Utrecht University

Summer Course Survey Research: Advanced Survey Design

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Mixed-mode and mixed-device surveys

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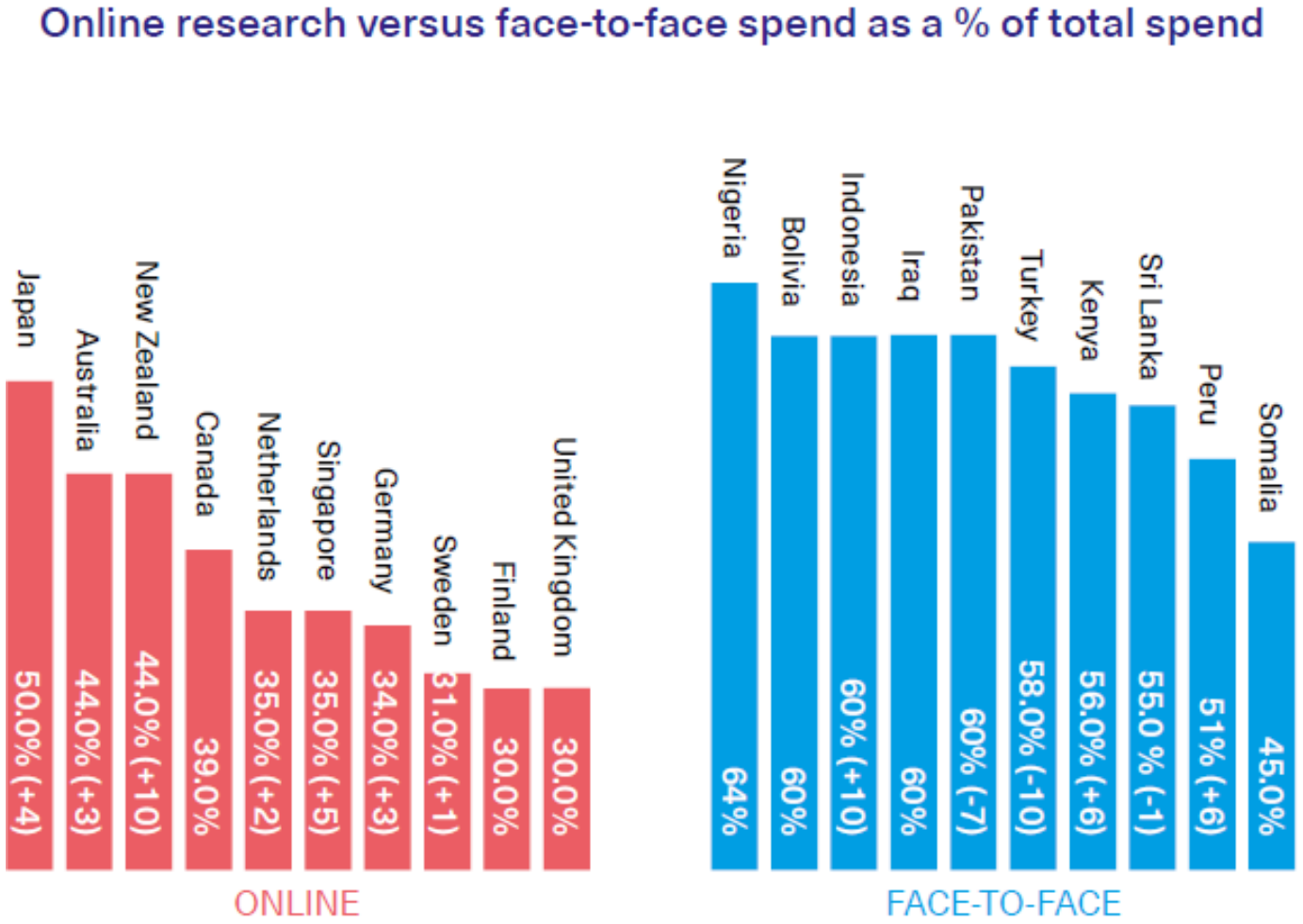
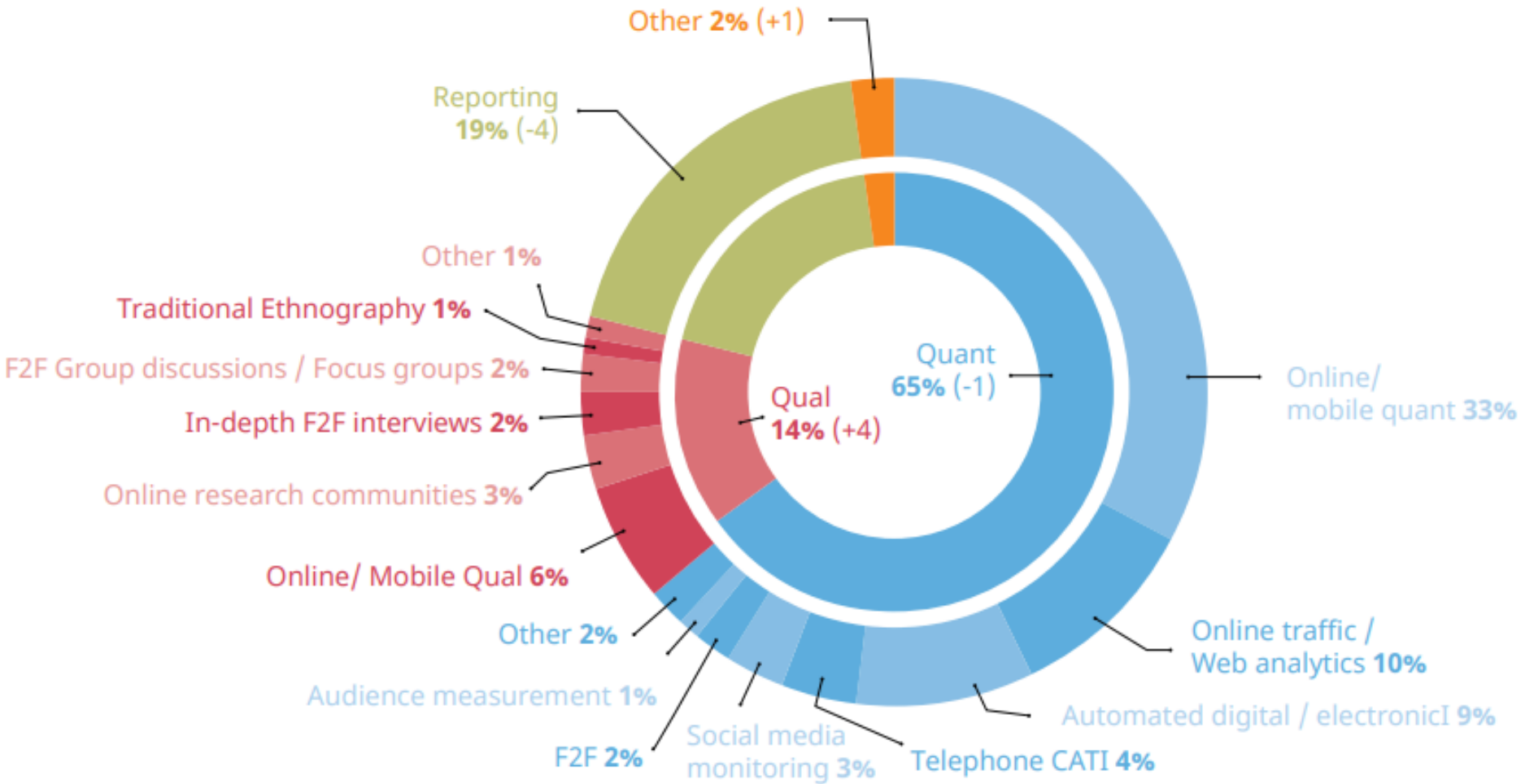
Survey modes



Source: ESOMAR 2017

Spend by method



ESOMAR Global Market Research 2022

Mixed-mode designs

- Why?
  - Balance for under-coverage, e.g. dual-frame designs
  - Increase overall response rates

Inclusion probability of peron *i*:

$$\pi_i \approx k_i^F \frac{m^F}{M^F} \cdot \frac{1}{z_i} + k_i^C \frac{m^C}{M^C}$$

Overview 1. Parameters required for the dual frame model

	Landline		Mobile
M^F	Size of the landline sampling frame	M^C	Size of the mobile phone sampling frame
m^F	Size of the landline sample	m^C	Size of the mobile phone sample
k_i^F	Number of landline phone numbers at which person *i* can be reached	k_i^C	Number of mobile phone numbers at which person *i* can be reached
z_i	Number of persons in the household of person *i* who belong to the target population		

  - Save costs – how?

https://www.gesis.org/fileadmin/upload/SDMwiki/Häder_Sampling_in_Practice.pdf

Mixed-mode designs

- Why?
  - Balance for under-coverage, e.g. dual-frame designs
  - Increase overall response rates
  - Save costs – how?

- How? 2 major differences (simplified):
  - Concurrent Design (Truly multiple mode): Let respondent choose preferred mode
  - Sequential Design (One main mode):
    - approach nonrespondents in first mode (e.g. Web) with second mode (e.g. CATI) or a combination of modes (CATI and CAPI)

Combining modes

- Mixing modes has advantages, but
  - Answers can differ by mode
  - Can we combine data collected through different modes in one study?
  - Can data that are collected through different modes be compared over studies or countries?

- How should questionnaires be designed?

“Thoughtless” Mixing increases Measurement Errors

- Different modes have a tradition of different formats
  - Question format has an effect on response distribution
- Consequence: Designers may routinely enhance unwanted mode effects in a mixed-mode survey
  - E.g. unfolding in one mode, full presentation of all response options in other mode
- What to do?

Design for the Mix

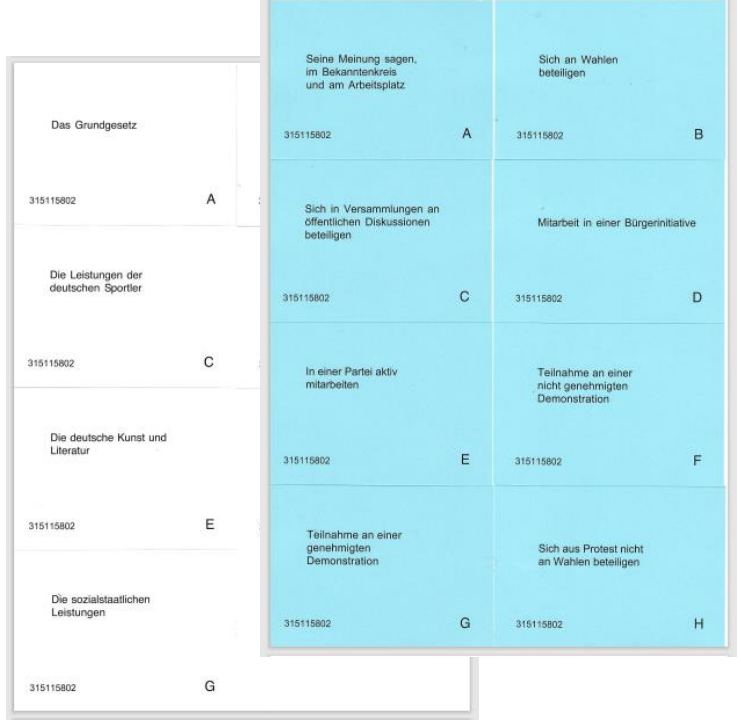
- Two Situations:
  - One main method that accommodates the survey situation best
    - Main method is used to maximum potential
    - Other methods auxiliary

      Examples: Nonresponse follow-up, Non-covered groups
  - Truly multiple mode design
    - Modes equally important

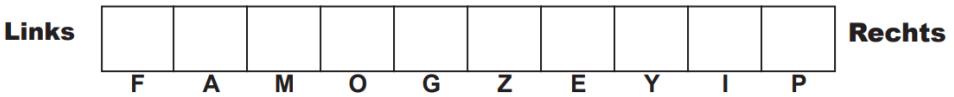
      Examples: International surveys, Longitudinal studies, Respondent is offered a choice

Example UNI Mode Design

Mail, Telephone and Face-to-face interview



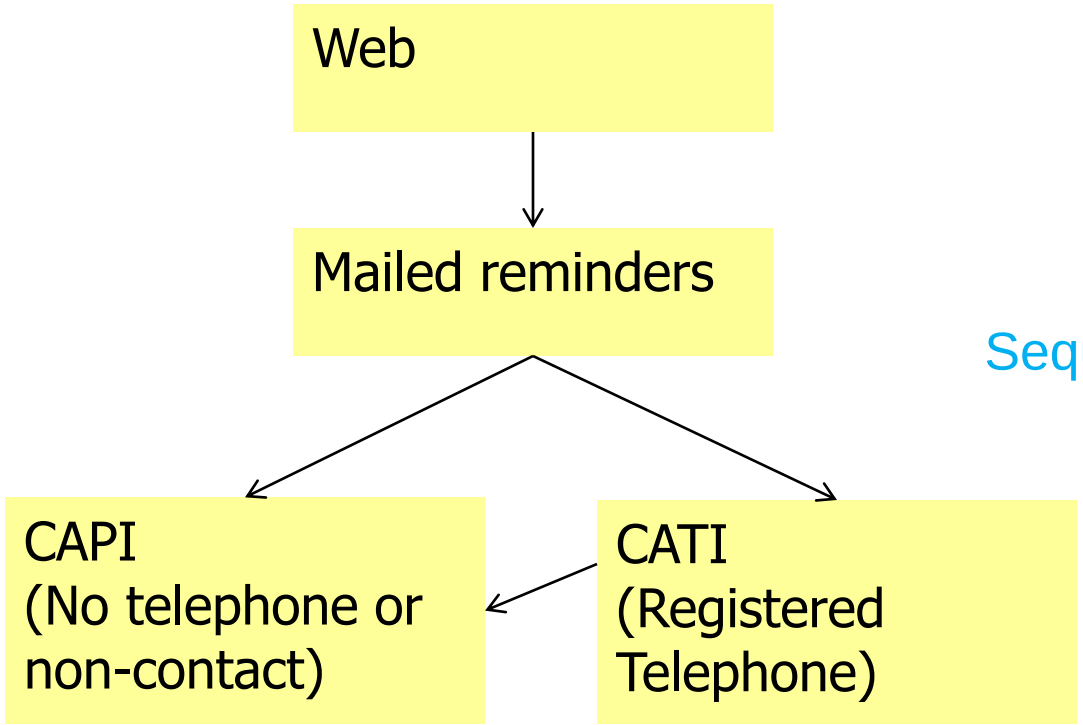
- Response options the same across modes
- Same descriptive labels for response categories
- Reduced number of response categories
  - Maximum 7 pushing the limit for CATI
  - But used show cards in face-to-face
    - Equivalent with visual presentation mail



- Used simple open questions
- Interviewer instructions and instructions in mail questionnaire equivalent

Example: Security Monitor

(roughly)



Sequence!

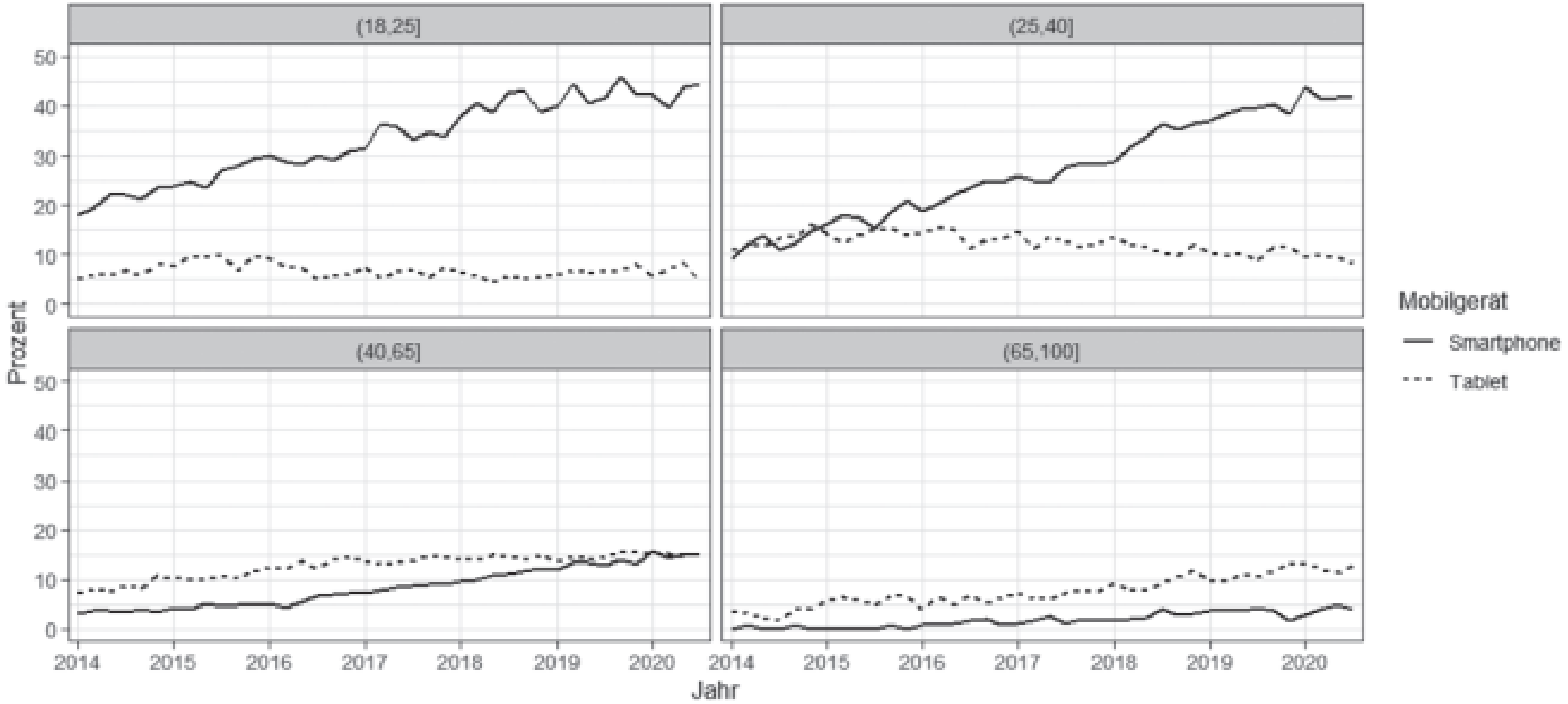
- Would you call the main mode or multiple mode design?

Mixed-device surveys

Online surveys are mixed-device surveys

- More and more people access online surveys via tablet or mobile phone
  - Does this result in measurement effects?
  - How to design mixed-device surveys?
  - Optimally designing surveys, no bias at all?

Smartphone & tablet survey completion



Source: Weiß, Silber, Struminskaya, Durrant 2022 DOI: 10.1007/978-3-658-37985-8_71

Smartphone as a research tool

- Web surveys are completed on different devices
  - Desktop PC
  - Tablet
  - Mobile phone
- Mobile phones are different than regular desktop PCs
  - Screen size
  - Touchscreen

Potential of mobile data collection

- “Anytime, anywhere” data collection can yield more immediate and reliable data
- Demographics who may be harder to recruit to traditional panels are more receptive to mobile
  - the young, single, ethnic minorities
- Many more options for recruitment and survey invitation delivery/reminders are available
- Potentially higher engagementon the mobile device because of 24/7 interaction

Respondents are not willing to do long surveys on mobiles

TIME WILLING TO SPEND ON SURVEYS

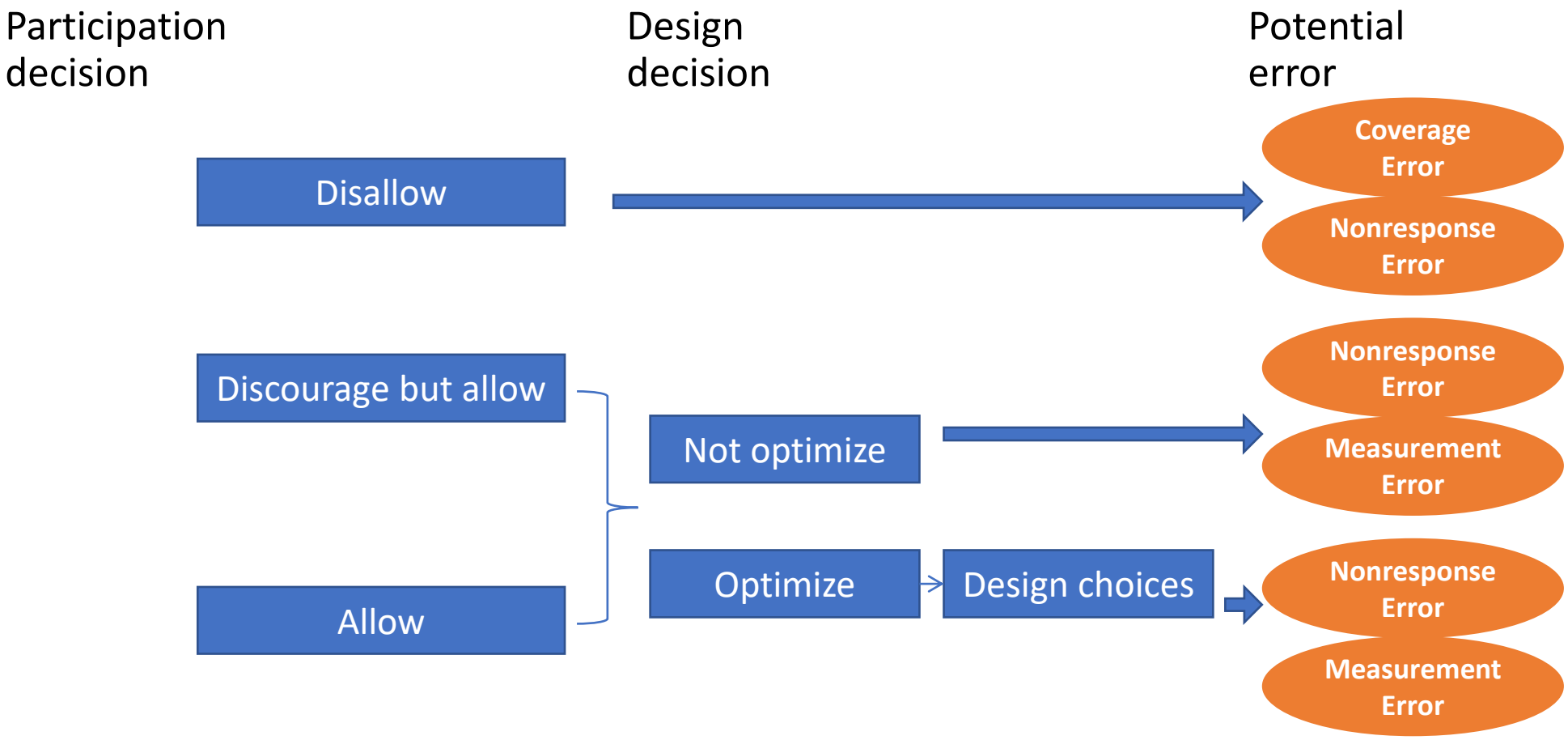
65% of US Smartphone users would not be willing to spend more than 15 minutes completing surveys

MAXIMUM TIME DOING SURVEYS:	COMPUTER	TABLET	SMARTPHONE
5 minutes or less	2%	9%	27%
10 minutes or less	9%	24%	45%
15 minutes or less	19%	42%	65%
20 minutes or less	34%	65%	73%
25 minutes or less	42%	71%	77%
30 minutes or less	65%	81%	85%

US data from 1185 completes November, 2012

Taken from: Kelley, 2013

Design choices and potential errors



(Peterson et al. 2017)

Mobile Web **Sampling** Opportunities

- Smartphone = phone + Internet-enabled device

→Overcome the *lack of frame* by using RDD (coverage & nonresponse remain problematic, legal constraints)

(Couper et al. 2017)

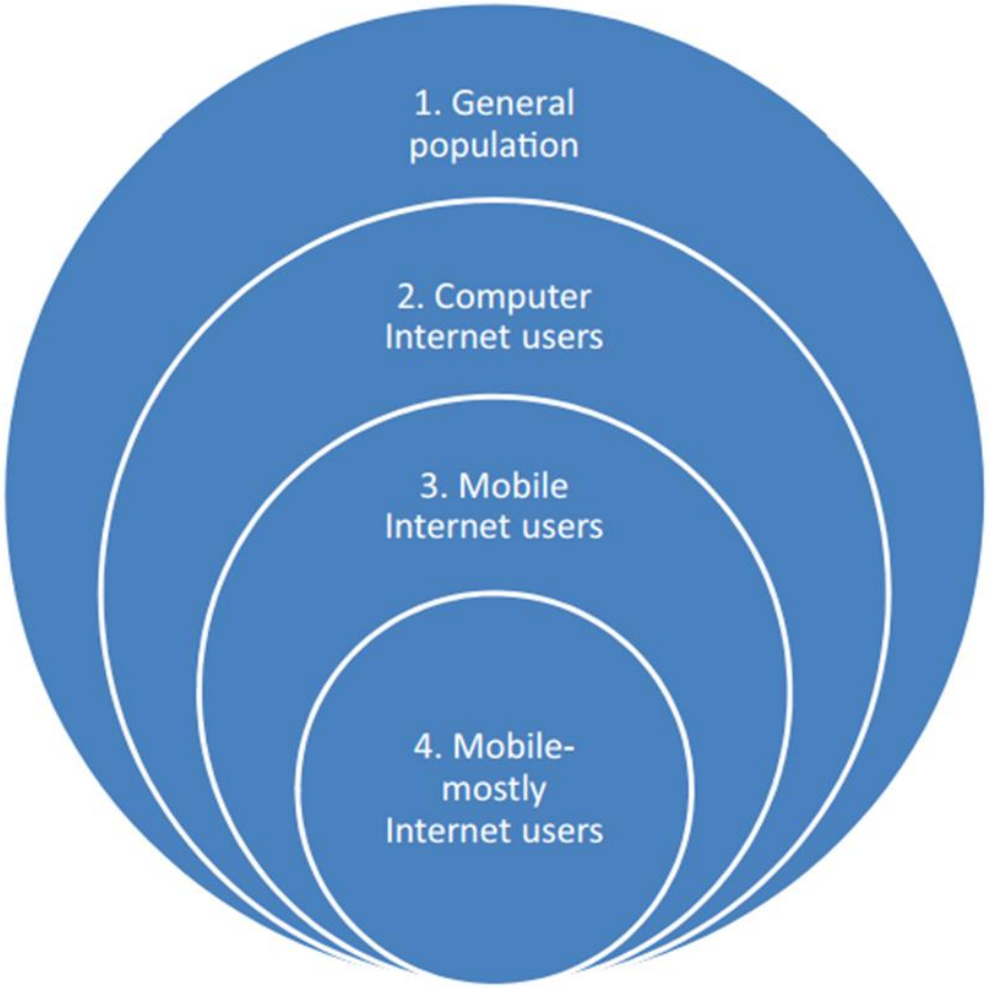
- Studying *hard-to-reach* groups

→Example: Sugie (2016) provided men recently released from prison with smartphones and followed them for 3 months

  - GPS location + encrypted call logs
  - augmenting short (EMS) smartphone surveys
  - role of social contacts and geographic context for job search behavior

Mobile Web **Noncoverage** Reduction Opportunities

- People forgo the use of computers using mobile devices
- „Device-divide“: mobile Internet users are younger, better educated, more likely Black or Hispanic, have higher income
- Mobile mostly Internet users: younger, more likely to be Black than computer-mostly (Antoun 2015)



(Antoun 2015: 102)
Figure not drawn to scale

Nonresponse in mobile web surveys

- Risk of errors: screen size, input mode, locations & distractions
- Higher **unit nonresponse**
  (Buskirk & Andrus 2014; de Bruijne & Wijnant 2013, Mavletova & Couper 2013)
- Higher **item nonresponse** (Struminskaya et al. 2015; Lugtig & Toepoel 2016)
- Higher item nonresponse (INR) in **open-ended questions** in early studies (Peytchev & Hill 2010)
- Newer studies: no difference in INR, but **shorter answers** (Mavletova 2013, Peterson 2012, Wells et al. 2014, Struminskaya et al. 2015)

Response rates for PCs and mobile web

	Response rate (%)	
	PC web	Mobile web
De Bruijne and Wijnant (2013)[a)]	61	47
Mavletova (2013)	82	40
Mavletova and Couper (2013)	74	31
Wells et al. (2013a)[a)]	61	58
Buskirk and Andrus (2014)	64	23
Antoun (2015b)[a)]	85	74

All mobile questionnaires were optimized for small screens.
a) Probability panels; others are opt-in panels.

Source: Couper, Antoun, Mavletova 2017

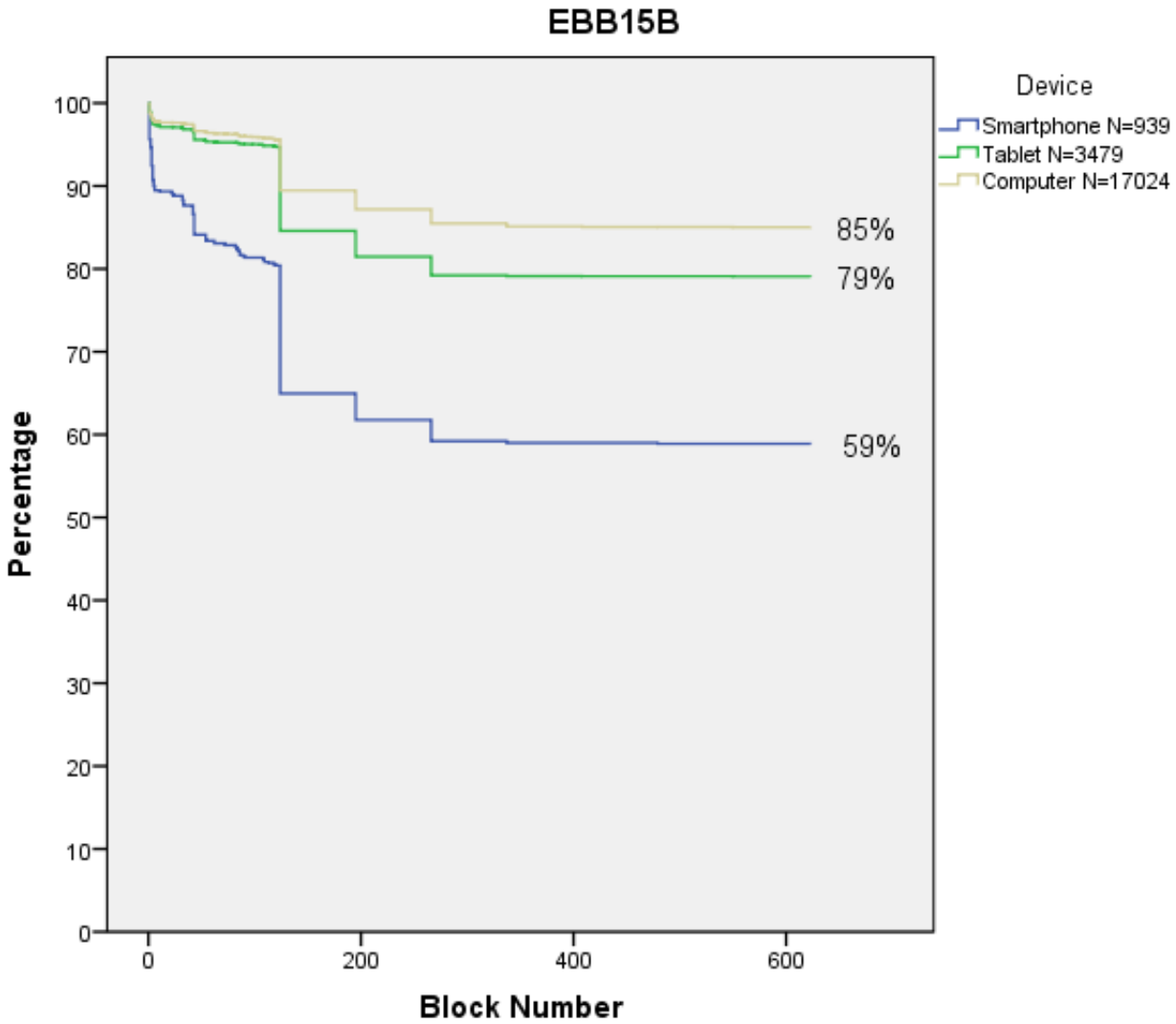
Break-off in mobile web surveys

- Meta-analysis by Mavletova & Couper (2015)
  - Average break-off rate in mobile web surveys: 6.6% [5.3; 8.2]
  - Significantly lower break-off: Mobile optimization, email invitation vs. SMS, short duration, using prerectuitment, large nuber of reminders, less complex design, opportunity to choose mode (PC vs. mobile)
  - Increased break-off: grids, drop-down boxes, images, slider bars, progress indicators (OR one element=1.3; all = 1.91, p<.001)
  - See also Wenz 2021 about the influence of the screen size

(Mavletova & Couper 2015)

Where do people break off?

Dutch Labour Force Survey



Measurement Error in Mobile Web Surveys

- *Disclosure of sensitive information*
  - No differences between PC & mobile web (Antoun 2015a)
  - Similar to PC but mobile web respondents report less alcohol consumption (Mavletova & Couper 2013)

- *Measurement error*
  - Coverage and nonresponse are larger problems; but certain formats (e.g., slider) more prone to errors (Antoun 2015a)
  - When comparing distribution means, only 4 out of 26 items show significant differences (de Bruijne & Wijnant 2013)

Measurement Error in Mobile Web Surveys

- *Response quality → mixed results*
  - Answers to open-ended questions:
    - longer in mobile vs. PC (Antoun 2015a*) vs.
    - shorter in mobile web (Mavletova 2013*; Peterson 2012; Wells et al. 2014*, Struminskaya et al. 2015)
  - Primacy effects:
    - some evidence (Lugtig & Toepoel 2016; Wells et al. 2014*) vs.
    - no evidence (Buskirk & Andrus 2014*; Mavletova & Couper 2013*; Toepoel & Lugtig 2014*; Wells et al. 2014*)
  - Nondifferentiation:
    - greater likelihood (McClain et al. 2012; Struminskaya et al. 2015)
    - vs. no evidence (Antoun 2015a*)
  - Check-all-that-apply questions: fewer options selected in mobile (Lugtig & Toepoel 2016)
  - Failing the attention check in non-optimized questionnaires (Toninelli & Revilla 2019*)

* optimized for mobile devices

Respondent effects or device effects?

- Experimental studies randomly assigning to devices face the issue of noncompliance (e.g., de Bruijne & Wijnant, 2013; Mavletova, 2013; Wells et al. 2014)

- Lugtig & Toepoel (2016): measurement errors do not increase when respondents switch from one device to the other → reporting with measurement error is respondent-related

- Struminskaya et al. (2015): control for respondents‘ characteristics in multilevel models – only item nonresponse is not predicted by tablet or smartphone completion

- Method to separate: cross-over experiment (e.g., Antoun et al. 2017)

Design for mobile

- Questionnaires should be mobile friendly
  - Adaptive survey design to
    - Small screen
    - Touchscreen as method of navigation
- Questionnaires should be short
  - Most questionnaires are too complex or too long for mobile completion

Design for mixed-device

- Respondents can access surveys with a variety of devices: optimal experience for any screen size.
- There are several ways to structure surveys:
  - Device agnostic
    - same survey on all devices.
  - Device adaptive
    - longer survey on large screens, shorter survey on smaller screens.
  - Mobile-specific
    - for those studies that require in-the-moment responses.

Trade offs in using multiple devices

- Device agnostic
  - One survey
  - Potentially less data collected
- Device adaptive
  - More complex script and data analysis
  - More data from large screened devices

Mixed-device survey

- Shorter surveys
  - 10 minutes or less
- Split surveys –data stitching
  - break the survey into parts (chunking), fielding each portion separately, combining parts into one holistic data analysis (stitching). Smaller chunks can be device agnostic or mobile only
- Updated look and feel
  - use device detection to display appropriately for screen size.
    - Device awareness –based on physical device size –7 categories of device
    - Mobile awareness –page and question layout adapt based on device used
    - Touch-friendly
    - Automatically renders in both Portrait and Landscape orientations

Modularization

Study	Type of sample & survey length	Randomization	Mobile complete vs. mobile modular
Johnson et al. 2015	nonprobability online panel, 25 min., modules 10 min.	online complete, online modular, mobile modular, mobile complete	lower straightlining, better follow grid question instructions, fewer zip code mismatches
Kelly et al. 2013	nonprobability online panel in the US, 26 min, online, mobile web, app	n/a	894 out of 900 mobile respondents completed in one setting
Toepoel & Lugtig 2016	LISS Panel respondents who own a mobile phone with Internet connection	regular, 3 modules, 10 modules (+email/SMS notifications)	higher RR, fewer DK, no diff. INR, no diff. extreme responding, evaluation less difficult, more clear
West et al. 2015	long-standing panel in Nepal, 15-item questionnaire, 5 min.	CATI, text messaging interviews complete vs. one question a day	higher INR evaluation as sig. easier no INR bias

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→ Higher data quality
→ Better evaluation

Mobile design guideliness

- Short, short, short
- Simple design with as few visual distractions as possible
  - Flat tile design
  - Remove images and progress bars
- No grids
  - Pictograms as answer options or visual relief
- No horizontal scrolling
- No Adobe Flash
  - These rules should enable a quick orientation and easy navigation in an online survey irrespective of the device used
  - See Arn et al., MDA, 2015 special issue on mixed-device surveys
  - Ipsos MORI Mobile First Best Practice Guide (2020)

No long introduction text

Add pictograms for visual relief

So….

- do not use unnecessary images
- replace text by informative images

KEEP IT CLEAN AND EASY!

Grids:
don’t use or design carefully

- Don’t have the answer options go off the screen
- Ask the items in the grid one at a time
- Keep the response options stable
- Some use drag & drop (might take longer)
- Accordion format (collapsable chunks)
- Carousel format (items pass by)

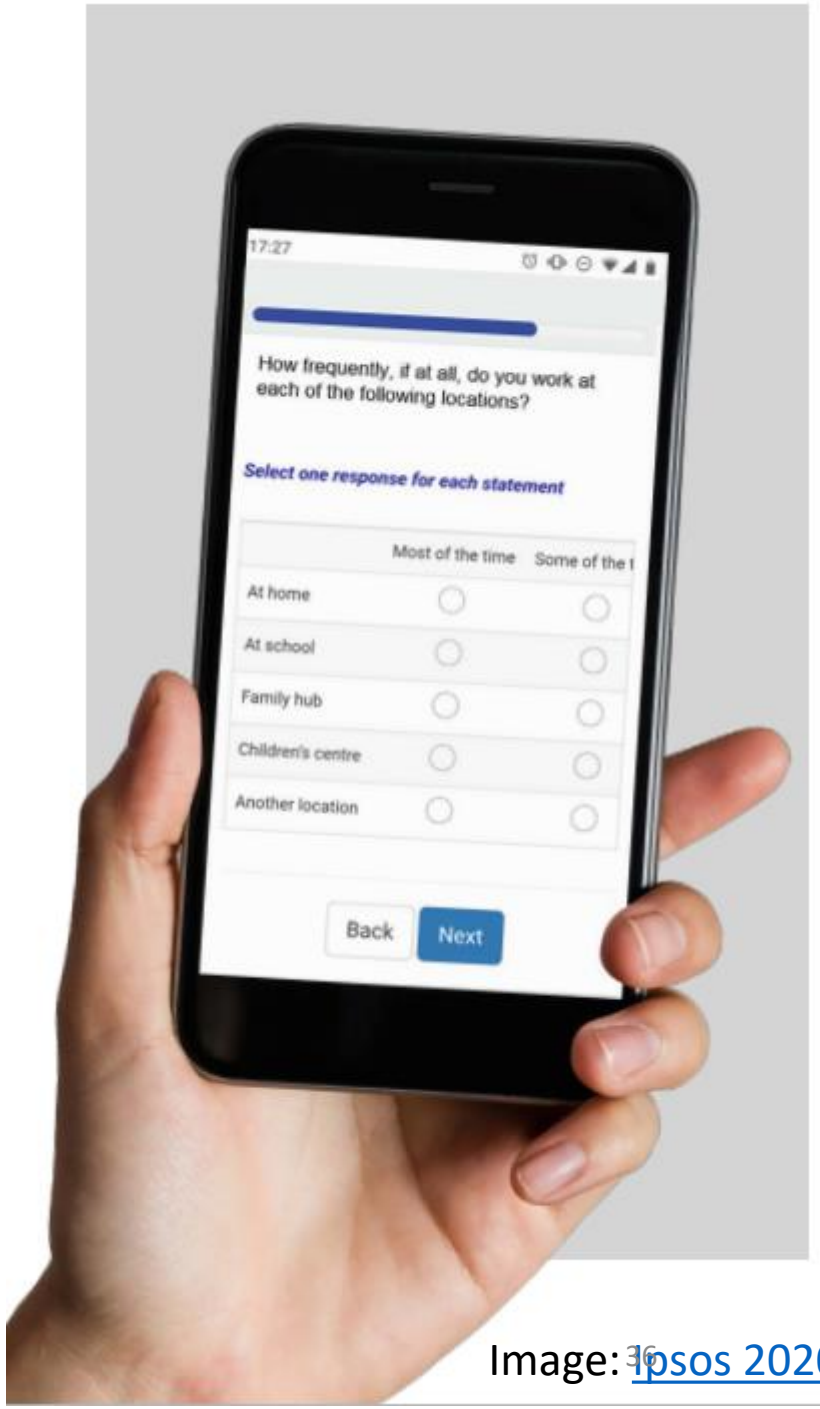
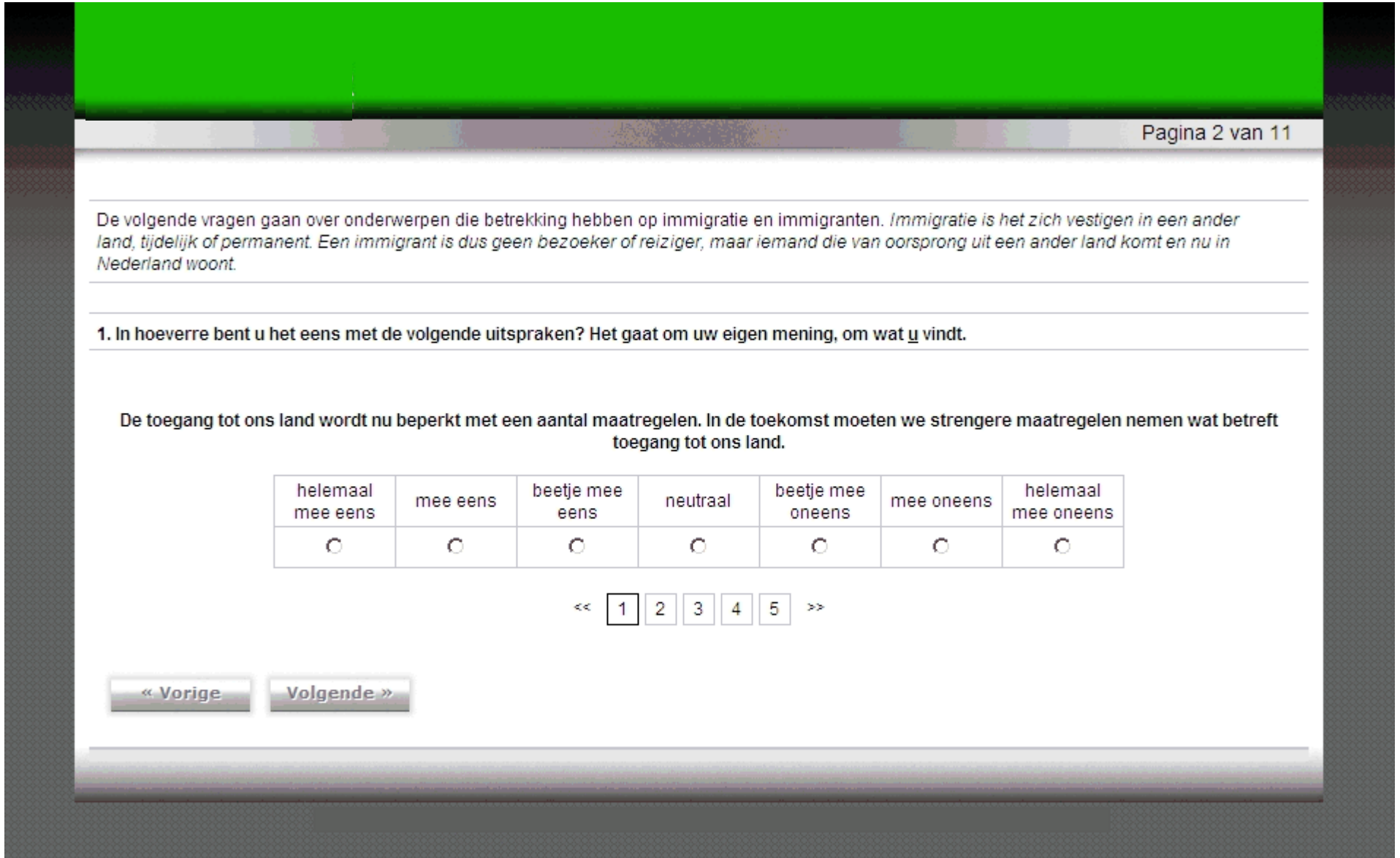


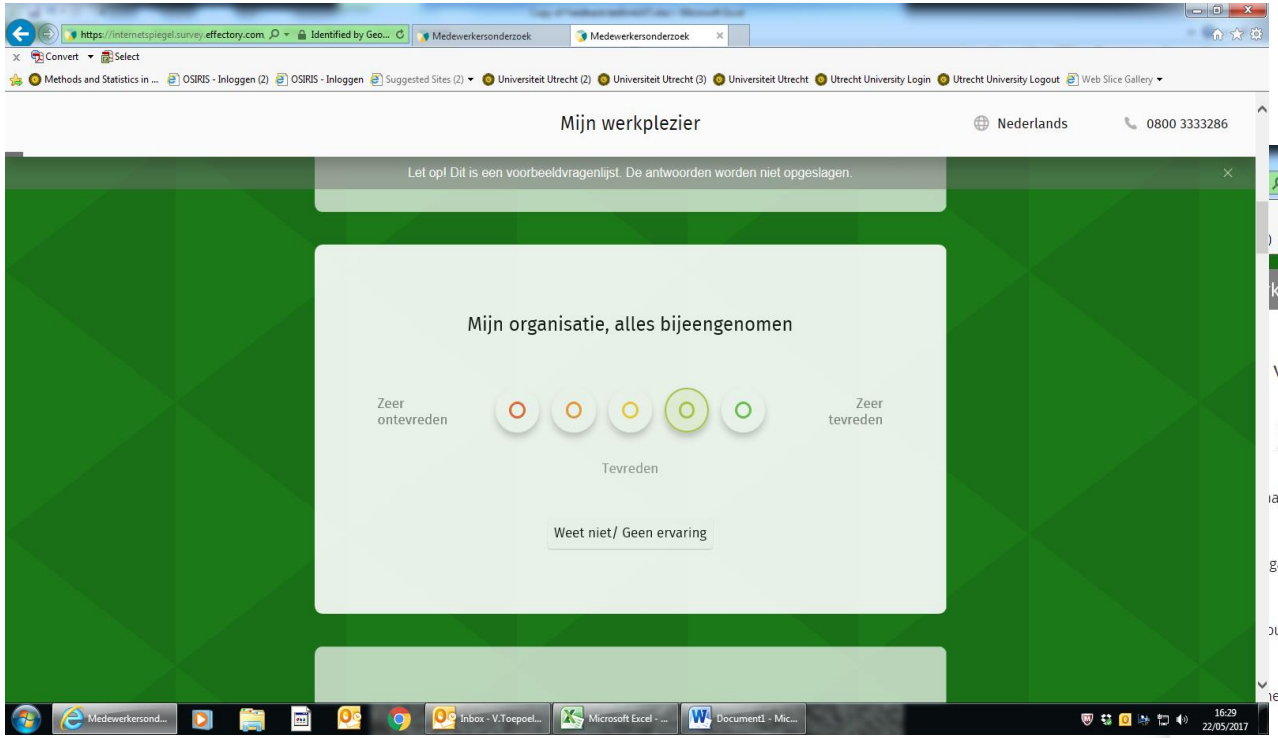
Image: Ipsos 2020

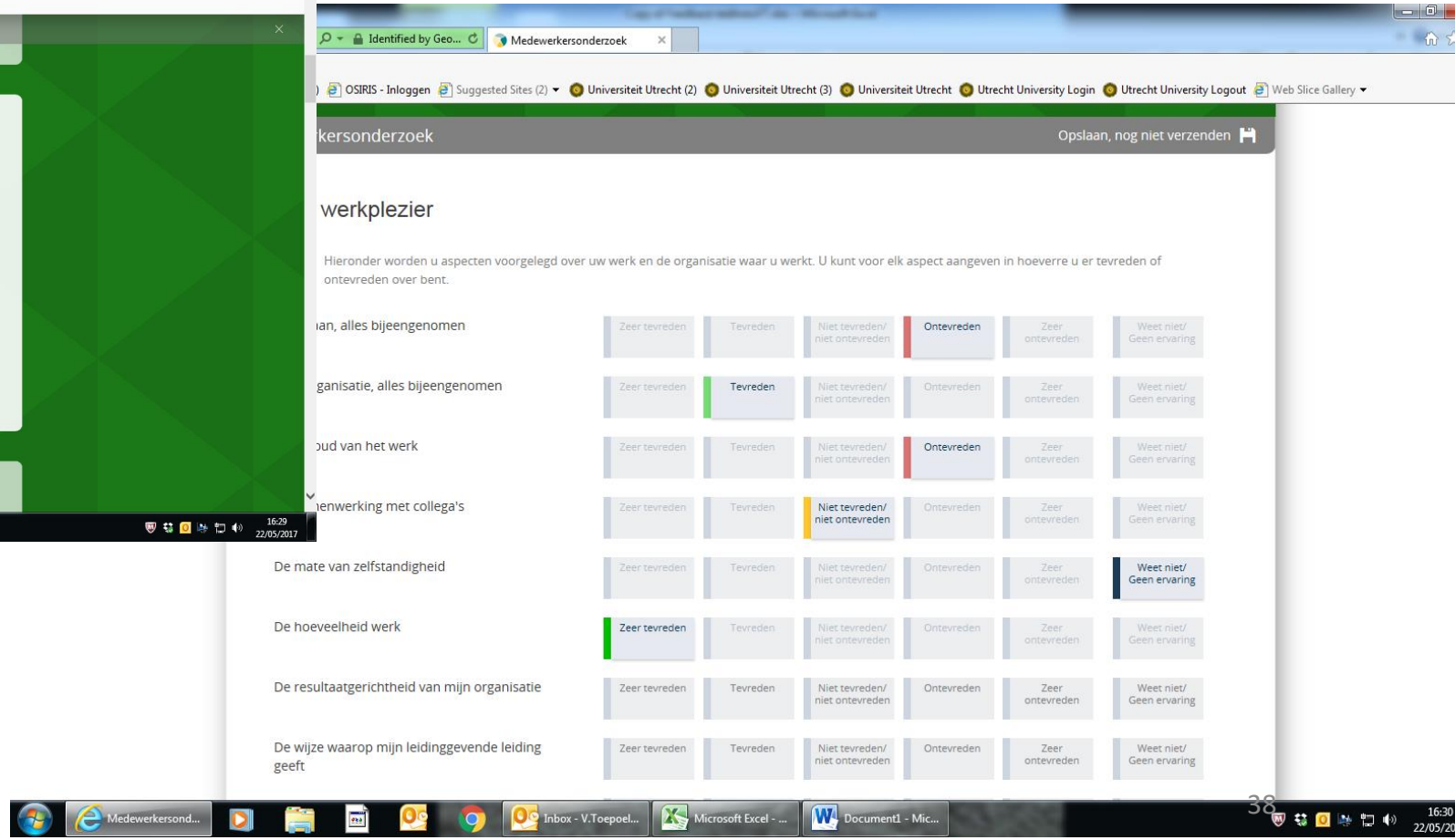
Carousel format for a grid (on a PC/laptop)

(see Klausch et al.)



Visual relief: (vertical) accordion vs. traditional grid





For mobile: do not use dropdown menu as it varies by browser

Radio buttons

Drop-down

All Devices/ Browsers

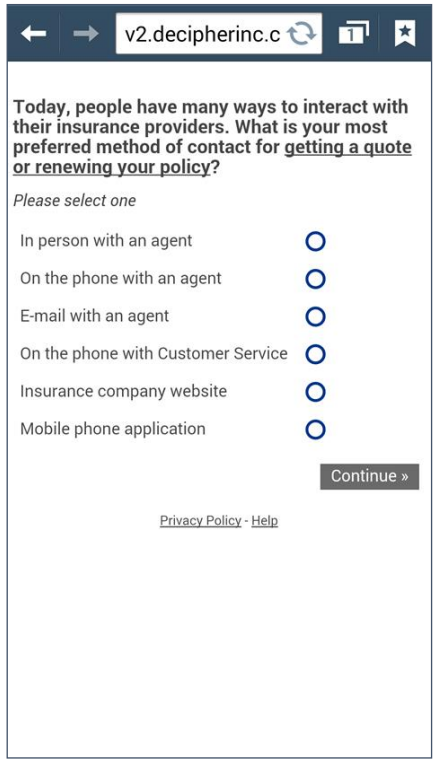
iPhone

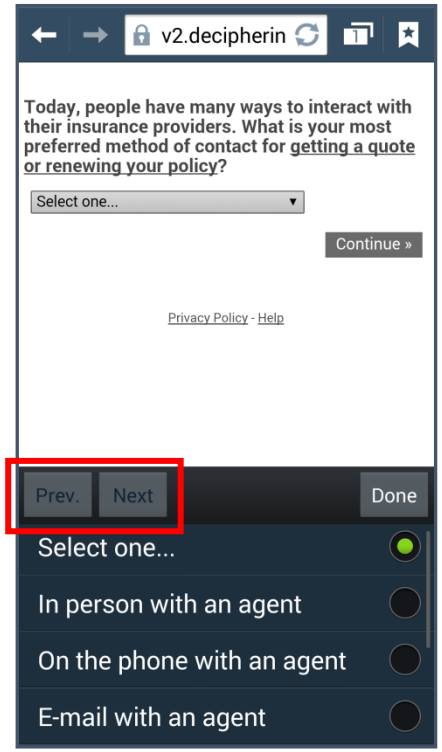
Android

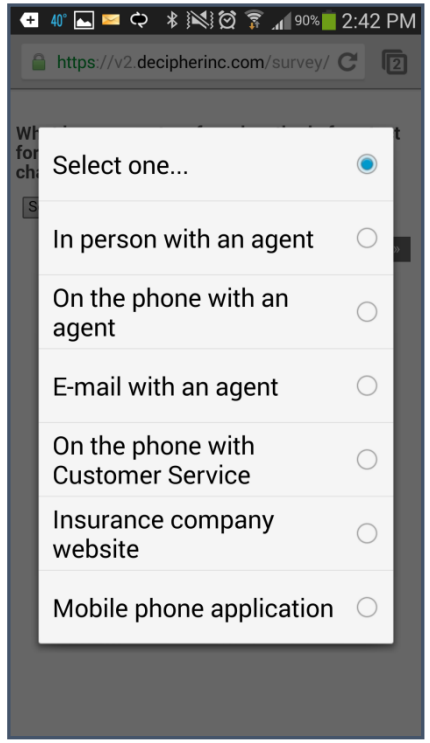
Safari Browser

Default Browser

Chrome/Firefox







Visual Analogue Scale vs. Slider Bar

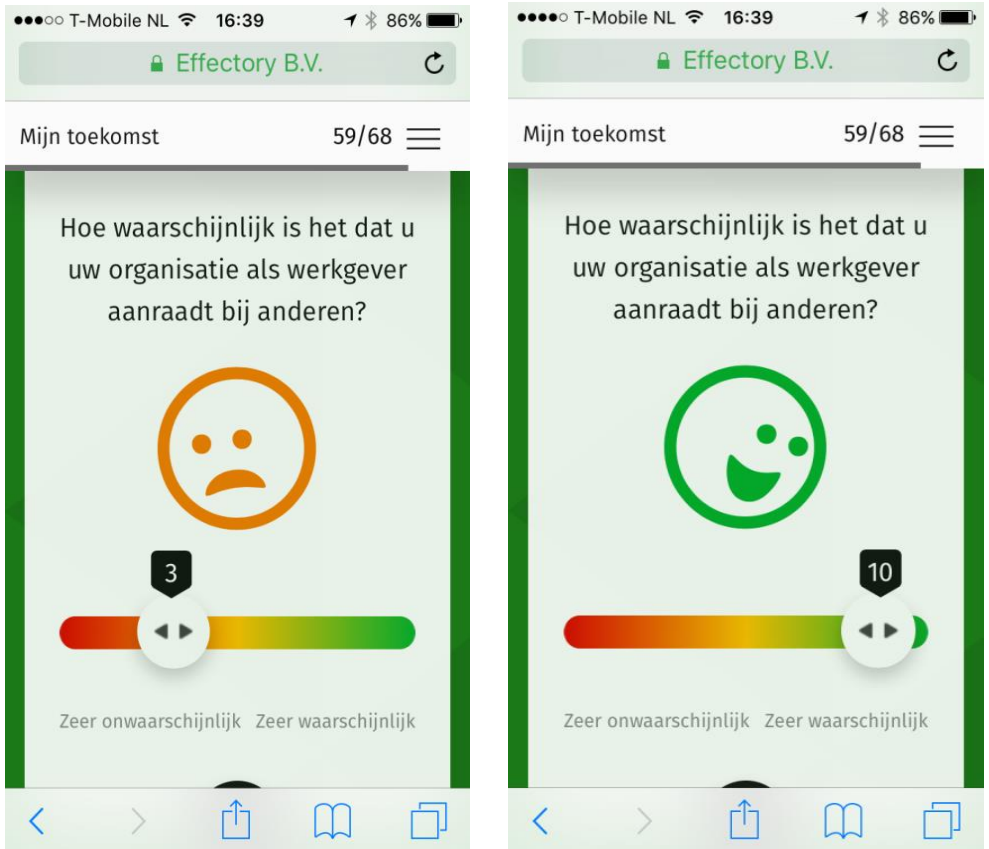
Better evaluated on mobile (see Toepoel and Funke 2018)
VAS works better on mobile than slider bars (Funke 2016)

- Visual analogue scale
  - Point and click

vs.

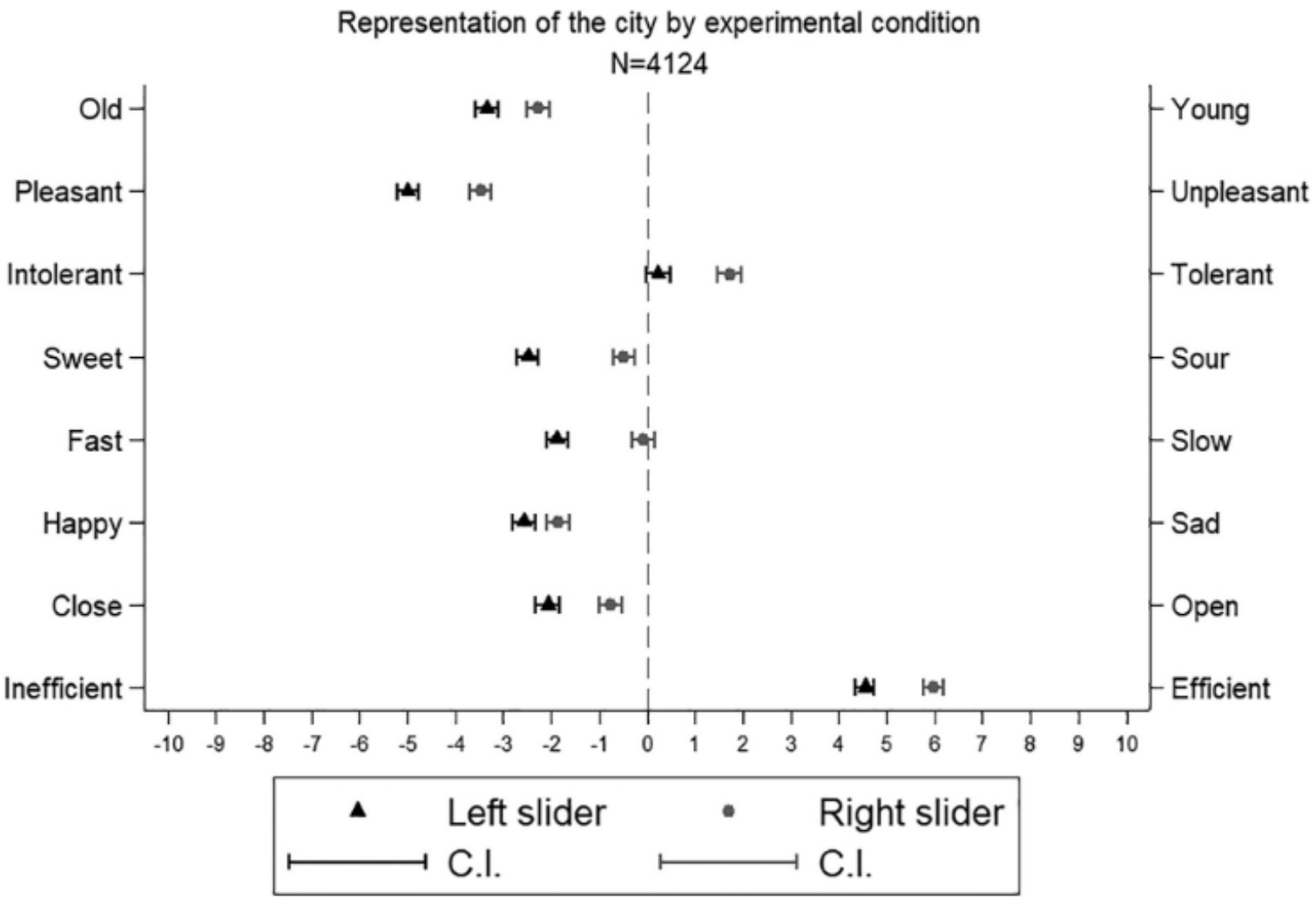
- Slider bar
  - Drag and drop
  - Initial position handle

  might influence results



Demo:
http://vasgenerator.net/Funke_2015_slider_vs_vas/

Initial position of the handle influences results



Source: [Maineri et al. 2021]

Bars in mobile web surveys

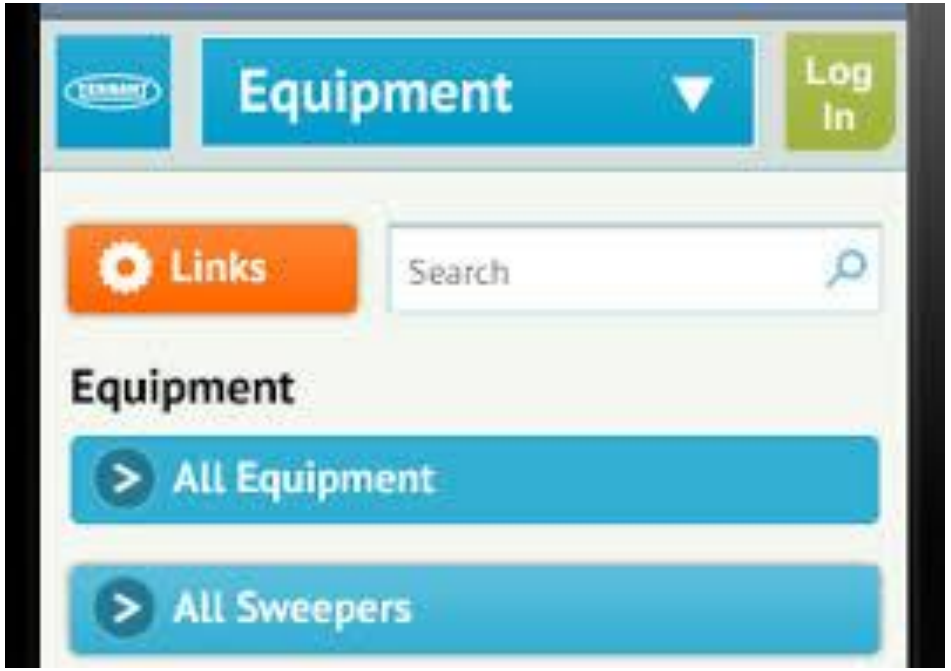
- With point and click
- Take less space on a screen
- More categories possible
  - Every pixel is a response option

- Require touch precision

→ Recommendations vary: Buskirk et al. (2015) recommend radio buttons over sliders in mixed-device surveys

For mobile: use tiles

- Entire cell is clickable
  - Not only the button on the left



Literature on optimally designing mixed-device survey

- Considerable amount uses mobile (up to 25% depending on country)
- Little/No effect on non-response
- Little/No effect on response quality
- Similar evaluation
- GPS can give additional insights
  - Only about 40% allow you to use their GPS coordinates (Struminskaya et al. 2020)
- No reason to believe that mixed-device is a problem WHEN DESIGNED OPTIMALLY
- Able to attract hard-to-reach group such as young people (Toepoel and Lugtig 2015)

How to implement mixed-device surveys

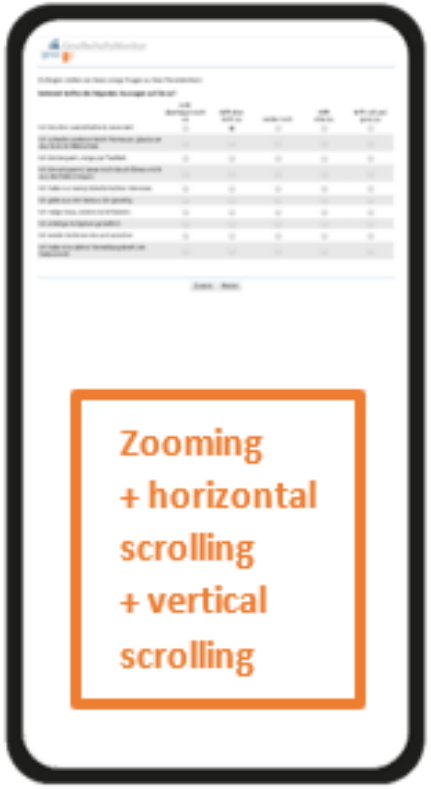
- Online-first vs. mobile-first (cf. GIP, GESIS Panel)

- A multitude of decisions, for example:
  - Split the grids into item-by-item
  - Change orientation of horizontal scales
  - Change the layout of paper questionnaires
  - Etc.

GESIS Panel Layout – Online First

Desktop PC

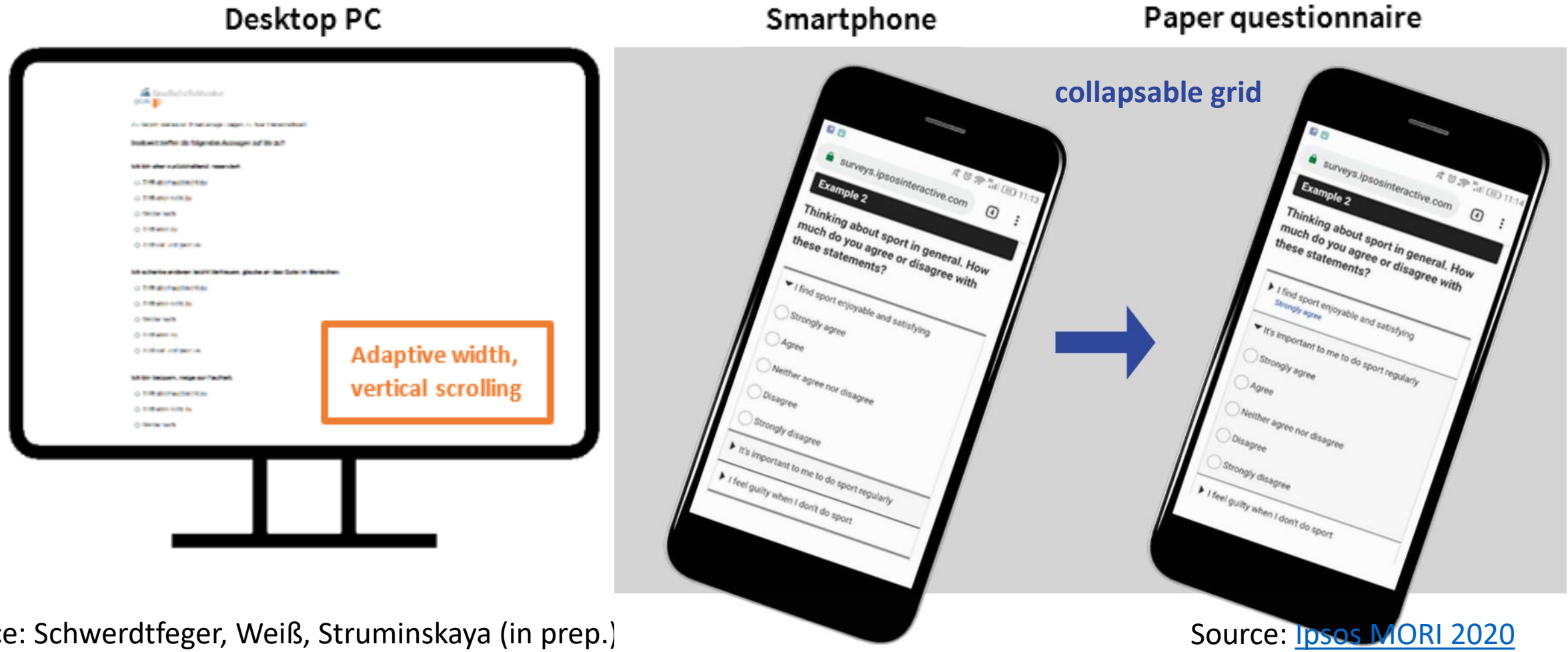
Smartphone



Paper questionnaire

Source: Schwerdtfeger, Weiß, Struminskaya (in prep.)

GESIS Panel Layout – Mobile first



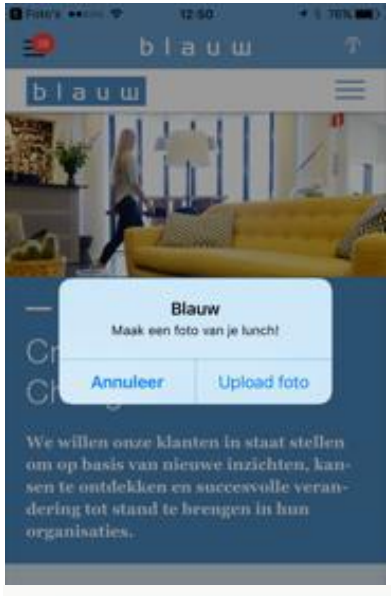
Source: Schwerdtfeger, Weiß, Struminskaya (in prep.)

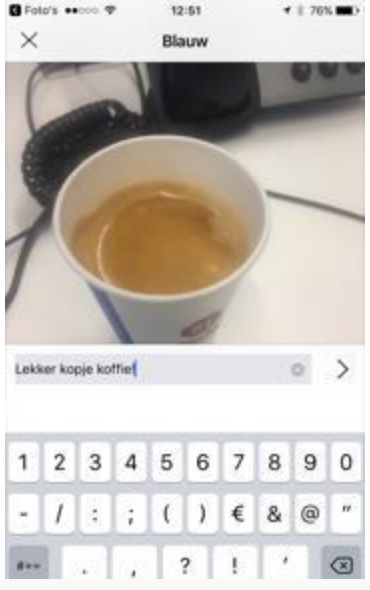
Source: Ipsos MORI 2020

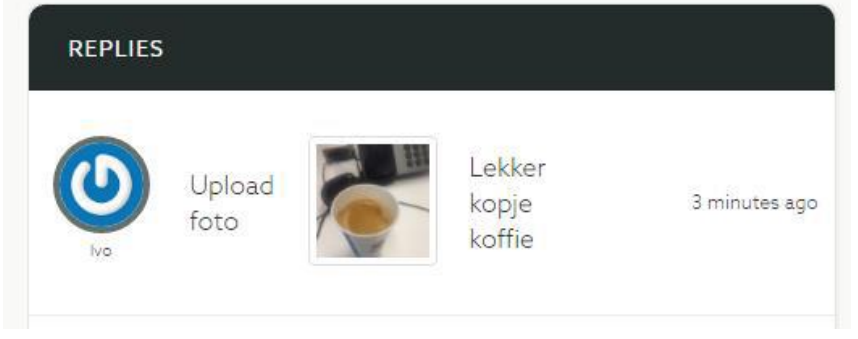
Beyond traditional mobile web: Micro surveys

- https://vimeo.com/153513746

- In the moment push notifications (or just after)
- Location Based or highly targeted short mobile surveys
- Notification can be the question itself



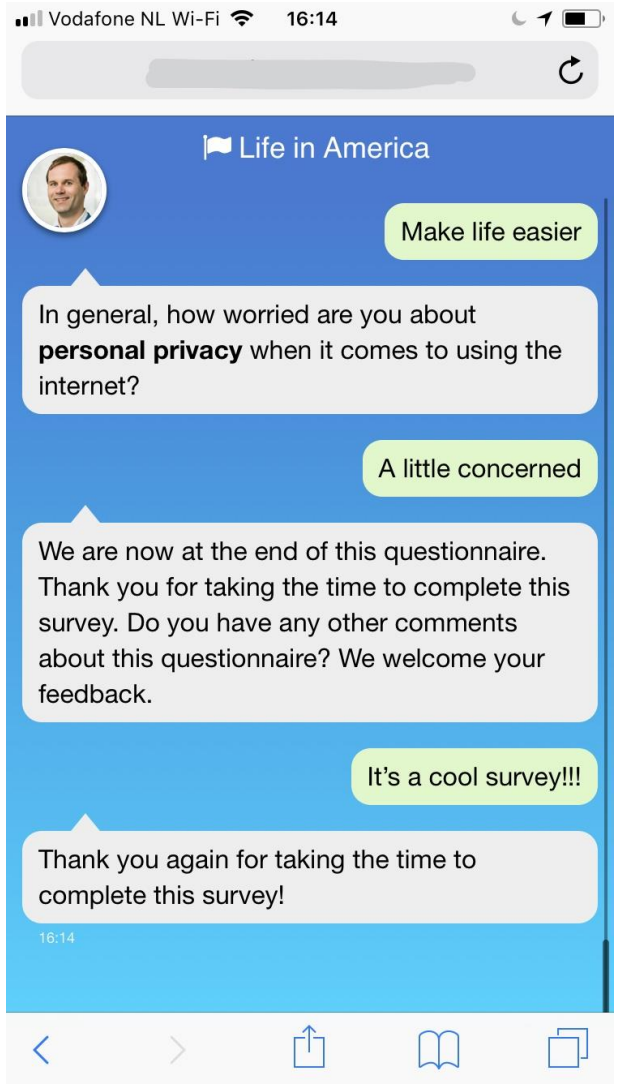




Beyond traditional mobile web: Geotimed surveys

- https://www.youtube.com/watch?v=FoVvPZRFd1I
- Right time and place
- Combined with other methods

Beyond traditional mobile web: Conversational, Persuasive, Gamified



- We communicate more and more through apps such as WhatsApp and Snapchat
- This communication closely resembles natural turn-by-turn conversation between humans
- Service chatbots try to mimic that communication style
- It's time for the traditional survey to follow the same route

Research messenger vs. responsive design

- Completion time

Seconds	Mean (standard deviation)	N
Research messenger	788 (397)	871
Responsive design	732 (443)	857
Total	760 (422)	1728
ANOVA F (1, 1727)=7.8	*p*=.005	Eta-squared=.004

- Nonsubstantive answers

% (n)	Research messenger	Responsive design	Total
At least one nonsubstantive anwer	9.1 (157)	7.6 (131)	16.7 (288)
No nonsubstantive answer	41.3 (714)	42.0 (726)	83.3 (1440)
Pearson chi-square	2.33	*p*=.13	

Toepoel, Lugtig, Struminskaya, Elevelt & Haan 2020, https://www.surveypractice.org/article/14188-adapting-surveys-to-the-modern-world-comparing-a-research-messenger-design-to-a-regular-responsive-design-for-online-surveys

Recommended Readings

- Toepoel, V. Doing Surveys Online. Sage (2016)
- Callegaro et al. (2015). Web Survey Methodology. Sage
- Struminskaya, B., Weyandt, K. and Bosnjak, M. (2015). The effects of questionnaire completion using mobile devices on data quality – Evidence from a probability-based general population panel. methods, data, analyses, 9 (2), 261–292. https://doi.org/10.12758/mda.2015.014
- Couper, M., Antoun, C., Mavletova, A. (2017). Mobile Web Surveys, In: Total Survey Error in Practice. Ed. By Biemer et al. Wiley https://doi.org/10.1002/9781119041702.ch7

Recommended websites

- www.websm.org
- Survey researcher's website, e.g. http://www.sesrc.wsu.edu/dillman/papers.html
- Research panels
  - www.lissdata.nl (Netherlands)
  - www.gesis.org/en/services/data-collection/gesis-panel/ (Germany)
  - https://openpanelalliance.org (Open Probability Panel Alliance: NL, DE, USA, Korea; prices about 0.85-1€ / $2-3 per respondent per minute)
  - A lot of data already available for free!