MEASURING SMARTPHONE USAGE THROUGH DATA DONATIONS: CHALLENGES AND BEST PRACTICES

WEB DATA OPP Workshop
Barcelona 18-19th March

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WHY DATA DONATIONS?

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  - → But it was not meant for research purposes

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  - Scrapping →
  - Meters →
  - Data donations →

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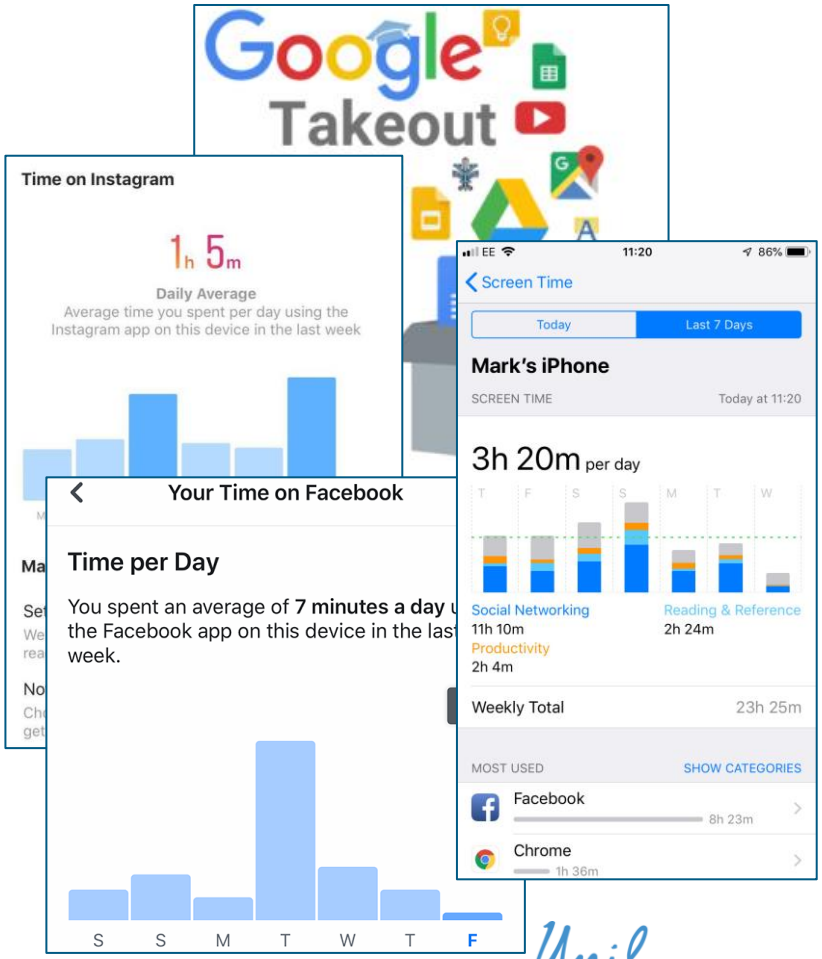
- How we collect it? APIs, Web scrapping, Meters or Data donations
  - APIs → Restricted access
  - Scrapping → Unauthorized, ethic and legal concerns
  - Meters → Contested quality
  - Data donations → ?

DATA DONATIONS

- **Users directly provide researchers with data** that already has been collected by their devices or platforms (Thorson et al. 2019).

- Increased agency, transparency and no reliance on tracking technologies



DATA DONATIONS

- Many approaches to collect data donations, not only one!

- In general, they vary in three dimensions (Baumgartner et al. 2022):
  - *How participants **access** the traces of interest*
  - *How they **capture** them*
  - *How they **share** the captured information with researchers*

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Goal: make design decisions across these three dimensions that minimises the required effort of participants to share data

OUR CASE STUDY

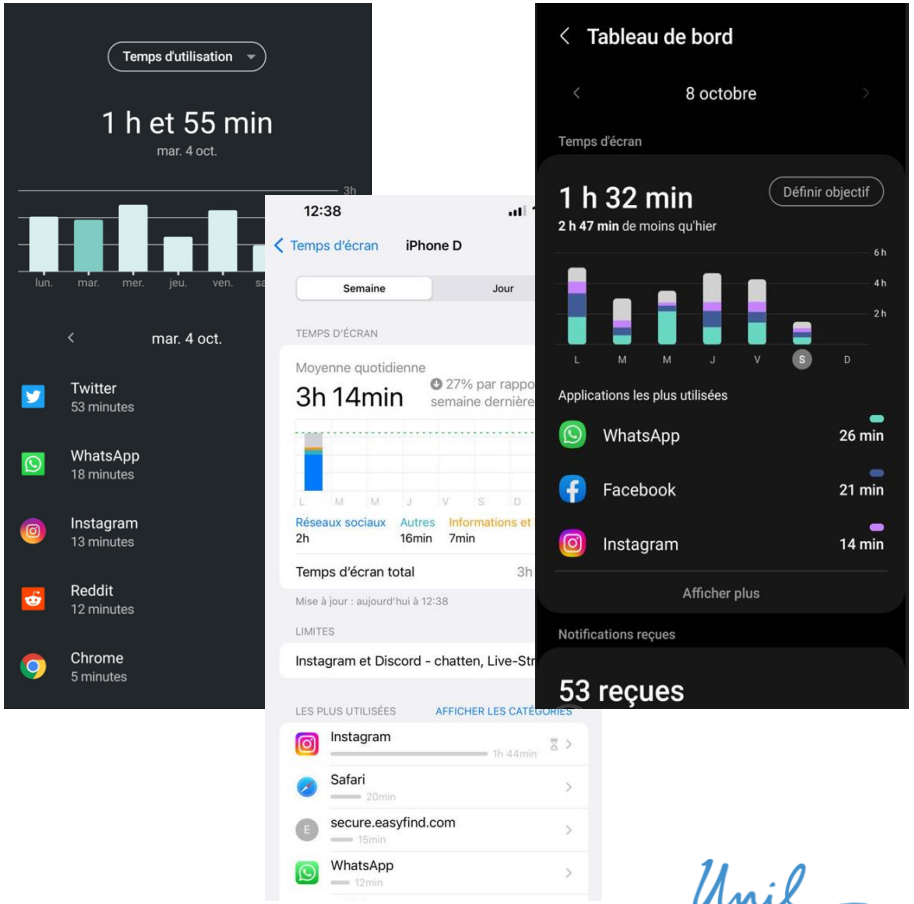
- **Feasibility** of asking respondents to provide information from their **Digital Wellbeing** (Android) / **Screen Time** (iOS) tool through a data donation task – either by taking **screenshots**, **videos** or manually reporting it (**enhanced recall**)

- Smartphone feature providing users with **information about their mobile device usage (log data)**

- Interested in a '**practical**' data donation experience

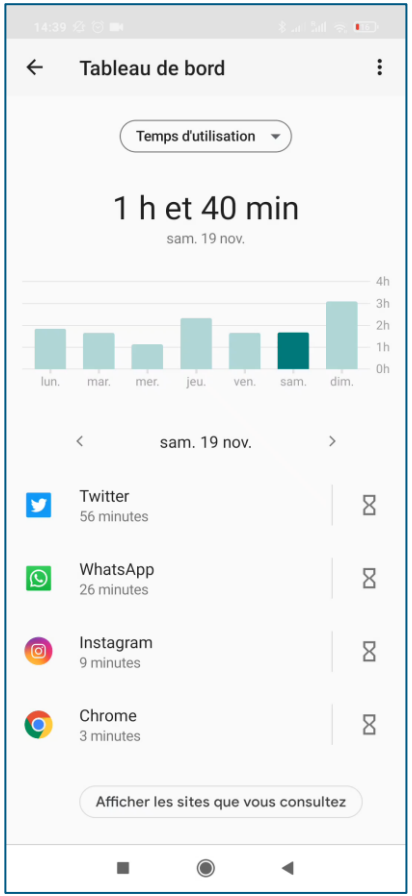
GROUP 1: SCREENSHOT

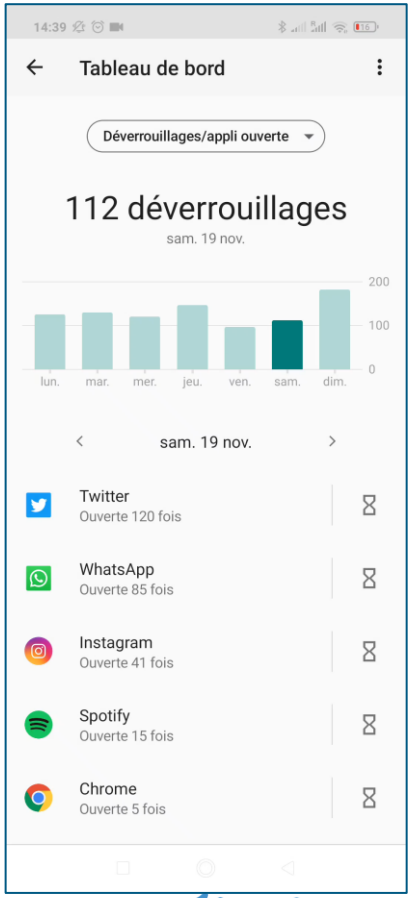
- Respondents were asked to take and upload a total of 10 screenshots
- One screenshot per day for the five past days
- Two tasks: '**Time spent**' and '**Number of unlocks**'
- We asked them to show **at least 4 apps** in their screenshots



GROUP 2: VIDEO

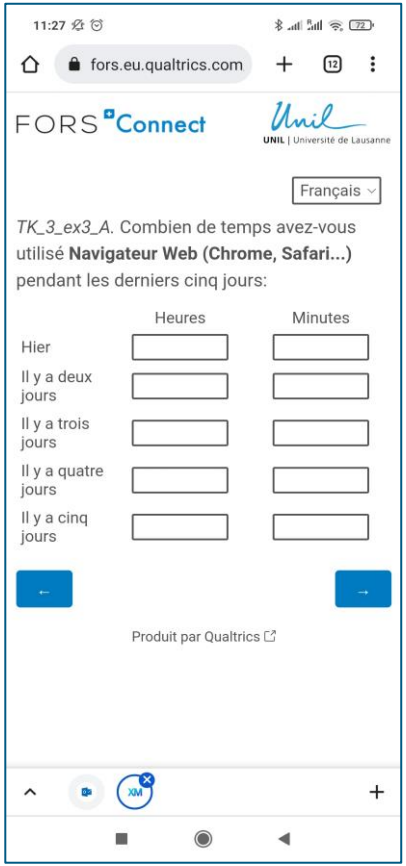
- Respondents were asked to take and upload two videos
- Each video navigating through the last five days
- Two tasks: '**Time spent**' and '**Number of unlocks**'
- We asked them to show **at least 4 apps** in their videos





GROUP 3: ENHANCED RECALL

- Respondents were asked to check the tool and manually report the information
- We asked them for their five most used apps (Yesterday only)
- **Time spent** using: Browser, WhatsApp, YouTube, Instagram & Facebook (Five days)
- **Total number of unlocks** for each of the past five days



DATA & RESEARCH QUESTIONS

- We 872 respondents from an online panel to **smartphone only** survey. A total of **597 respondents started the survey with a smartphone**.
- Respondents randomly assigned to one of the three experimental groups.
- **Feasibility**:
  - **RQ1.** What is the impact of asking participants to donate their data through screenshots, video recordings and enhanced recall on breakoff, compliance, and overall donation rates?
  - **RQ2.** And what is the effect on the composition of the final sample of donors?
- **Validity and accuracy**:
  - **RQ3**. How accurate are the self-reports measures compared to their log data equivalent?
  - **RQ4**. What is the convergent and predictive validity of both estimates?

SOME CONSIDERATIONS

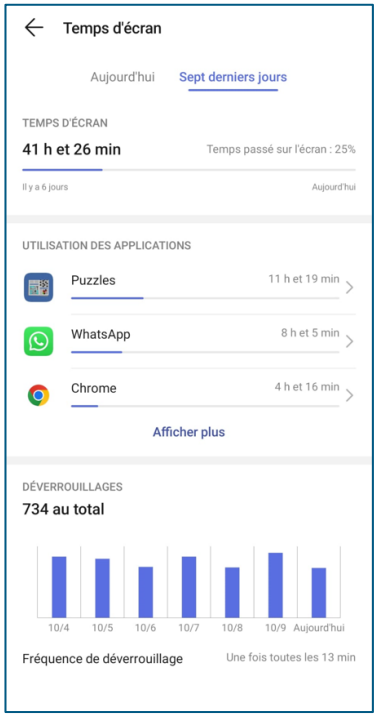
- We assumed no knowledge and fully instructed respondents on:
  - How to access the Digital Wellbeing / Screen Time tools
  - How to navigate through the tools and find the requested data
  - How to take a video of their screen
  - How to take screenshots
  - How to upload the screenshots / videos to the survey

- We tailored the instructions for manufacturer (iOS / Android) and Android model (Samsung / Huawei / Base Android)

- Screen Time is not a default option in iOS devices. A pre-notification was sent

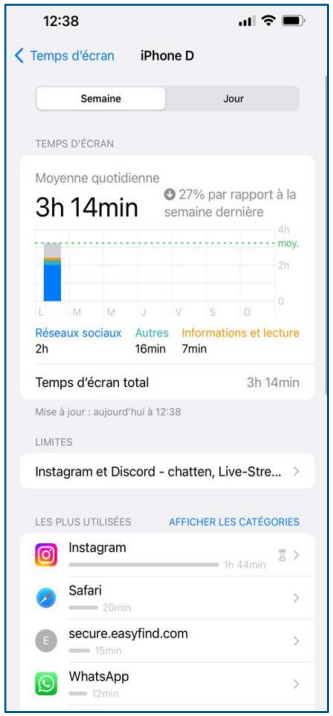
DIFFERENCES IN DEVICES / OS

Xiaomi



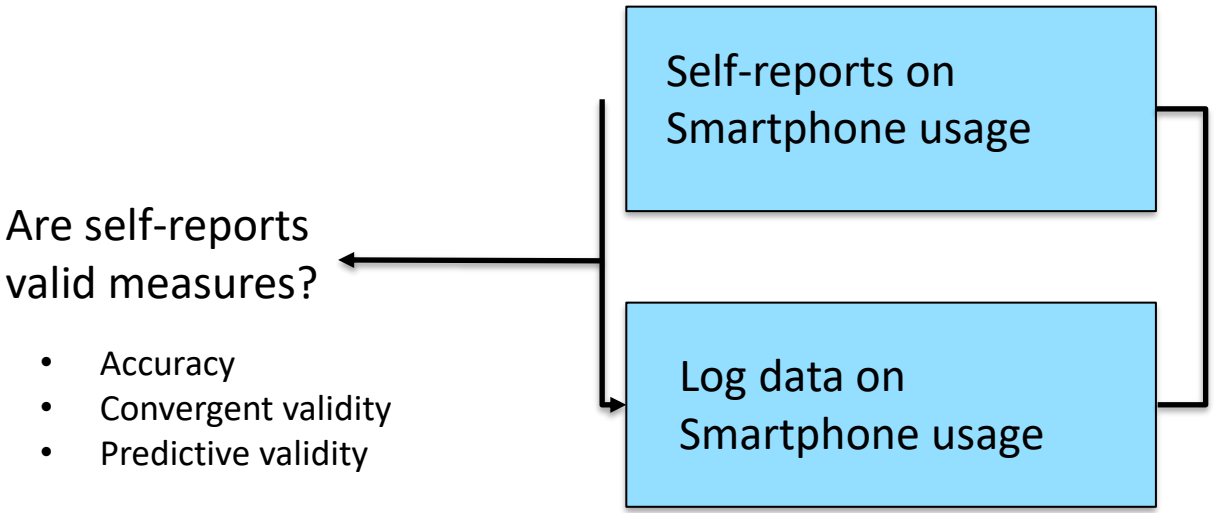
Huawei

Samsung



iOS

A GRAPHIC SUMMARY OF THIS STUDY



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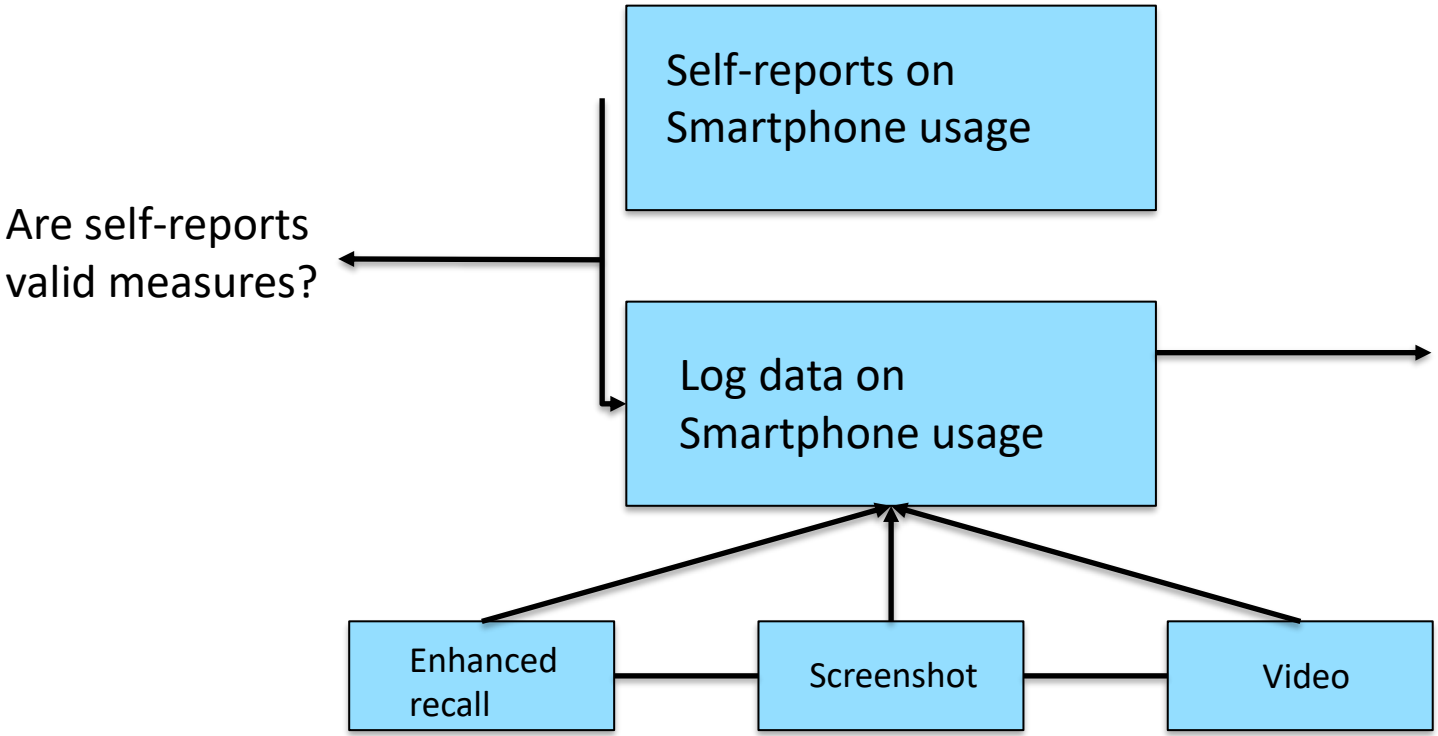

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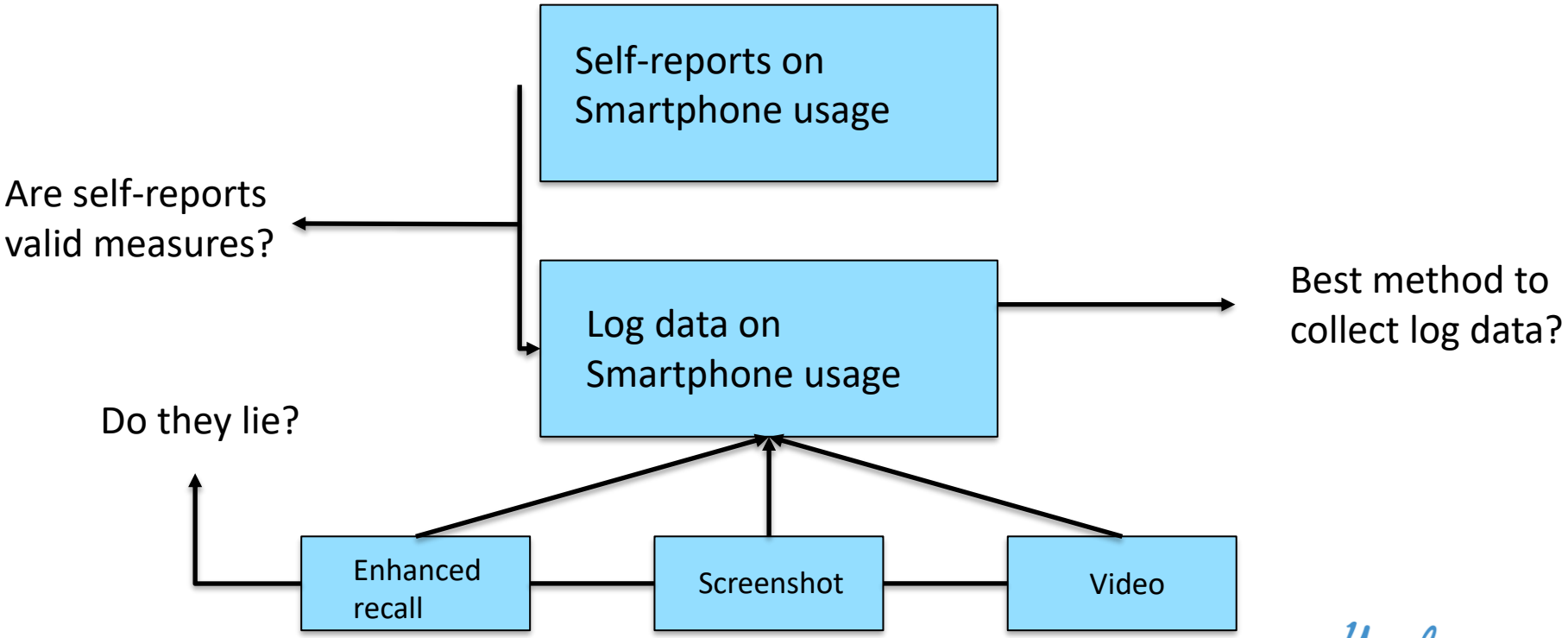

COMPLIANCE – BREAK-OFF

	Screenshot	Video Recording	Enhanced Recall
Introduction			
Broke-off	21.4	24.3	5.0*†
n	182	177	180
Screen Time (Task 1)			
Broke-off	16.1	20.9	11.7†
n	143	134	171
Number of unlocks (Task 2)			
Broke-off	10.0	8.5	2.0*†
N	120	106	151

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Alarming break-off rates just by introducing the task…even if it was optional and paid!

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Although enhanced recall's break-off rates are not ignorable, they are way lower

PROPORTION OF DONORS

	Screenshot	Video Recording	Enhanced Recall
Screen Time	**6.6**	**14.1***	**60.0*†**
General	28.6	20.9	71.7*†
4 apps	9.9	22.0*	61.7*†
Number of unlocks	**26.9**	**21.5**	**63.3*†**
n	182	177	180

People fail to actually put everything in the screenshot, dealing to very low % sharing all the data.

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In line with what other research has found for screenshot / video

Enhanced recall, even if in principle very burdensome, performs very well!

ACCURACY – DIFFERENCES BETWEEN LOG DATA AND SELF-REPORTS

	Average screen time (in minutes)			Average number of unlocks		
	Screenshot & Video	Enhanced recall	All	Screenshot & Video	Enhanced recall	All
Self-report	115.6 (75.8)	136.7 (123.2)	127.9 (106.3)	23.1 (16.0)	22.9 (20.4)	23.0 (18.6)
Log data	146.4 (116.4)	149.2 (135.1)	148.0 (127.3)	51.5 (38.2)	47.3 (40.6)	49.1 (39.6)
Absolute error	30.8 (104.8)	12.5 (104.0)	20.1 (104.5)	28.4 (40.9)	24.4 (36.3)	26.1 (38.3)
Over-report	20.3 (42.1)	26.4 (57.3)	23.9 (51.5)	2.0 (8.52)	1.69 (5.3)	1.8 (6.8)
Under-report	51.1 (84.4)	38.9 (73.9)	44.0 (78.5)	30.4 (38.4)	26.1 (34.7)	27.9 (36.3)

Notes. Standard deviation in parenthesis

MAIN CHALLENGES

- Necessity to **heavily instruct** respondent in the context of a general population survey.
  - Generates fatigue and in turn, drop-out
  - As researchers, this supposes an extra layer of difficult as decisions on the ‘how-to’ will affect respondents engagement

MAIN CHALLENGES

- Necessity to **heavily instruct** respondent in the context of a general population survey.
- **Different operative systems**, different needs
  - Huawei devices produce different estimates. Adapt or drop?
  - iOS Screen Time it is not activated by default. Pre-notify or ignore?

MAIN CHALLENGES

- Necessity to **heavily instruct** respondent in the context of a general population survey.
- **Different operative systems**, different needs
- **Non-compliance** is a serious problem
  - We face non-response biases
  - Who is donating the data?
  - Can we make meaningful generalizations?

MAIN CHALLENGES / VIRTUES

Screenshot

- Moderate – low compliance rate
- Very low % valid donors
- Limited to screen size
- The more we ask… the worse?
- Requires some instructions
- Analyze data is an extra step

Video

- Low compliance rate
- Moderate - low % valid donors
- Flexible, easier to perform the task
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Enhanced recall

- High compliance rate
- High % of valid donors?
- Uncertainty about the valid nature of the data
- The more we ask…the worse?
- Little instructions needed

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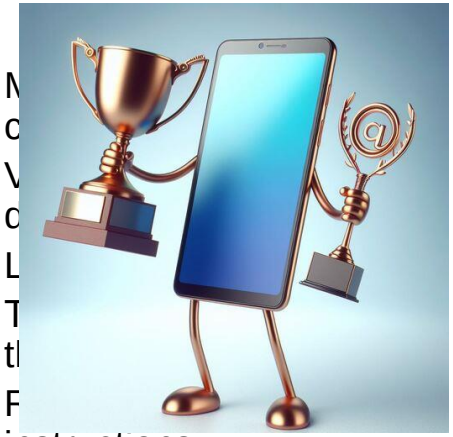

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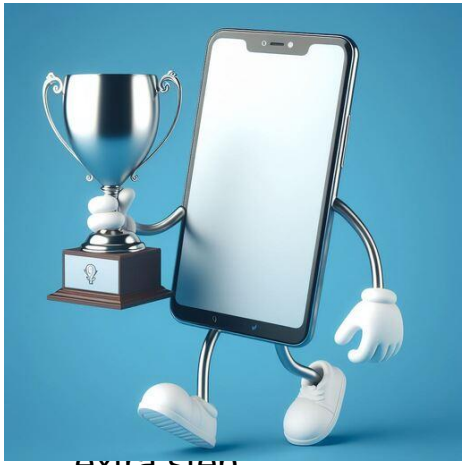

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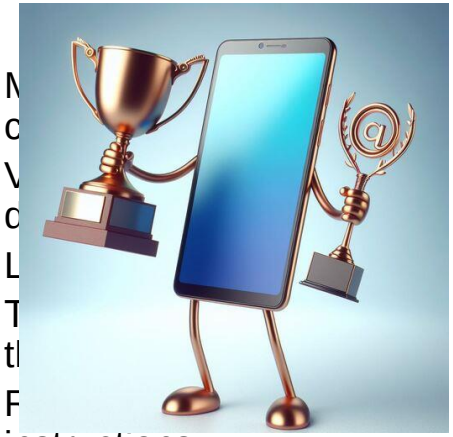

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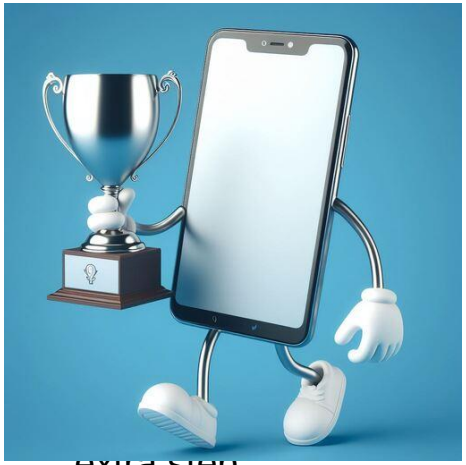

extra step

Enhanced recall

- High compliance rate

THANK YOU FOR YOUR ATTENTION!

Questions?

If you are not satisfied with my work, please e-mail my employer at iss@unil.ch
If you would like to reach me, please e-mail me at marc.asensiomanjon@unil.ch (only work related)