

Data management, analyses & visualisations

Computational Modelling of Social systems - 2025

Ana María Jaramillo
Postdoctoral researcher

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Data management:

Ethical considerations of your [data](#):

- Ownership (consent when dealing with individuals data)
 - Transparency (Collection, storage and usage)
 - Privacy (Personally identifiable datasets & de-identification)
 - Intention (What you plan to do after analysing this data?)
 - Outcomes (Disparate impact)
- * [Natural resources](#) used to acquire, analyse, and storage your data.

Data analyses:

Use methods that will solve your research questions:

1. Simple is better than complex.
2. Increase complexity if the question has not been solved yet or a simple method didn't give meaningful answers.

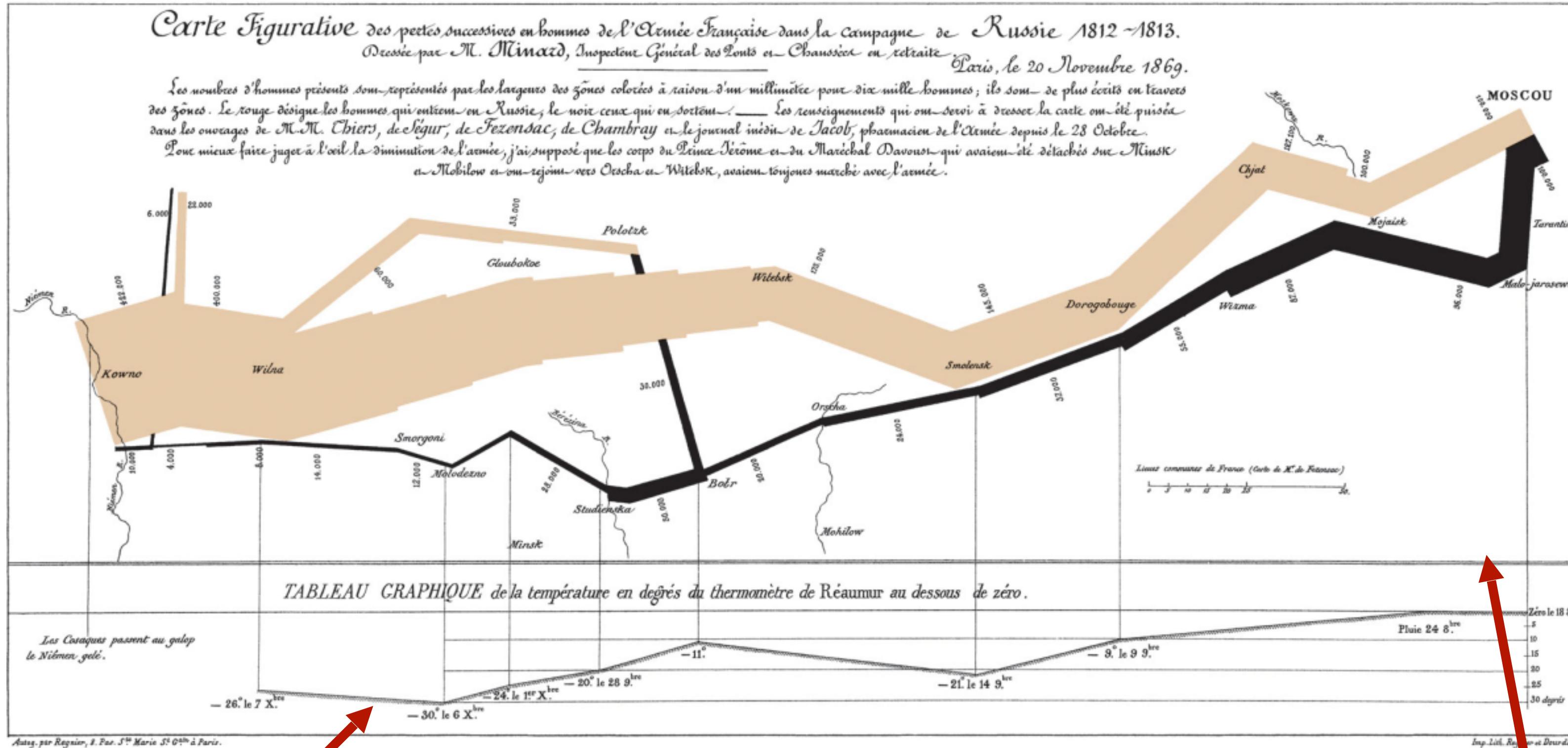
Steps to follow:

- Simple demographic statistics to characterise the population.
- Specific methodologies (modelling) depending on the field, question, and data.
- Regressions if needed to answer your questions.
- Correlations among variables that make sense.

Visualisations:

The Minard Map

Different colours for different categories of the same variable



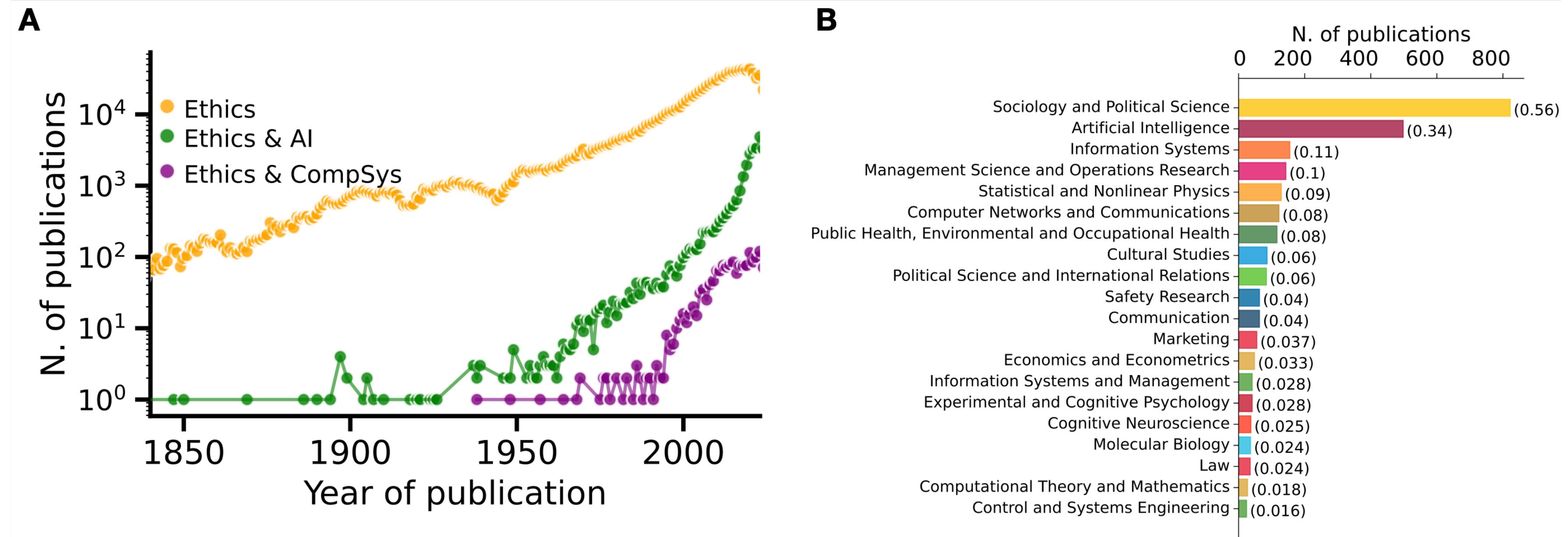
Subplots to highlight relevant data

Independent variable in the x-axis (e.g. time, temperature)

Datasets displayed:

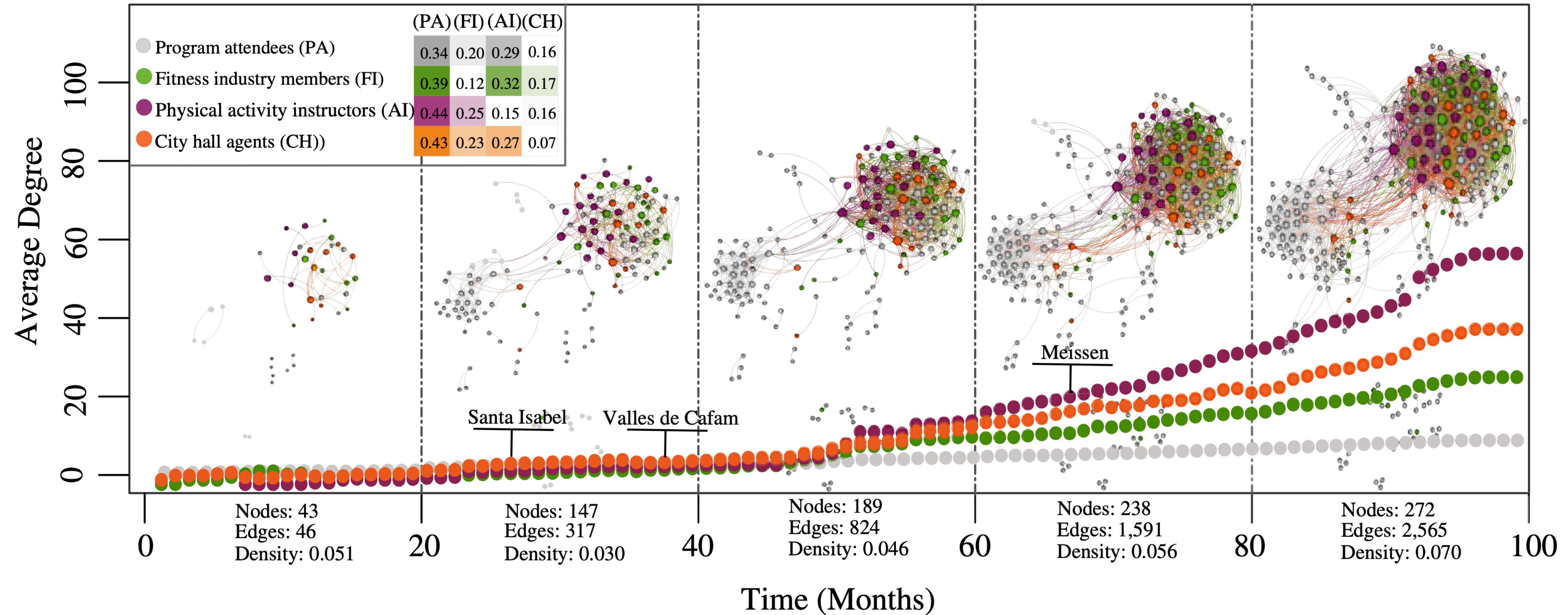
- Geography
- Flows of army
- Army direction
- Number of soldiers
- Temperature
- Time

Visualisations (Examples):



Adisa, O., Blay, E. A., Asgari, Y., Di Bona, G., Dies, S., Jaramillo, A. M., ... & Leitao, A. M. D. S. (2024). **The overlooked need for Ethics in Complexity Science: Why it matters**. *arXiv preprint arXiv:2409.02002*.

Visualisations (Examples):



Jaramillo AM, Montes F, Sarmiento OL, et al. **Social cohesion emerging from a community-based physical activity program: A temporal network analysis**. Network Science. 2021;9(1):35-48. doi:10.1017/nws.2020.31

Visualisations (Examples):

National

Local

International



Nodes: institutions.

Node color: institution field.

- Public Health
- Sports and Recreation
- Clinic
- Social Sciences
- Engineering
- Transport

Node shape: institution sector.

- Private
- Public
- Academy

Node size: degree.

Edges: meetings between the two institutions.

Edges size: accumulated number of meetings between the two institutions.

Rubio MA, Mosquera D, Blanco M, et al. **Cross-sector co-creation of a community-based physical activity program for breast cancer survivors in Colombia.** *Health Promot Int.* 2022;37(3):daac073. doi:10.1093/heapro/daac073

Resources:

- Pen & paper: draw some sketches :)
- Get inspired by plots you like from other publications.
- See plots in the galleries of different libraries: [seaborn](#), [matplotlib](#),
[CSH visualisation page](#)
- Search for nice palette colours: <https://colors.co/>
- Ask to a friend if your message is clear or for suggestions.

Information for the literature review:

Information taken from: <https://www.scribbr.com/methodology/literature-review/>

Step 1 – Search for relevant literature

Before you begin searching for literature, you need a clearly defined [topic](#).

If you are writing the literature review section of a dissertation or research paper, you will search for literature related to your [research problem](#) and [questions](#).

Literature review research question example

What is the impact of social media on body image among Generation Z?

Make a list of keywords

Start by creating a list of keywords related to your research question. Include each of the key concepts or variables you're interested in, and list any synonyms and related terms. You can add to this list as you discover new keywords in the process of your literature search.

Keywords example

- Social media, Facebook, Instagram, Twitter, Snapchat, TikTok
- Body image, self-perception, self-esteem, mental health
- Generation Z, teenagers, adolescents, youth

Search for relevant sources

Use your keywords to begin searching for sources. Some useful databases to search for journals and articles include:

- Your university's library catalogue
- [Google Scholar](#)
- [JSTOR](#)
- [EBSCO](#)
- [Project Muse](#) (humanities and social sciences)
- [Medline](#) (life sciences and biomedicine)
- [EconLit](#) (economics)
- [Inspec](#) (physics, engineering and computer science)

You can also use [boolean operators](#) to help narrow down your search.

Make sure to read the [abstract](#) to find out whether an article is relevant to your question. When you find a useful book or article, you can check the bibliography to find other relevant sources.

Resources for TU and KFU: <https://ub.uni-graz.at/de/suchen-ausleihen/wo-und-was-kann-ich-suchen/>