NASP (Network for the Advancement in Social and Political Studies) - Ph.D. Programme in Economic Sociology and Labour Studies

Social Network Analysis - Academic Year 2021-2022 - 30 hours – 5 CFU

Instructor: Federico Bianchi

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Objectives

Learning to pursue an empirical research project to explain structures of social relationships or to study the effect of social relationships on other social outcomes. More specifically:

- assessing whether and which social network research design is appropriate to a target research question
- designing a network survey
- computing statistics to describe network- and individual-level properties
- testing hypotheses of causal mechanisms through state-of-the-art statistical modelling

Short course description

After a brief introduction on the main graph-theoretic concepts of social network analysis, the course is mostly composed by applied sessions mirroring the real process of an empirical social network research project. From research design to computational modelling, students will be required to apply the most appropriate concepts and tools through mostly hands-on sessions with 'R' computing language.

Programme

Class hours: 10 am - 1 pm.

1. Tuesday, 3 May

- why social network research
- graph theory: basic concepts
- social relationships vs. relational data

2. Thursday, 5 May

- social mechanisms, processes, and networks
- research design: networks as outcomes vs. networks as predictors
- research design: sociocentric vs. egocentric
- name (resource) generators and interpreters

3. Tuesday, 10 May

- designing a network survey
- measuring social networks

4. Thursday, 12 May

- data structures
- introduction to `sna` and `igraph` in `R`
- loading network data
- connectivity: degree distribution and density

5. Tuesday, 17 May

- centrality
- centralization
- clustering

6. Thursday, 19 May

- random graphs
- network dependency

7. Tuesday, 24 May

- statistical modelling of network data
- Exponential Random Graph Models (ERGM)
- explaining networks with ERGMs with `statnet`

8. Tuesday, 31 May

- Stochastic Actor-Oriented Models (SAOM) for panel data
- Agent-Based Models (ABM) of behaviour-network co-evolution

9. Monday, 6 June

- wrap-up

10. Tuesday, 14 June

- students' presentations

Reference material

All course material (readings, code notebooks, slides, etc.) will be uploaded on a shared folder in due time (see email communication). Slides and notebooks will be uploaded after each session.

Auxiliary readings will be suggested throughout the course, mostly as selected chapters of Robins (2015), Borgatti, Everett, and Johnson (2013), and Scott (2013).

Requirements and examination information

The course requires:

1. basic understanding of probability theory and statistics covered by the GSSPS mathematical and statistical courses;
2. working knowledge of `R`, `RStudio`, and `Rmarkdown`, by attending the GSSPS *Introduction to R* online course: https://valutazionenaspgssps.ariel.ctu.unimi.it/v5/frm3/ThreadList.aspx?name=contents

Reading of Bonacich and Lu (2012) (chapters 1-4, 7-8, 14) (available on shared folder, see email communication) is recommended before the course.

Students will be encouraged to use their laptops with the latest versions of `R` and `RStudio Desktop` installed. (Otherwise, computers will be available in the room).

Students will be required to actively participate to classes by engaging in discussions and performing assignments. During the final meeting, students will be required to make an oral presentation reporting:

a) a (simple) analysis of network data (either provided by the instructor or collected by self);
b) a critical analysis of a previously assigned article reporting empirical network research;
c) the design of an empirical network research related to their own dissertation project.

Further Information

More on the instructor.

More on the BEHAVE research centre.

References

Bonacich, Phillip, and Philip Lu. 2012. *Introduction to Mathematical Sociology*. Princeton, NJ: Princeton University Press.

Borgatti, Stephen P., Martin G. Everett, and Jeffrey C. Johnson. 2013. *Analyzing Social Networks*. London: Sage.

Robins, Garry. 2015. *Doing Social Network Research. Network-Based Research Design for Social Scientists*. London: Sage.

Scott, John. 2013. *Social Network Analysis*. 3rd ed. London: Sage.