What do people do online? Using data donation to understand digital behavior.

a workshop at the SPP Junior Researcher Meeting

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Our Agenda

- What is digital trace data?
- What is data donation? The participant's perspective.
- What is data donation? The researcher's perspective.

Who are you?

Please raise your hand 🖐 if you ...

- are familiar with the term digital trace data
- have worked with APIs
- have worked with data donation
- have worked with automated content analysis
- regularly use programming languages (e.g., R, Python)

About me: Frieder Rodewald

PhD, University of Mannheim & Institute for Employment Research

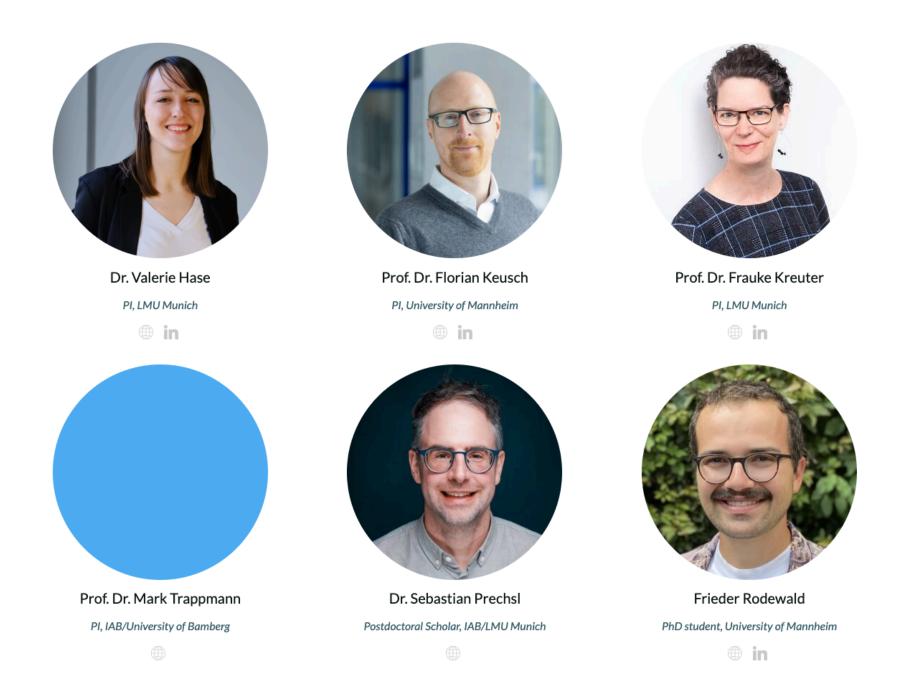
Research interests: "I study what people do online."

More info: github.com/frodew & frieder-rodewald.de

About me: Sebastian Prechsl

- Postdoc at Institute for Employment Research & LMU
- Research interests: Social inequalities (in the labor market), potentials of digital trace data for labor market research

part of the SPP project Integrating Data Donations in Survey Infrastructure



Our Team

A huge thanks to <u>Valerie Hase</u>, for contributing to the conceptualizion of a previous data donation workshop at CompText in Vienna.

What is the goal of this workshop?

- ullet Understanding digital data traces as a *type* of data
- ullet Understanding data donation as a *method* of data access
- Working through key steps of data donation methods (participant & researcher view)
- ? Discussing when (not) to use data donation studies
- X Detailed implementation (e.g., server set-up, coding data extraction scripts)

What is digital trace data?

Which examples for digital trace data you know?

What is digital trace data?

Definition: The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena.

This might include:

- Tweets, likes, shares on social media
- Geo data (locations, movements)
- Digital payments
- Spotify playlists

Where can we find/collect digital trace data?

- Apps (e.g., running apps)
- Social media platforms (e.g., Instagram)
- Payment systems (e.g., Paypal)
- Wearable devices (e.g., smart watch)

Which (latent) constructs can we measure?

- Internet use (Parry et al. 2021) related to ...
 - Well-being (Ohme et al. 2024) Or Voting (Bach et al. 2021)
- News engagement (Reiss 2023) related to ...
 - News diversity (Jürgens and Stark 2022) or public opinion formation (Yan, Schroeder, and Stier 2022)
- Movements related to ...
 - Mobility during pandemics (Li et al. 2021) or social networks

(Sepulvado et al. 2022)

Why are digital traces becoming more popular?

- Problems with self-reported data (e.g., via survey)
 - Self-reported data subject to specific bias (<u>Scharkow 2016</u>; <u>Parry et al.</u>
 - Response rates in surveys are declining (Luiten, Hox, and de Leeuw 2020)
- Availabillity
 - Cheap (e.g., via APIs)
 - Large data sets ("big data")

Be careful: These "advantages" are often claimed, but **not** empirically proven.

Digital traces are neither necessarily less biased, cheaper, or larger.

(Dis-)advantages of digital trace data

- More fine-grained, often longitudinal measures due to timestamps
- Variables (e.g., algorithmic inference)
- X Bias due to errors in representation and measurement
- X Implementation can be expensive and cumbersome
- X More data does not mean better data!

How can we collect digital traces?

Platform- and user-centric methods

- Platform-centric (based on platform cooperation)
 - API (Jünger 2021)
 - Cooperation with platforms (Wagner 2023)
- **User-centric** (based on user cooperation and informed consent) or "follow the user" approaches (Caliandro 2024)
 - Data donation (Carrière et al. 2025)
 - Linkage (Sloan et al. 2020)
 - Sensors (Struminskaya et al. 2021)
 - Tracking (Christner et al. 2022)

Questions?

What is data donation?

The participant's perspective.

Changes in legal contexts 4

- EU secures right to own data in Art. 15 of the General Data Protection Regulation
 - "The data subject shall have [...] access to the personal data" (§ Art. 15, 1)
 - "The controller shall provide a copy of the personal data" (§ Art. 15, 3)
- According to § Art. 20, users must receive their data "in a structured, commonly used and machine-readable format" (§ Art. 20, 1)
- **Solution:** Platforms offer data download packages (DDPs), which users can request and download to inspect data.
- **Consequence**: Researchers uses DDPs as part of user-centric data donation studies.

Please raise your hand

(Before a week ago...) Who has ever tried to request their data from an online platform?

What are data donation studies?

- **Definition:** Data donation studies are a user-centric method for collecting digital traces.
- Users have the right to request, access, and download data that platforms collect about them.
- They can make their *data download packages (DDPs)* available to science, often in the context of web surveys.
- Researchers use CSS methods to filter, anonymize, and aggregate this data locally on participants' devices.
- Participants can inspect/delete their data before any data is transferred.

Which types of data do DDPs contain?

For platforms like YouTube, Instagram, or LinkedIn, for example...

(Hase et al. 2024)

- User profiles (e.g., privacy settings)
- Activities (e.g., friends, likes, searches, exposure, analog movements)
- Content and context (e.g., ads watched, algorithmically inferred interests)

How is data from DDPs different?

Compared to APIs (Ohme et al. 2024)...

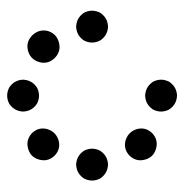
- Control & informed consent of users
- Longitudinal data without "rate limits"
- Partly additional measurements (e.g., exposure data; nonpublic data)
- but can be burdensome for participants!



Survey



Request & Download Data



Extract Data



Inspect Data



Consent

Survey



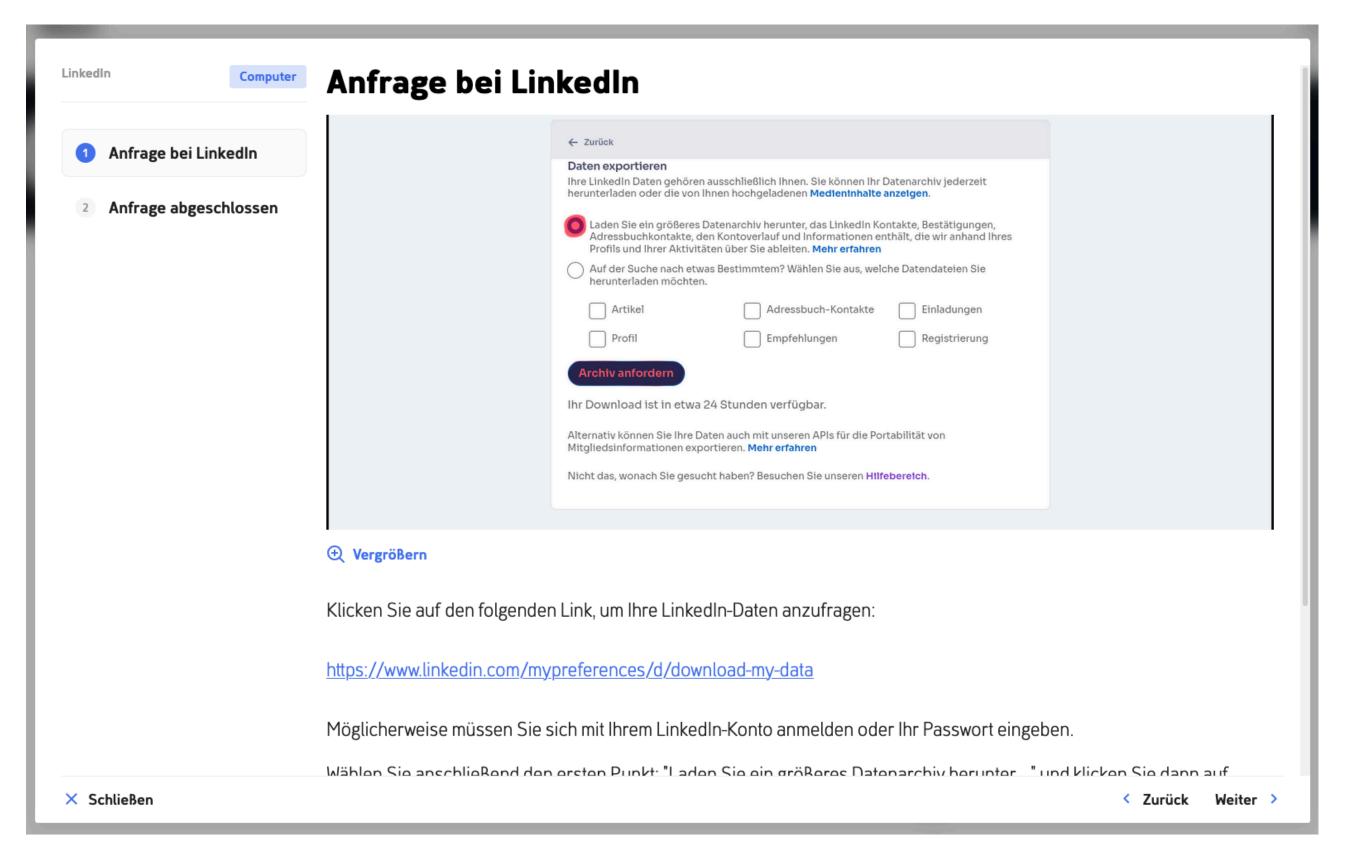
männlich	0			
weiblich	0			
Anderes und zwar:	<u> </u>			
Wie alt sind Sie?				
Welche Sprache haben Sie auf dem Gerä	it (z.B. Smartphone oder Comp	iter), das Sie gerade nutze	en eingestellt?	
Welche Sprache haben Sie auf dem Gerä		ıter), das Sie gerade nutze	en, eingestellt?	
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Survey start page

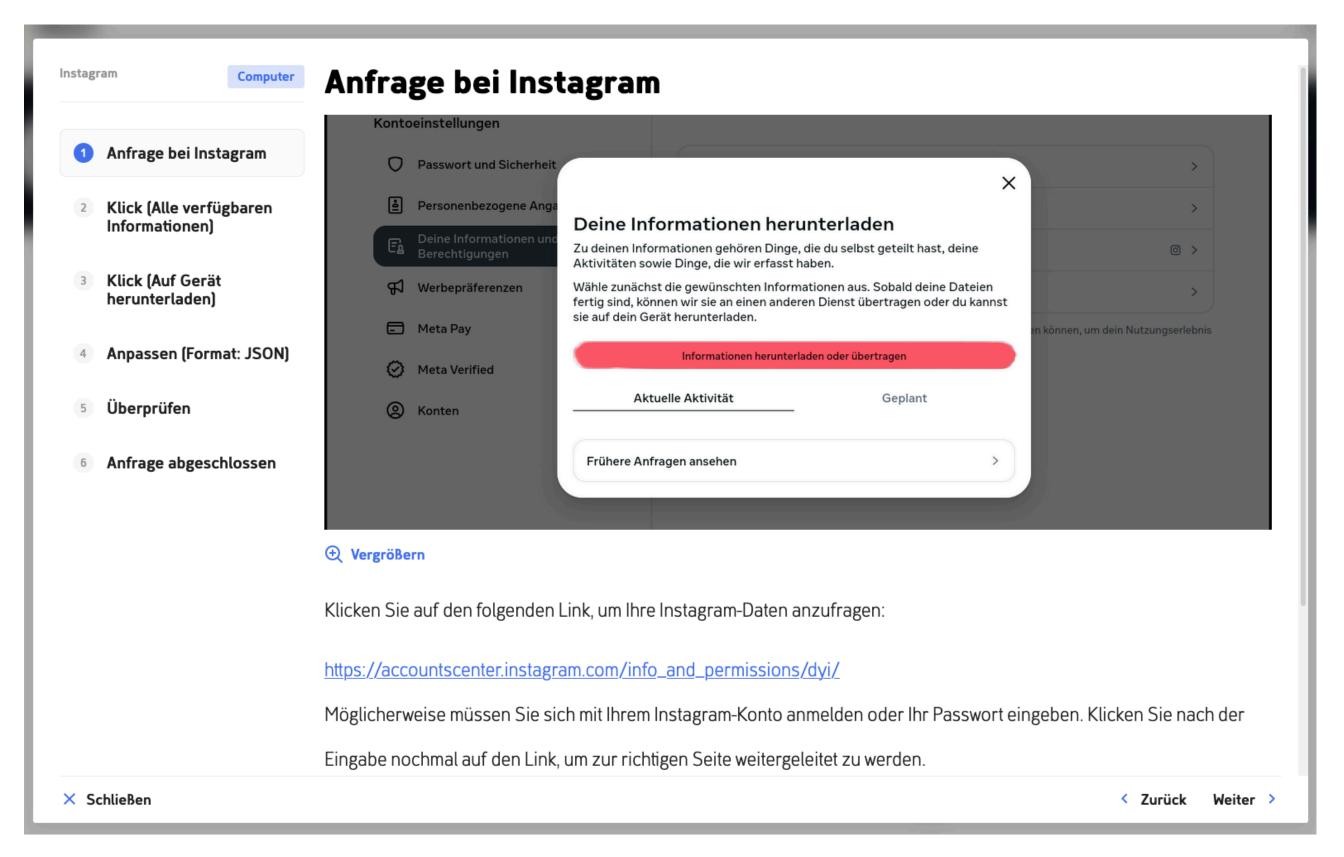
Request & Download Data

Different degrees in standardization for data requests (Hase et al. 2024)...

- Verification procedure (password requirements)
- Specification of data (metrics, observation period)
- Notification on provision of DDP
- Duration of DDP availability



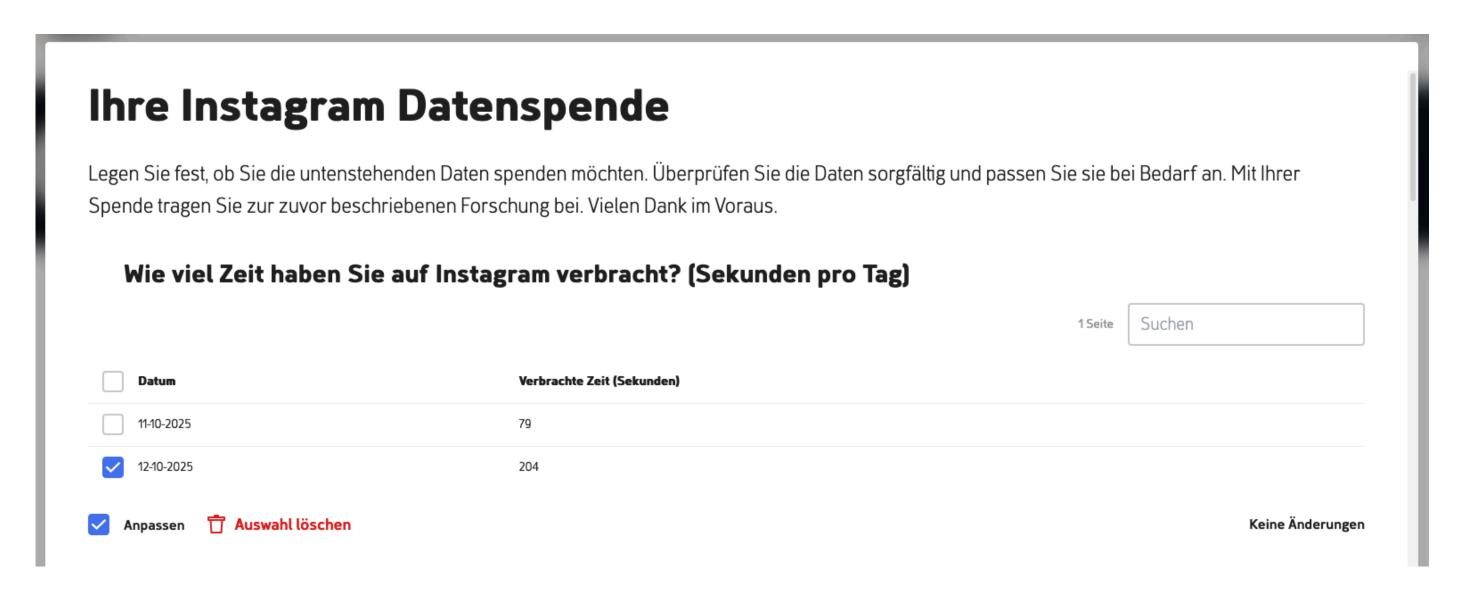
Request manual for LinkedIn on computer



Request manual for Instagram on computer

:: Extract Data

Q Inspect Data



Data overview on data donation platform

Data donation

Task: Try it yourself.

You might have already requested and downloaded your data in preparation for today.

Did you encounter any difficulties in sharing your data?

Questions?

What is data donation?

The researcher's perspective.

What are methodological decisions researchers have to take in data donation studies?



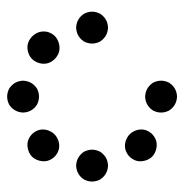
- Which theoretical questions do I want to answer?
- How do I operationalize key variables via my data donation tool?
- How do I integrate the tool in surveys & recruit participants?



Survey



Request & Download Data



Extract Data



Inspect Data



Consent

Decisions we took

Frame and Motivate:

Testing strategies to increase participation in data donation studies.

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Preprint Version

Version: 09. October 2025

- **Goal**: Feasability to implement data donation in a labor market panel, develop best-use practices, and understand non-response bias
- **Issues**: Data availability, low response rates and bias (e.g., (Keusch et al. 2024))
 - Behavioral intentions as "willingness to donate"
 high (79-52% of survey respondents)
 - Actual behavior as "participation in data donation" low (37-12% of survey respondents)
 - Well known intention-behavior gap; where seems to help (Kmetty et al. 2025)
- Sample: A non-probability panel (online access panel)

B Survey

- Survey concerning...
 - online platform usage (YouTube, Instagram, and LinkedIn),
 - labor market characteristics,
 - and common indicators for non-participation.

Data request & download

: Data extraction

X Strategy to make the extraction work

- 1. Take a look at the DDP; download it, best for multiple time periods and for different languages
- 2. Understand the structure of the JSON or CSV.
- 3. Get an example file running.
- 4. Write the code for the extraction script.
- 5. Test your script, first locally and then in the wild.
- 6. Adapt your script.

Task: Try it yourself.

Take a look at your downloaded data. What do you see; anything caught your eye?

Feel free to work in groups of 2-3 people for 5 minutes.

Different degrees in standardization for DDP content (Hase et al. 2024)...

- Documentation
 - DDP structure?
 - Measurements?
- Completeness & scope
 - Missing data?
 - Limited time frames?
 - Language sensitive?



Key issues (Hase et al. 2024)

- Missing documentation by platforms (e.g., file structure)
- Sudden changes in DDPs
- Differences across languages & devices
- Insufficient in-tool classification (e.g., LLM integration)

Example: Extract list of subscriptions

4	А	В	С	D
1	Channel Id	Channel Url	Channel Title	
2	UC0vBXGSyV14uvJ4hECDOl0Q	http://www.youtube.com/channel/UC0vBXGSyV14uvJ4hECDOl0Q	Techquickie	
3	UC1H1NWNTG2Xi3pt85ykVSHA	http://www.youtube.com/channel/UC1H1NWNTG2Xi3pt85ykVSHA	Jordan Harrod	
4	UC4NNPgQ9sOkBjw6GlkgCylg	http://www.youtube.com/channel/UC4NNPgQ9sOkBjw6GlkgCylg	Ben Vallack	
5	UC6-ymYjG0SU0jUWnWh9ZzEQ	http://www.youtube.com/channel/UC6-ymYjG0SU0jUWnWh9ZzEQ	Wisecrack	
6	UC6DUUo63tKyr1_BHN26OiJw	http://www.youtube.com/channel/UC6DUUo63tKyr1_BHN26OiJw	Wahre Verbrechen. Wahre Stories	
7	UCAD-xOOaUI6N7Uq9laOVbcw	http://www.youtube.com/channel/UCAD-xOOaUI6N7Uq9laOVbcw	Code Therapy w/ René Rebe	
8	UCAXCI-ASTfZqfv9-YklfPlA	http://www.youtube.com/channel/UCAXCI-ASTfZqfv9-YkIfPIA	PacKMeN	
9	UCApPPpJ4d3ueW38lArwiWoA	http://www.youtube.com/channel/UCApPPpJ4d3ueW38lArwiWoA	Kenny Beats	
10	UCBa659QWEk1AI4TgmrJ2A	http://www.youtube.com/channel/UCBa659QWEk1AI4TgmrJ2A	Tom Scott	
11	UCDhu1klCDnf2glev0YbYkDA	http://www.youtube.com/channel/UCDhu1klCDnf2glev0YbYkDA	BeHaind	
12	UCFZms3ivokCP_HO8o5JzxEw	http://www.youtube.com/channel/UCFZms3ivokCP_HO8o5JzxEw	moTricksTV	
13	UCGII8SK7YD2B0Gd43DZk4NQ	http://www.youtube.com/channel/UCGII8SK7YD2B0Gd43DZk4NQ	mattes	
14	UCHnyfMqiRRG1u-2MsSQLbXA	http://www.youtube.com/channel/UCHnyfMqiRRG1u-2MsSQLbXA	Veritasium	
15	UCJXa3_WNNmlpewOtCHf3B0g	http://www.youtube.com/channel/UCJXa3_WNNmlpewOtCHf3B0g	LaurieWired	
16	UCJkMlOu7faDgqh4PfzbpLdg	http://www.youtube.com/channel/UCJkMlOu7faDgqh4PfzbpLdg	Nerdwriter1	
17	UCMELMEuQqmxTqM4_ArhHPjQ	http://www.youtube.com/channel/UCMELMEuQqmxTqM4_ArhHPjQ	High5	
18	UCMI9UhY1ehLGfOP5KNIKIaQ	http://www.youtube.com/channel/UCMI9UhY1ehLGfOP5KNIKIaQ	Doktor Allwissend	
19	UCMu5gPmKp5av0QCAajKTMhw	http://www.youtube.com/channel/UCMu5gPmKp5av0QCAajKTMhw	ERB	
20	UCN29LJGZ8FY30ysxdTnDsaw	http://www.youtube.com/channel/UCN29LJGZ8FY30ysxdTnDsaw	Filmanalyse	
21	UCNTwGcSEDHIbGhk7l5xFGwA	http://www.youtube.com/channel/UCNTwGcSEDHIbGhk7l5xFGwA	tinseltown	
22	UCOpcACMWblDls9Z6GERVi1A	http://www.youtube.com/channel/UCOpcACMWblDls9Z6GERVi1A	Screen Junkies	
23	UCU98JVxJf-VQXbPQPNbkbQQ	http://www.youtube.com/channel/UCU98JVxJf-VQXbPQPNbkbQQ	Meditations for the anxious mind	
24	UCUyeluBRhGPCW4rPe_UvBZQ	http://www.youtube.com/channel/UCUyeluBRhGPCW4rPe_UvBZQ	ThePrimeTime	

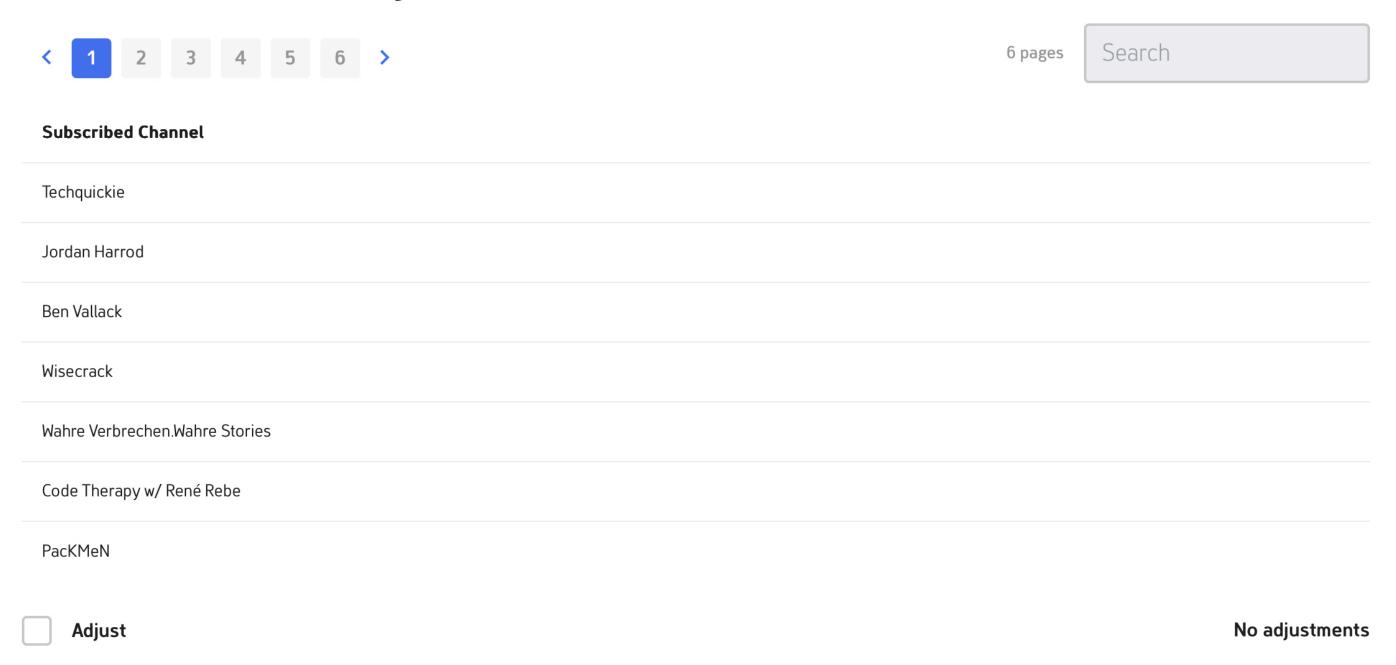
subscriptions.csv (before processing)

```
"subscriptions": {
    "extraction_function": ef.extract_subscriptions,
    "possible_filenames": ["Abos.csv", "subscriptions.csv"],
    "title": {
        "en": "Which channels are you subscribed to?",
        "de": "Welche Kanäle haben Sie abonniert?",
        "nl": "Op welke kanalen ben je geabonneerd?",
    },
    }
}
```

```
def extract_youtube_content_from_zip_folder(zip_file_path, possible_filenames):
    """Extract content from YouTube data export zip file using filenames"""
    try:
        with zipfile.ZipFile(zip_file_path, "r") as zip_ref:
            # Get the list of file names in the zip file
            filenames = zip_ref.namelist()
            # Look for matching files
            for possible_filename in possible_filenames:
                for filename in filenames:
                    if possible_filename in filename:
                        try:
                            # Process based on file extension
                            if filename.endswith(".json"):
                                with zip_ref.open(filename) as json_file:
                                    json_content = json.loads(json_file.read())
                                    return json_content
                            elif file_name.endswith(".csv"):
                                with zip_ref.open(file_name) as csv_file:
                                    csv_content = pd.read_csv(csv_file)
```

```
1  def extract_subscriptions(subscriptions_csv):
2     """Extract YouTube channel subscriptions"""
3     # Define column name
5     if "Kanaltitel" in subscriptions_csv.columns:
6         channel_column = "Kanaltitel"
7     else:
8          channel_column = "Channel Title"
9     # Define description
11         channel_name = "Subscribed Channel"
12     # Create DataFrame with just the channel names
14     subscriptions_df = pd.DataFrame({channel_name: subscriptions_csv[channel_column]})
15     return subscriptions_df
```

Which channels are you subscribed to?



subscriptions.csv (after processing)

Q Data inspection

Data donation

- A data donation platform helps to guide them through the process
- The process should be made as easy as possible for participants



Workshop Takeaways

- There are many ways in which researchers can learn about people's online behavior through digital trace data
- People can request, download and finally donate their (anonymized) data form most online platforms
- Data donation can be burdensome for participants
- Data quailty heavily depends on the platform and what kind of data you extract from participants

Thank you for participating; happy to talk with you about data donation (and anything else) throughout the next days.

EXTRA: Can I extend the data?

- Manual annotation by participants during data donation
- APIs/scraping to extend collected data
- Text-as-data methods for classification

EXTRA: Errors in representation

For example ...

- Coverage error: Who is (not) represented in the sampling frame? (e.g., social media users vs. YouTube users)
- **Sampling error**: Who is (not) represented in the sample? (e.g., non-probability samples)
- **Non-response error**: Who does (not) want to participate in the data donation?
- Compliance error: Who is (not) able to participate in the data donation?

What do you think: Which participant characteristics may correlate with non-response or non-compliance?

EXTRA: What's next for data donation studies?

Advancing the method

- Multimodal & cross-platform data (Wedel, Ohme, and Araujo 2024)
- In-tool, local classification (e.g., local ML/LLMs?)
- Workflow/UX-perspective

Data as a political tool

- Platforms do (willingly?) not provide data according to the GDPR/DSA (Hase et al. 2024)
- The EU has started to sanction platforms like X/TikTok
- DSA may become the subject of larger geo-political debates with the USA (Seiling, Ohme, and De Vreese 2025)



Can we improve & apply the method?

- Can the method actually be applied for empirical research? (few examples, like (Thorson et al. 2021; Wojcieszak et al. 2024))
- Requires interdisciplinary perspectives (e.g., addressing bias, integration in probability-based panels)

Questions?

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