Data Linking I:

Survey data & social media data

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What is social media data?

- Simple definition: Any data generated by users of social media platforms, such as Facebook, Twitter, YouTube or Reddit
- More specific definition difficult due to differences between platforms:
  - Different types of interactions/use
  - Different types of data

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Examples of social media data

- Facebook
  - Posts & comments
  - Photos
  - Profile information
- Twitter
  - Tweets, retweets, & replies
  - Profile information
- YouTube
  - Video or channel statistics
  - Viewer comments

Why collect social media data?

- Social media use have become ingrained in everyday life for many people
- This use generates a lot of data
- A lot of these data are also interesting for research in the social sciences

Social media data in the social sciences

- Most studies/researchers use text data
- Other types of social media data (e.g., photos, videos) less commonly used
- Unit(s) of analysis for social sciences typically are the user(s)

How can you collect social media data?

- Basically 3 ways (Breuer, J., Bishop, L., & Kinder-Kurlanda, K. (2019). The practical and ethical challenges in acquiring and sharing digital trace data: Negotiating public-private partnerships. *New Media & Society*, Accepted for publication):
  1. Collect data yourself
  2. Direct cooperation with social media company
  3. Buy data from data reseller or market research company
- Choice should essentially depend on the research question and the available resources (knowledge/skills, time, money…)

Collect your own data (CYOD)

- Again, 3 options:
  1. Application Programming Interfaces (APIs) of platforms
  2. Web scraping
  3. “Data donation”
- each option has specific advantages and disadvantages

APIs

Advantages	Disadvantages
• Most social media platforms provide them • Usually good documentation • Many software tools and packages (e.g., for R and Python) available for collecting social media data via APIs • Provide structured data (often in the form of JSON files)	• APIs typically have rate limits for requests (that can also change substantially) • Can be limited, changed or even closed off entirely (prime example: Facebook essentially closing its Graph API in the wake of the Cambridge Analytica scandal)

APIs

- Freelon (2018): Computational Research in the **Post-API Age**
  - argues for the importance of moving (back) to web scraping in computational research
- interesting exchange between Bruns (2019) and Puschmann (2019) about consequences of changes/closing of APIs recently published in *Information, Communication, & Society*

Web scraping

Advantages	Disadvantages
• Flexible • Does not depend on goodwill of social media companies	• More complicated/involved (than access via APIs) • Changes in website structures can be an issue • Data has to be structured/cleaned • Can be (deemed) a legal grey zone

Data donation

- people can download their personal data from most platforms (in many cases implemented in reaction to the new European GDPR) which they could then share with researchers
- Halavais (2019) proposes this as a solution for "overcoming terms of service"
- Thorson et al. (2019) used this approach to study "exposure to news and politics on Facebook" (with a student sample)
- browser plugins can be another option (see Haim & Nienierza, 2019 for an example for Facebook data)

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Data donation

Advantages	Disadvantages
• Informed consent • Transparency for the users • No issues with rate limits, terms of service, etc.	• Not easy to implement (users have to be instructed, data has to be safely uploaded…) • Solutions for anonymization required (example: friends tagged in participants' Facebook posts)

What is data linking?

- Combining data from different sources for the same units of analysis (e.g., individuals)
  - in the quantitative social sciences usually survey data + X
- Different terms in the literature:
  - Data linking
  - Data linkage
  - Record linkage
- 2 basic linkage/linking types:
  1. Deterministic
  2. Probabilistic
- focus here on deterministic linkage or linking: unique identifiers (or combination of identifiers) allows direct matching of units of analysis

Why link surveys & social media data?

- Self-reports can be biased
  - social desirability
  - problems with recall
- Social media data alone can be difficult to use as they tend to lack…
  - information about the individuals being studied (e.g., attitudes, personality…)
  - relevant outcome variables (e.g., voting intention/behavior)
  - explicit informed consent
- Linking to alleviate limitations of the two data types (Stier et al., 2019)

How to link surveys & social media?

- 4 general types of linking

a) When does the linking happen?
   1. Ex ante: Data are collected together (for the same time period)
   2. Ex post: Data that have been collected are linked with existing data

b) On what level are the data linked?
   1. Individual level
   2. Aggregate level

Use cases

- Methodological questions, e.g., regarding over- oder underreporting in surveys: Haenschen (2019) used a combination of survey and Facebook data to measure political activity on the platform
- Political attitudes and opinions: Pasek et al. (2019) use data from polls and Twitter to assess attitudes towards US presidents
- Many other applications possible: e.g., to study media use, social networks or well-being

Challenges

- Working with linked survey and social media data creates specific challenges for all phases of the research data lifecycle
- Exemplary key issues:
  - Recruitment of participants
  - Informed consent
  - Privacy & data protection

Recruiting participants

- Two options:
  1. Collect social media data & recruit people via that social media platform
  2. Collect survey data, then ask for consent to collect social media data
- How you recruit your participants and what method you use to collect the social media data affects the composition of your sample (and might introduce different biases)
- Choice should depend on your research question

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Informed Consent

- Important to collect informed consent (esp. in Europe with GDPR) when you link surveys and social media data
- Make clear what data you collect, why you collect it and how it will be used and stored (also mention data sharing if applicable)
- Al Baghal et al. (2019) provide a good template (they linked surveys and Twitter data): short informed consent with important basic information in the survey + extended (privacy) information that is optional to read for participants

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Privacy & data protection

- Need to pay special attention to the privacy of people who did not consent to their data being used in the study (e.g., Facebook friends tagged in posts)
- Some of the resources for sharing social media data can also be used as guidance for dealing with linked survey and social media data (e.g., Bishop & Gray, 2017; Kinder-Kurlanda et al., 2017; Mannheimer & Hull, 2017; Williams et al., 2017)

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Case study

- internal GESIS research project with aim of studying use of online media (esp. news)
- Methods
  - Web tracking panel from market research company
    - ~ 2000 participants per month
    - data for one year
    - ~ 94 mio. data points (visits: domain level)
  - Additional data for parts of the sample
    - Tracking of mobile app use
    - Data from 3 online surveys (focus: media use and politics)
    - Social media data: Twitter, Facebook, Spotify

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Social media data in our project

- consent collected via online surveys
- Twitter
  - Continuous tracking using public streaming API
- Facebook
  - Browser plugin (Haim & Nienierza, 2019)
    - for Firefox and Chrome
    - collects public posts (+ some metadata) from users‘ feeds
- Spotify
  - Web app developed at KU Leuven
  - Collects 50 most recently played songs, playlists, and preferences

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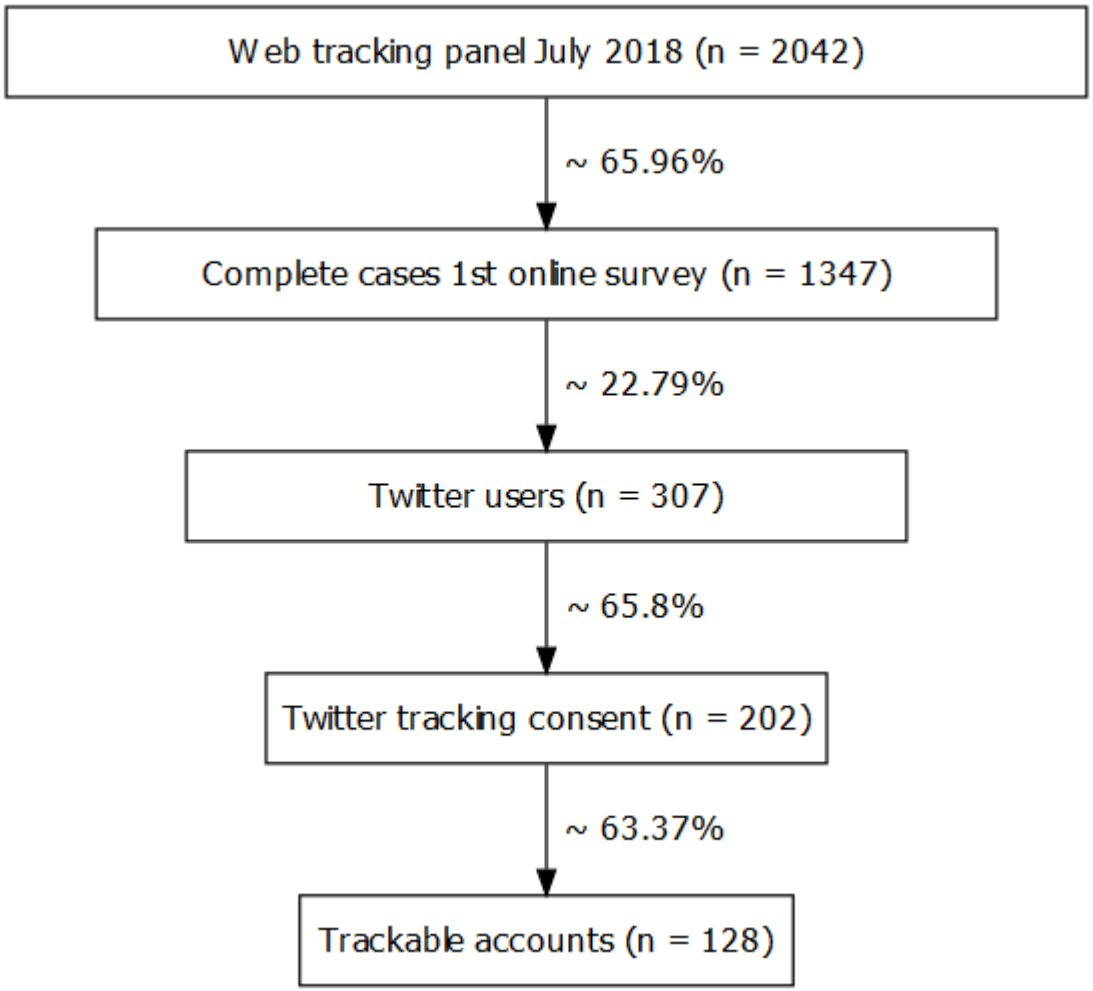
Twitter data



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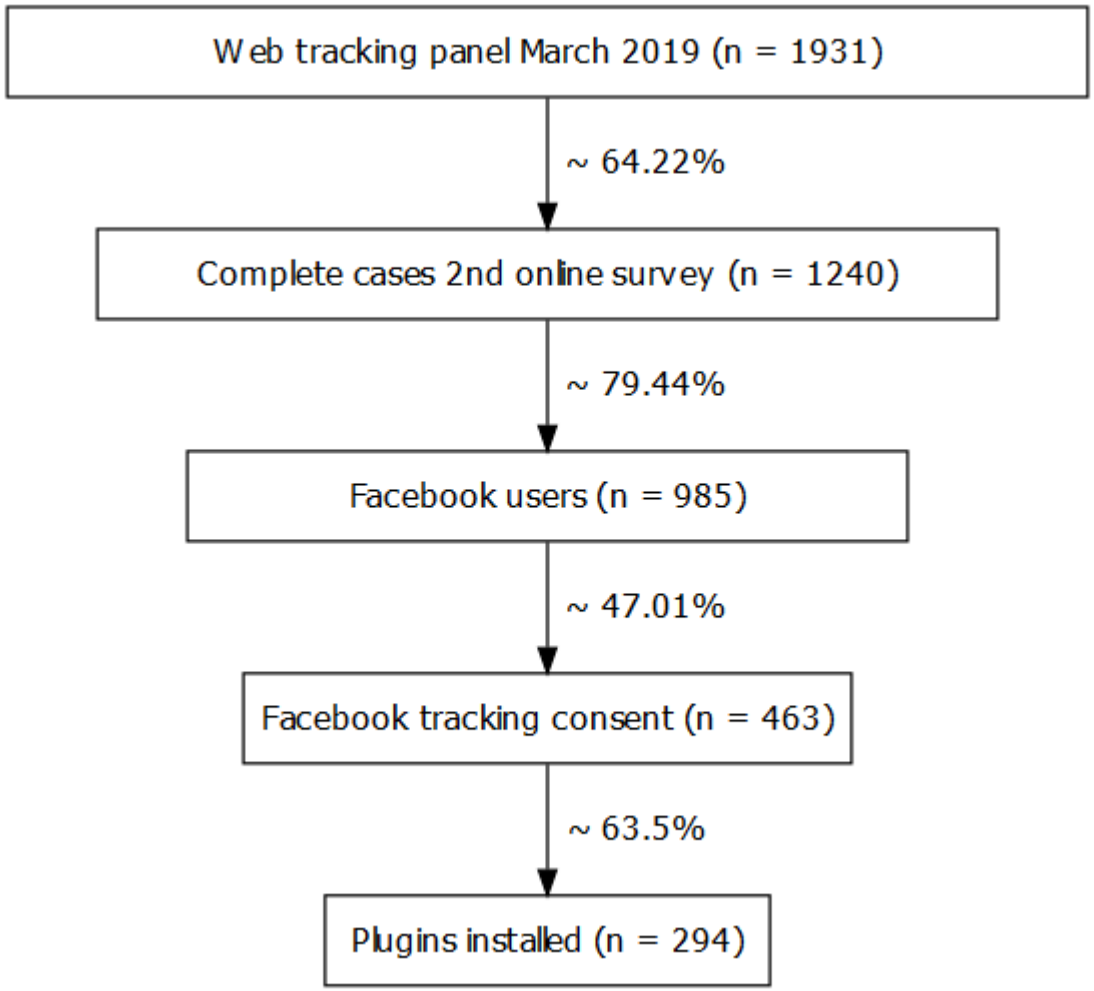
Facebook data



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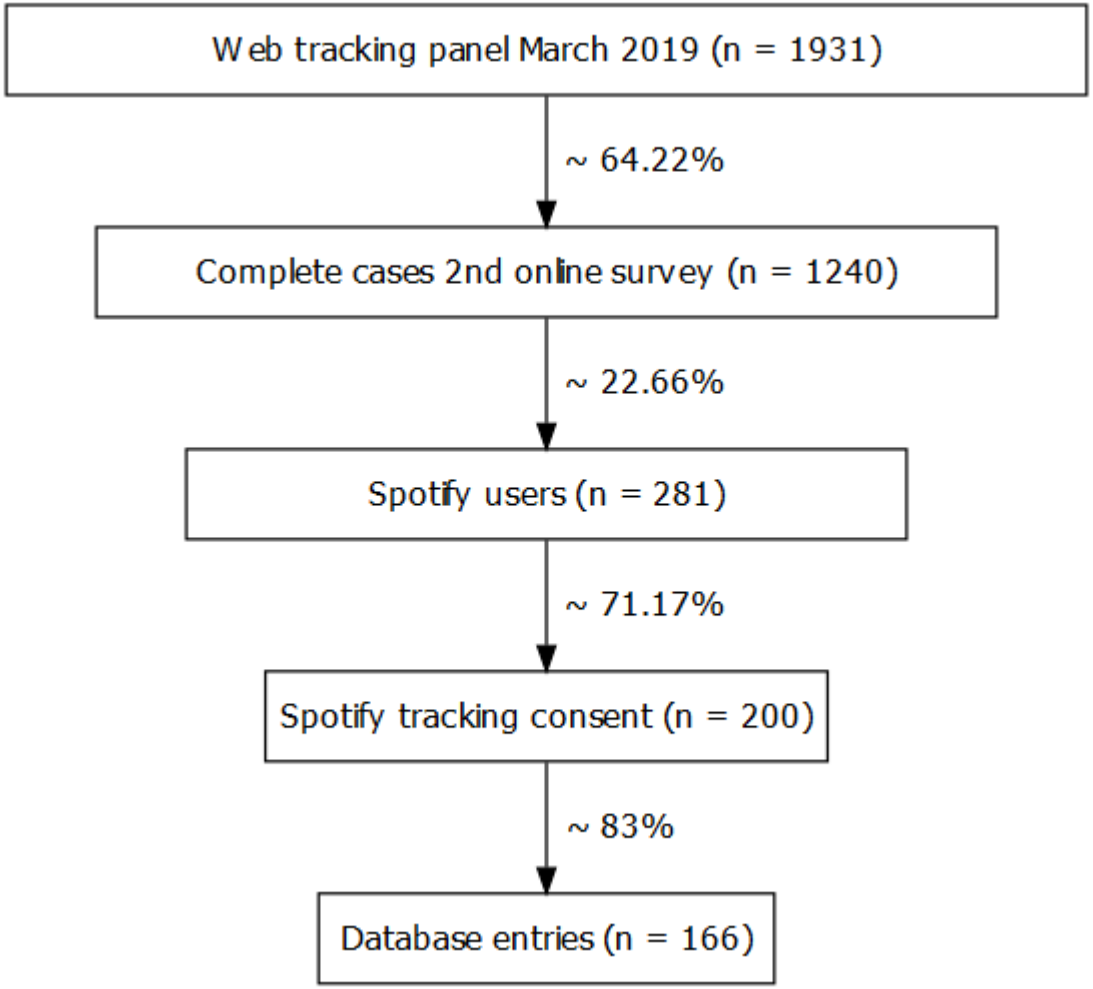
Spotify data



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Next data processing steps in our project

- Check for systematic bias in the dropout stages
- Check data quality
  - Quantity of user activity: data points per person
  - Quality of user activity: e.g., active vs. passive Twitter use or importance of Facebook as news source
- Find solutions for making the data available
  - Full raw data cannot be shared (example: people frequently visiting their personal homepage)

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Pros and cons of our approach

Advantages	Disadvantages
• Individual-level data • Large and heterogeneous sample • Large bandwidth of data • Informed consent from participants • Easy access to web tracking data • Facebook data without need to use API	• Potential biases in the sample • High costs • Need to use APIs for Twitter & Spotify • Changes to Facebook feed structure can be problematic for browser plugin

Conclusion

- There are different ways of collecting social media data, each with their own pros and cons
- Linking surveys and social media data can help in alleviating some of the limitations of these data types
- The choice of data collection and linking methods should depend on your research question (but also take into account what resources are available)
- Recruiting participants, collecting informed consent, and protecting participant privacy are some of the key challenges when working with