Mixed Mode and Mixed Device Surveys

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EMOS Webinar, May 12 2020

EUROPEAN MASTER IN OFFICIAL STATISTICS
EMOS

Webinar

Part 1

Mixed Mode Surveys

Nothing New Really

"Mixed mode surveys, that is, surveys that combine the use of telephone, mail, and/or face-to-face interview procedures to collect data for a single survey project are occurring with increasing frequency. A second, or in some cases even a third, method to collect data for a single survey is being used throughout the world…. Indeed, mixed mode is becoming one of the survey buzz words of the late 20th century"

Dillman & Tarnai, 1988

- Important goals then
  - Coverage (telephone), dual frame sampling
  - Nonresponse follow-up
- Important Issues already identified by Dillman & Tarnai
  - Data comparability
  - Questionnaire construction

At Present

- The norm and expected to increase….
  - MIMOD, 2019: Tourangeau, 2017, Biemer & Lyberg, 2003
- Many forms
  - ***Contact* by different mode**
    - Recruitment probability based online panels (Blom et al, 2015)
    - Special letters (e.g., with incentive, push to web) (Dillman, 2017)
  - Another mode ***specific questions* for all respondents**
    - Self-administered forms for sensitive questions
    - Direct observations (e.g., GPS signal)
  - Different ***response modes* for different** (groups of) respondents
    - Concurrent (e.g., international surveys, special groups)
    - Sequential (e.g., nonresponse follow-up)
  - **Alternating** modes in longitudinal design

Common Mixed-Mode Designs Data Collection

- Cross-sectional
  - Offer two or more modes at same time
    - To overcome coverage problems
- Cross-national (& cross-cultural)
  - Different countries have different traditions main modes

Concurrent Mixed Mode

- Cross-sectional
  - Start with cheapest and follow-up with more expensive to reduce nonresponse
- Longitudinal mixed-mode or panel
  - Start with expensive high response mode
  - First contact formation online (probability) panel

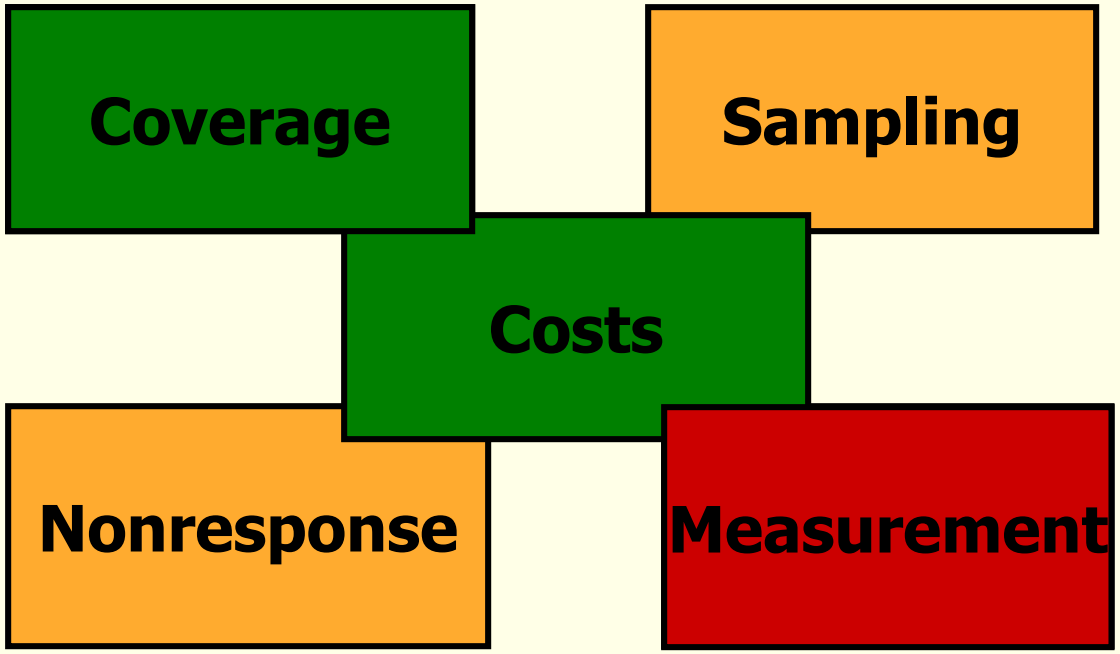
Sequential Mixed Mode

Why? We Need To!

- Nonresponse increase and changes in nonresponse nature and characteristics
- Increased costs traditional methods
  - Combined with cuts in research budgets
- Increase in Online Surveys and desire to exploit new technologies and devices
  - Coverage Problems
- Increase in International Surveys
  - Different survey traditions in different countries
  - Different coverage patterns

Mixed Mode

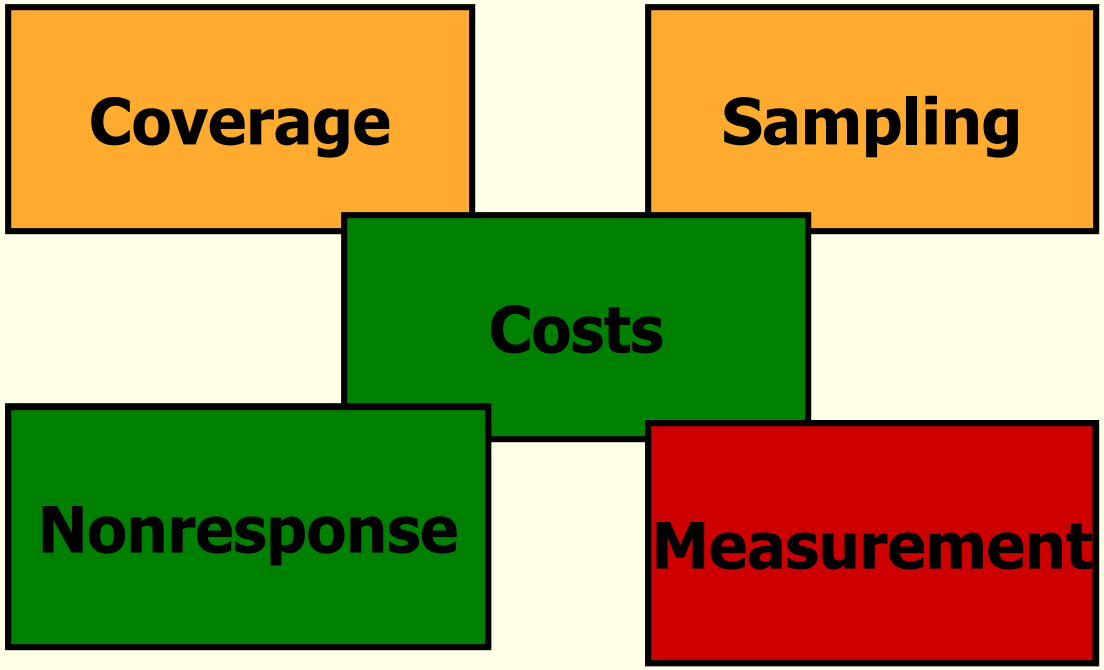
To Improve Coverage



Example: Concurrent mixed-mode
Two or more methods at same time

Mixed Mode

To Increase Response



Example: Sequential Mixed Mode:
One method after another

Does it Work? MM and Representativity

- Few empirical comparative studies:
  - Kappelhof (2015): Study of immigrants in Holland
    - Socio-demographic different respondents participate in different modes, but, single mode CAPI best reflection of immigrants
  - Klausch et al (2016): General population Holland
    - For socio-demographics the F2F follow up increased overall R-indicators of mail and telephone single-mode response.
    - Representativeness of single-mode web was already optimal
  - Bandilla et al (2014): Reapproach ALLBUS Germany
    - Web + mail better representation, demographics + general attitudes
  - Messer & Dillman (2011); Dillman (2017): General population Several States, USA
    - Web-Only excludes important segments of population.
    - Web plus mail better representation demographics

Results Meta Analysis

- Nonexperimental study on Representativity
  - Meta-analysis (Cornesse & Bosjnak 2018, SRM)
    - 45 mixed mode surveys and 51 single mode surveys, all using R-indicators
  - Significant higher R-indicators for mixed mode (.04 average difference) indicating higher representativity in mixed mode surveys
  - Benchmarks and Median Absolute Bias (MAB) too few studies
    - Only 8 mixed-mode (vs 101 single mode) using MAB

Sequential vs Concurrent

- Empirical evidence sequential mixed-mode best:
  - Offering a choice may lower response rates
- Fulton & Medway (2012). Meta-analysis of 19 experimental comparisons of concurrent choice option of web/mail vs mail only surveys
  - Choice reduces response rates (on average 3.8%).
- Advice use a sequential approach
  - Do not offer pure CHOICE, but TAILOR
  - When you KNOW the preferred mode, always present people with their preferred they respond better (Olson et al, 2012).
  - ADAPTIVE design offer special groups special methods

Concurrent 2.1

- Form of adaptive (responsive) M-M design
- Offer known preference
  - Known from previous survey
    - Longitudinal, panel approach, e.g. GESIS
      - GESIS online but paper mail for those who do not have Internet OR prefer paper
- Estimate propensity of mode preference / bests suited mode
  - Tailor mode to respondent
    - Early example Dutch survey of Consumer Sentiments (2013)
- Not offer choice, but ‘nudge’ respondent
  - Push to web approach (Dillman, 2017)

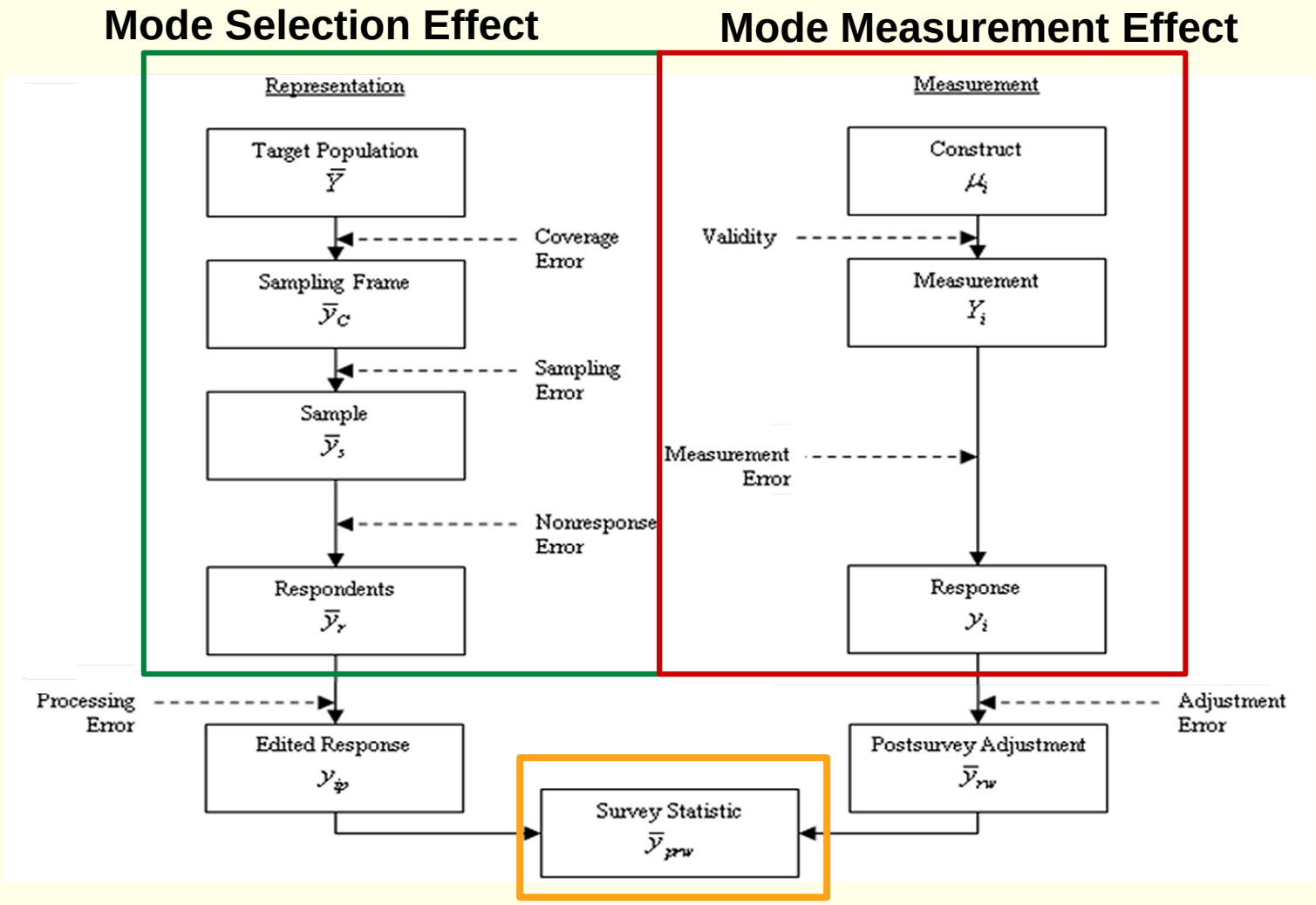
Free Lunch?

- How about measurement / data quality?
  - It depends
- Different response mode for specific questions to **All**
  - Sensitive questions in self-administered mode for all
  - Observation, such as, GPS signal though mobile
  - Biomarkers
  - Administrative data
  - Win-Win
- Different response modes for **different** respondents
  - Goal reduce noncoverage or nonresponse
    - Examples: sequential mixed mode, push to the web
    - Potential for differential measurement error
  - Mode Effects Potential Pitfall!

About Mode Effects

- Mode effect as such does not exist (Tourangeau)
  - Mode effect has two components
    - Differential non-observation error or **mode-selection-effect**
    - Differential observation error or **mode-measurement-effect**
    - Mode effect is net effect of non-observation and measurement error differences by mode
- Using two or more modes within one survey for one population (e.g., sequential mixed mode design) should increase coverage and response
  - Mode selection effect is than **wanted / desirable** as it reduces overall coverage and nonresponse error!
  - If there is no selection, different modes bring in the same respondents → use the cheapest mode for all
- Mode measurement effect cause for concern

Confounding Mode Selection and Measurement Effects



To Mix is to Design

- Mixing data collection modes has advantages in reducing noncoverage and nonresponse errors:
  - The **wanted** mode selection effects
- Mixing methods may enhance measurement errors
  - The **unwanted** mode measurement effects
    - Especially important for comparisons over groups!
- So, Design for Mixed Mode Surveys
  I. Design equivalent questionnaires!
  II. Estimate mode effects, separating wanted mode selection from unwanted mode measurement effects
    I. Need auxiliary data
  III. Adjust for unwanted mode measurement effects

I. Questionnaire Design

Design Equivalent Questionnaires
To AVOID Unwanted Differential Question Format Effects

Equivalent questionnaires are NOT the lowest common denominator
(see de Leeuw & Berzerak, 2016)

Improve questionnaires
Aim at better instruments!

Need For Auxialiary Data

-To distinguish between wanted selection and unwanted mode measurement effects

-To estimate mode measurement effects

-To adjust for mode measurement effects

Examples:

Subsample single mode ESS experiment:
Jaeckle, Roberts, Lynn (2010)

Existing reference survey: Revilla (2015)
Vannieuwenhuijze (2013)

Repeated measures: Klausch (2014)

Longitudinal data: Cernat (2015), Hox (2015)

Optimize M-M: In Sum

- Design phase
  - *Minimize* differences (in data collection)
    - Equivalent questionnaires and procedures
  - Plan collecting / finding auxiliary information
  - Decide on analysis strategy

- Analysis phase
  - Estimate both the **wanted** mode selection effects and the **unwanted** mode measurement effects
    - Mode measurement effects typically differ *for different questions* in the questionnaire
  - If there are *mode measurement effects, adjust for these*

Burning Questions?

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Part 2

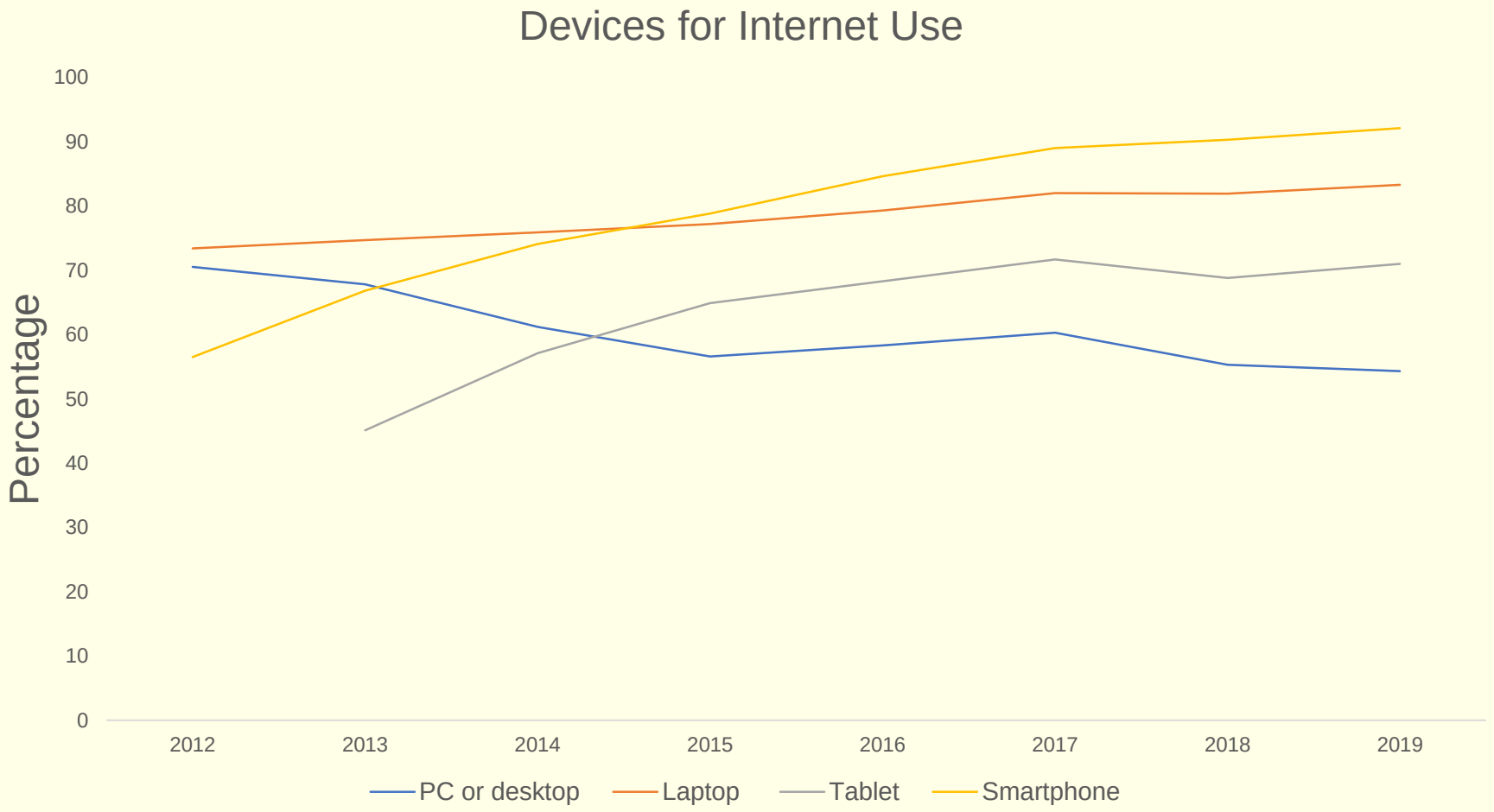
Mixed Device Surveys

Online surveys are now mixed-device surveys.

(Lugtig & Toepoel, 2015)

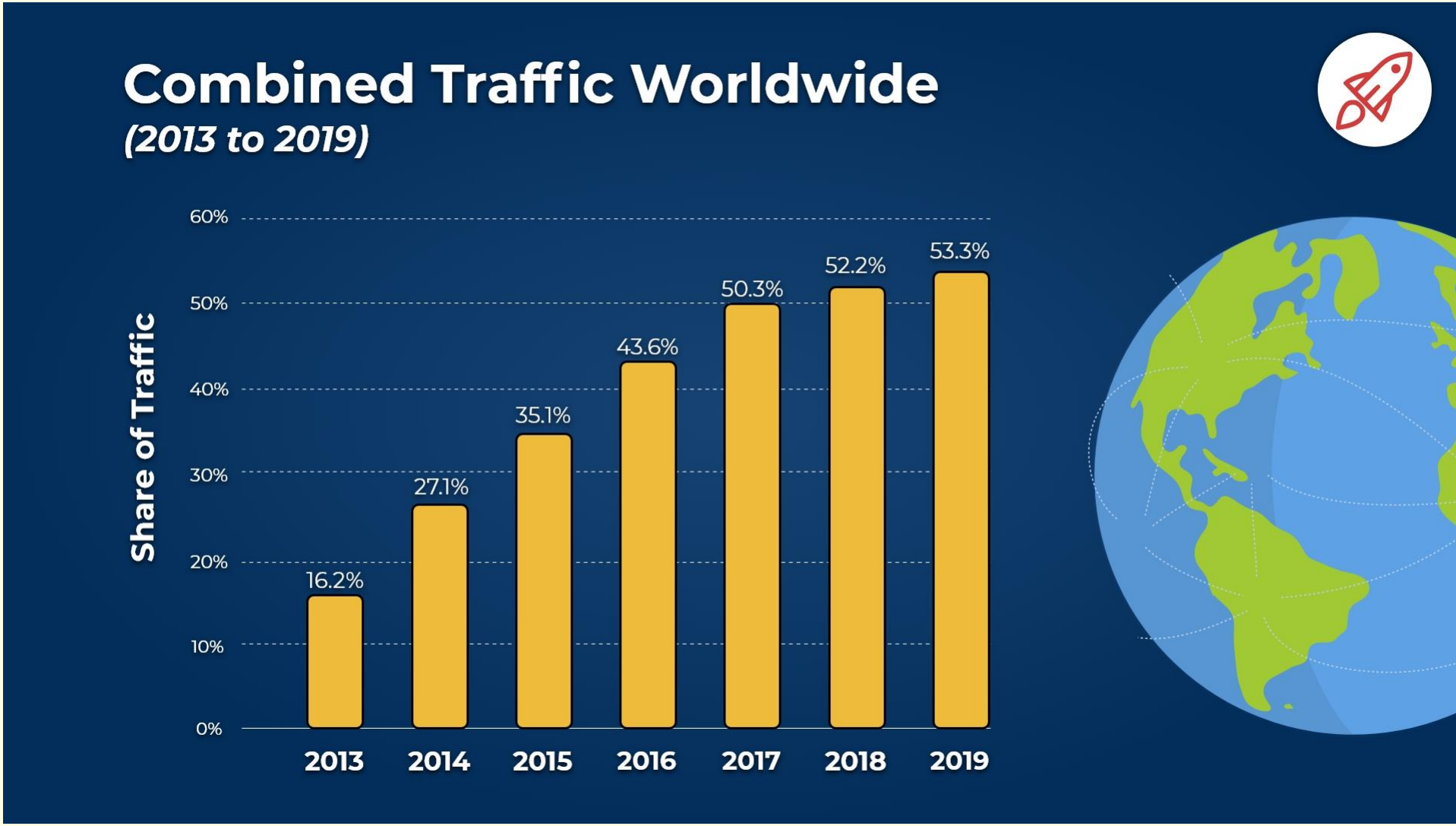

2005
Luca Bruno / AP
2013
NBC NEWS
Michael Sohn / AP

Device Ownership in the Netherlands



(Statline, Statistics Netherlands)

Share of internet traffic by smartphones



(Statista, found on www.broadbandsearch.net)

Online surveys are now mixed-device surveys.

(Lugtig & Toepoel, 2015)

1. What does this mean for your sample -> representation error
2. What does this mean for your design? -> measurement error

Devices

- PC/Laptop
- Mobiles:
  - Smartphone
  - Tablet

Differ in:

- Screen size
- Keyboard or not

What does this mean for your sample?

Selection bias

- Device ownership
- Device familiarity
- Sociodemographics
  - Age
  - Education
  - Income

(e.g. Antoun, 2015; Couper et al., 2017; de Bruijne & Wijnant, 2014; Haan, Lugtig & Toepoel; Lambert & Miller, 2015; Mavletova & Couper, 2014)

Representation error

- Increase coverage
  - Able to attract hard-to-reach populations, like young people and refugees
- More options for survey invitation delivery or reminders
  - SMS/Random Digit Dialing
  - Anywhere, anytime

(e.g. Keusch et al., 2019; Lugtig, Toepoel & Amin, 2016; Lugtig et al., 2019; Toepoel & Lugtig, 2015)

What does this mean for your survey design?

Optimizing or standardizing?

- Optimizing
  - Responsive design
  - *Device adaptive*
- Standardizing
  - PC first
  - Smartphone friendly
  - Smartphone first
  - *Device agnostic*

(e.g. Dillman, 2000; de Leeuw & Toepoel, 2018, Mavletova & Couper, 2015, Roßmann, Gummer, & Silber, 2018)

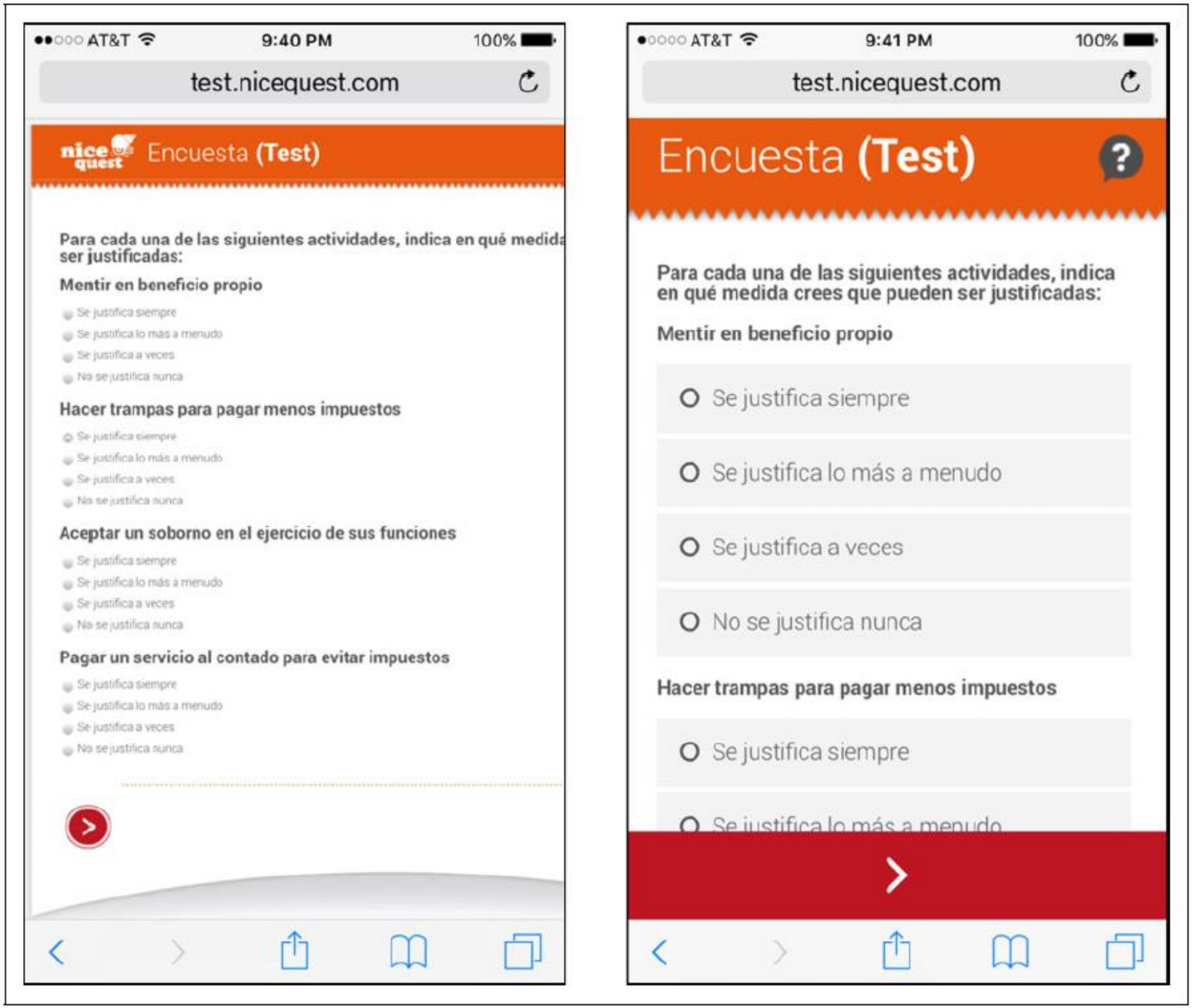


Figure 1. Examples of "non-optimized" (left) and "optimized" designs (right) taken from questionnaires (in Spanish) used by Revilla, Toninelli, and Ochoa (2017).

(Antoun et al., 2017)

Think about:

- App vs browser
- Visual design
- Navigation
- Length

App versus browser

- Respondent satisfaction is higher for apps
- Apps can deploy more advanced features
  - More and more possible through JavaScript though
- Apps need to be developed
- Apps need to be installed -> dropout

(e.g. Buskirk & Andrus, 2012; Link et al., 2014)

Visual Design (see Antoun et al, 2018)

Design Heuristics:

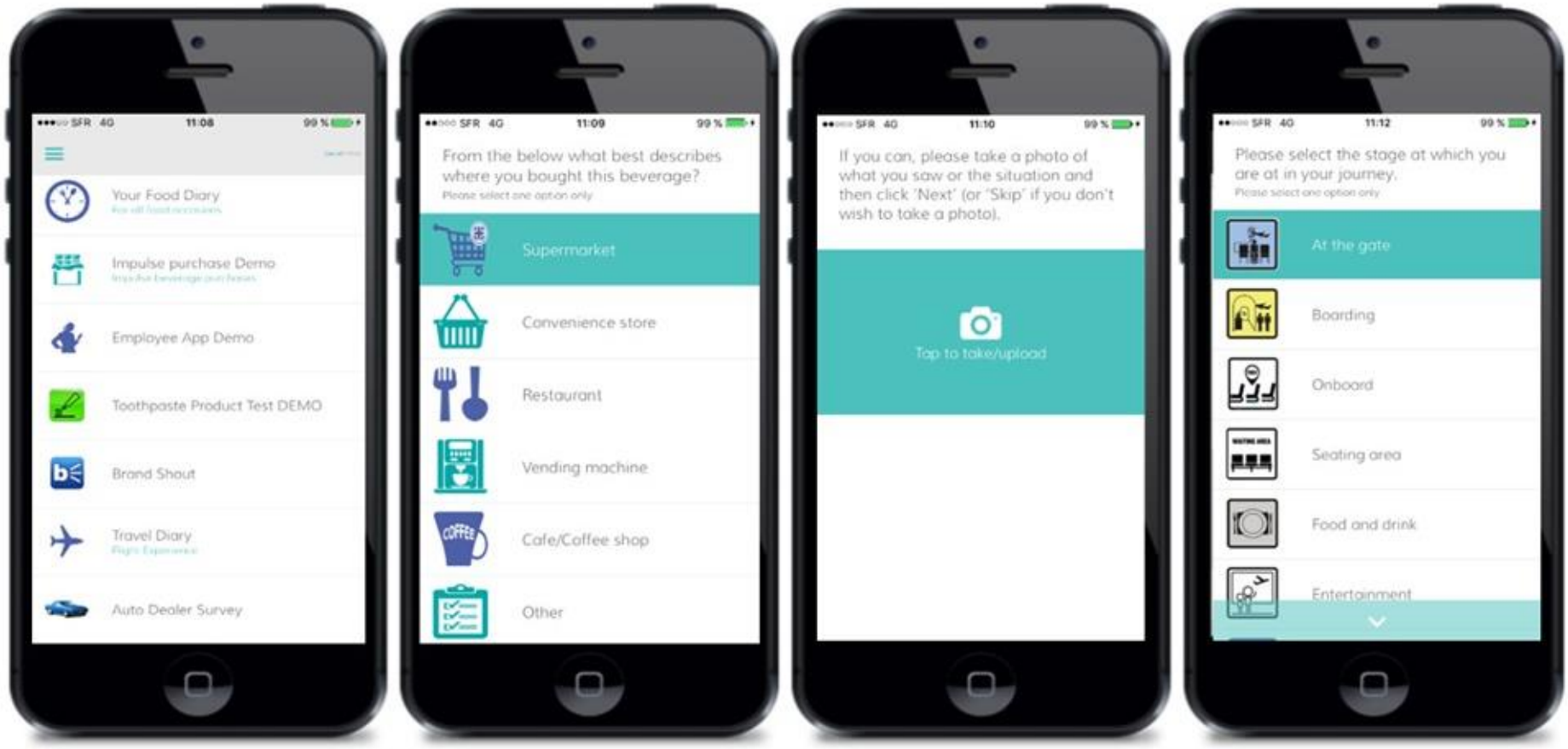
- Readability
- Ease of selection
- Visibility across the page
- Simplicity of design features
- Predictability across devices

Use device detection to display appropriately for screen size.

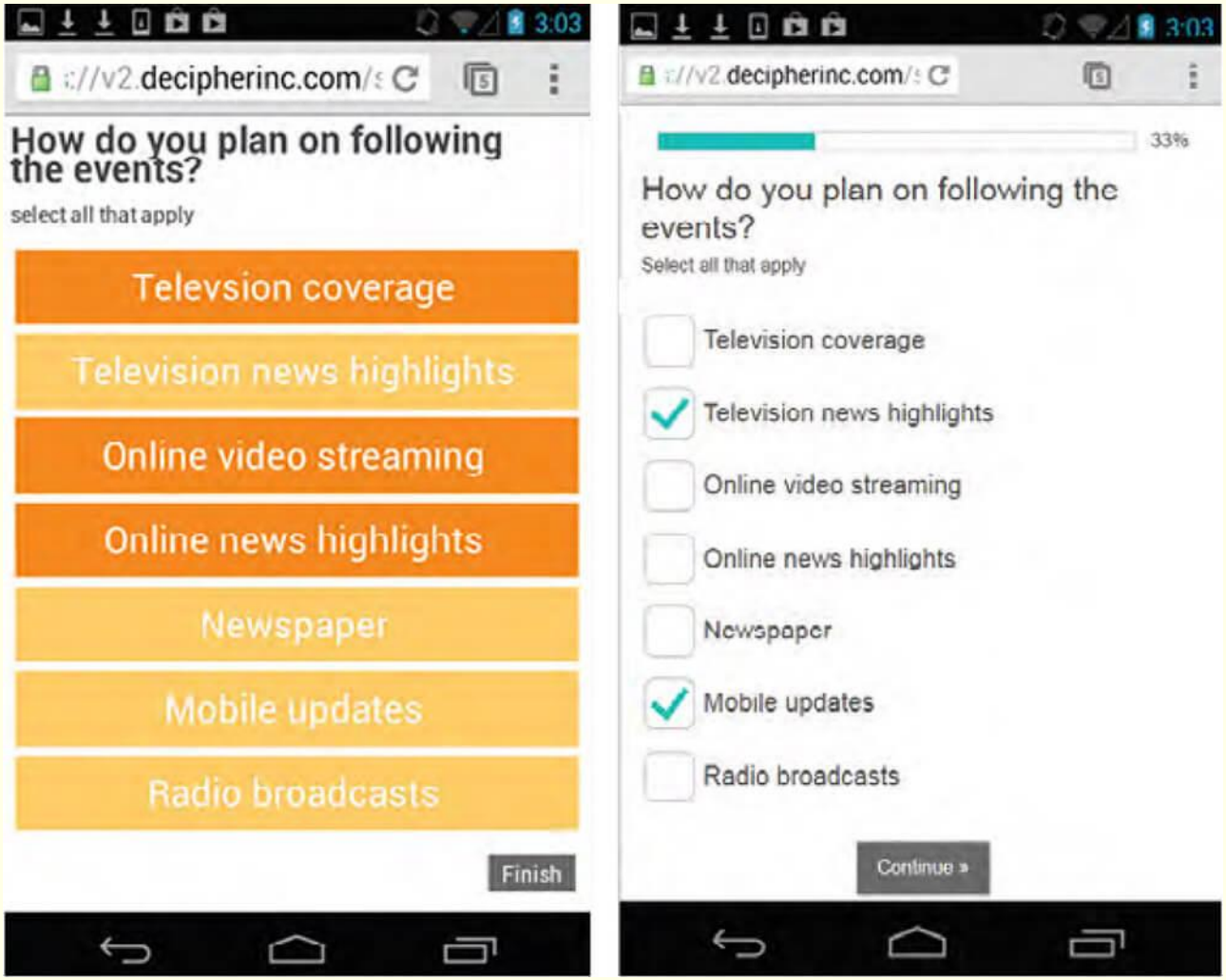
Visual Design (see Antoun et al, 2018)

- Larger fonts
- Larger response options
- Content fit to width of screen
- No long (introduction) texts
- Simple questions
- No grids
- Eliminate visual distractions

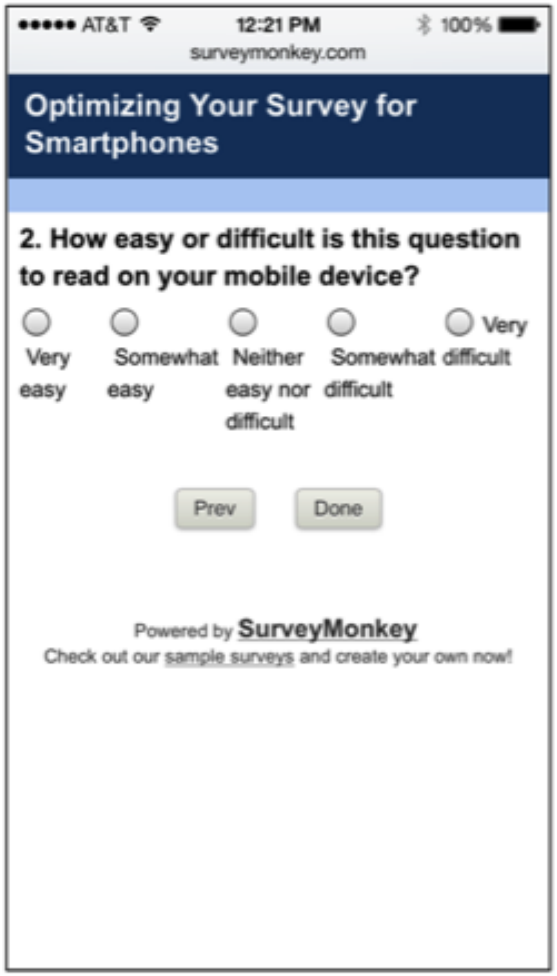
Screenshots



GAME CHANGERS

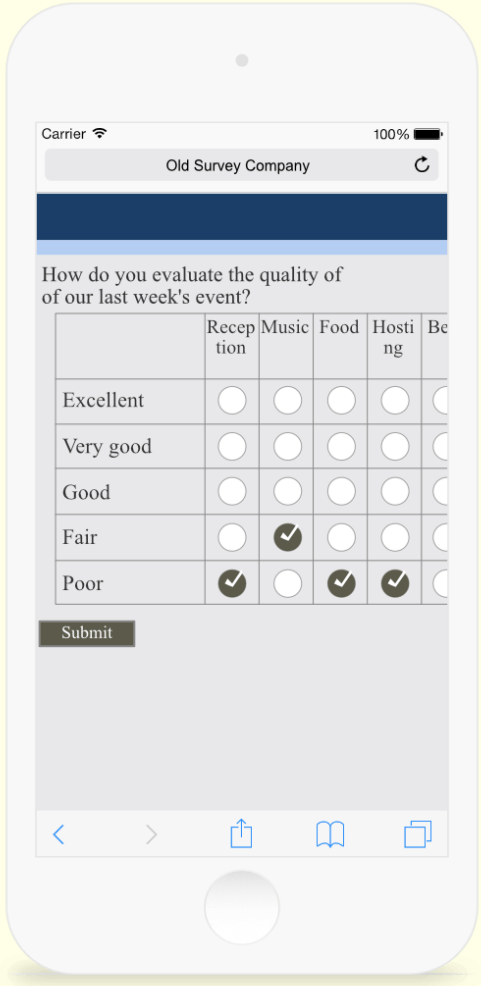

3:03
How do you plan on following the events?
select all that apply
Televsion coverage
Television news highlights
Online video streaming
Online news highlights
Newspaper
Mobile updates
Radio broadcasts
Finish
33%
How do you plan on following the events?
Select all that apply
Television coverage
Television news highlights
Online video streaming
Online news highlights
Newspaper
Mobile updates
Radio broadcasts
Continue »


●●●●● AT&T 12:21 PM 100%
surveymonkey.com
Optimizing Your Survey for Smartphones
1. How easy or difficult is this question to read on your mobile device?
Very easy
Somewhat easy
Neither easy nor difficult
Somewhat difficult
Very difficult
Next
Powered by SurveyMonkey
Check out our sample surveys and create your own now!
BEST OPTION!


●●●●● AT&T 12:21 PM 100%
surveymonkey.com
Optimizing Your Survey for Smartphones
2. How easy or difficult is this question to read on your mobile device?
Very easy
Somewhat easy
Neither easy nor difficult
Somewhat difficult
Very difficult
Prev
Done
Powered by SurveyMonkey
Check out our sample surveys and create your own now!


●●●●○ AT&T 12:25 PM 100%
surveymonkey.com
Optimizing Your Survey for Smartphones
3. How easy or difficult is this question to read on your mobile device?
Prev
Done
Powered by SurveyMonkey
Check out our sample surveys and create your own now!

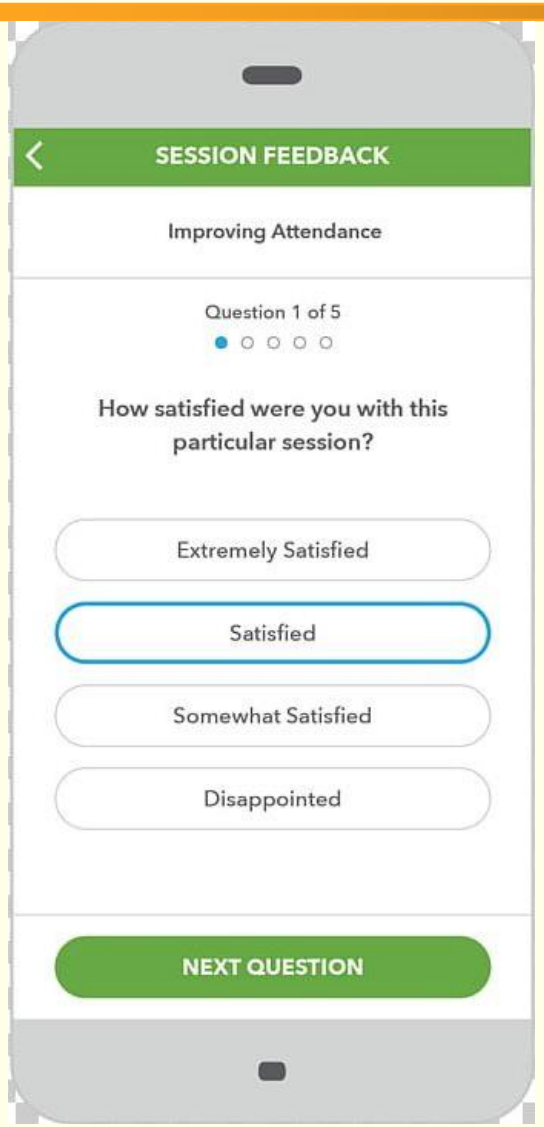
Don’t do this…

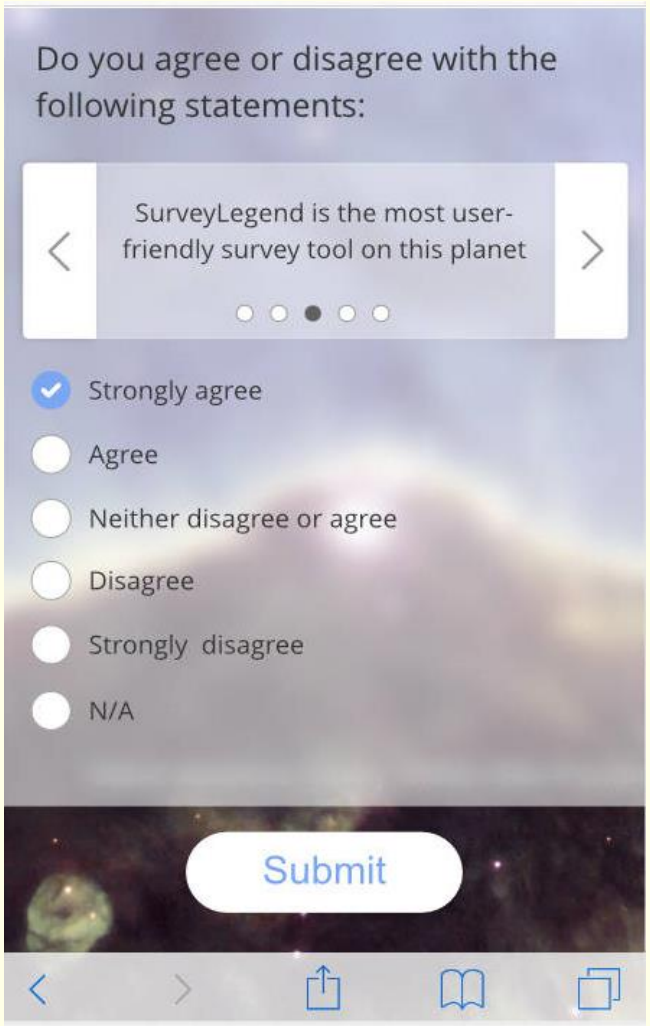

Carrier
100%
Old Survey Company
How do you evaluate the quality of of our last week's event?
Recep tion
Music
Food
Hosti ng
Be
Excellent
Very good
Good
Fair
Poor
Submit

Navigation

- Scrolling
- Paging
- Auto-forward

(e.g De Bruijne & Wijnant, 2014; Haan et al., 2018; Mavletova & Couper, 2014)


SESSION FEEDBACK
Improving Attendance
Question 1 of 5
How satisfied were you with this particular session?
Extremely Satisfied
Satisfied
Somewhat Satisfied
Disappointed
NEXT QUESTION


Do you agree or disagree with the following statements:
SurveyLegend is the most user-friendly survey tool on this planet
Strongly agree
Agree
Neither disagree or agree
Disagree
Strongly disagree
N/A
Submit

Length

- Keep it short.
  - Respondents are not willing to do long surveys on smartphones
  - Higher termination rates
  - Fatigue

(e.g Couper et al., 2017, KANTAR, 2014; Link et al., 2014;)

Measurement error

Little effect when designed:

- Smartphone first
- Optimally

- No reason to believe mixed-device is a problem.

New opportunities

- Sending invitations
  - QR codes
  - RDD (random sample)
  - SMS
  - App
- Passive data collection
  - Paradata
  - Sensor data
- Research apps

(e.g Elevelt et al., 2019a; 2019b; Höhne & Schlosser, 2019; Keusch et al., 2019; Link et al., 2014)

Burning Questions?


TAKE AWAY
TAKE AWAY
TAKE AWAY

Wanted Mode Selection and Unwanted Measurement Effects

I. Design Equivalent Questionnaires

AVOID Unwanted Differential

Question Format Effects

II. Estimate

(1)Wanted Mode Selection Effects

(2) **Unwanted** Mode Measurement Effects

III Adjust ONLY for

Unwanted Mode Measurement Effect

Mixed-Device is not a problem

If you can’t do it on a smartphone;

Don’t do it!


DISCUSSION


thank you
tenki
ขอขอบคุณคุณ
takk
спасибо
kam sah hamnida
hvala
תודה
dhanyavadagalu
tack
je
дзякуй
dziękuję
bedankt
dank
blagodaram
mèsi
xièxie
tanemirt
gracias
rahmet
enkosi
trugarez
djiere dieuf
mochchakkeram
arigatô
danke
kop khun krap
faafetai lava
akun
shukriya
ありがとう
kia ora
dankon
děkuji
manana
diolch
gràçie
kiitos
spas
ačiū
grazzi
mamnun
barka
dhanyavad
gratias ago
tau
dankie
शुक्रिया
sulpáy
tapadh leat
gràcies
chnorakaloutioun
teşekkür ederim
bayarlalaa
obrigada
σας ευχαριστώ
sagolun
murakoze
taiku
mahalo
didi madloba
sukriya
obrigado
chokrane
rahmat
dakujem
misaotra
welalin
najis tuke
nanni
terima kasih
mercé
köszönöm
asante
grazie
謝謝
mersi
sobodi
شكرا
mauruuru
nandri
merci
vinaka
matondo
cảm ơn bạn
go raibh maith agat
paldies
ngiyabonga

Follow-up Readings

- Introduction to mixed-mode:
  - Edith **de Leeuw** (2018). Mixed-Mode: Past, present, future. Survey Research Methods, 12,2, 75-89. Available at https://ojs.ub.uni-konstanz.de/srm/article/view/7402

- Overview survey modes and mixed mode design:
  - Edith de Leeuw & Necj **Berzelak** (2016). Survey Mode or Survey Modes? In: Christof Wolf, et al (eds), The Sage Handbook of Survey Methodology https://www.researchgate.net/publication/305386094_Survey_Mode_or_survey_modes_On_mixed_mode_surveys

Follow-up Readings

- Overview on push-to-the-web methodology:
  - Don A. Dillman (2017). The promise and challenges of pushing respondents to the web in mixed-mode surveys. Survey Methodology (Statistics Canada), June 2017, vol 43, no 1, pp 3-30. Available at https://www150.statcan.gc.ca/n1/pub/12-001-x/2017001/article/14836-eng.pdf

- Analysis of Mixed-Mode surveys:
  - Joop **Hox**, Edith de Leeuw, Thomas Klausch (2017) Mixed Mode Research: Issues in Design and Analysis. In: Paul Biemer, et al (eds). Total Survey Error in Practice (chapter 23). New York: Wiley. Available at https://www.researchgate.net/publication/313585673_Mixed-Mode_Research_Issues_in_Design_and_Analysis

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- Joop **Hox**, Edith de Leeuw, Thomas Klausch (2017) Mixed Mode Research: Issues in Design and Analysis. In: Paul Biemer, et al (eds). Total Survey Error in Practice (chapter 23). New York: Wiley. At https://www.researchgate.net/publication/313585673_Mixed-Mode_Research_Issues_in_Design_and_Analysis
- Jaeckle, A., Roberts, C., & Lynn, P. (2010). Assessing the effect of data collection on mode of measurement. *International Statistical Review,* 78, 1, 3-20.

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- Edith **de Leeuw** (2005) To mix or not to mix data collection modes in surveys. Journal of Official Statistics, 21, 2, 233-255 http://www.jos.nu/Articles/abstract.asp?article=212233
- Edith **de Leeuw** (2018). Mixed-Mode: Past, present, future. Survey Research Methods, 12,2, 9999-10013. doi:10.18148/srm/2018.v12i2.7402 At www.surveymethods.org

  https://ojs.ub.uni-konstanz.de/srm/article/view/7402/6582
- Edith de **Leeuw**, Joop, Hox, & Anja Boeve, A. (2016). Handling Do-Not-Know answers. Exploring new approaches in online and mixed-mode surveys. *Social Science Computer Review*, *34*, 116-132.: https://www.researchgate.net/publication/276596592_Handling_Do-Not-Know_Answers_Exploring_New_Approaches_in_Online_and_Mixed-Mode_Surveys
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- Roger **Tourangeau** (2017). Mixing Modes: Tradeoffs among Coverage, Nonresponse, and Measurement Error. In: Paul Biemer et al (eds). Total Survey Error in Practice. New York: Wiley.

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- Buskirk, T.D. and C.H. Andrus.2014. Making Mobile Browser Surveys Smarter. Results from a Randomized Experiment Comparing Online Surveys Completed via Computer or Smartphone. Fieldmethods, 26,4, 322-342.

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Appendix

On Mixed Mode Surveys

FAQ 1: On Coverage

- Internet coverage increasing over years
  - Countries differ in internet penetration
    - International comparative surveys
      - Different modes or mode mixes in different countries
- But, even with high coverage in a country
  - Digital divide between subpopulations
    - Differences in age, education, gender…
      - Couper, 2008
    - Declining over time, but bias still exists
      - Mohorko et al, 2013 Sterret et al, 2017
- Solution: *Concurrent* mixed mode survey
  - Different modes for different parts of population
    - E.g., online and mail. Example German GESIS-panel

FAQ 2: NonResponse

- Nonresponse is increasing over countries and time
- Consequences:
  - Smaller realized samples (smaller N!) and **higher costs** per completed
  - Respondents and nonrespondents may differ on key variables: **nonresponse bias**
- Solution: Sequential mixed-mode approach
  - Different modes in sequence, most affordable first
    - American Community Survey
      - Online, mail, telephone (CATI), face-to-face (CAPI)
    - Statistics Netherland Mixed-Mode experiments and production
      - Examples Online, CATI, CAPI, see also presentation Luiten
    - UK Understanding Society Innovation panel experiment
      - CAWI, CAPI (earlier CATI, CAPI)

FAQ3: Offer Choice?

- Researcher's viewpoint
  - Offer mode choice is client centered, respondent friendly
- Respondent's viewpoint is different
  - Increased cognitive burden
    - Two decisions to make instead of one
      - From "will I participate" to "will I participate + what method do I want to use"
      - Two decisions harder task than one
      - Simplest thing is opt-out
    - More concentrated on choice, not on survey
      - Distracts from message and arguments on why to cooperate
        - Weakens saliency
  - Respondents postpone, procrastinate, and quit

FAQ4: No Choice Offer but Use Adaptive Design

- Dutch Survey of Consumer Sentiments (SCS)
  - Ongoing cross-sectional CATI survey
  - Uses para-data from previous data collection
  - Uses demographics from registers
    - Logistic regression contact and cooperation response propensity (Luiten & Schouten, 2013)
  - Experiment with concurrent mixed mode next wave
    - Mail survey to those with low propensity to respond, web to those with high propensity (middle group given choice)
      - Cost considerations important, respondent burden important
    - Follow-up nonrespondents with CATI (sequential)
  - Maintain level of response (high prop: 31% low prop 35%: in reference survey 38 vs 18%)
  - Better representatively (R-indicators) on key variables SCS (sex, age, ethnicity, etc)

https://www.cbs.nl/NR/rdonlyres/1071A190-B552-4758-94C3-B9E29CD584DE/0/2013x11Luitenpub.pdf

FAQ 5: No Choice Offer but Push to the Web

- Further pushing to the web (Millar & Dillman, 2011)
- Use E-mail augmentation of postal contacts
  - Requesting a response to online survey by paper mail is burdensome
  - Prenotification by paper mail has advantages
    - Can send an incentive
    - Emphasize legitimacy
  - Combine email and postal (e-mail augmentation)
    - Postal advance letter (prenotification)
    - Supportive e-mail message following the first postal contact
      - To decrease burden and time for respondent (just click on URL)
      - Show that researchers care about respondents (show regard)
  - This results in response rate equivalent to mail-only

FAQ6: Coverage,Nonresponse, and Costs

- Sequential Mixed-Mode Approach
  - May be more effective than giving respondents a choice
- Concurrent 2.0 tailor / use adaptive design
  - When preferred mode is known (previous study)
  - When propensity is known/special groups
- Mixed mode needs multiple contacts (e.g. reminder) but accelerated scheme reminders with online
  - Schedule shorter than old/traditional (1978) Dillman's mail-only schedules
- Reduce costs?
  - Depends on initial single mode strategy and specific mix
    - If single mode is online, mixed-mode more expensive
    - If single mode face-to-face ,mix with online first less expensive

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- **Acknowledgements**
  - With thanks to Lars Lyberg (Inizio), Don Dillman (WSU), Deirdre Giessen (CBS), Joop Hox (UU), Joost Kappelhof (SCP), and Thomas Klausch

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- **Acknowledgements**
  - Special thanks to Vera Toepoel (UU) and Peter Lugtig (UU).