

# Collecting Digital Trace Data via Data Donation

---

**Florian Keusch**

University of Mannheim

[f.keusch@uni-mannheim.de](mailto:f.keusch@uni-mannheim.de)

[floriankeusch.weebly.com](http://floriankeusch.weebly.com)

Future Directions for Social and  
Behavioral Science Methodologies in  
the Next Decade: A Workshop  
September 25–26, 2024  
Washington, DC

# What Are Digital Traces?

---

*"Records of activity (trace data) undertaken through an online information system (thus, digital)"*

(Howison et al. 2011:769)

*"Behavioral residue [individuals leave] when they interact online"*

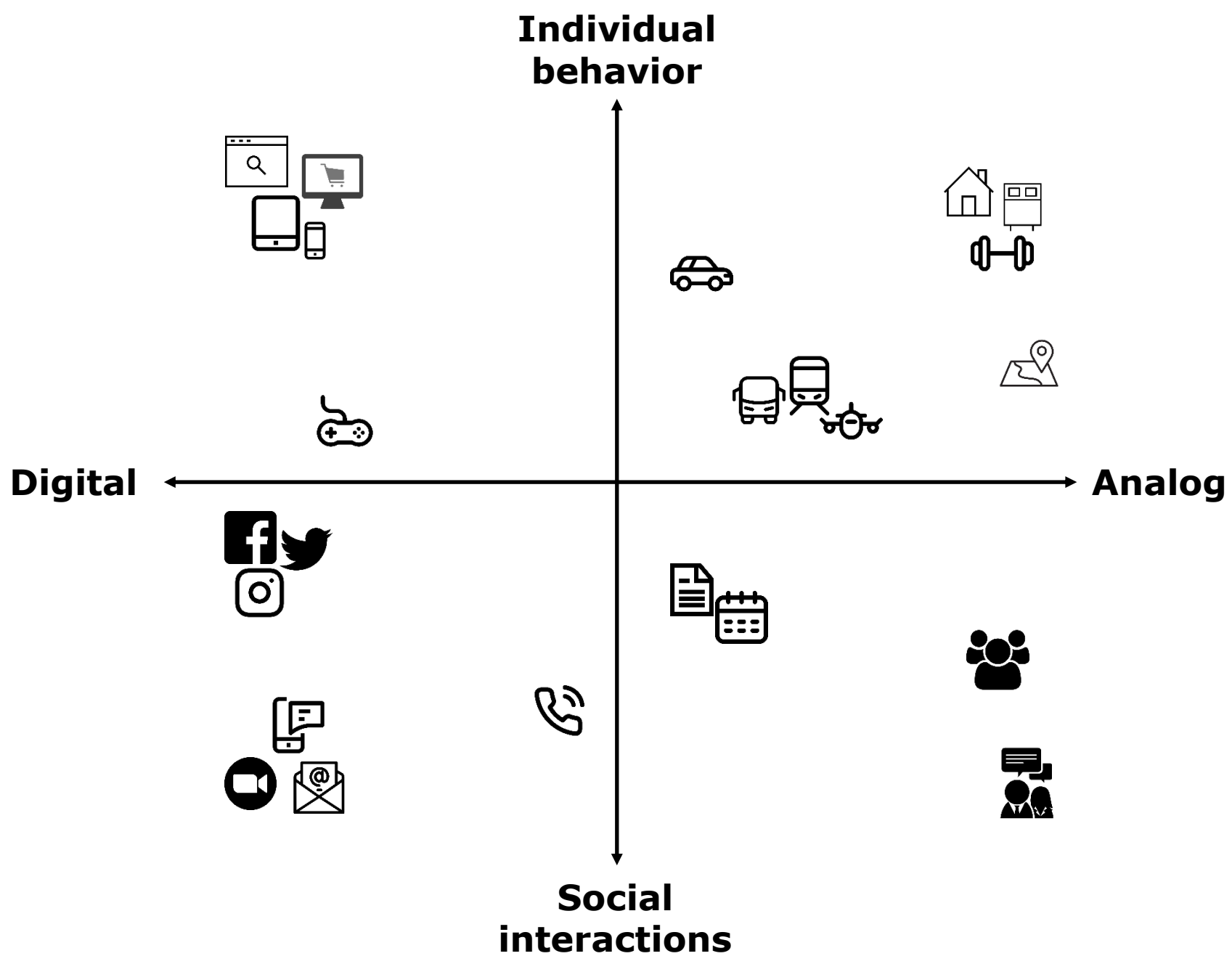
(Hinds & Joinson 2018:2)

**Individual  
behavior**



**Social  
interactions**

**Digital**



# Benefits of Digital Trace Data

---

- Allow measurement of behavior (in-the-moment) at high frequency
  - Evaluation of moment-to-moment changes
  - Without increasing burden on participants
  - Scalable

# Benefits of Digital Trace Data

---

- Allow measurement of behavior (in-the-moment) at high frequency
  - Evaluation of moment-to-moment changes
  - Without increasing burden on participants
  - Scalable
- Measurement is nonreactive, i.e., without direct solicitation of subject studied
  - Digital trace data should be unaffected by measurement itself
  - Reduced measurement error when measuring...
    - **smartphone use** (Kobayashi & Boase 2012; Boase & Ling 2013; Andrews, et al. 2015; De Reuver & Bouwman 2015; Revilla et al. 2017; Jones-Jang et al. 2020)
    - **online media consumption** (Araujo et al. 2017; Haenschen 2020; Revilla et al. 2017; Scharnow 2016)
    - **mobility** (Stopher et al. 2007; Scherpenzeel 2017)

# How to Collect Individual-Level Digital Traces

---

- Use APIs

# How to Collect Individual-Level Digital Traces

---

- Use APIs

[Meta](#)

An Update on Our Plans to Restrict Data Access on Facebook

April 4, 2018



Chesnot / Getty Images



# How to Collect Individual-Level Digital Traces

- Use APIs

Meta

## An Update on Our Plans to Restrict Data Access on Facebook

April 4, 2018



Chesnot / Getty Images

SCIENCE / TWITTER / TECH

## Twitter just closed the book on academic research / Twitter was once an indispensable resource for academic research. That's changed under Elon Musk.

By [Justine Calma](#), a science reporter covering the environment, climate, and energy with a decade of experience. She is also the host of the Hell or High Water podcast.

May 31, 2023, 3:19 PM GMT+2 | [23 Comments](#) / [23 New](#)



<https://www.theatlantic.com/technology/archive/2023/02/elon-musk-twitter-ethics-algorithm-biases/673110/>

# How to Collect Individual-Level Digital Traces

- Use APIs

Meta

## An Update on Our Plans to Restrict Data Access on Facebook

April 4, 2018



Chesnot / Getty Images

SCIENCE / TWITTER / TECH

## Twitter just closed the book on academic research / Twitter was once an indispensable resource for academic research. That's changed under Elon Musk.

By [Justine Calma](#), a science reporter covering the environment, climate, and energy with a decade of experience. She is also the host of the Hell or High Water podcast.

May 31, 2023, 3:19 PM GMT+2 | [23 Comments](#) / [23 New](#)



<https://www.theatlantic.com/technology/archive/2023/02/elon-musk-twitter-ethics-algorithm-biases/673110/>

FEATURE

## Reddit pricing: API charge explained

Providing a free API was becoming costly for Reddit. Enterprise-scale developers now have to pay for access to Reddit's data.

By [Ben Lutkevich](#), Technical Features Writer

Published: 11 Jul 2023



Shutterstock

# How to Collect Individual-Level Digital Traces

- Use APIs
- Collaborate with industry

**Like-minded sources on Facebook are prevalent but not polarizing**  
Brendan Nyhan, Jaime Settle, Emily Thorson, Mac...  
Hunt Allcott, Taylor Brown, Adriana Crespo-Tenorio, Sandra González-Bailón, Andrew M. Guess, Edward...  
Malhotra, Devra Moehler, Jennifer Pan, Daniel Robert...  
Arun Wilkins, ... Joshua A. Tucker + Show authors  
Nature (2023) | Cite this article  
Metrics

**Abstract**  
Many critics raise concerns about the prevalence of like-minded sources on Facebook during the 2020 US presidential election, but have not examined the potential role in increasing political polarization. We investigated the challenges of conducting large-scale field experiments to measure the scope of the problem. Here we present data from a randomized controlled trial of 23,377 adult Facebook users in the USA showing that the majority of what people see on the platform represent only a small fraction of these exposures. Concerns about the effects of echo chambers, we found, were not supported by our data. Facebook among 23,377 users for whom we reduced exposure to uncivil language, but had no measurable effect on attitudinal measures such as affective polarization, false claims, or belief in false claims. These preferences for exposure to content from like-minded sources were prevalent during the 2020 US presidential election, but did not lead to increased polarization in beliefs or attitudes.

**How do social media feed algorithms affect attitudes and behavior in an election campaign?**  
ANDREW M. GUESS · NEIL MALHOTRA · DEEN FREELON · I. I. AND JOSHUA A. TUCKER  
SCIENCE · 27 Jul 2023 · Vol 381, Issue 6656 · pp. 392-398

**Abstract**  
We investigated the effects of algorithmically-ordered feeds on political news exposure during the 2020 US election. We found that algorithmic feeds substantially reduced exposure to political news. In addition, the amount of political news seen decreased on Facebook among users who interacted with ideological content. Despite these substantial effects, the algorithmic feed did not affect political knowledge or polarization.

**Reshares on social media amplify political news but do not detectably affect beliefs or opinions**  
ANDREW M. GUESS · NEIL MALHOTRA · DEEN FREELON · I. I. AND JOSHUA A. TUCKER  
SCIENCE · 27 Jul 2023 · Vol 381, Issue 6656 · pp. 392-398

**Abstract**  
We studied the effects of reshares on political news exposure during the 2020 US election. We found that reshares amplified exposure to political news, but did not affect beliefs or opinions. This suggests that reshares may be an important mechanism for spreading political news, but do not necessarily lead to increased polarization.

**Asymmetric ideological segregation in exposure to political news on Facebook**  
SANDRA GONZÁLEZ-BAILÓN · DAVID LAZER · PABLO BARBERÁ · MEIQING ZHANG · HUNT ALLCOTT · TAYLOR BROWN · ADRIANA CRESPO-TENORIO · DEEN FREELON · MATTHEW GENTZKOW · I. I. AND JOSHUA A. TUCKER +17 authors | Authors Info & Affiliations  
SCIENCE · 27 Jul 2023 · Vol 381, Issue 6656 · pp. 392-398

**Abstract**  
Does Facebook enable ideological segregation in political news consumption? We analyzed exposure to news during the US 2020 election using aggregated data for 208 million US Facebook users. We compared the inventory of all political news that users could have seen in their feeds with the information that they saw (after algorithmic curation) and the information with which they engaged. We show that (i) ideological segregation is high and increases as we shift from potential exposure to actual exposure to engagement; (ii) there is an asymmetry between conservative and liberal audiences, with a substantial corner of the news ecosystem consumed exclusively by conservatives; and (iii) most misinformation, as identified by Meta's Third-Party Fact-Checking Program, exists within this homogeneously conservative corner, which has no equivalent on the liberal side. Sources favored by conservative audiences were more prevalent on Facebook's news ecosystem than those favored by liberals.

# How to Collect Individual-Level Digital Traces

- Use APIs
- Collaborate with industry

**Like-minded sources on Facebook are prevalent but not polarizing**  
Brendan Nyhan, Jaime Settle, Emily Thorson, Max Hunt, Allcott, Taylor Brown, Adriana Cresco-Tenorio, Sandra González-Bailón, Andrew M. Guess, Edward Malhotra, Devra Moehler, Jennifer Pan, Daniel Robert Arjun Wilkins, ... Joshua A. Tucker + Show authors  
Nature (2023) | Cite this article  
Metrics

**Abstract**  
Many critics raise concerns about the prevalence of like-minded sources on Facebook and the potential role in increasing political polarization. We investigated the challenges of conducting large-scale field experiments to measure the scope of the problem. Here we present data from a randomized controlled trial of 208 million adult Facebook users in the USA showing that the majority of what people see on the platform represent only a small fraction of these exposures. We also investigate concerns about the effects of echo chambers, with an intervention that increased their exposure to content from like-minded sources during the 2020 US presidential election. We found that exposure to uncivil language, but had no measurable effects on attitudinal measures such as affective polarization, political news evaluations and belief in false claims. These preferences were not affected by exposure to content from like-minded sources. We found that exposure to content from like-minded sources was more prevalent during the 2020 US presidential election than during the 2016 US presidential election, and that polarization in beliefs or attitudes.

**How do social media feed algorithms and behavior in an election campaign affect political polarization?**  
ANDREW M. GUESS, NEIL MALHOTRA, DEEN FREELON, I. I. AND J. ...  
SCIENCE • 27 Jul 2023 • Vol 381, Issue 6656

**Abstract**  
We investigated the effects of social media algorithms on the 2020 US election. We used a randomized controlled trial to compare algorithmically-ordered feeds with chronological feeds. We found that algorithmic feeds substantially reduced the amount of political content seen by users. In addition, the amount of content seen decreased on Facebook for users who interacted with ideological sources with ideological content. Despite these substantial effects, the algorithmic feed did not affect polarization, political news evaluations, or belief in false claims.

**Reshares on social media not detectably affect political polarization**  
ANDREW M. GUESS, NEIL MALHOTRA, DEEN FREELON, I. I. AND J. ...  
SCIENCE • 27 Jul 2023 • Vol 381, Issue 6656

**Abstract**  
We studied the effects of resharing content on the 2020 US election. We used a randomized controlled trial to compare content that did not contain reshared content with content that contained reshared content from untrusted sources. We found that clicks and reactions to reshared content were higher than for non-reshared content, although this was not true for all users. Contrary to our expectations, we found that polarization on Facebook was not affected by resharing content.

**Asymmetrical news consumption on Facebook**  
SANDRA GONZÁLEZ-BAILÓN, DEEN FREELON, MATTHEW ...  
SCIENCE • 27 Jul 2023 • Vol 381, Issue 6656

**Abstract**  
Does Facebook's news ecosystem exhibit asymmetrical news consumption? We analyzed exposures to 208 million US users' news feeds with the information that they saw (after algorithmic curation) and the information with which they engaged. We show that (i) ideological segregation is high and increases as we shift from potential exposure to actual exposure to engagement; (ii) there is an asymmetry between conservative and liberal audiences, with a substantial corner of the news ecosystem consumed exclusively by conservatives; and (iii) most misinformation, as identified by Meta's Third-Party Fact-Checking Program, exists within this homogeneously conservative corner, which has no equivalent on the liberal side. Sources favored by conservative audiences were more prevalent on Facebook's news ecosystem than those favored by liberals.

**POLICY FORUM | POLICY FORUM**

## Independence by permission

Industry–academy collaboration explores the 2020 US election

[MICHAEL W. WAGNER](#) [Authors Info & Affiliations](#)

**SCIENCE** • 27 Jul 2023 • Vol 381, Issue 6656 • pp. 388-391 • DOI: 10.1126/science.adi2430

# How to Collect Individual-Level Digital Traces

---

- Use APIs
- Collaborate with industry
- Have users install meters and apps that continuously...
  - ...track information on web browsing (URLs, HTML code, screen scraping)
  - ...logs usage behavior, (native) mobile browsing, and sensor readings

# How to Collect Individual-Level Digital Traces

---

- Use APIs
- Collaborate with industry
- Have users install meters and apps that continuously...
  - ...track information on web browsing (URLs, HTML code, screen scraping)
  - ...logs usage behavior, (native) mobile browsing, and sensor readings

## Advantages

- + Access to fine-grained, prospective data
- + Relatively easy to combine with self-reports (Keusch & Conrad 2023)
  - e.g., EMAs



# How to Collect Individual-Level Digital Traces

---

- Use APIs
- Collaborate with industry
- Have users install meters and apps that continuously...
  - ...track information on web browsing (URLs, HTML code, screen scraping)
  - ...logs usage behavior, (native) mobile browsing, and sensor readings

## Advantages

- + Access to fine-grained, prospective data
- + Relatively easy to combine with self-reports (Keusch & Conrad 2023)
  - e.g., EMAs

## Challenges

- Coverage & nonparticipation (Bosch et al. 2024; Keusch et al. 2022, 2023)
- Ethics & privacy concerns (Keusch et al. 2019; Revilla et al. 2019; Struminskaya et al. 2020, 2021; Wenz et al. 2019; Wenz & Keusch 2023)
- Missing data (Bähr et al. 2022)
- Analytical challenges

# How to Collect Individual-Level Digital Traces

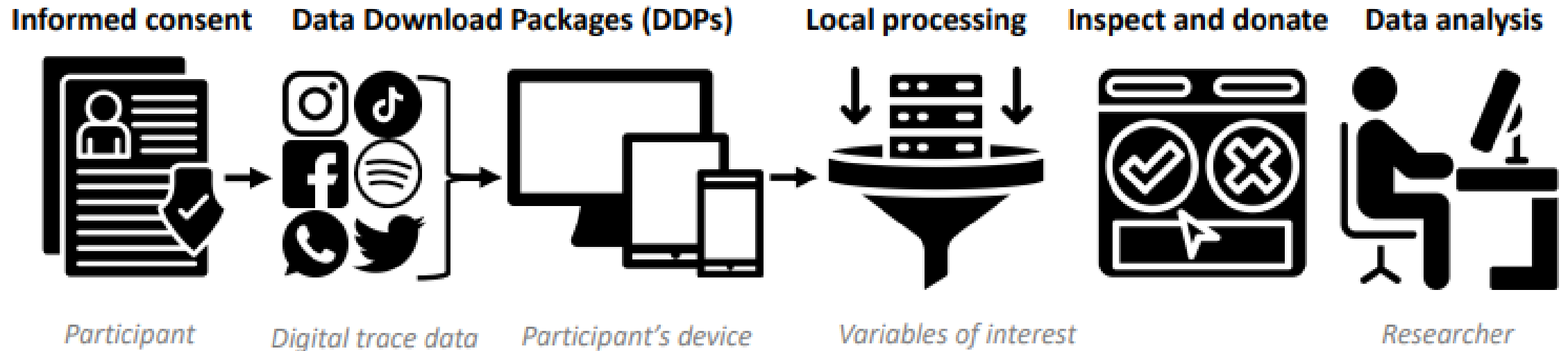
---

- Use APIs
- Collaborate with industry
- Have users install meters and apps
- Ask users to “donate” data
  - Takes advantage of legislation such as GDPR Articles 15 (*Right of access by the data subject*) and 20 (*Right to data portability*)
    - See also California Consumer Privacy Act (CCPA)



# Privacy-preserving Data Donation Platforms

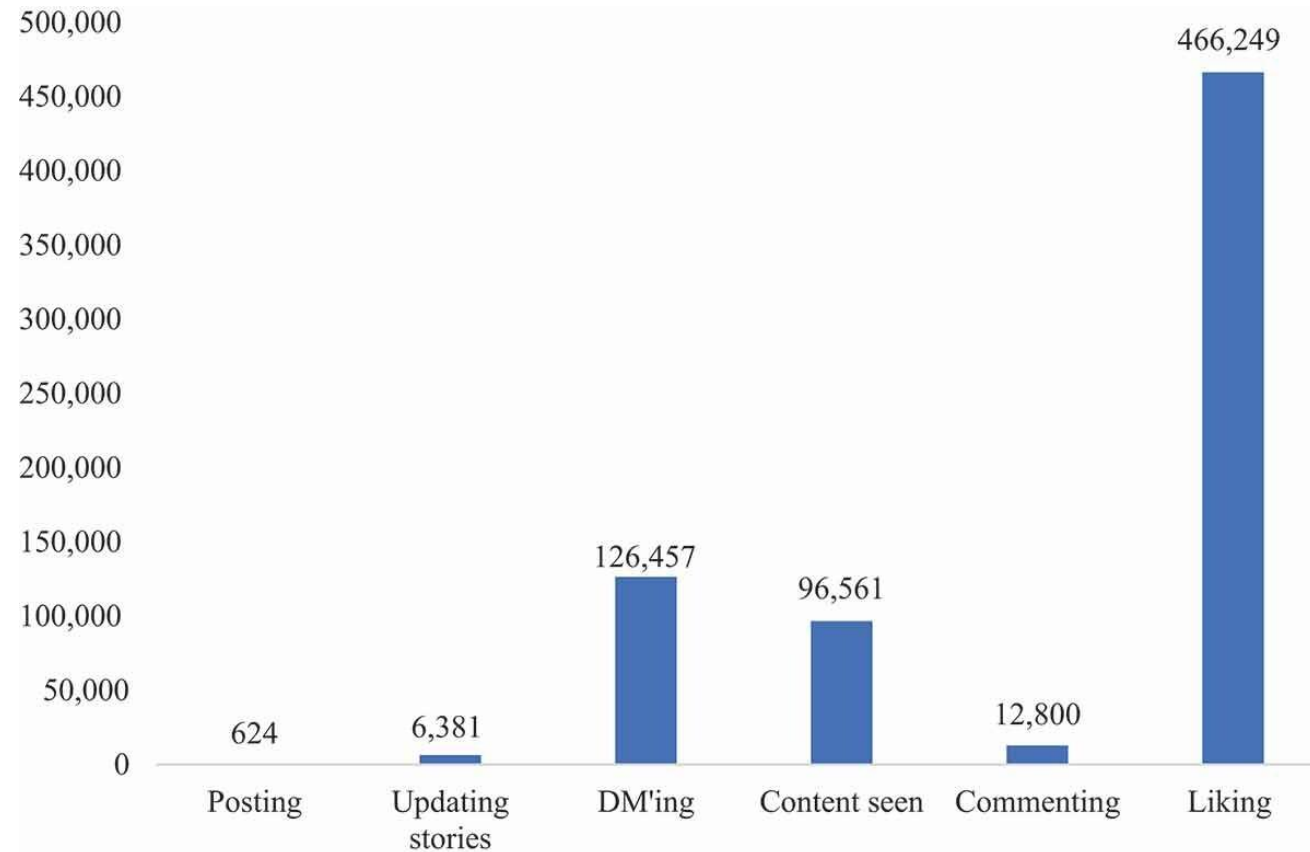
---



# Example Studies

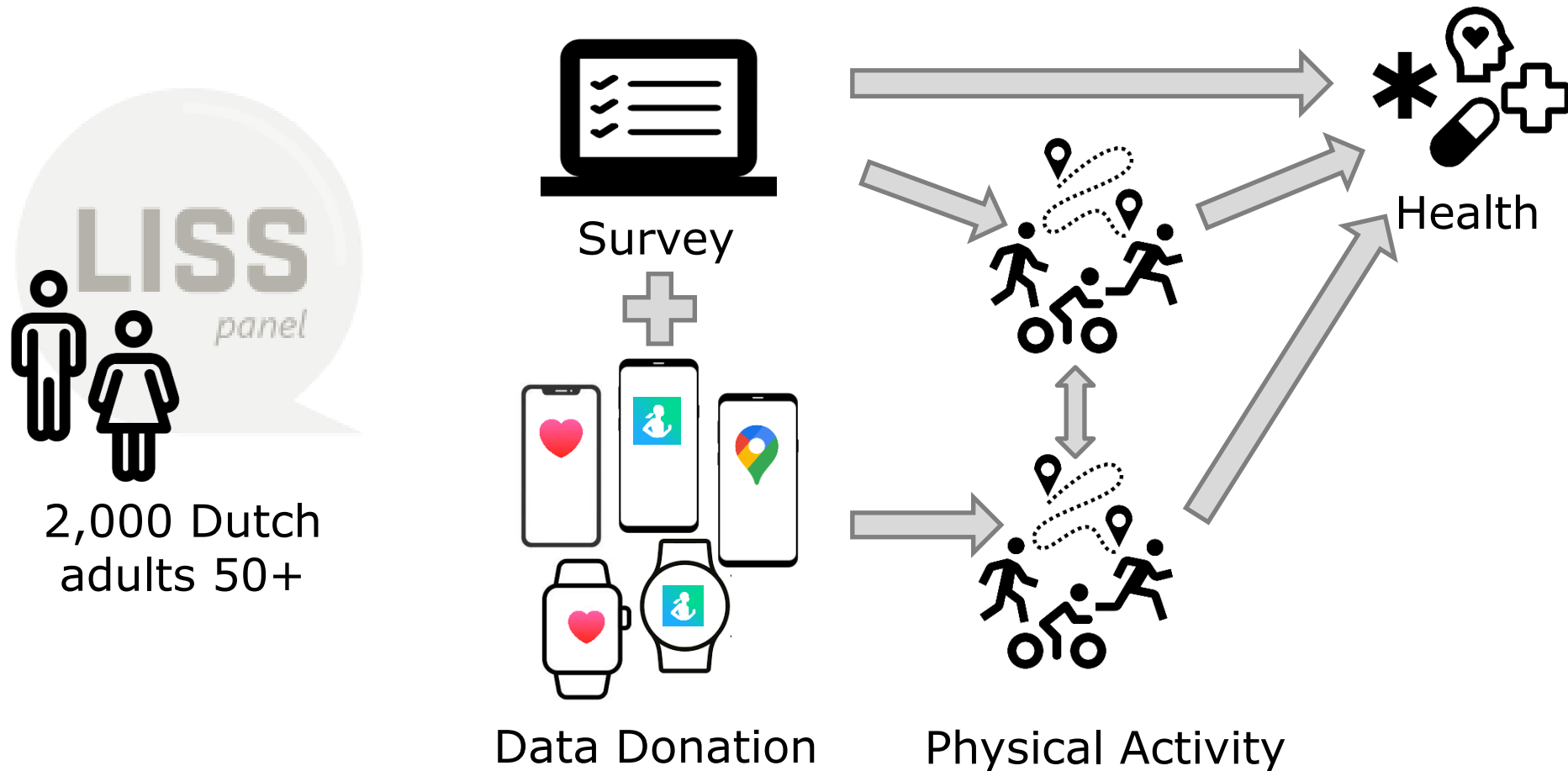
---

- Instagram activities among 8th and 9th graders (van Driel et al. 2022)



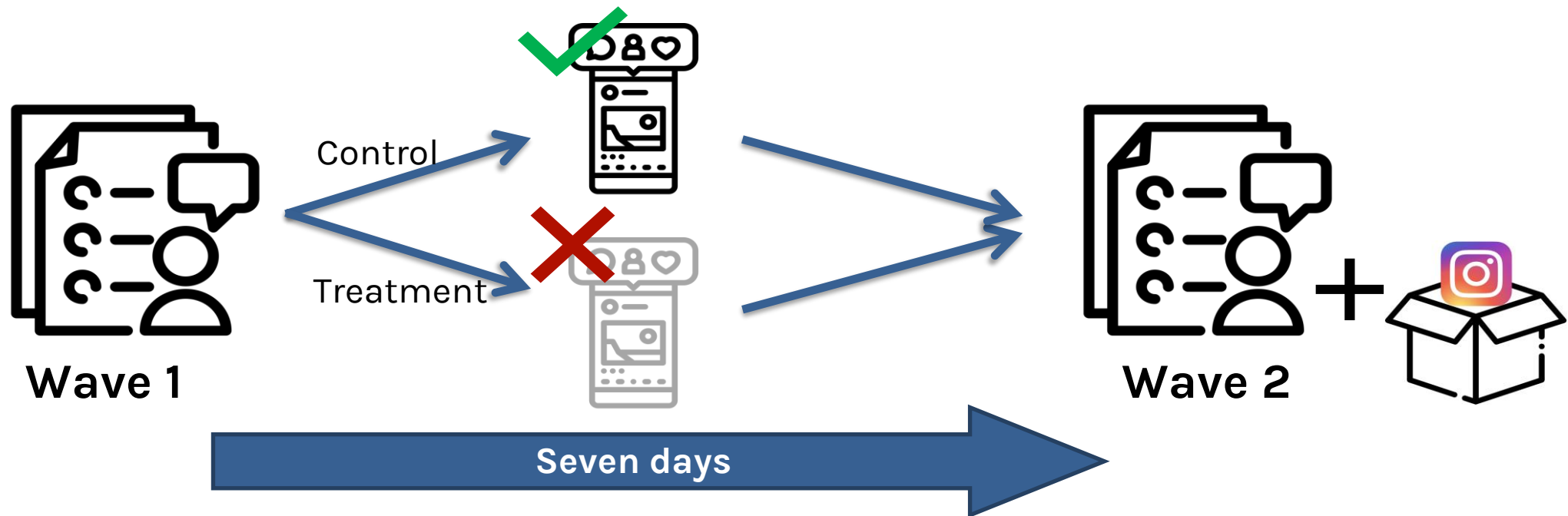
# Example Studies

- Instagram activities among 8th and 9th graders (Driel et al. 2022)
- Physical activity of older adults (Keusch & Struminskaya in preparation)



# Example Studies

- Instagram activities among 8th and 9th graders (Driel et al. 2022)
- Physical activity of older adults (Keusch & Struminskaya in preparation)
- Effect of Instagram abstinence on body image (Szafran et al. in preparation)



# Data Donation

---

## Advantages

- + Allows access to digital trace data that cannot be collected otherwise
  - e.g., <https://www.facebook.com/dyi>
- + Works for large range of platforms
  - WhatsApp, Facebook, Instagram, Google, LinkedIn, YouTube, Netflix, Apple Health, Fitbit,...
- + User retains full control over what data are donated

# Data Donation

---

## Advantages

- + Allows access to digital trace data that cannot be collected otherwise
  - e.g., <https://www.facebook.com/dyi>
- + Works for large range of platforms
  - WhatsApp, Facebook, Instagram, Google, LinkedIn, YouTube, Netflix, Apple Health, Fitbit,...
- + User retains full control over what data are donated

## Challenges

- Data donation process rather cumbersome for users (consent, data download, data upload)
- Technical skills needed to participate

# What Do We Know So Far?

---

- Users report relatively high willingness to donate data (30-75%)  
(Hase & Haim 2024; Keusch et al. 2024; Ohme et al. 2021; Pfiffner and Friemel 2023; Silber et al. 2022; van Driel et al. 2022)
  - Main reason for not being willing: privacy concerns (Keusch et al. 2024)
- Large share (up to 50%) drop out during data donation process  
(Hase & Haim 2024; Keusch et al. 2024; Ohme et al. 2021; Silber et al. 2022; van Driel et al. 2022)
  - Cumbersome process that requires some technical skills
- So far, few studies have assessed nonparticipation bias
  - Some evidence for higher social media use (Hase & Haim 2024; but not Keusch et al. 2024), political interest (Hase & Haim 2024), and “healthy donor” bias (Keusch et al. 2024)

# Potential Developments for Methodological Research on Data Donation

---

- Communicate idea of data donation to participants
  - e.g., stressing data privacy advantages for participants
- Effective integration of data donation into survey infrastructure
  - At what point to ask for donation, how to frame, how to incentivize
- Platforms/data controllers keep changing structure of and access to DDPs (Hase et al. 2024)
  - Constant monitoring (by researchers) and/or standardization (by legislators)
- Unpacking full potential of digital trace data
  - In combination with self-reports, e.g., measurement models (Cernat et al. 2024)



# Thank You!

---



## **Florian Keusch**

University of Mannheim

School of Social Sciences

Social Data Science & Methodology

 [f.keusch@uni-mannheim.de](mailto:f.keusch@uni-mannheim.de)

 <http://floriankeusch.weebly.com/>

 [@floriankeusch](https://twitter.com/floriankeusch)

# References

---

- Andrews, Sally, David A. Ellis, Heather Shaw, and Lukasz Piwek. 2015. "Beyond self-report: Tools to compare estimated and real-world smartphone use." *PLOS ONE* 10(10):e0139004. <https://doi.org/10.1371/journal.pone.0139004>
- Araujo, Theo, Anke Wonneberger, Peter Neijens, and Claes de Vreese. 2017. "How much time do you spend online? Understanding and improving the accuracy of self-reported measures of internet use." *Communication Methods and Measures*, 11:173-90. <https://doi.org/10.1080/19312458.2017.1317337>
- Bähr, Sebastian, Georg-Christoph Haas, Florian Keusch, Frauke Kreuter, and Mark Trappmann. 2022. "Missing data and other measurement quality issues in mobile geolocation sensor data." *Social Science Computer Review* 40:212-35. <https://doi.org/10.1177/0894439320944118>
- Boase, Jeffrey, and Rich Ling. 2013. "Measuring mobile phone use: Self-report versus log data." *Journal of Computer-Mediated Communication* 18:508-19. <https://doi.org/10.1111/jcc4.12021>
- Boeschoten, Laura, Niek C. de Schipper, Adriëne M. Mendrik, Emiel van der Veen, Bella Struminskaya, Heleen Janssen, and Theo Araujo. "Port: A software tool for digital data donation." *Journal of Open Source Software* 8(90):5596. <https://doi.org/10.21105/joss.05596>
- Bosch, Oriol J., Patrick Sturgis, Jouni Kuha, and Melanie Revilla. 2024. "Uncovering digital trace data biases: Tracking undercoverage in web tracking data." *Communication Methods and Measures*. <https://doi.org/10.1080/19312458.2024.2393165>
- de Reuver, Mark, and Harry Bouwman. 2015. "Dealing with self-report bias in mobile Internet acceptance and usage studies." *Information & Management* 52:287-94. <https://doi.org/10.1016/j.im.2014.12.002>
- Haenschen, Katherine. 2020. "Self-reported versus digitally recorded: Measuring political activity on Facebook." *Social Science Computer Review* 38:567-83. <https://doi.org/10.1177/0894439318813586>
- Hase, Valerie and Mario Haim. 2024. "Can we get rid of bias? Mitigating systematic error in data donation studies through survey design strategies." *Computational Communication Research* 6(2). <https://doi.org/10.5117/CCR2024.2.2.HASE>
- Hase, Valerie, Jef Ausloos, Laura Boeschoten, Nico Pfiffner, Heleen Janssen, Theo Araujo, Thijs Carrière, Claes de Vreese, Jörg Haßler, Felicia Loecherbach, Zoltán Kmetty, Judith Möller, Jakob Ohme, Elisabeth Schmidbauer, Bella Struminskaya, Damian Trilling, Kasper Welbers, and Mario Haim. 2024. "Fulfilling data access obligations: How could (and should) platforms facilitate data donation studies?" *Internet Policy Review* 13(3). <https://doi.org/10.14763/2024.3.1793>
- Hinds, Joanne, and Adam N. Joinson. 2018. "What demographic attributes do our digital footprints reveal? A systematic review." *PLOS ONE* 13(11):e0207112. <https://doi.org/10.1371/journal.pone.0207112>

Howison, James, Andrea Wiggins, and Kevin Crowston. 2011. "Validity issues in the use of social network analysis with digital trace data." *Journal of the Association for Information Systems* 12:767-97. <https://doi.org/10.17705/1jais.00282>

Jones-Jang, S Mo, Yu-Jin Heo, Robert McKeever, Jung-Hyun Kim, Leigh Moscovitz, and David Moscovitz. 2020. "Good news! Communication findings may be underestimated: Comparing effect sizes with self-reported and logged smartphone use data." *Journal of Computer-Mediated Communication* 25:346-63. <https://doi.org/10.1093/jcmc/zmaa009>

Keusch, Florian, Sebastian Bähr, Georg-Christoph Haas, Frauke Kreuter, and Mark Trappmann. 2023. "Coverage error in data collection combining mobile surveys with passive measurement using apps: Data from a German national survey." *Sociological Methods & Research* 52:841-78. <https://doi.org/10.1177/0049124120914924>

Keusch, Florian, Sebastian Bähr, Georg-Christoph Haas, Frauke Kreuter, Mark Trappmann, and Stephanie Eckman. 2022. "Non-participation in smartphone data collection using research apps." *Journal of the Royal Statistical Society. Series A* 185:S225-45. <https://doi.org/10.1111/rssa.12827>

Keusch, Florian, and Frederick G Conrad. 2022. "Using smartphones to capture and combine self-reports and passively measured behavior in social research." *Journal of Survey Statistics and Methodology* 10:863-85. <https://doi.org/10.1093/jssam/smab035>

Keusch, Florian, and Frauke Kreuter. 2022. "Digital trace data. Modes of data collection, applications, and errors at a glance." In *Handbook of Computational Social Science. Volume 1: Theory, Case Studies and Ethics*, edited by Uwe Engel et al., 100-118. Milton Park: Routledge. <https://doi.org/10.4324/9781003024583-8>

Keusch, Florian, Paulina Pankowska, Alexandru Cernat, and Ruben Luksa Bach. 2024. "Do you have two minutes to talk about your data? Willingness to participate and nonparticipation bias in Facebook data donation." *Field Methods*. <https://doi.org/10.1177/1525822X231225907>

Keusch, Florian, Bella Struminskaya, Christopher Antoun, Mick P. Couper, and Frauke Kreuter. 2019. "Willingness to participate in passive mobile data collection." *Public Opinion Quarterly* 83:210-35. <https://doi.org/10.1093/poq/nfz007>

Kobayashi, Tetsuro, Jeffrey Boase, Tsutomu Suzuki, and Takahisa Suzuki. 2015. "Emerging from the cocoon? Revisiting the tele-cocooning hypothesis in the smartphone era." *Journal of Computer-Mediated Communication* 20:330-45. <https://doi.org/10.1111/jcc4.12116>

Ohme, Jakob, Theo Araujo, Claas de Vreese, and Jessica T. Piotrowski. 2021. "Mobile data donations: Assessing self-report accuracy and sample biases with the iOS Screen Time function." *Mobile Media & Communication*, 9:293-313. <https://doi.org/10.1177/2050157920959106>

Pfiffner, Nico, and Thomas N. Friemel. 2023. "Leveraging data donations for communication research: Exploring drivers behind the willingness to donate." *Communication Methods and Measures* 17:227-49. <https://doi.org/10.1080/19312458.2023.2176474>

Revilla, Melanie, Mick P. Couper, and Carlos Ochoa. 2019. "Willingness of online panelists to perform additional tasks." *methods, data, analyses* 13:223-52. <https://doi.org/10.12758/mda.2018.01>

- Revilla, Melanie, Carlos Ochoa, and Germán Loewe. 2017. "Using passive data from a meter to complement survey data in order to study online behavior." *Social Science Computer Review* 35:521-36. <https://doi.org/10.1177/0894439316638457>
- Scharkow, Michael. 2016. "The accuracy of self-reported internet use—a validation study using client log data." *Communication Methods and Measures* 10:13-27. <https://doi.org/10.1080/19312458.2015.1118446>
- Scherpenzeel, Annette. 2017. "Mixing online panel data collection with innovative methods." In *Methodische Probleme von Mixed-Mode-Ansätzen in Der Umfrageforschung*, edited by Stefanie Eifler and Frank Faulbaum, 27-49. Schriftenreihe Der ASI - Arbeitsgemeinschaft Sozialwissenschaftlicher Institute. Wiesbaden: Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-15834-7\\_2](https://doi.org/10.1007/978-3-658-15834-7_2)
- Silber, Henning, Johannes Breuer, Christoph Beuthner, Tobias Gummer, Florian Keusch, Pascal Siegers, Sebastian Stier, and Bernd Weiß. 2022. "Linking surveys and digital trace data: Insights from two studies on determinants of data sharing behaviour." *Journal of the Royal Statistical Society Series A: Statistics in Society* 185:S387-S407. <https://doi.org/10.1111/rssa.12954>
- Stopher, Peter, Camden FitzGerald, and Min Xu. 2007. "Assessing the accuracy of the Sydney Household Travel Survey with GPS." *Transportation* 34:723-41. <https://doi.org/10.1007/s11116-007-9126-8>
- Struminskaya, Bella, Peter Lugtig, Vera Toepoel, Barry Schouten, Deirdre Giesen, and Ralph Dolmans. 2021. "Sharing data collected with smartphone sensors: Willingness, participation, and nonparticipation bias." *Public Opinion Quarterly* 85:423-62. <https://doi.org/10.1093/poq/nfab025>
- Struminskaya, Bella, Vera Toepoel, Peter Lugtig, Marieke Haan, Annemieke Luiten, and Barry Schouten. 2020. "Understanding willingness to share smartphone-sensor data." *Public Opinion Quarterly* 84:725-59. <https://doi.org/10.1093/poq/nfaa044>
- Wenz, Alexander, Annette Jäckle, and Mick P. Couper. 2019. "Willingness to use mobile technologies for data collection in a probability household panel." *Survey Research Methods* 13:1-22. <https://doi.org/10.18148/srm/2019.v1i1.7298>
- Wenz, Alexander and Florian Keusch. 2023. "Increasing the acceptance of smartphone-based data collection." *Public Opinion Quarterly* 87:357-88. <https://doi.org/10.1093/poq/nfad019>
- van Driel, Irene I., Anastasia Giachanou, J. Loes Pouwels, Laura Boeschoten, Ine Beyens, and Patti M. Valkenburg. 2022. "Promises and pitfalls of social media data donations." *Communication Methods and Measures* 16:266-82. <https://doi.org/10.1080/19312458.2022.2109608>