayesian model selection for exponential random graph models. *Social Networks*. 35(1):11–24.

Week 14: May 5 & 7. Networks over Time

Articles:

- Hanneke, S., W. Fu, and E.P. Xing. 2010. Discrete Temporal Models of Social Networks. *Electronic Journal of Statistics*. 4:585–605.
- Snijders, T.A.B., G.G. van de Bunt, and C.E.G. Steglich. 2010. Introduction to stochastic actor-based models for network dynamics. *Social Networks*. 32(1):44–60.
- Winecoff, W.K. *Under Review*. Global Banking as a Complex Political Economy

Supplemental:

- Almquist, Z.W. and C.T. Butts. 2013. Dynamic Network Logistic Regression: A Logistic Choice Analysis of Inter- and Intra-Group Blog Citation Dynamics in the 2004 US Presidential Election. *Political Analysis*. 21:430–448.
- Cranmer, S.J., T.Heinrich, and B.A. Desmarais. 2014. Reciprocity and the structural determinants of the international sanctions network. *Social Networks*. 36:5–22.
- Zaheer, A. and G. Soda. 2009. Network Evolution: The Origins of Structural Holes. *Administrative Science Quarterly* 54(1):1-31.

NOTE: Papers due Monday, May 11, 5pm