UNIVERSITÄT
LEIPZIG

Forschungsseminar CSS – hi

NSG SR 325, 14/10/2025

Felix Lennert, M.Sc.

TODAY

- what is CSS?
  - where does it come from – data availability
  - what does it facilitate?
  - CSS ~ Analytical sociology (Jarvis, Keuschnigg, and Hedström 2021)
  - state of the field (Edelmann et al. 2020)
- getting to know each other
- housekeeping


The Economist
Obama the warrior
Misgoverning Argentina
The economic shift from West to East
Genetically modified crops blossom
The right to eat cats and dogs
The data deluge
AND HOW TO HANDLE IT: A 14-PAGE SPECIAL REPORT


The Economist
Theresa May v Brussels
Ten years on: banking after the crisis
South Korea's unfinished revolution
Biology, but without the cells
The world's most valuable resource
Data and the new rules of competition

Harvard Business Review

Sign In

Data Scientist: The Sexiest Job of the 21st Century

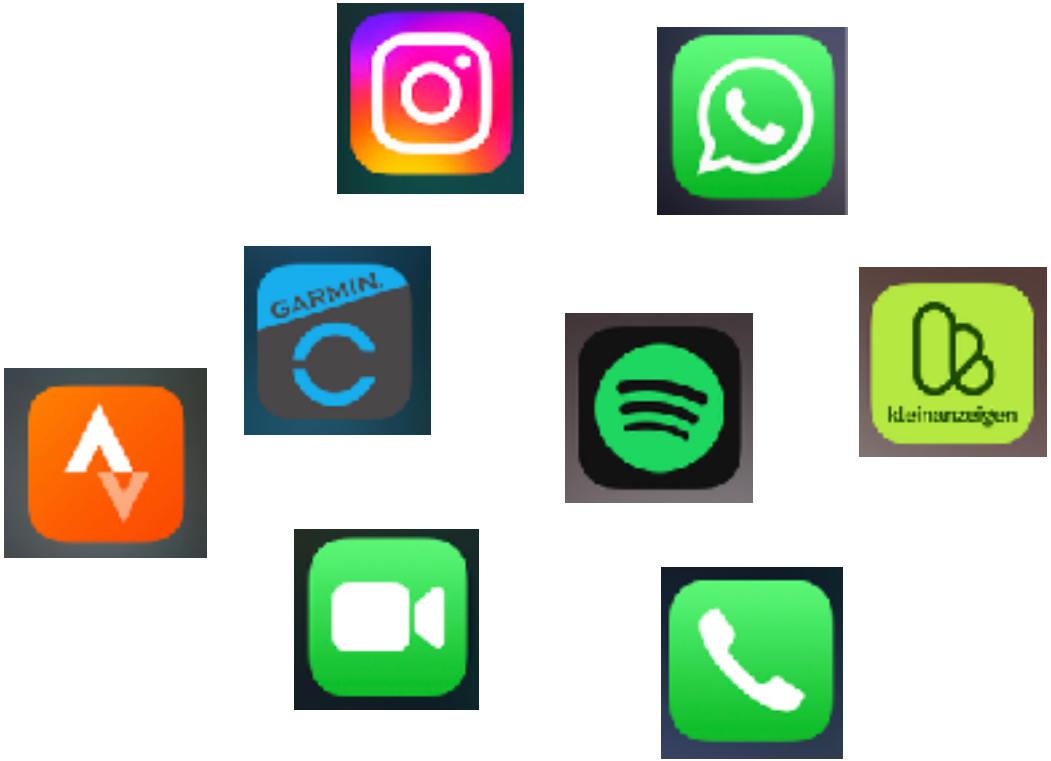
by Thomas H. Davenport and DJ Patil

From the Magazine (October 2012)

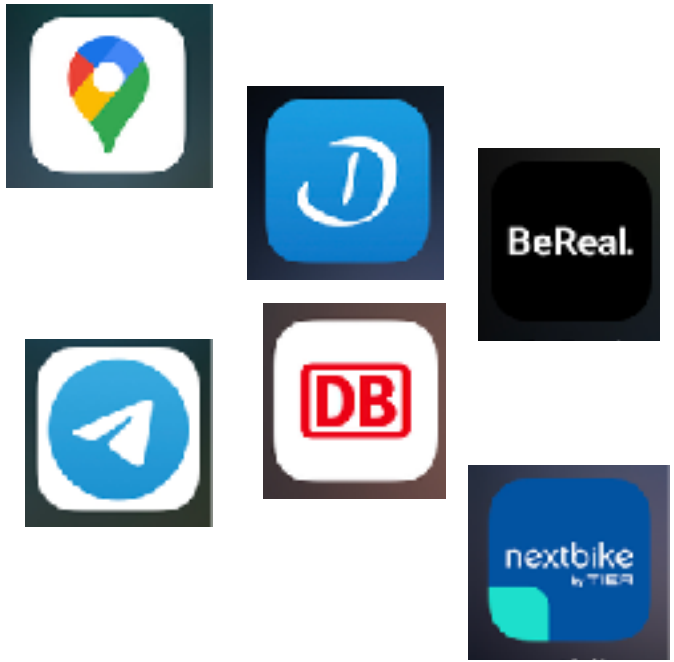
“We live life in the network. When we wake up in the morning, we check our e-mail, make a quick phone call, walk outside (**our movements captured by a high definition video camera**), get on the bus (**swiping our RFID mass transit cards**) or drive (**using a transponder to zip through the tolls**). We arrive at the airport, making sure to purchase a sandwich with a **credit card** before boarding the plane, and **check our BlackBerries** shortly before takeoff. Or we visit the doctor or the car mechanic, generating **digital records of** what **our medical or automotive problems** are. We post **blog entries** confiding to the world our **thoughts and feelings**, or maintain personal **social network profiles** revealing our **friendships and our tastes**. Each of these transactions leaves **digital breadcrumbs** which, when pulled together, offer increasingly comprehensive pictures of both individuals and groups, with the potential of transforming our understanding of our lives, organizations, and societies in a fashion that was barely conceivable just a few years ago.”

(Lazer et al. 2009, p. 721–722)

What data have I produced today?



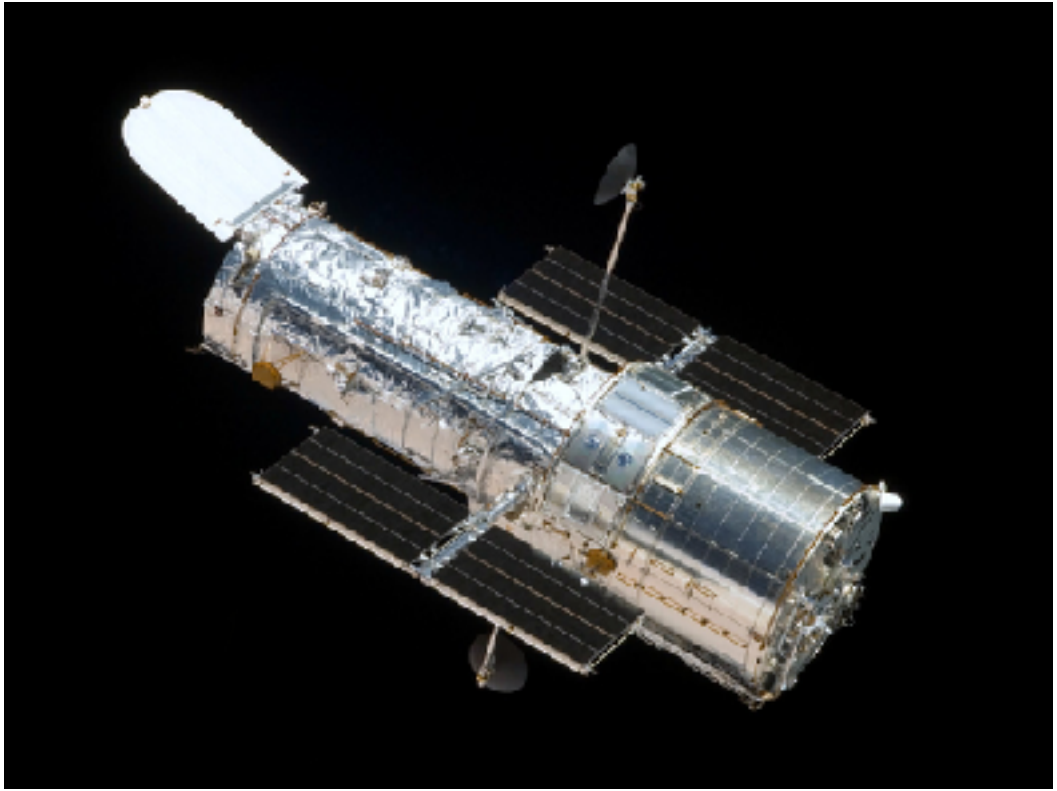
What data have I produced throughout the last years



What data did I produce 15 years ago?

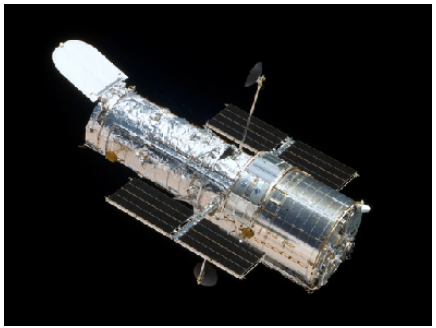
“Big data … requires a computational social science—a mash-up of computer science for inventing new tools to deal with complex data, and social science, because the substantive substrate of the data is the collective behavior of humans”

(Lazer & Radford 2017)



Source: Wikipedia / Ruffnax

INTERNET VS. TELESCOPE



- watches the world from a different scope

- watches human behavior from a different scope
  —> from “above”

Source: Wikipedia / Mario Roberto Duran Ortiz

INTERNET VS. OBSERVATORY

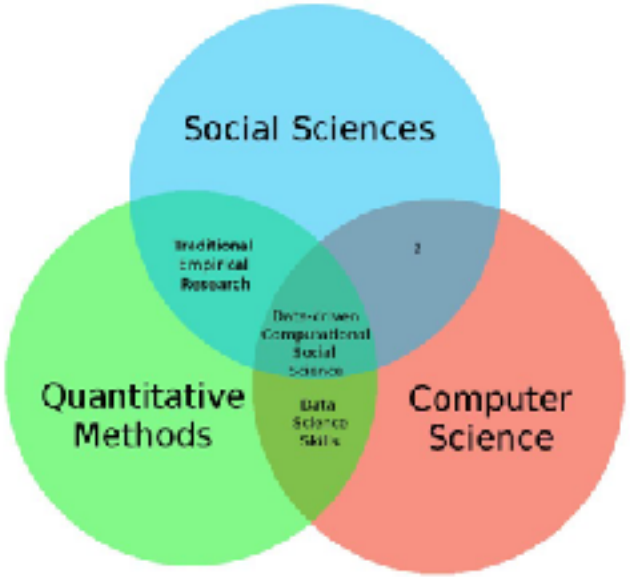
- sensitive enough to measure small differences (e.g., radiation emitted by Neutron stars)

- can uncover small differences in human behavior – e.g., hourly changes of people's mood or activities (Golder & Macy 2011)

"[J]ust as the invention of the telescope revolutionized the study of the heavens, so too by rendering the unmeasurable measurable, the technological revolution in mobile, Web, and Internet communications has the potential to revolutionize our understanding of ourselves and how we interact … [T]hree hundred years after Alexander Pope argued that the proper study of mankind should lie not in the heavens but in ourselves, we have finally found our telescope. Let the revolution begin."

–Duncan Watts (2011, p. 266)

A VENN DIAGRAM



CIOFFI-REVILLA 2010

- “Computational social science is a fledging interdisciplinary field at the intersection of the social sciences, computational science, and complexity science.” (p. 259)

- “The main computational social science methods in use today can be classified in five areas:
    - Automated information extraction
    - Social network analysis (SNA)
    - Geospatial Analysis
    - Complexity modeling
    - Social simulations models” (p. 260)

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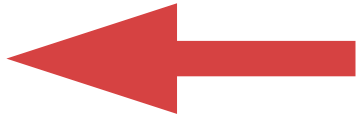


10
Cultural diffusion
(Keuschnigg et al., forthcoming)
Mobility
"Fake News"/Misinformation
(Herasimenka et al., 2022)
Traffic patterns
(Muñoz-Villazimar, 2022)
Discrimination
(Wagner & Petev, forthcoming)
"Strength of weak ties"
(Onnela et al., 2007)
"Meme wars"
(Al-Rawi, 2021)

ANALYTICAL SOCIOLOGY & CSS (JARVIS, KEUSCHNIGG, AND HEDSTRÖM 2021)

- AS is interested in **how social phenomena come about**
  - methodological individualism
  - bottom-up explanations
- AS scholars strive for **empirical realism**
  - goal: empirical identification of mechanisms *in the wild*

What does CSS bring to the table here?

ANALYTICAL SOCIOLOGY & CSS

What does CSS bring to the table here?

⟹ A plethora of ways to observe and model individuals' behavior

- Digital Trace data
  - observing individuals' behavior
  - data often entails relational (network) information
  - data are very wide – large samples, hard-to-study groups
  - data are also deep – many data points and variables per individual

ANALYTICAL SOCIOLOGY & CSS

What do CSS approaches bring to the table here?

⟹ A plethora of ways to observe and model individuals' behavior

- Digital Trace data
  - observing individuals' behavior – a *sensor*
  - data often entails relational (network) information
  - data are very wide – large samples, hard-to-study groups
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ANALYTICAL SOCIOLOGY & CSS

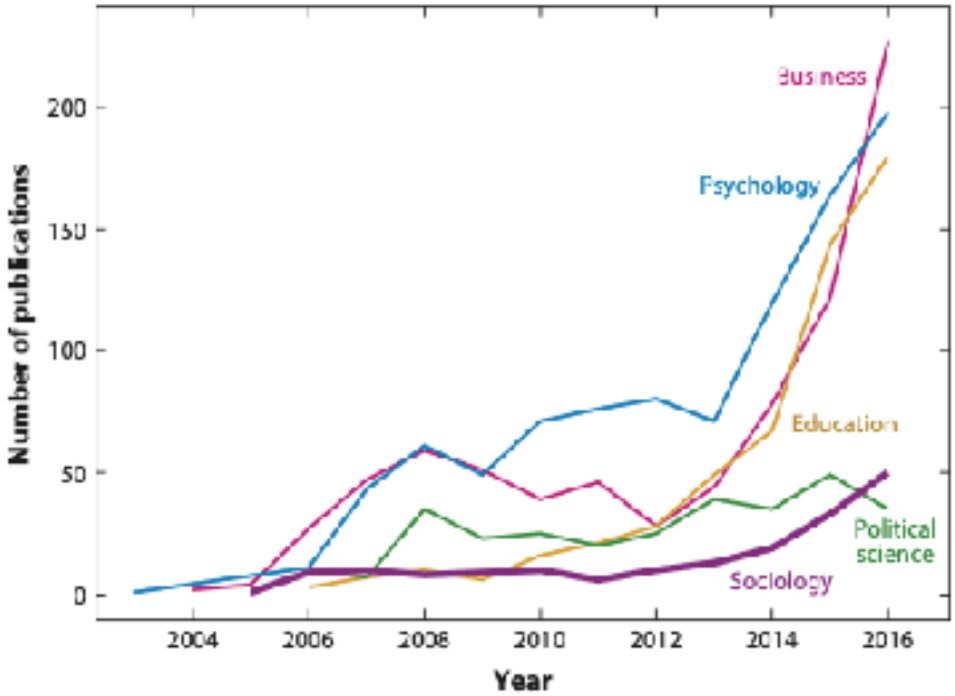
What does CSS bring to the table here?

⟹ A plethora of ways to observe and model individuals' behavior

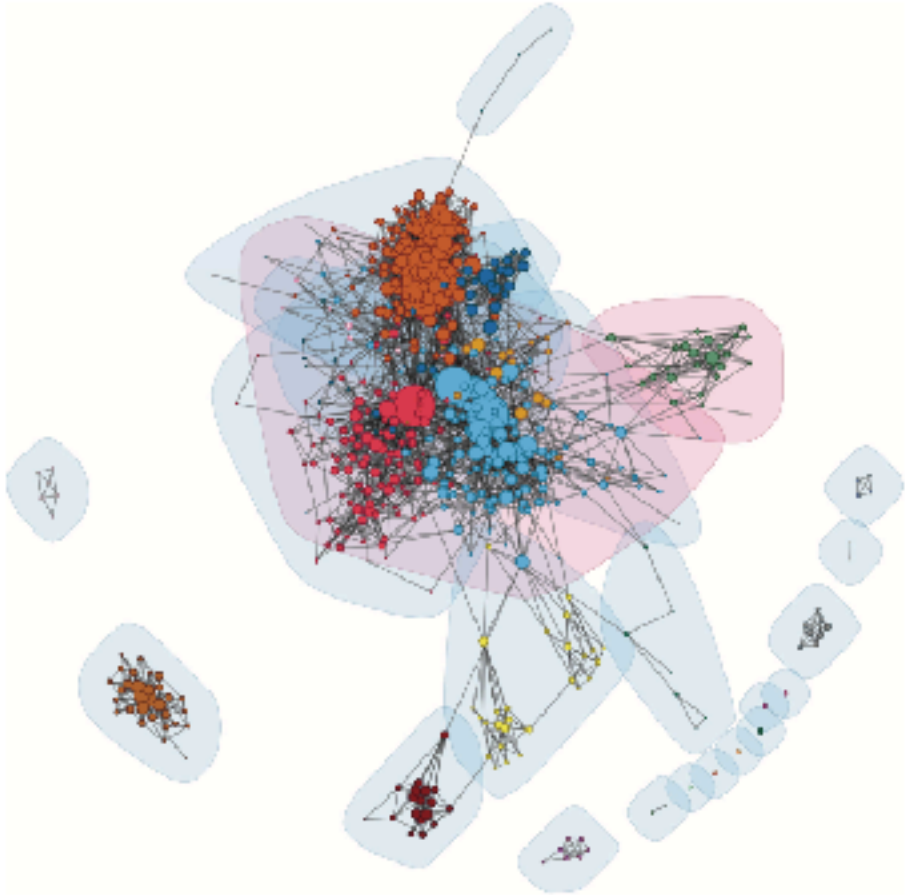
- Computational Text Analysis
  - observing individuals' thoughts and expressions
  - new machine-learning algorithms provide unprecedented angles from which to study meaning and shared understanding(s)

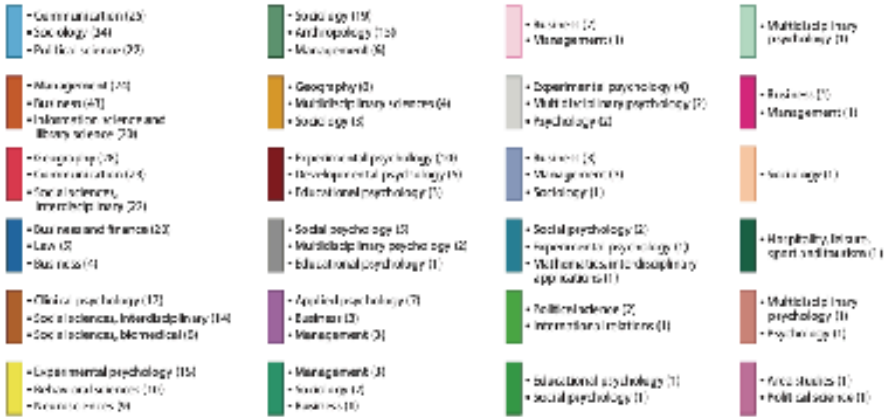
EDELMANN ET AL. 2020

"Computational social science is an interdisciplinary field that **advances theories of human behavior by applying computational techniques to large datasets** from social media sites, the Internet, or other digitized archives such as administrative records." (p. 2)



number of CSS publications by year and genre (Edelmann et al. 2020, p. 4)





CSS citation network (Edelmann et al. 2020, p. 5)

CURRENT SHORTCOMINGS ACCORDING TO EDELMANN ET AL. 2020

- "… many studies are using new types of data and methods to revisit old sociological questions that were once thought impossible to study" (p. 13–14)
- "… to develop new theories of the social *terra incognita* created by the rise of digital technology itself" (p. 14)
- "… develop new ways of creating theory itself" (p. 14)
- "…access to training in computational social science. Coding in open-source software, embedding field experiments in online platforms, and dealing with unconventional data structures is not part of regular training within most sociology departments." (p. 15)

welcome!

06-002-107-3: Forschungsseminar B – Experimentelle Soziologie und Computational Social Science

WHO I AM

- **B.A. Political Science (University of Regensburg)**
  - introduction to “classic” empirical social science
  - first steps toward analysis of digital trace data
- **M.Sc. in Computational Social Science (Linköping University)**
  - training in sociological theory as well as computational methods
  - research assistant in “Mining for Meaning” project (PI: Marc Keuschnigg)
- Currently: **PhD Student at Ecole Polytechnique (Paris)**
  - research interest: political polarization in different facets
  - Spring 2024/2025: Visiting Scholar at Duke University at the Worldview Lab (host: Stephen Vaisey)
  - plus: Research Fellow at the Leipzig University
  - organizer of the Summer Institute for Computational Social Science (2022 & 2023)

Working title:
“Seeing Political Polarization Through a Fresh Set of AIs”

Main themes and contributions:

- Interrogate U.S.-focused research using the European case
  - different facets of political polarization: affective, elite, ideological, cultural/lifestyle
  - thereby, assessing generalizability
- Use recently developed (NLP) methods and new data to assess them
  - methods: transformer-based classifiers, probabilistic word embeddings, mixed membership clustering (LDA), regression trees
  - data: surveys, newspaper data, Tweets, Twitter co-following data

Working title:
“Seeing Political Polarization Through a Fresh Set of AIs”

- paper #1: investigating the relationship between affective polarization of elites and the public
- paper #2: elites’ ideological stances and their transmission to the public
- paper #3: assessment of lifestyle polarization in Sweden

YOUR TURN

- name
- research interests
- expectations?
- things you want to see addressed in the course

LITERATUR

- Cioffi-Revilla, Claudio 2010: Computational Social Science. In *Wiley Interdisciplinary Reviews: Computational Statistics* 2(3), pp. 259–271.
- Edelmann, Achim/Wolff, Tom/Montagne, Danielle/Bail, Christopher 2020: Computational Social Science and Sociology. In *Annual Review of Sociology* 46(1), pp. 61–81.
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MERCI

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