WEB DATA OPP workshop

Barcelona, Spain

18-19 March 2024

upf. Universitat Pompeu Fabra Barcelona

RECSM Research and Expertise Centre for Survey Methodology

IBEI INSTITUT BARCELONA ESTUDIS INTERNACIONALS

Context

- Workshop organized in the frame of the WEB DATA OPP project
  - Funded by an ERC starting grant
  - Started in 2020 – Will end in 2026

- Why organizing this workshop?
  - To disseminate our results
  - To learn about others' research
  - To share experiences in particular regarding the challenges faced
  - To get feedback that can help us in the next months
  - To generate new collaborations?

Acknowledgements

Universitat Pompeu Fabra Barcelona

RECSM Research and Expertise Centre for Survey Methodology

INSTITUT BARCELONA ESTUDIS INTERNACIONALS

WEB DATA OPP team

Oriol Bosch

Patricia Iglesias

Carlos Ochoa

Ksenija Ivanovic

Tracy Silva

Thanks!

European Research Council
Established by the European Commission

All of you!

Maria Paula Acuña

Mick Couper

Some practical points

- Necessary that you all sign the assistance list **every day**
- Wi-Fi: free university Wi-Fi (network guest@upf) or Eduroam
- Coffee breaks & lunch: next to Auditori Mercè Rodoreda → be careful with personal belongings
- Dinner meeting points:
  - 19h30 entrance hotel H10 Marina
  - 20h restaurant Gastrobar Pipa (Carrer de Llull, 159)

Some practical points

- Regarding the presentations:
  - Remember that each presenter has **15-16 minutes to present**, followed by 4-5 minutes for questions
  - If you want the session chair to indicate you when X minutes are left, please let them know
  - Please check during one of the breaks that your slides have been correctly uploaded on the computer and that everything works as expected

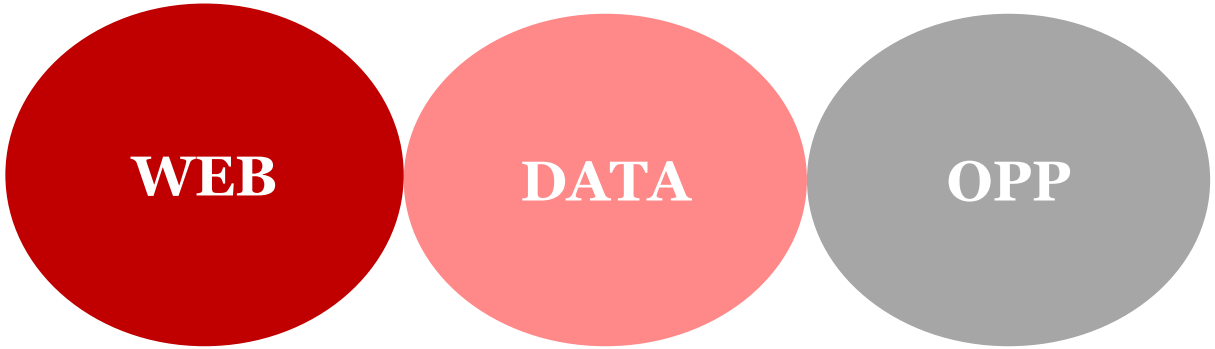
Overview of the WEB DATA OPP project

18 March 2024

Melanie Revilla | IBEI

Acknowledgments:
This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 849165). Part of the research done has also been supported by the Spanish Ministry of Science and Innovation under the "R+D+i projects" programme (grant number PID2019-106867RB-I00 /AEI/10.13039/501100011033 (2020-2024)); the BBVA foundation under their grant scheme to scientific research teams in economy and digital society, 2019; and GESIS.

Project's research questions



1. Can we **improve** web survey **data quality** by using new measurement opportunities?

2. Can we **replace** part of the web survey data by using new measurement opportunities?

3. Can we achieve a **more complete picture** of the reality by **combining** new measurement opportunities with web survey data?

Which new opportunities?

WHICH NEW OPPORTUNITIES

Growing use of (mobile) Internet

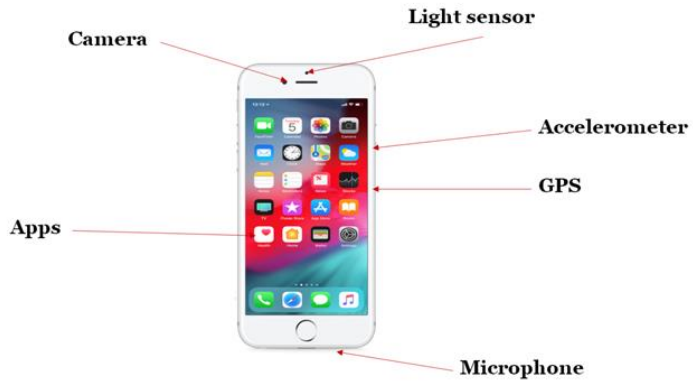
More and more of people's life happens **online**

+30m Average daily time[1] spent online by each internet user from 2016 to 2021

More and more of the online activity is done through **smartphones**

83% of the world population have smartphones[2]

Smartphones have sensors + apps
→ possible to collect many different types of new data



[1] https://datareportal.com/reports/digital-2022-global-overview-report; [2] https://www.bankmycell.com/blog/how-many-phones-are-in-the-world

WHICH NEW OPPORTUNITIES

New data types considered

VISUAL DATA

Screenshots
Photos/videos taken during the survey
Visual files saved on (or accessible from) the device

VOICE DATA

Dictation
Voice recording

Most of those data can also be collected for PCs

METERED DATA

Obtained through a tracking application ("meter") installed by the participants on their devices to register at least the URLs of the webpages visited. Usually collected in metered panels.

GEOLOCATION DATA

Obtained through a tracking application installed on participants' mobile devices to register at least the GPS coordinates

IN-THE-MOMENT SURVEYS triggered by such data

How could they help?

HOW COULD THE NEW DATA TYPES HELP?

Main expected benefits (Revilla, 2022)

Researchers

- Reduce some of the issues related to measurement errors
- Massive amount of data
- Granular / detailed data
- Real time / continuous (passive data)
- Provide data for new concepts (not measured so far)
- Answer new research questions

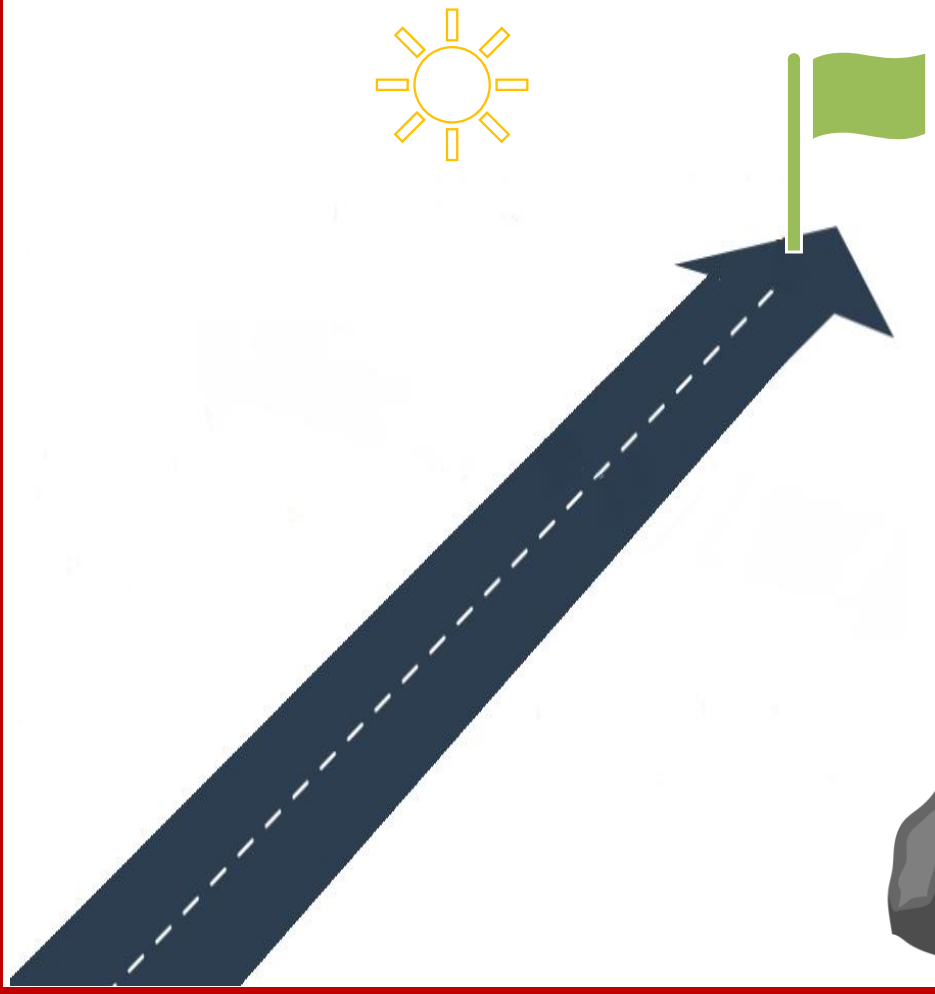
Participants

- Reduce time dedicated to provide information
- Reduce efforts
- More enjoyable

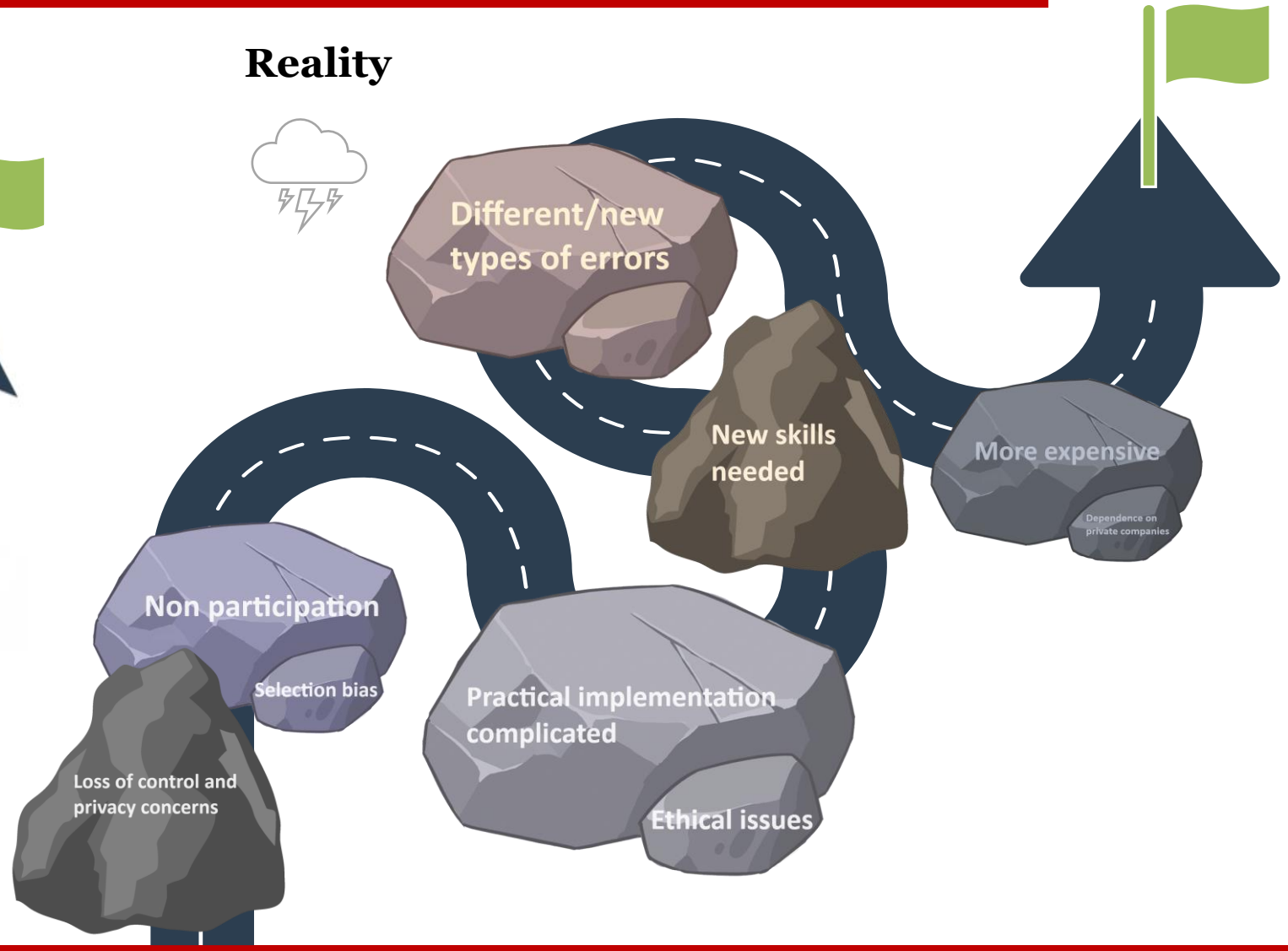
But this is not that easy…

Our goal = get more knowledge that will help better use such data

What most people think



Reality



Summary of the research we did or are doing

WHAT WE DID OR ARE DOING

Visual data

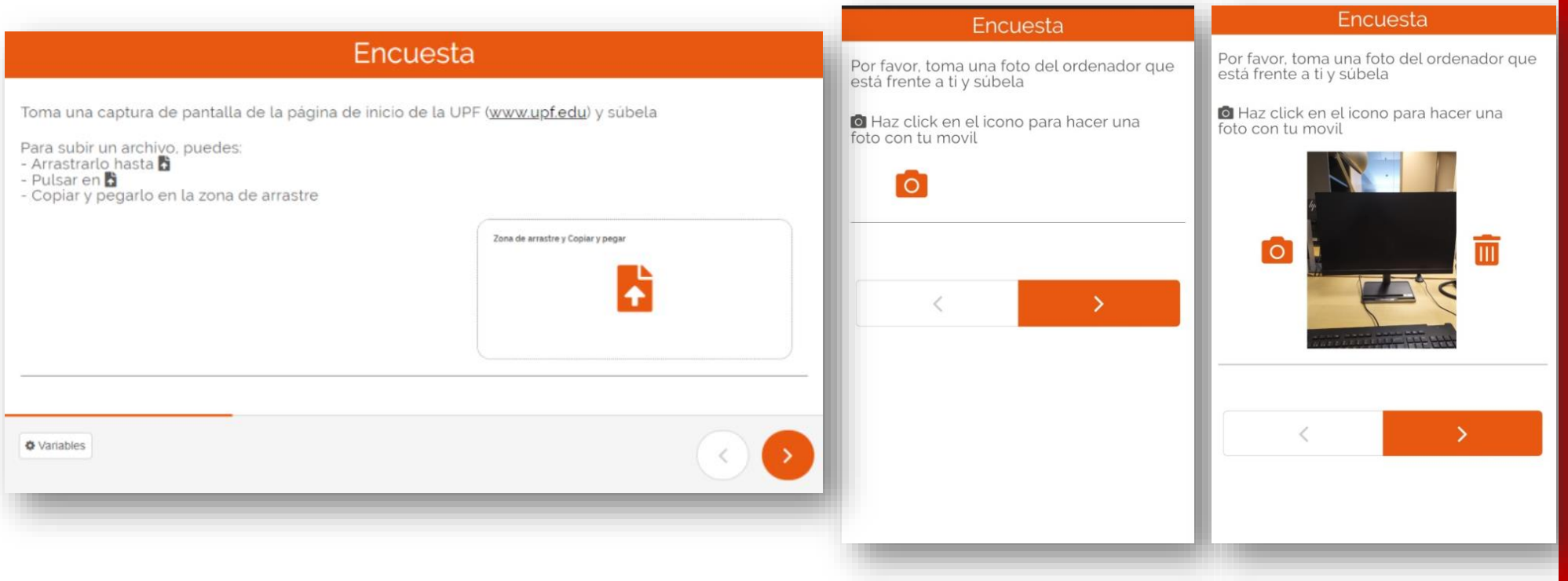
Create a tool

Try to disentangle the mechanisms behind non-response

Prepare a guide about collecting images in surveys

Implement an experiment

WebdataVisual (Revilla et al., 2022a): allows collecting visual data produced during the survey (using the device camera or screenshots) or sharing already saved visual data.



More information available at: https://www.upf.edu/web/webdataopp/tools

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Quality of the information obtained with images depends on the capacity to extract the needed information from the images. Thus how the images are classified is crucial. We prepared a guide for researchers interested in using images in their research (Iglesias et al., 2024).

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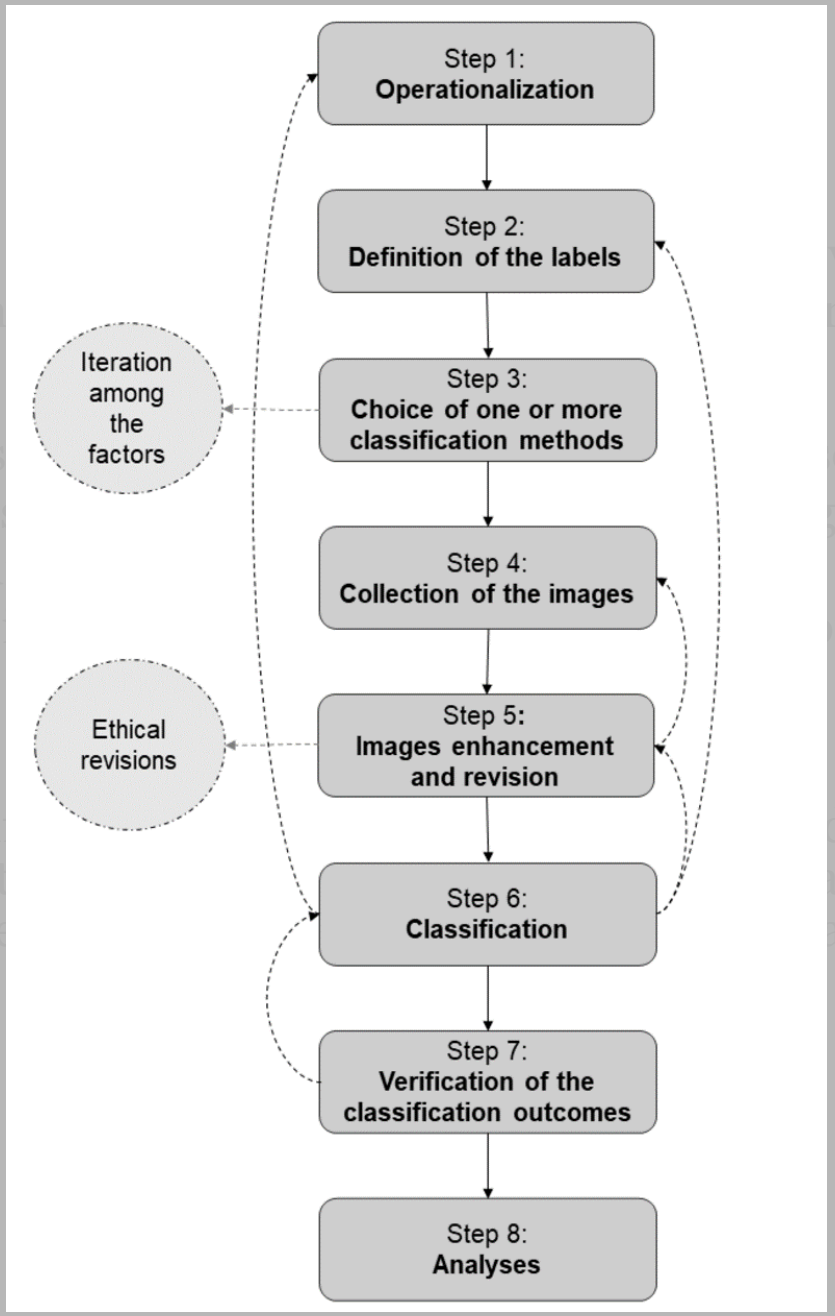

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Implement an experiment	Asked participants to share photos of the books they have in their main residence + to report the number of books in their residence, the proportions in different languages and the way they store such books. Compare participation, quality, evaluation, of the different methods (Iglesias, under review). Data also used for substantive research.

WHAT WE DID OR ARE DOING

Voice data

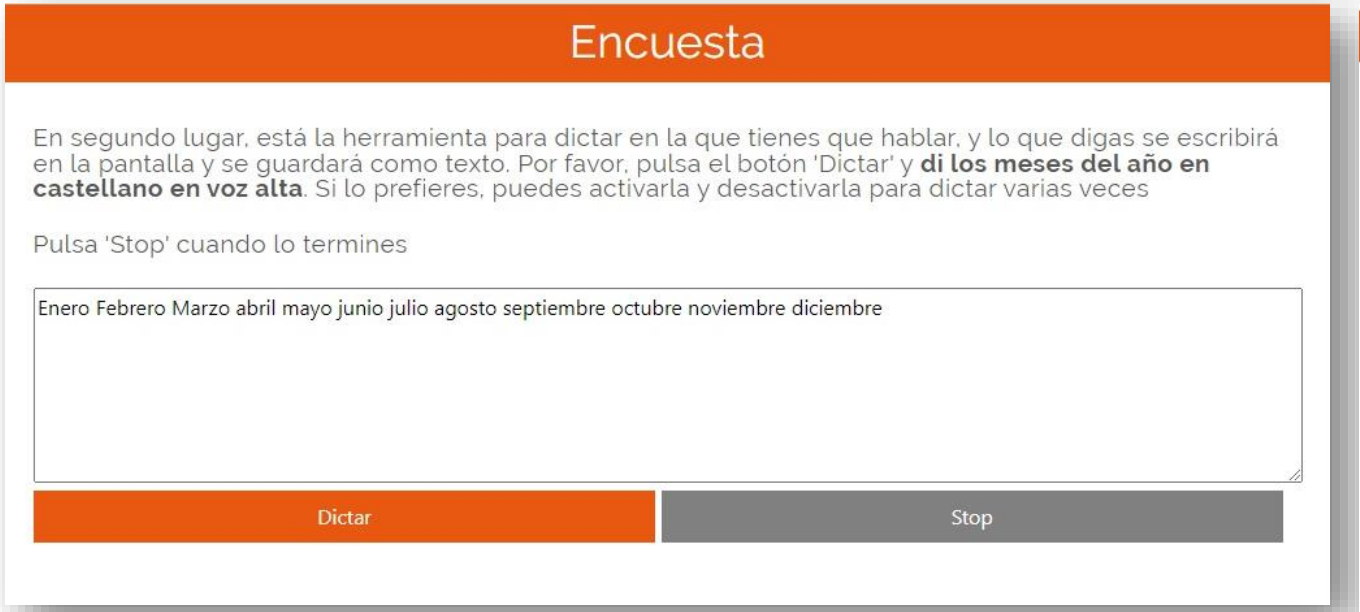
Create a tool

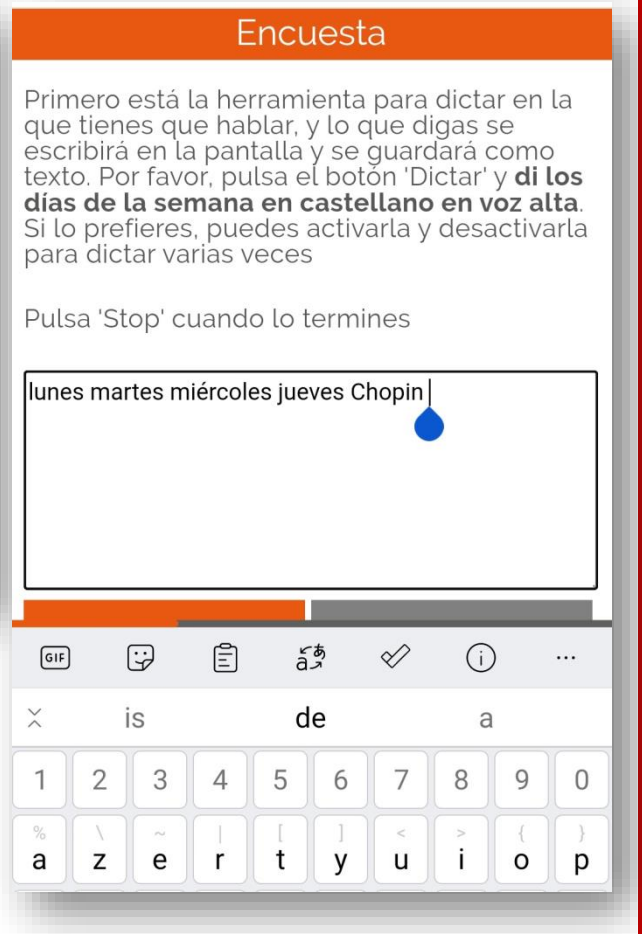
WebdataVoice (Revilla et al., 2022b): allows collecting data through dictation and/or voice recordings.

Compare different ways to propose voice inputs

Try to understand the problems & challenges

Propose additional incentive





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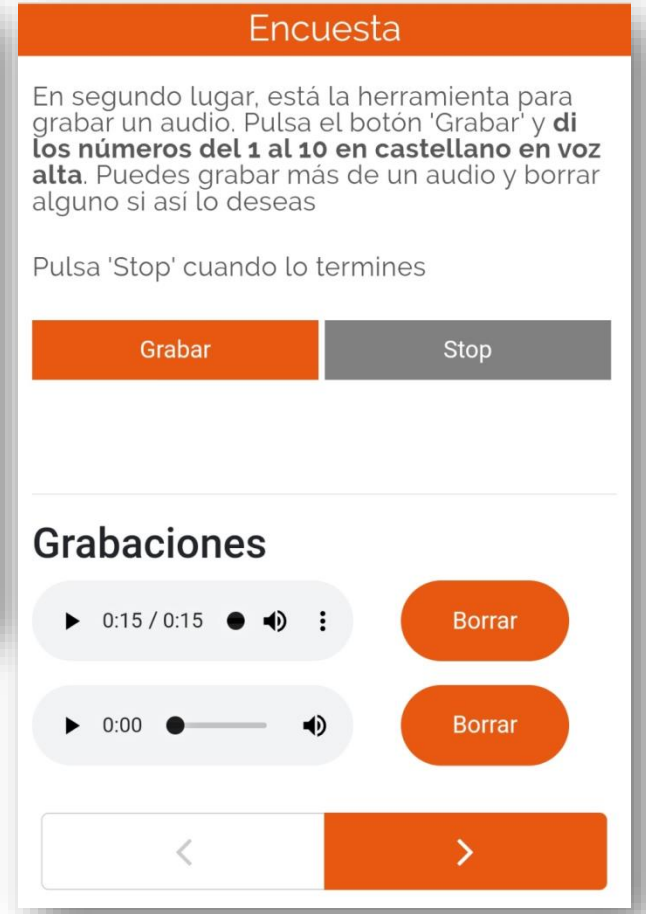

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Ask participants of opt-in online panel to answer 2 experimental questions through dictation or voice recordings, either providing a choice or pushing them to voice inputs. Results: in all experimental groups, participation is lower, even if text was always possible. Quality seems to be slightly higher (Revilla & Couper, under review, a).

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Try to understand the problems & challenges	Study reasons for not using voice inputs and challenges faced when using them + whether panelists dis/liked and found it easy/difficult to use the voice input tools. Results: Context and difficulty in expressing orally are the most reported issues. Most participants found it easy; less liked it (Revilla & Couper, under review, b).
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Propose additional incentive	Focus on push-to voice recording. Try to propose an extra incentive conditional on using voice to answer the 2 experimental questions. Distinguish 3 groups depending on the likelihood of using voice (Höhne et al., pre-registration)

WHAT WE DID OR ARE DOING

Metered data

Create a framework

Apply the framework

Estimate the size of tracking undercoverage

Study the reliability & validity of metered measures

Total error framework for metered data = adaptation of the total survey error (TSE) framework to metered data → explain all possible errors (Bosch & Revilla, 2022a)

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Total error fr … survey error (TSE) framework t… & Revilla, 2022a)

Error components	Specific error causes
Specification error	– Measuring concepts from which not enough data is available – Inferring attitudes – Defining valid information
Measurement error	– Non-trackable target – Meter not installed – Uninstalling the meter – New non-tracked device – Technology limitations – Technology errors – Hidden behaviours – Shared device – Social desirability – Extraction error
Processing error	– Coding error – Aggregation at the domain level – Data anonymization
Coverage error	– Non-trackable individuals
Sampling error	– Same error causes than for surveys
Missing data error	– Noncontact – Non-consent – Non-trackable target – Meter not installed – Uninstalling the meter – New non-tracked device – Technology limitations – Technology error – Hidden behaviour

WHAT WE DID OR ARE DOING

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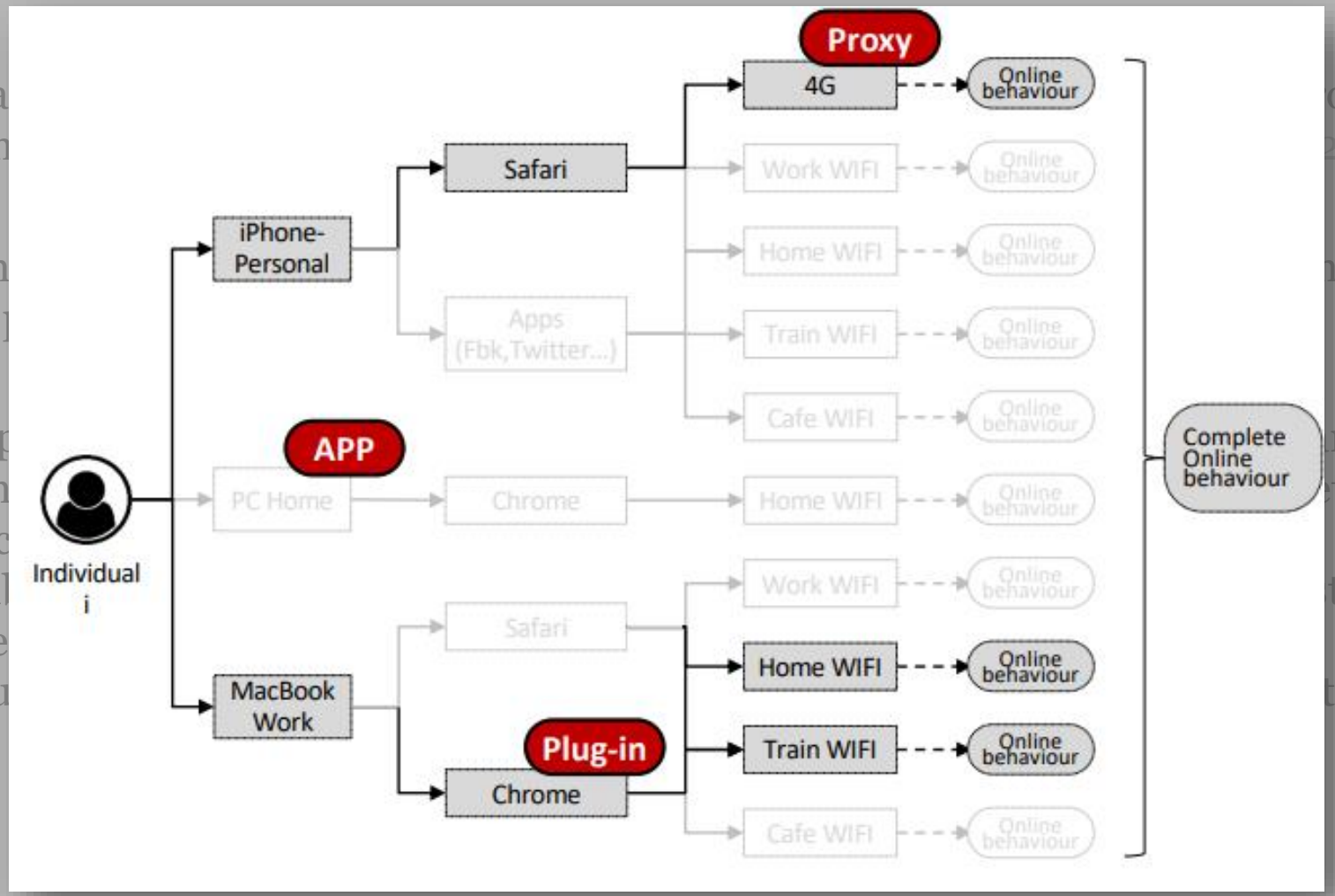

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web data opp

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Study the reliability & validity of metered measures	Most research using metered data assume the measurement is perfect. Clearly not true, but to what extent? Focus on "online news media exposure" (Bosch, 2023). Study validity & reliability + look at the impact of different design choices (e.g., which list of media news domain was used, how many media on those lists, how many days of metered data collection, etc.).

WHAT WE DID OR ARE DOING

Metered data

Estimate measurement quality

Detect cheating in knowledge questions

Predict pregnancy and parenthood

Study job search

To learn more about measurement errors, an MTMM experiment was implemented (Netquest metered panel, Spain, June 2023) → allowed to estimate the reliability and measurement validity of measures based on conventional questions vs metered data (Bosch et al., 2023b). Potentially important errors when using metered data.

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Detect cheating in knowledge questions

Different way to combine metered data with surveys: use metered data to detect cheating in political knowledge questions (Bosch & Revilla, 2024). Tested using same survey as previous one. Web tracking can be an option to catch people cheating, but it is still imperfect, mainly when there is no in-app data.

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Predict pregnancy and parenthood	Plan to study whether we can predict pregnancy and parenthood (of "young children") using metered data (URLs, app use and search terms). Will use metered data and profiling data collected by Netquest. In progress (Joshua Claassen). COMING SOON
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Study job search	Provide new insights about how people search for jobs online using metered data. In progress (Carlos Ochoa).

WHAT WE DID OR ARE DOING

In-the-moment surveys (ITMS)

Create a tool

Acceptance and coverage of fast invitation methods

Study the willingness and its determinants

Implement 2 experiments

WebdataNow (Revilla et al., 2022c): allows implementing ITMS triggered by metered or geolocation data.

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Acceptance and coverage of fast invitation methods

Participation in ITMS requires that invited units see the survey notification quickly enough. Thus, information about acceptance and coverage of different invitation methods (e.g., SMS or app-notification) and which one participants see first is crucial. Results: Invitation through a mobile app is the best option. Using several methods is recommended (Ochoa & Revilla, 2022a).

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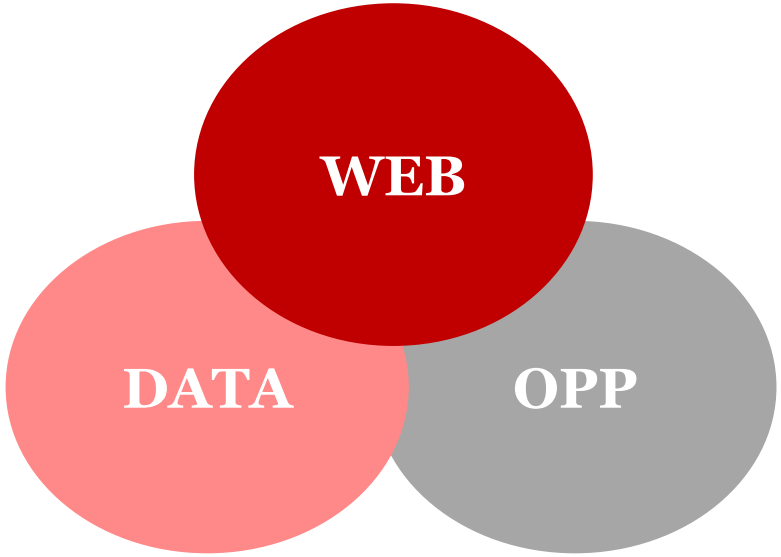
Implement 2 experiments	Experiment 1: ITMS triggered by online job application. Long fieldwork + practical difficulties; but some improvements + new insights (Ochoa, 2023). Data also used for substantive research. Experiment 2: ITMS triggered by a visit to a beach in Spain. Planned for summer 2024.

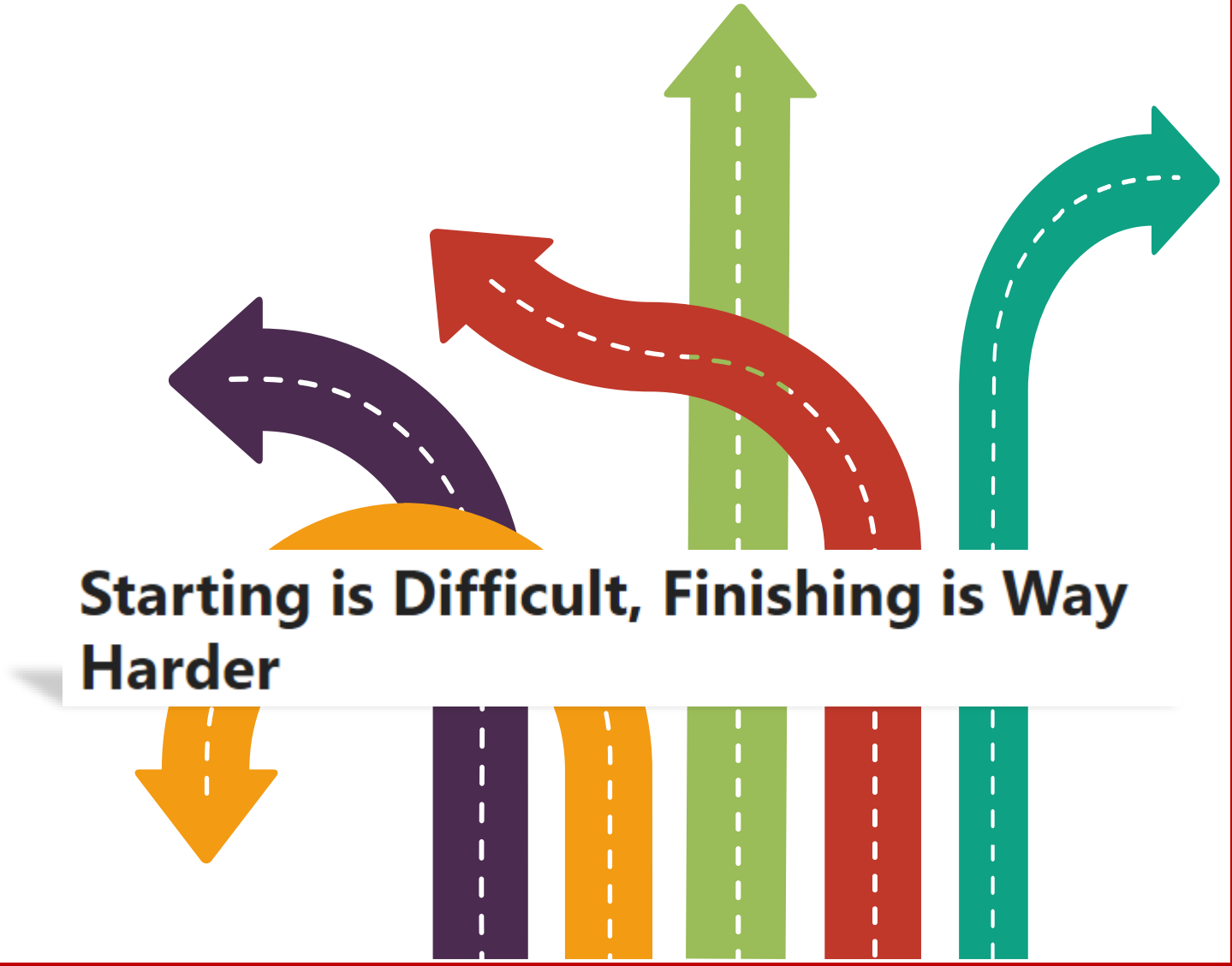
Summing up

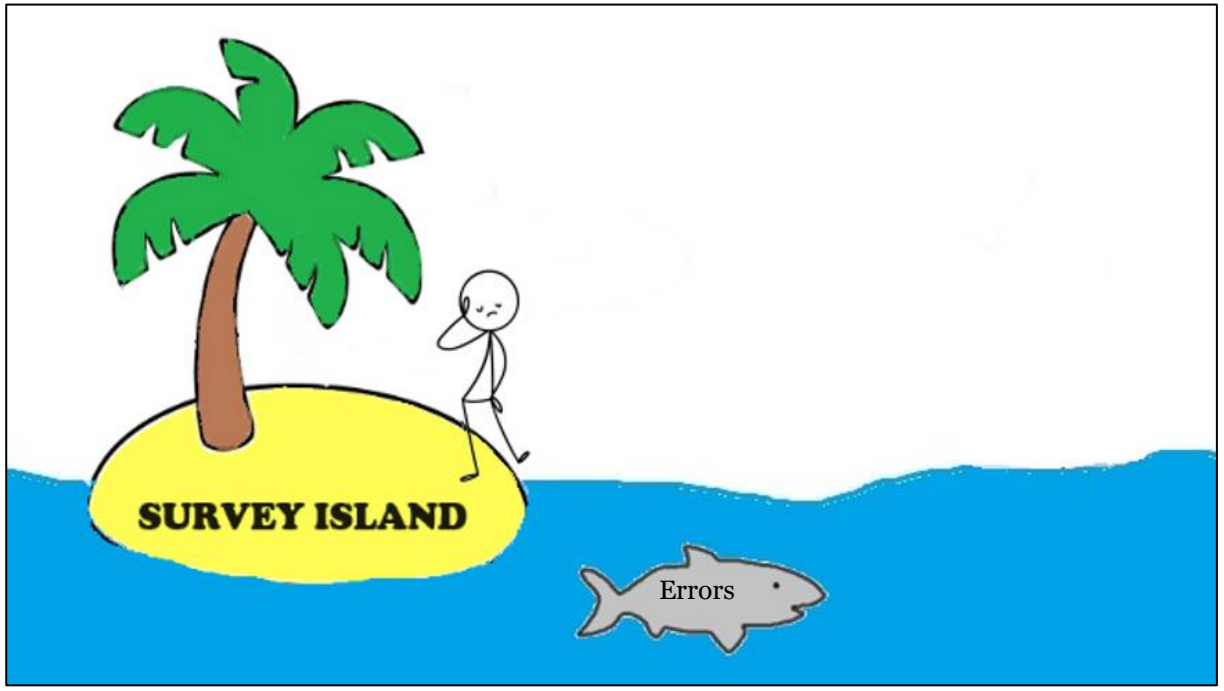
- Very little had been done before regarding the 4 types of data that the project is focusing on

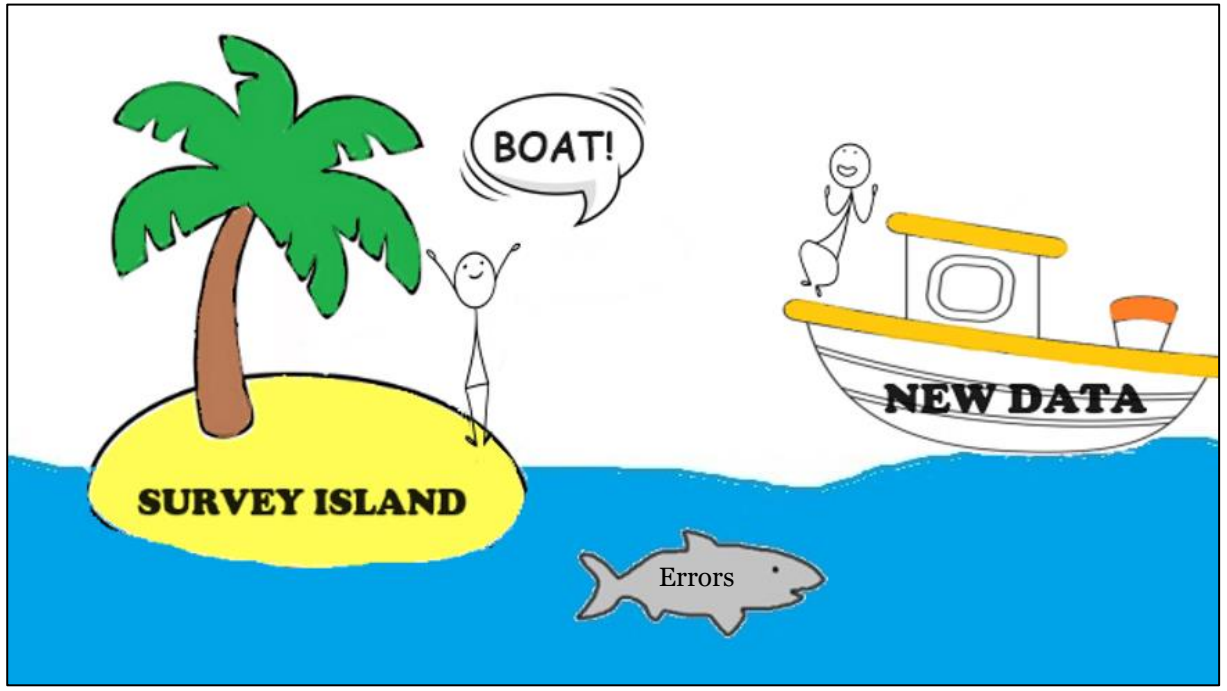
- Contribution at different levels
  - New tools
  - Framework
  - Practical guidelines
  - New empirical evidences
  - Cases studies regarding different topics
  - Data have also been used for substantive research

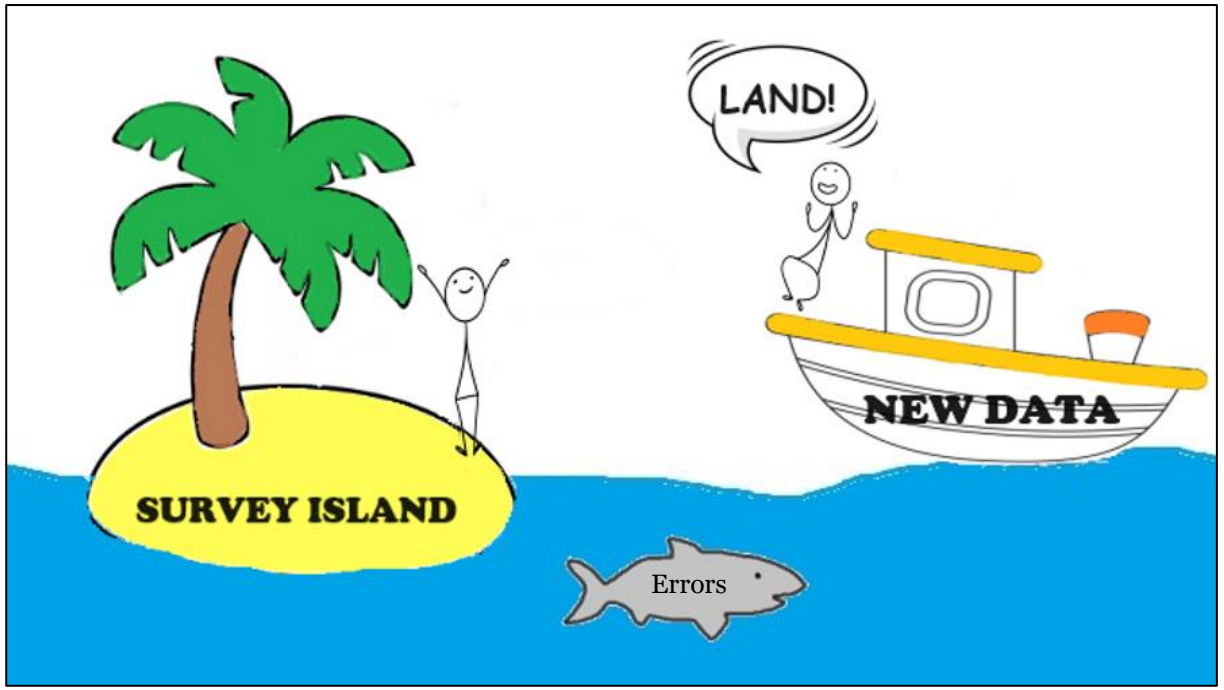


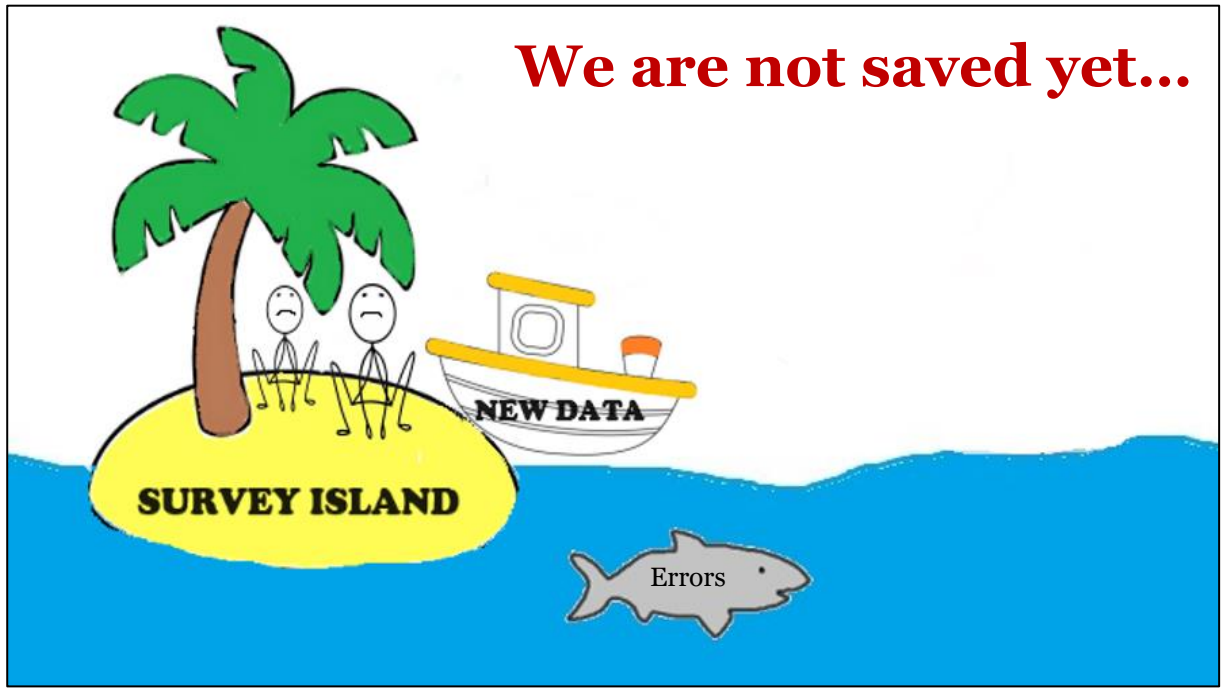
Conclusions




SURVEY ISLAND
Errors

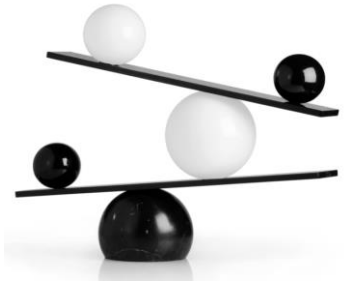

BOAT!
NEW DATA
SURVEY ISLAND
Errors


LAND!
NEW DATA
SURVEY ISLAND
Errors


We are not saved yet...
NEW DATA
SURVEY ISLAND
Errors

Much more research needed

1. Learn more about the **errors** of these data in different contexts
   - Types of errors
   - Size of errors
   - Effects on the results
2. Understand better **when** it is worth using new data types
   - Need to better understand the mechanisms
   - Need to identify when benefits > problems (researchers & participants)



CONCLUSIONS

Much more research needed

3 Understand better **how** to use these data

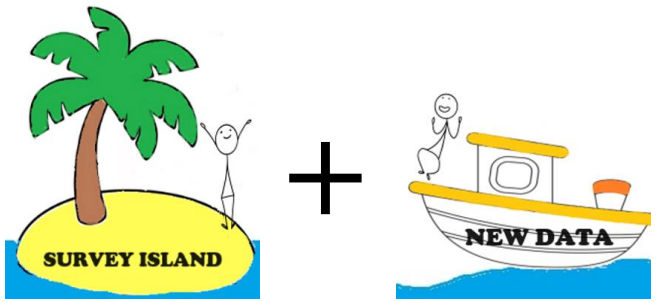
Replace conventional data?

Errors will always be present

Crucial to **identify** them and think about their **consequences**

Combine with conventional surveys?

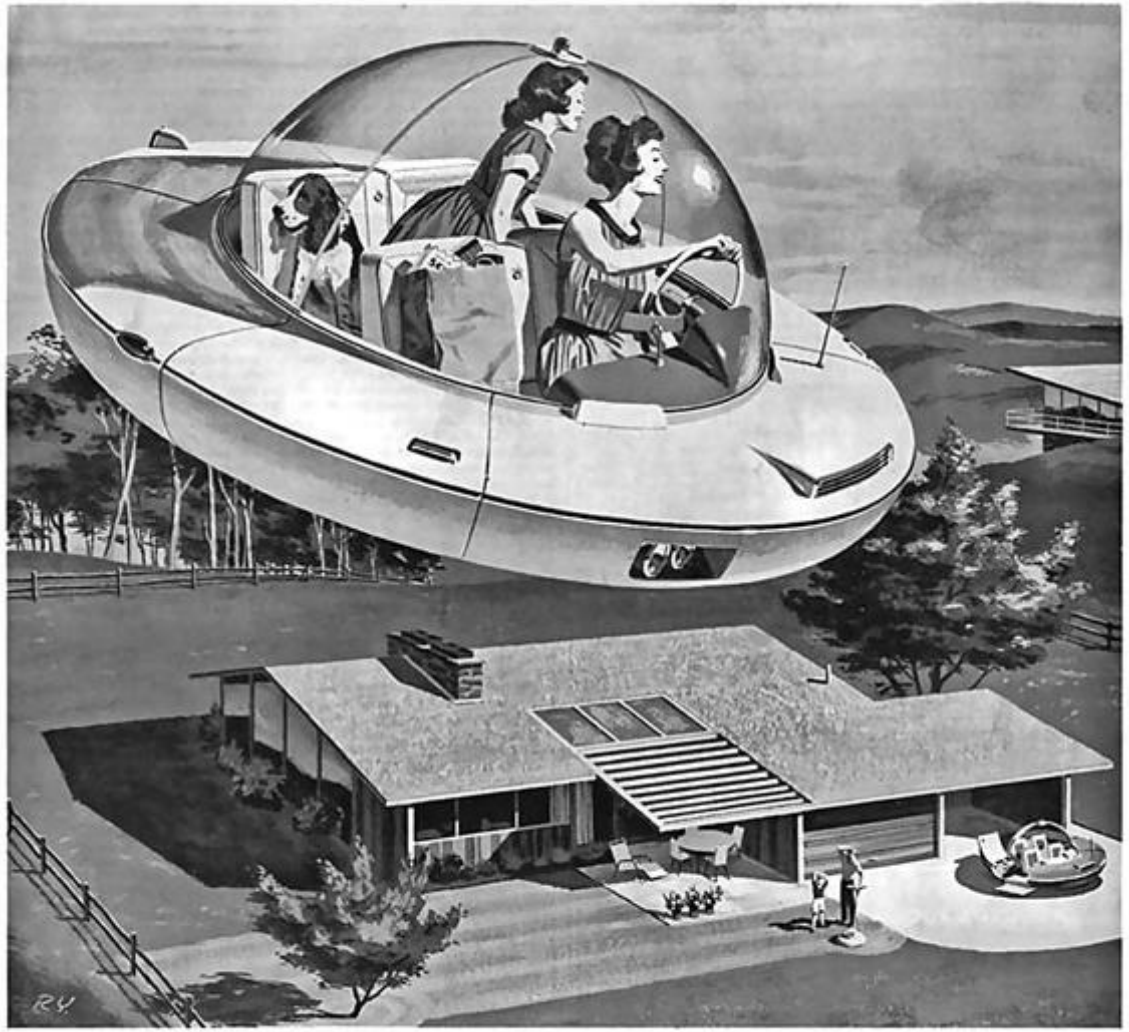
Provide **different** but **complementary information**



CONCLUSIONS

Maybe we just need more time…

In the 1950s people predicted flying cars by 2000



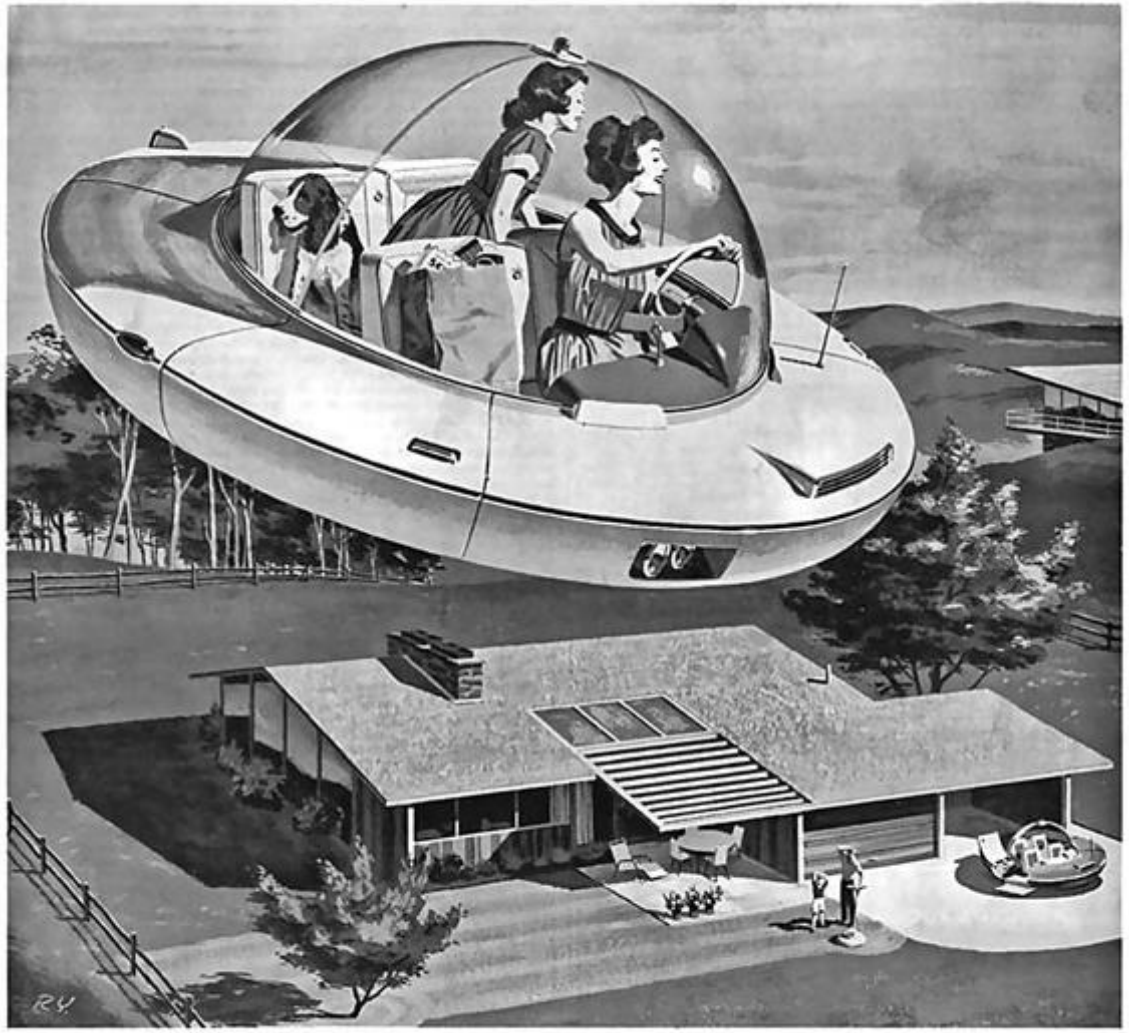
YOUR PERSONAL "FLYING CARPET" Step into it, press a button, and off you go to market, to a friend's home, or to your job. Take off and land anywhere; no parking problems. Plug in to any electric outlet for recharging. They're working on it!

My parents' car in 2000…

CONCLUSIONS

Maybe we just need more time…

In the 1950s people predicted flying cars by 2000



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Paris Prepares to Launch Flying Taxis during 2024 Olympics

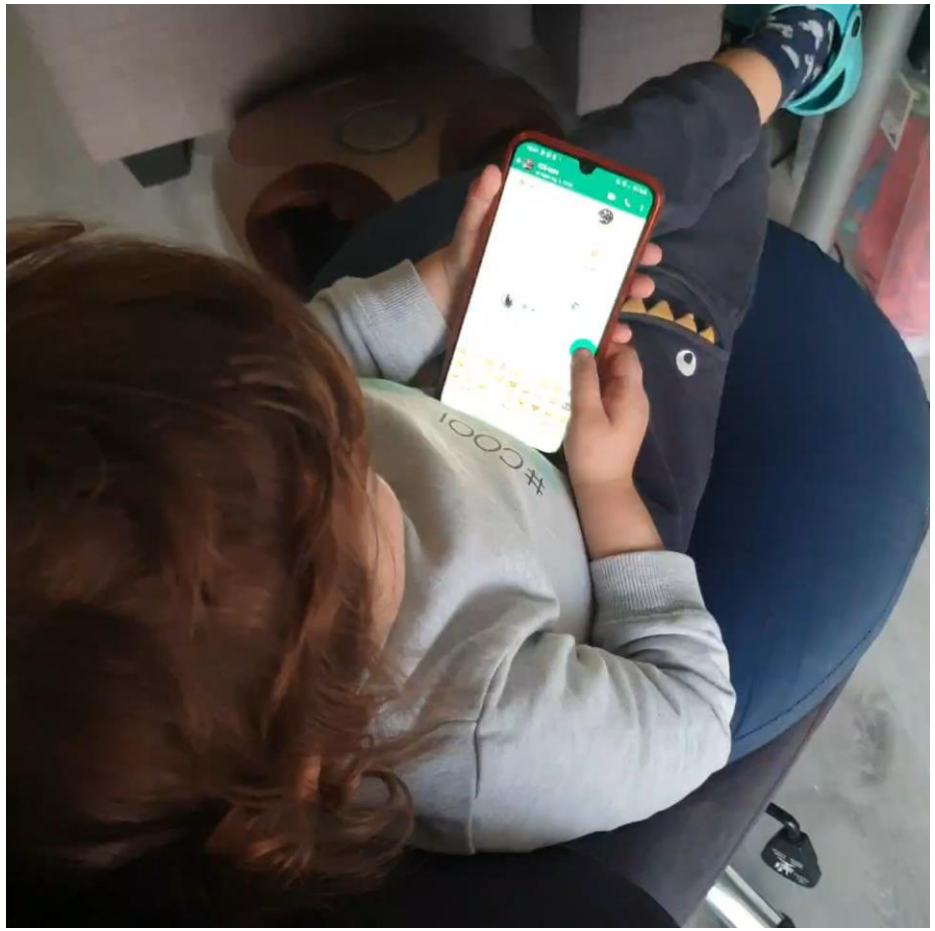
eVTOLs Expected to Take Center Stage at Paris 2024 Olympic Games (Credit: Volocopter)

CONCLUSIONS

Maybe we just need more time…

What my 2-year-old son can do with pencils

But he can send voice messages…



Thanks!

Questions?

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https://www.upf.edu/web/webdataopp

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References

- Bosch, O.J., & Revilla, M. (2024). Can we identify and prevent cheating in online surveys? Evidence from a web tracking experiment. GOR Conference, Cologne, 23 of February. Available at: https://www.upf.edu/web/webdataopp/dissemination#Presentations
- Bosch, O.J. (2023). Validity and Reliability of Digital Trace Data in Media Exposure Measures: A Multiverse of Measurements Analysis. Preprint. https://doi.org/10.31235/osf.io/fyr2z
- Bosch, O.J., Sturgis, P., Kuha, J., Revilla, M. (2023a). Uncovering digital trace data biases: tracking undercoverage in web tracking data. Preprint. https://doi.org/10.31235/osf.io/t2dbj
- Bosch, O.J., Sturgis, P., Kuha, J., Revilla, M. (2023b). Surveys or digital trace data, which one should we use? Using MultiTrait-MultiMethod models to simultaneously estimate the measurement quality of surveys and digital trace data. ESRA conference, Milan, 20th July. Available at: https://www.upf.edu/web/webdataopp/dissemination#Presentations
- Bosch, O.J., & Revilla, M. (2022a). When survey science met web tracking: presenting an error framework for metered data. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*. https://doi.org/10.1111/rssa.12956
- Bosch, O.J., & Revilla, M. (2022b). The challenges of using digital trace data to measure online behaviors: lessons from a study combining surveys and metered data to investigate affective polarization. In SAGE Research Methods Cases. https://dx.doi.org/10.4135/9781529603644
- Höhne, J.K., Revilla, M. & Couper, M.P. (pre-registration): https://doi.org/10.17605/OSF.IO/CXZ4S

References

- Iglesias (under review). Preferences, participation, and evaluation of the experience when answering questions about the books participants have at home.
- Iglesias, P.A., Ochoa, C, & Revilla, M. (2024). A practical guide to (successfully) collect and process images through online surveys. *Social Sciences & Humanities Open*, 9, 100792. https://doi.org/10.1016/j.ssaho.2023.100792
- Iglesias, P., & Revilla., M. (2023). Skills, availability, willingness, expected participation and burden of sharing visual data within the frame of web surveys. *Quality and Quantity*. https://doi.org/10.1007/s11135-023-01670-3
- Ochoa, C. (2023). Researching the moment of truth. An experiment comparing in-the-moment and conventional surveys to investigate online job applications. ESRA conference, 20th July 2023. Presentation (preliminary results).
- Ochoa, C. (2022). Willingness to participate in geolocation-based research. PLoS ONE 17(12): e0278416. https://doi.org/10.1371/journal.pone.0278416
- Ochoa, C., Revilla, M. (2023). Framing Effects on Willingness to Participate in Geolocation-Based Research. International Journal of Market Research, 0(0). https://doi.org/10.1177/14707853231170107.
- Ochoa, C., Revilla, M. (2022). Willingness to participate in in-the-moment surveys triggered by online behaviors. Behavior Research Methods (2022). https://doi.org/10.3758/s13428-022-01872-x

References

- Revilla, M. (2022). How to enhance web survey data using metered, geolocation, visual andvoice data?. *Survey Research Methods*, 16(1): 1-12. https://doi.org/10.18148/srm/2022.v16i1.8013
- Revilla, M., & Couper, M.P (under review, a). Expanding survey response options: a hybrid approach combining dictation and/or voice recording with text to answer narrative open-ended survey questions
- Revilla, M., & Couper, M.P. (under review, b). Exploring Respondents' Problems and Evaluation in Survey Questions Proposing Voice Inputs.
- Revilla, M., Iglesias, P., Ochoa, C., & Antón, D. (2022a). WebdataVisual: a tool to gathervisual data within the frame of web surveys. OSF. http://doi.org/10.17605/OSF.IO/R7CAX
- Revilla, M., Iglesias, P., Ochoa, C., & Antón, D. (2022b). WebdataVoice: a tool for dictation or recording of voice answers in the frame of web surveys. OSF. http://doi.org/10.17605/OSF.IO/B2WYZ
- Revilla, M., Ochoa, C., Iglesias, P. Antón, D. (2022c). WebdataNow: a tool to send in-the-moment surveys triggered by passive data. OSF. http://doi.org/10.17605/OSF.IO/G3MSC