## USING DATA DONATIONS TO COLLECT DIGITAL TRACE DATA

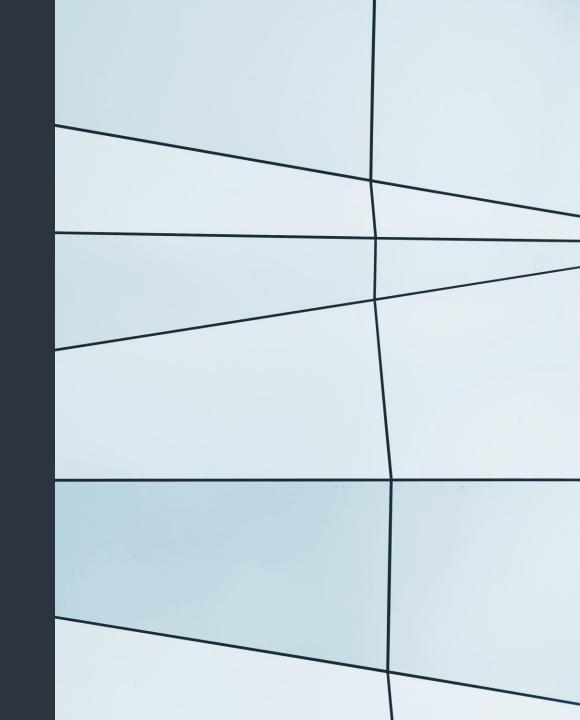
PROMISES & PITFALLS FOR THE SOCIAL SCIENCES

Dr. Valerie Hase, LMU Munich





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■ Digital traces as "records of activity (trace data) undertaken through an online information system" (Howison et al., 2011, p. 2)



Source: Alang Fung via Unsplash

e.g., analog vs. digital activities (Keusch & Kreuter, 2021)



Source: John Schnobrich via Unsplash

 Digital traces as "records of activity (trace data) undertaken through an online information system" (Howison et al., 2011, p. 2)



Source: Danny G via Unsplash

e.g., individual behavior vs. social interaction

(Keusch & Kreuter, 2021)



Source: Alexander Andrews via Unsplash

 Digital traces as "records of activity (trace data) undertaken through an online information system" (Howison et al., 2011, p. 2)



Source: Jacob Owens via Unsplash

e.g., public vs. private data (Haim & Hase, 2024)



Source: Elf-Moondance via Pixabay

- Digital traces as "records of activity (trace data) undertaken through an online information system" (Howison et al., 2011, p. 2)
- Relevance due to fine-grained, longitudinal, & less reactive nature e.g., to enrich or validate survey data (Keusch & Kreuter, 2021)
- Used to study social science questions on public opinion (Scharkow et al., 2020), labour market behavior (Rajkumar et al., 2022), or political communication (Jungherr, 2015)

#### COLLECTING DIGITAL TRACES (Haim & Hase, 2023; Ohme et al., 2024)

- Platform-centric approaches (e.g., APIs, industry collaborations)
  - Decreased or no access (Bruns, 2019; Freelon, 2018)
  - Limited control over samples & measurements (Bagchi et al., 2024; Ho, 2020; Schatto-Eckrodt, 2022)
  - Concerns about user consent

#### COLLECTING DIGITAL TRACES (Haim & Hase, 2023; Ohme et al., 2024)

- Platform-centric approaches (e.g., APIs, industry collaborations)
- User-centric approaches (Hase & Schmidbauer, 2024)
  - Active via sensors
  - Passive via tracking
  - Linkage
  - Data donations

#### USING DATA DONATIONS TO COLLECT DIGITAL TRACES

- (1)—What are data donation studies?
  - **2** What are important steps of data donation studies?
    - **3** What are promises & pitfalls of such studies?

1

# WHAT ARE DATA DONATION STUDIES?



#### LEGAL CONTEXT

- EU supports right to own data for users (§15 GDPR):
  - §15(1): Right of access to and information about the personal data undergoing processing
  - §15(3): Copy of the personal data
- Users must be able to transmit data: data portability (§ Art. 20 GDPR):
  - §20(1): Receive data in a structured, commonly used, and machine-readable format; transport data

#### LEGAL CONTEXT

According to legal requirements (Ausloos & Veale, 2021; Hase et al., 2024), data should be...

- Concise & easily accessible
- Transparent about included information
- Complete

**Use data for research?** 

### DEFINITION: DATA DONATION STUDY

Participants download their data from platforms as Data Download Packages (DDPs) & then donate this data to research via Data Donation Tools (DDTs).

Researchers use CSS methods to filter, anonymize & analyze this data.

#### USING DATA DONATIONS TO COLLECT DIGITAL TRACES

- 1 What are data donation studies? User-centric approach: Participants download & donate their data to research.
  - **2** What are important steps of data donation studies?

**3** What are promises & pitfalls of such studies?



#### As part of a survey...



#### Let's continue with your data donation!

In data donation studies, participants voluntarily share their data with researchers. Your donated data helps us to understand how people inform themselves on digital platforms.

Your data is completely anonymized so that we cannot draw any conclusions about who it came from. You can also decide for yourself which data you would like to donate - and which not.

#### Would you like to donate your data?

- Yes, I want to donate my data.
- No, I do not want to donate my data.

As part of a survey...



#### **Downloading Your Social Media Data**

Before you click "Next", please download your data for the platforms for which you would like to donate data using these instructions. You are free to choose which platform(s) you would like to donate data from.

Here, you will find instruction for how to download your data from Instagram.

Next











- Download
  User download their
  Data Download
  Packages (DDPs).
- Data Donation
  Users donate their data
  to research via Data
  Donation Tools (DDTs).

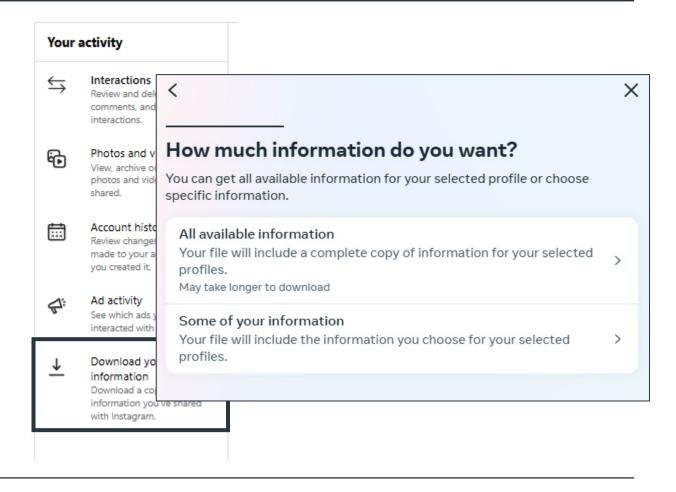
# Have you ever requested a copy of your own data from a platform (e.g., Google, Instagram, etc.)?



Few people know about/do this - e.g., 8% of all Swiss citizens (Pfiffner & Friemel, 2023, p. 17)

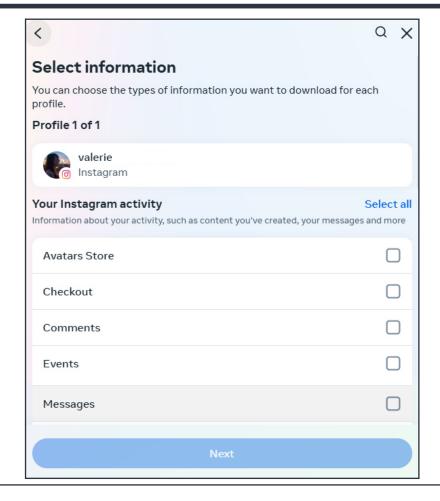






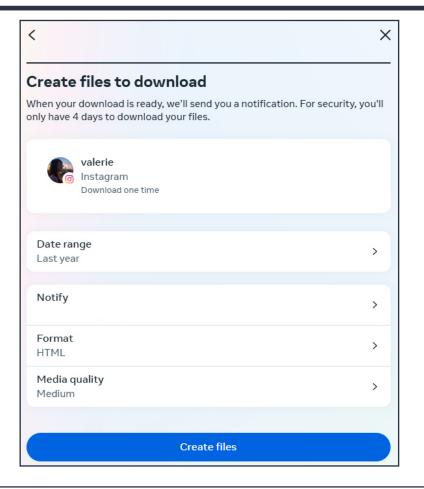






















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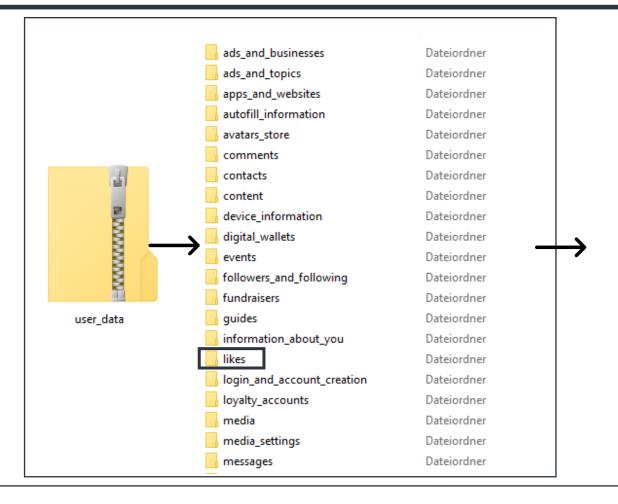


Download
User download their
Data Download
Packages (DDPs).

 After a few hours/days, users get notified that their DDP is accessible.



Download
User download their
Data Download
Packages (DDPs).





Download
User download their
Data Download
Packages (DDPs).

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     "string_list_data": [
          "href": "https://www.instagram.com/p/Cs3LwsrI8/"
          "timestamp": 1392964862
```



Download
User download their
Data Download
Packages (DDPs).

Typically timestamped data on... (Hase et al., 2024)

- User characteristics (e.g., profile information, privacy settings)
- Activites (e.g., social networks, likes, searches, messages)
- Partly content & context (e.g., [links to] ads/posts users engaged with; algorithmically inferred interests; rarely information about exposure)







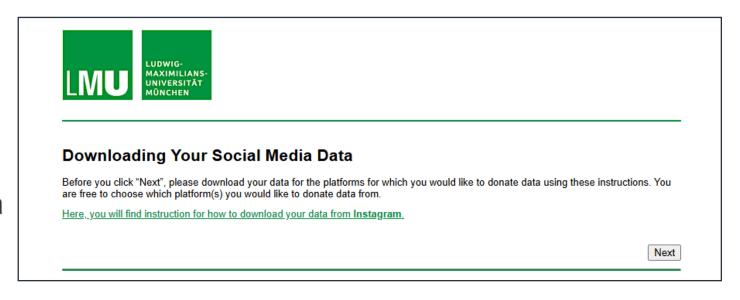




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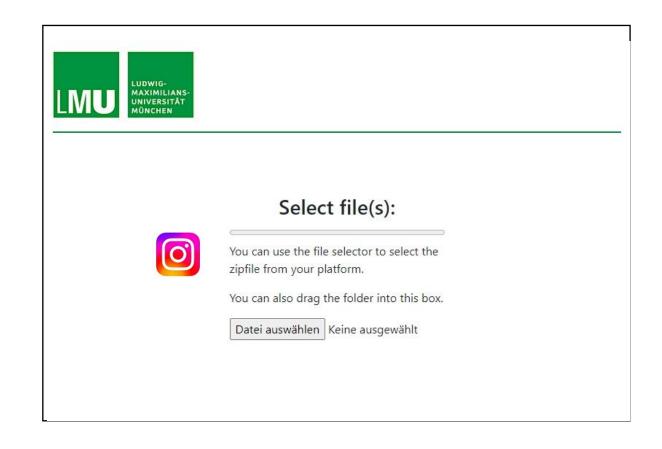


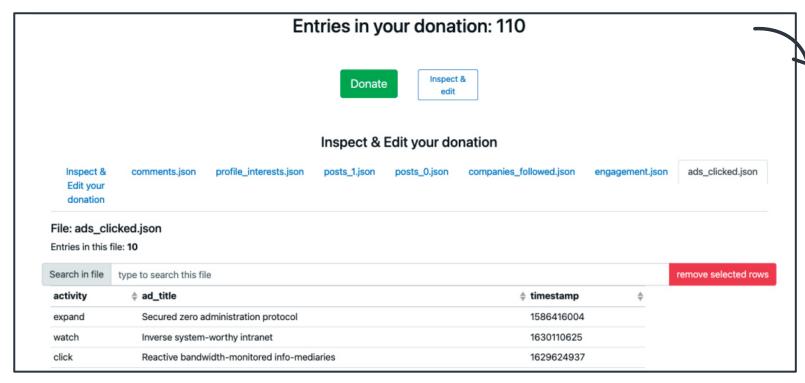
Data Donation
Users donate their data
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Users donate their data
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- Participants can view data
- Participants can delete data before donation
- Participation again give informed consent

Source: Araujo et al., 2022, p. 278

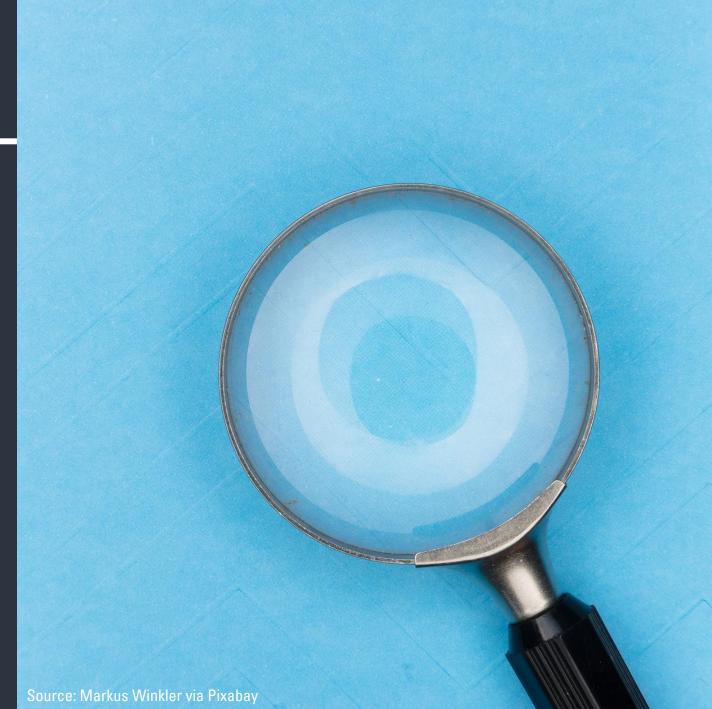
#### USING DATA DONATIONS TO COLLECT DIGITAL TRACES

1 What are data donation studies? User-centric approach: Participants download & donate their data to research.

2 What are important steps of data donation studies?
Participants: Requesting, downloading & uploading data

**3** What are promises & pitfalls of such studies?

## DATA DONATION STUDY: RESEARCHER PERSPECTIVE



#### DATA DONATIONS: RESEARCHER PERSPECTIVE

Quality & Quantity https://doi.org/10.1007/s11135-024-01983-x



#### Best practices for studies using digital data donation

Thijs C. Carrière 10 · Laura Boeschoten 10 · Bella Struminskaya 10 · Heleen L. Janssen 20 · Niek C. de Schipper 30 · Theo Araujo 30

Accepted: 18 September 2024 © The Author(s) 2024

#### Abstract

Digital trace data form a rich, growing source of data for social sciences and humanities. Data donation offers an innovative and ethical approach to collect these digital trace data. In data donation studies, participants request a copy of the digital trace data a data controller (e.g., large digital social media or video platforms) collected about them. The European Union's General Data Protection Regulation obliges platforms to provide such a copy. Next, the participant can choose to share (part of) this data copy with the researcher. This way, the researcher can obtain the digital trace data of interest with active consent of the participant. Setting up a data donation study involves several steps and considerations. If executed poorly, these steps might threaten a study's quality. In this paper, we introduce a workflow for setting up a robust data donation study. This workflow is based on error sources identified in the Total Error Framework for data donation by Boeschoten et al. (2022a) as well as on experiences in earlier data donation studies by the authors. The workflow is discussed in detail and linked to challenges and considerations for each step. We aim to provide a starting point with guidelines for researchers seeking to set up and conduct a data donation study.

 $\textbf{Keywords} \ \ Data \ donation \cdot Digital \ trace \ data \cdot Data \ quality \cdot Local \ processing \cdot Privacy \\ preservation$ 

#### DIGITALE DATENSPUREN NUTZBAR MACHEN

Datenspenden als Methode der Kommunikationswissenschaft



ON THIS PAGE

Infos zum Workshop Materialien

Weiterführende Tutorials

Weiterführende Literatur

Quelle: Foto von Sara Kurfeß auf Unsplash

#### INFOS ZUM WORKSHOP

- Methodenworkshop als Teil der Jahrestagung der Fachgruppen
   Wissenschaftskommunikation und Journalistik/Journalismusforschung der DGPuK 2023.
   s. Call for Participants
- 20. September 2023, 11:00 13:30 Uhr
- Workshop-Leitung: Valerie Hase (Ludwig-Maximilians-Universität München). Mehr Infos: github.com/valeriehase & valerie-hase.com



Carriére et al., 2024

Hase, 2023

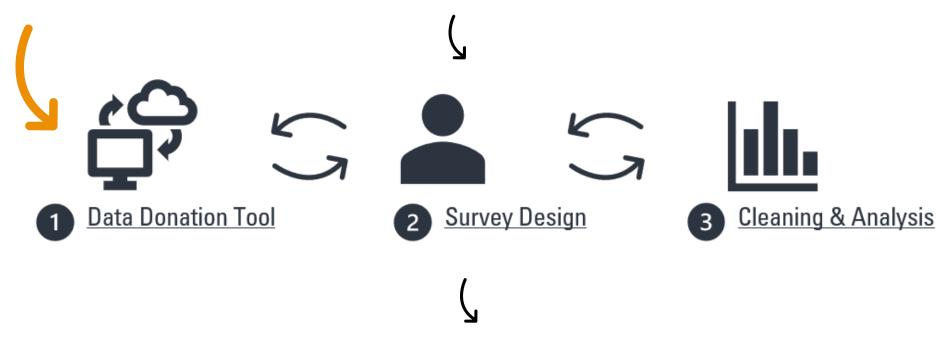
#### DATA DONATIONS: RESEARCHER PERSPECTIVE

Data donation studies often involve (Carrière et al., 2024)...

- Social scientists (e.g., figuring out substantive RQs)
- Methodologists (e.g., text-as-data, survey design)
- Research engineers/IT experts (e.g., setting up server)
- Data protection/legal experts (e.g., IRB approval)

#### DATA DONATIONS: RESEARCHER PERSPECTIVE

Deciding on a RQ that can be answered with a data donation study



Sharing methods & data (see further Munzert et al., 2023)



## **DECISIONS:** DATA DONATION TOOL



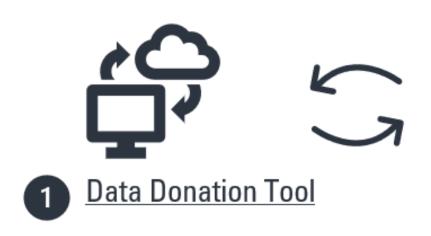
- Which Data Donation Tool should we use?
- II. Which files/metrics do we want to extract?
- III. How is data preprocessed?

#### I. WHICH DATA DONATION TOOL SHOULD WE USE?

Most Data Donation Tools rely on privacy-by-design ...

- 1. Local extraction of files
- 2. Local anonymization (and further processing)
- 3. Data minimization/interaction by participants
- 4. Informed consent (again)
- 5. Data send to researcher database

### I. WHICH DATA DONATION TOOL SHOULD WE USE?



#### Many open source tools, for example...

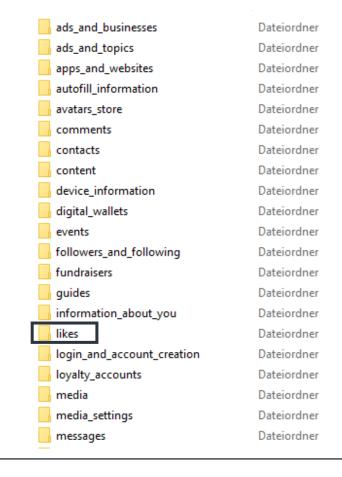
- OSD2F, now PORT/Next (Boeschoten et al., 2022, 2023)
- Data Donation Module (Pfiffner et al., 2024)
- Social Media Donator (*TikTok*) (Zanettou et al., 2022)
- WhatsR (*WhatsApp*) (Kohne, 2024)
- PrimaDona (*Facebook, WhatsApp*) (Hakobyan et al., 2024)

#### II. WHICH FILES/METRICS DO WE WANT TO EXTRACT?

Local extraction of files (often .zip folders with .html/.json files)

**Important**: Handling exceptions!

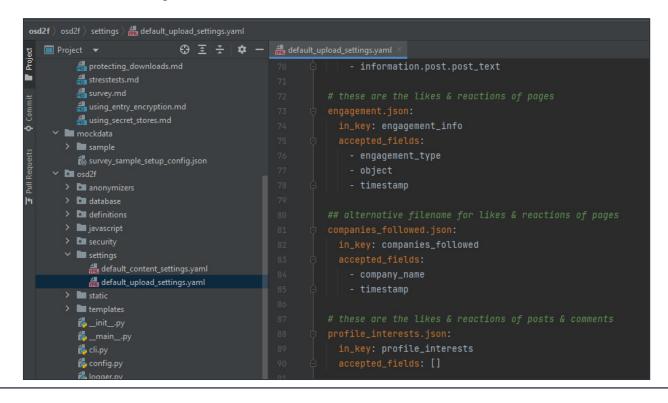




#### II. WHICH FILES/METRICS DO WE WANT TO EXTRACT?

#### Local extraction of files (often .zip folders

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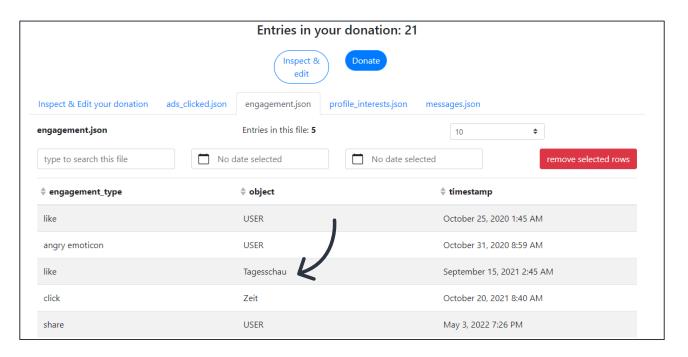


## III. HOW IS DATA PREPROCESSED?

- 1. Anonymization (Boeschoten et al., 2021)
  - Whitelists
  - Build-in classifiers
- 2. Aggregation
- 3. Data extension (Wedel et al., 2024)
  - APIs (problematic!)
  - Scraping
  - Annotations by participants

# III. HOW IS DATA PREPROCESSED?

Local preprocessing (e.g., anonymization)



# III. HOW IS DATA PREPROCESSED?

#### Local preprocessing (e.g., anonymization)

```
File Edit View Navigate Code Refactor Run Tools Git Window Help osd2f - instagram.py - Administrator
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          🟭 protecting_downloads.md
          using_entry_encryption.md
          using secret stores.md

✓ Image osd2f

             init_.py
             facebook.py
            🚜 instagram.py
             ample_platform.py
             twitter.py
             💤 youtube.py
```

# DATA DONATIONS: RESEARCHER PERSPECTIVE





# DECISIONS: SURVEY DESIGN



IV. How is the data donation task integrated in the survey?

V. How are participants recruited?

#### IV. HOW IS THE DATA DONATION TASK INTEGRATED?



#### Fewer tools, for example...

- PORT/Next (Boeschoten et al., 2022, 2023)
- OSD2F for SoSci Survey (Haim et al., 2023)
- Also: instructions for participants!

# V. HOW ARE PARTICIPANTS RECRUITED?



- To date, often non-probability samples (see later: bias)
- High participant burden: incentivation, reminders, etc.?

# DATA DONATIONS: RESEARCHER PERSPECTIVE





# DECISIONS: CLEANING & ANALYSIS



VI. How are data points classified?

VII. How are data points

aggregated/modelled?

# VI. HOW ARE DATA POINTS CLASSIFIED?



Debate about how to classify digital traces (Clemm van Hohenberg et al., 2024)...

- e.g., classification via accounts vs. URLs vs. content (Adam et al., 2024; Bosch, 2023; Reiss, 2023; van Hoof et al., 2024)
- e.g., classification of "exposure"/engagement
   (Clemm van Hohenberg et al., 2024; Mangold et al., 2022)
- e.g., handling missing data (Dahlke et al., 2023; Knöpfle & Schatto-Eckrodt, 2024)

#### VII. HOW ARE DATA POINTS AGGREGATED/MODELLED?



Debate about how to model digital traces (Clemm van

Hohenberg et al., 2024) . . .

- e.g., nestedness within individuals, over time, across platforms, etc.
- e.g., skewness of "interesting" behaviour

#### USING DATA DONATIONS TO COLLECT DIGITAL TRACES

1 What are data donation studies? User-centric approach: Participants download & donate their data to research.

What are important steps of data donation studies?

Participants: Requesting, downloading & uploading data;

Researchers: DDT, survey design, cleaning, analysis – many degrees of freedom!

**3** What are promises & pitfalls of such studies?

4

# DATA DONATIONS: PROMISES & PITFALLS



# DATA DONATIONS: PROMISES

- Less reactive, longitudinal, and highly granular data
- Partly new data (e.g., algorithmically inferred interests)
- Reliance on user consent & current provision in law (GDPR, DSA)
- ✓ Data Donation Tools largely open-source

# DATA DONATIONS: PROMISES & PITFALLS

- x free of errors related to representation
- X free of errors related to measurements
- to date: playground for methodologists?

# PITFALL 1: ERRORS OF REPRESENTATION

#### Errors in representation, for example due to ... (Boeschoten et al., 2022)

- Non-probability samples
- Low response rates, also compared to tracking (Silber et al., 2022), and potentially bias (Hase & Haim, 2024; Keusch et al., 2024; Ohme et al., 2021)
- Systematic drop-out for specific metrics/platforms
- Can "classic" survey design strategies mitigate bias? (Hase & Haim, 2024)
  - A-posteriori: incentives, timing of request, etc. (Keusch et al., 2024; Kmetty et al., 2024; Silber et al., 2022)
  - Post-hoc: weighting, etc. (Park et al., 2022)

# **EXAMPLE: ERRORS OF REPRESENTATION**

(Hase & Haim, 2024)



Errors of representation in surveys integrating the collection of digital traces

(Jürgens, 2020; Keusch et al., 2023; Struminskaya et al., 2021; Ohme et al., 2021)



How prevalent is nonresponse error in data donation studies? Can we address it?



2 survey experiments with integrated data donation

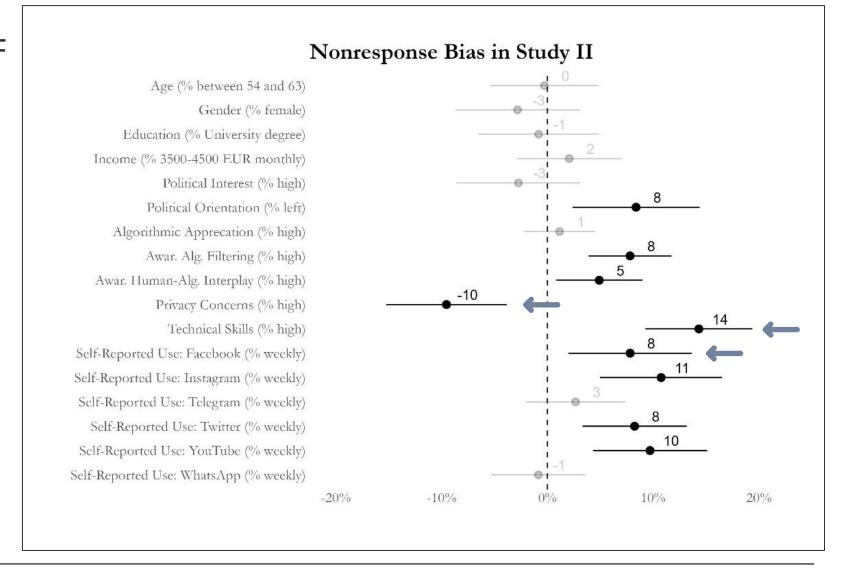
(see Haim et al., 2023 for tool)



Non-probability sample online panel (N= 2,309) & student sample (N= 345)

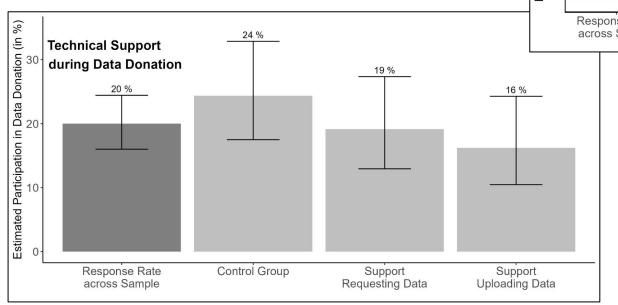
# EXAMPLE: ERRORS OF REPRESENTATION

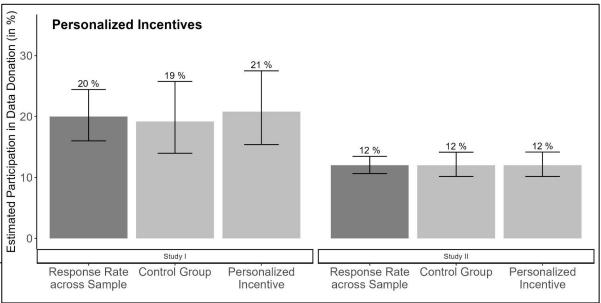
(Hase & Haim, 2024)



# EXAMPLE: ERRORS OF REPRESENTATION

(Hase & Haim, 2024)





### PITFALL 2: MEASUREMENT ERROR

#### Measurement error, for example due to... (Boeschoten et al., 2022)

- Mismatch between social science concepts/theories & DDPs measurements
- Missing data due to volatility in DDPs (Carriére er al., 2024) or platform non-compliance (Hase et al., 2024)
- Misclassification via NLP methods (TeBlunthuis et al., 2024)

#### EXAMPLE: MEASUREMENT ERROR

(Hase et al., 2024)

#### Challenges: burdensome data access

- Different interfaces
- Notification about data availability
- Period of data availability

#### Challenges: lack of transparency

- Completeness?
- Measurements?
- Changes?

#### EXAMPLE: MEASUREMENT ERROR

(Hase et al., 2024)



Maybe DSA, Art. 40?

Recommendation 1.

Platforms should provide a central link for data access

(based on legal requirement of concise and easily accessible form, GDPR Art. 12(1))

Recommendation 2.

Platforms should provide public data documentation

(based on legal requirement of transparency, GDPR Art. 5(1)(a) and Art. 12(1))

#### Improving the right of access

Recommendation 3.

Platforms should provide complete data

(based on legal requirement of completeness, GDPR Art. 15(1)-(3)

Recommendation 4.

Platforms should enable dataaccess-mandates

(similarly suggested related to data portability, GDPR Art. 20)

# PITFALL 3: METHODOLOGICAL PLAYGROUND?

To date, methodological rather than empirical use... (Hase & Schmidbauer, 2024)

- (Vignette) experiments on errors of representation
- Opinion pieces on measurement error
- Best practice guidelines

Empirical application to answer substantial social science questions?

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What are important steps of data donation studies?

Participants: Requesting, downloading & uploading data;

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3 — What are promises & pitfalls of such studies?

Granular & longitudinal data, but lack of standardization & control introduces errors related to samples & measurements. To date: Empirical use limited!

# THE ROAD AHEAD: WHAT IS NEXT FOR DATA DONATION STUDIES?

- More documentation & potentially better measurements due to DSA (for VLOPs)
- Increased use within probability samples / established panels
- Increased empirical application
- Continuing struggles with in-tool classification & audio-visual data

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