



Social and Political Networks

Time & Place:

07/10/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
14/10/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
21/10/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
28/10/2022 11:00-13:00 @ Seminar Room 4, Badia Fiesolana
04/11/2022 11:00-13:00 @ Sala del Capitolo, Badia Fiesolana
11/11/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
18/11/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
25/11/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
02/12/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana
09/12/2022 11:00-13:00 @ Seminar Room 2, Badia Fiesolana

Instructor: Arnout van de Rijt

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Open to: all researchers, visiting students, MW fellows and other research fellows at EUI. All participants must attend all meetings and do all assignments and presentations (no audits).

Course Description and Objectives

This objective of this course is to introduce SPS researchers to social network theory and analysis. There will be an emphasis on applications to political science and sociology, but the scope of the course is broader. This is both a theory and a methods course. The weekly meetings are organized around a key theoretical concept, hypothesis, notion or insight from social network analysis. In a typical week we read a chapter from a textbook, do the textbook exercises, read a scientific article about networks of people, organizations, or countries that have to do with that key theme, and

complete an assignment. We finish with a mini practicum. While the primary purpose of the course is conceptual understanding, some of the practica are dedicated to dealing with software and network data analysis issues.

Requirements for credit: Attendance: This course requires regular attendance and active participation. Weekly assignments, done in teams (which must change in composition from week to week).

Readings

The textbook we draw on is:

“Networks, Crowds, and Markets” by J. Kleinberg and D. Easley (2009). A free pre-publication copy is available: <https://www.cs.cornell.edu/home/kleinber/networks-book/networks-book.pdf>

Researchers are expected to do readings ahead of the meeting and to complete all textbook exercises in the appropriate chapters. The instructor will not grade these exercises as answer keys undoubtedly circulate online. In addition, each week a scientific article using social network analysis is assigned.

Schedule

Week 1. October 7, 2022. Introduction

Required readings:

Kleinberg & Easley chapters 1,2

Optional readings:

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.

Feld, S. L. (1991). Why your friends have more friends than you do. *American journal of sociology*, 96(6), 1464-1477.

Mini practicum:

Handling social network data

Assignment 1:

Due Wednesday October 12, 2022 at 17:00

Week 2. October 14, 2022. Social capital

Required readings:

Kleinberg & Easley chapter 3

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380.

Optional readings:

Burt, R. S. (2004). Structural holes and good ideas. *American journal of sociology*, 110(2), 349-399.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, 94, S95-S120.

Gee, L. K., Jones, J. J., Fariss, C. J., Burke, M., & Fowler, J. H. (2017). The paradox of weak ties in 55 countries. *Journal of Economic Behavior & Organization*, 133, 362-372.

Rajkumar, K., Saint-Jacques, G., Bojinov, I., Brynjolfsson, E., & Aral, S. (2022). A causal test of the strength of weak ties. *Science*, 377(6612), 1304-1310.

Mini practicum:

Calculating network measures in UCINET

Assignment 2:

Due Wednesday October 19, 2022 at 17:00

Week 3. October 21, 2022. Homophily and segregation

Required readings:

Kleinberg & Easley chapter 4

Schelling, T. C. (1971). Dynamic models of segregation. *Journal of Mathematical Sociology*, 1(2), 143-186.

Optional readings:

Adamic, L. A., & Glance, N. (2005, August). The political blogosphere and the 2004 US election: divided they blog. In *Proceedings of the 3rd international workshop on Link discovery* (pp. 36-43).

Bakshy, E., Messing, S., & Adamic, L. A. (2015). Exposure to ideologically diverse news and opinion on Facebook. *Science*, 348(6239), 1130-1132.

Boutyline, A., & Willer, R. (2017). The social structure of political echo chambers: Variation in ideological homophily in online networks. *Political psychology*, 38(3), 551-569.

Bruch, E. E., & Mare, R. D. (2006). Neighborhood choice and neighborhood change. *American Journal of sociology*, 112(3), 667-709.

Centola, D., & van de Rijt, A. (2015). Choosing your network: Social preferences in an online health community. *Social science & medicine*, 125, 19-31.

McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual review of sociology*, 415-444.

Mini practicum:

Brainstorming research ideas and help with ongoing research involving networks

Assignment 3:

Due Wednesday October 26, 2022 at 17:00

Week 4. October 28, 2022. Structural balance

Required readings:

Kleinberg & Easley chapter 5

Doreian, P., & Mrvar, A. (2015). Structural balance and signed international relations. *Journal of Social Structure*, 16, 1.

Optional readings:

Antal, T., Krapivsky, P. L., & Redner, S. (2006). Social balance on networks: The dynamics of friendship and enmity. *Physica D: Nonlinear Phenomena*, 224(1-2), 130-136.

Cartwright, D., & Harary, F. (1956). Structural balance: a generalization of Heider's theory. *Psychological review*, 63(5), 277.

Davis, J. A. (1967). Clustering and structural balance in graphs. *Human relations*, 20(2), 181-187.

Heider, F. (1946). Attitudes and cognitive organization. *The Journal of psychology*, 21(1), 107-112.

Rawlings, C. M., & Friedkin, N. E. (2017). The structural balance theory of sentiment networks: Elaboration and test. *American Journal of Sociology*, 123(2), 510-548.

Van de Rijt, A. (2011). The Micro-Macro Link for the Theory of Structural Balance. *The Journal of mathematical sociology*, 35(1-3), 94-113.

Mini practicum:

Modeling simple dynamics through matrix multiplication in Matlab

Assignment 4:

Due Wednesday November 2, 2022 at 17:00

Week 5. November 4, 2022. Exchange networks

Required readings:

Kleinberg & Easley chapter 12

Cook, K. S., Emerson, R. M., Gillmore, M. R., & Yamagishi, T. (1983). The distribution of power in exchange networks: Theory and experimental results. *American Journal of Sociology*, 89(2), 275-305.

Optional readings:

Willer, D. (Ed.). (1999). *Network exchange theory*. Greenwood Publishing Group.

Mini practicum:

Brainstorming research ideas and help with ongoing research involving networks

Assignment 5:

Due Wednesday November 9, 2022 at 17:00

Week 6. November 11, 2022. The structure of the WWW and PageRank

Required readings:

Kleinberg & Easley chapter 13, 14

Fowler, J. H., & Jeon, S. (2008). The Authority of Supreme Court Precedent. *Social Networks*, 30(1), 16-30.

Optional readings:

Broder, A., Kumar, R., Maghoul, F., Raghavan, P., Rajagopalan, S., Stata, R., & Wiener, J. (2000). Graph Structure in the Web. *Computer Networks*, 33(1-6), 309-320.

Mini practicum:

Brief introduction to RSiena: software for analyzing longitudinal network data

Assignment 6:

Due Wednesday November 16, 2022 at 17:00

Week 7. November 18, 2022. Preferential attachment

Required readings:

Kleinberg & Easley chapter 18

Barabási, A. L., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, 286(5439), 509-512.

Optional readings:

Clauset, A., Shalizi, C. R., & Newman, M. E. (2009). Power-law distributions in empirical data. *SIAM review*, 51(4), 661-703.

Van de Rijt, A., Kang, S. M., Restivo, M., & Patil, A. (2014). Field experiments of success-breeds-success dynamics. *Proceedings of the National Academy of Sciences*, 111(19), 6934-6939.

Van de Rijt, A. (2019). Self-Correcting Dynamics in Social Influence Processes. *American Journal of Sociology* 124(5), 1468-95.

Mini practicum:

Brainstorming research ideas and help with ongoing research involving networks

Assignment 7:

Due Wednesday November 23, 2022 at 17:00

Week 8. November 25, 2022. Behavioral cascades

Required readings:

Kleinberg & Easley chapter 19

Centola, D., & Macy, M. (2007). Complex contagions and the weakness of long ties. *American journal of Sociology*, 113(3), 702-734.

Optional readings:

Graham, E. R., Shipan, C. R., & Volden, C. (2013). The diffusion of policy diffusion research in political science. *British journal of political science*, 43(3), 673-701.

Ryan, B., & Gross, N. C. (1950). *Acceptance and diffusion of hybrid corn seed in two Iowa communities* (Vol. 372). Ames, IA: Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts.

Vasi, I. B., & Strang, D. (2009). Civil liberty in America: The diffusion of municipal bill of rights resolutions after the passage of the USA PATRIOT Act. *American Journal of Sociology*, 114(6), 1716-1764.

Mini practicum:

Event-history analysis of diffusion processes in Stata

Assignment 8:

Due Wednesday November 30, 2022 at 17:00

Week 9. December 2, 2022. Small worlds

Required readings:

Kleinberg & Easley chapter 20

Watts, D. J., & Strogatz, S. H. (1998). Collective dynamics of 'small-world' networks. *Nature*, 393(6684), 440-442.

Optional readings:

Travers, J., & Milgram, S. (1977). An experimental study of the small world problem. In *Social networks* (pp. 179-197). Academic Press.

Centola, D. (2010). The spread of behavior in an online social network experiment. *Science*, 329(5996), 1194-1197.

Dodds, P. S., Muhamad, R., & Watts, D. J. (2003). An experimental study of search in global social networks. *science*, 301(5634), 827-829.

Mini practicum:

How to build agent-based models in Netlogo

Assignment 9:

Due Wednesday December 7, 2022 at 17:00

Week 10. December 9, 2022. Epidemics

Required readings:

Kleinberg & Easley chapter 21

Block, P., Hoffman, M., Raabe, I. J., Dowd, J. B., Rahal, C., Kashyap, R., & Mills, M. C. (2020). Social network-based distancing strategies to flatten the COVID-19 curve in a post-lockdown world. *Nature Human Behaviour*, 1-9.

Optional readings:

Manzo, G., & van de Rijt, A. (2020). Halting SARS-CoV-2 by Targeting High-Contact Individuals. *Journal of Artificial Societies and Social Simulation*, 23(4).

Centola, D. (2020). Considering network interventions. *Proceedings of the National Academy of Sciences*, 117(52), 32833-32835.

Mini practicum:

Agent-based models of network interventions against COVID-19

Assignment 10:

Due Wednesday December 14, 2022 at 17:00

Schedule summary

Week	Day	Topic	Required readings		Mini practicum
1	October 7	<i>Introduction</i>	Ch 1, 2		Handling social network data
2	October 14	<i>Social capital</i>	Ch 3	Granovetter (1973)	Calculating network measures
3	October 21	<i>Homophily & segregation</i>	Ch 4	Schelling (1973)	<i>Brainstorming and help w. research</i>
4	October 28	<i>Balance</i>	Ch 5	Doreian & Mrvar (2015)	Network dynamics using matrices
5	November 4	<i>Exchange</i>	Ch 12	Cook et al. (1983)	<i>Brainstorming and help w. research</i>
6	November 11	<i>WWW & Pagerank</i>	Ch 13/4	Fowler & Jeon (2008)	Analysis of longitudinal networks
7	November 18	<i>Preferential attachment</i>	Ch 18	Barabási & Albert (1999)	<i>Brainstorming and help w. research</i>
8	November 25	<i>Behavioral cascades</i>	Ch 19	Vasi & Strang (2009)	Event-history analysis of diffusion
9	December 2	<i>Small worlds</i>	Ch 20	Watts & Strogatz (1998)	Agent-based modeling (ABM)
10	December 9	<i>Epidemics</i>	Ch 21	Block et al. (2020)	ABM of network interventions