

Survey data analysis

Week 48:

“mixed-modes”

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Today

- Lecture on survey modes and mixing them
- Exercise on measurement
 - In pairs

Overview

1. Why and how mix different modes?
2. TSE and mixed-mode (bonus)?
3. How do modes differ?
4. Questionnaire design for single modes
5. Exercise on questionnaire design
6. Design
7. Logistics and mixed mode (bonus)
8. Evaluation (bonus)
9. Mixed-device (bonus)

1. Why and how mix modes?

Why Mixed-Mode?

- Choosing the Optimal Data Collection Method!
- Best data collection procedure given
 - Research question
 - Population
- Reduce Total Survey Error (TSE)
 - Respect survey ethics/privacy
 - Within available time
- Within available *budget*
- See class exercise week 37

We Need to Mix

- Increase in International Surveys
 - Different survey traditions in countries
 - Different coverage patterns
 - Different sampling frames
- Increase in Online Surveys and desire to exploit new technologies
 - Coverage problems
- Nonresponse increase
 - Need more effort to increase response
- Increase in survey costs
 - Optimal costs ratio
- Measurement

Mixed-mode

Two important distinctions

- Different Modes used for **Contacting**
 - But data collection in single mode
- Different modes used for **Data Collection**

Mix for Contact

- Different ***contact*** methods are used in different phases of the survey
- Examples:
 - Screening for special groups by telephone
 - Sampling frames
 - E.g. addresses for some, e-mail for others
 - Convincing or reminding in different mode
 - Prenotification letter f2f survey
 - Mail invitation for web survey
 - Reminder letter/postcards

Multiple Modes of Communication

- Nielsen media research
- **Actual data collection is uni-mode (diaries)**
 - **Multiple modes of contact** in 7 steps
 1. Pre-recruitment postcard
 2. Recruitment phone call
 3. Advance postcard announcing diary
 4. Diary survey package
 5. Reminder postcard
 6. Reminder phone call
 7. Reminder postcard

Bennett & Trussel, 2001
Trussell & Lavrakas, 2004

Mixing Mode data collection

- Different modes for different parts of survey
 - But all persons get same mode for same part
 - Example: self-administered mode for section of questionnaire with sensitive questions in interview
 - Win-win: optimal data quality
- Different modes for same task
 - The same questionnaire is offered in different modes
 - Risk of differential measurement error

Sequential vs. Concurrent

- **Concurrent**

- Multiple modes are used simultaneously for data collection: implemented at **same time**
 - Example: Asthma awareness study
 - Invitation postcard offering choice of modes
 - Establishment and business surveys (e.g., fax, mail, web)
 - International surveys

- **Sequential**

- Different modes in sequence during data collection phase
 - Example: American Community Survey
 - Mail, telephone, face-to-face

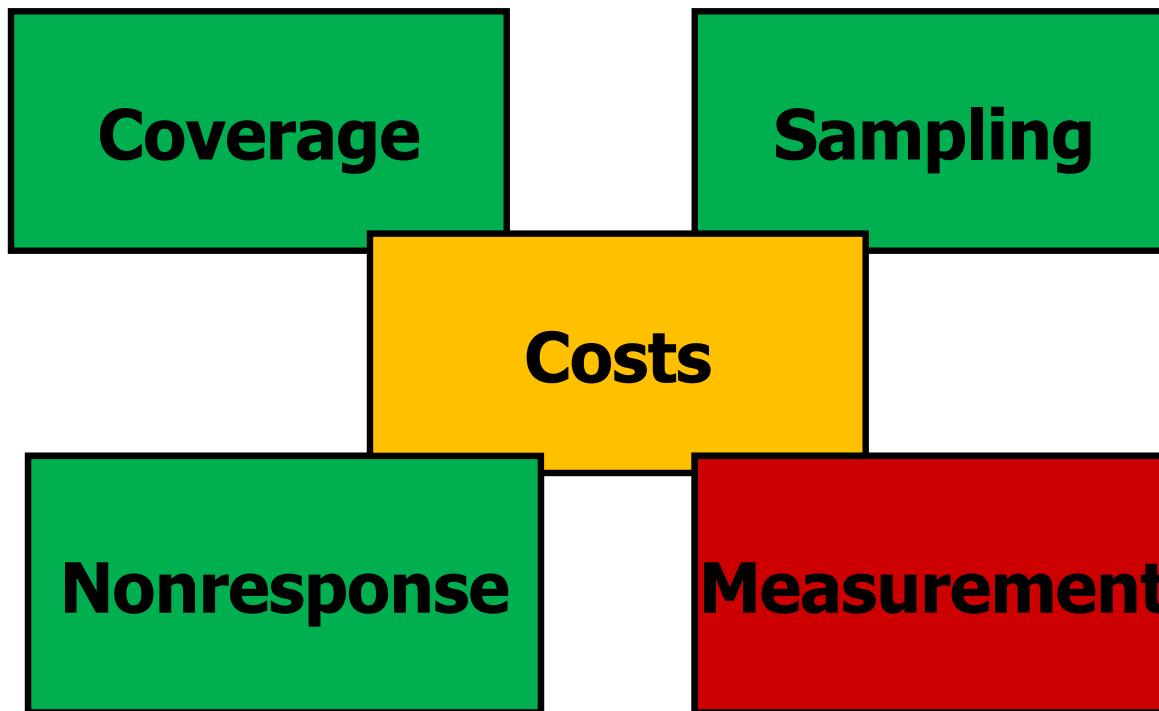
Concurrent Mixed Mode 1

- Multiple modes implemented at same time
 - For **subset** of questions only
- Reduce Social Desirability Bias
 - Sensitive questions in more ‘private’ mode
 - CAPI - (A)CASI mix
 - Telephone - IVR (or T-CASI) mix
 - Face-to-face – paper SAQ mix
 - Example: US National Survey on Drug Use and Health (NSDUH)
- Win-win situation ☺

Concurrent Mixed Mode 2

- Multiple modes implemented at same time
 - For **all questions**, full questionnaire, **one population**
- Reducing Coverage Error at reasonable costs
 - E.g., Dual frame sampling (more than one frame)
- Dangers concurrent mixed-mode
 - Measurement differences
 - E.g., social desirability, recency effects
 - Difficult to entangle as (self-)selection and mode effect are confounded
- Reduced coverage error at the price of increased measurement error

Concurrent Mixed Mode



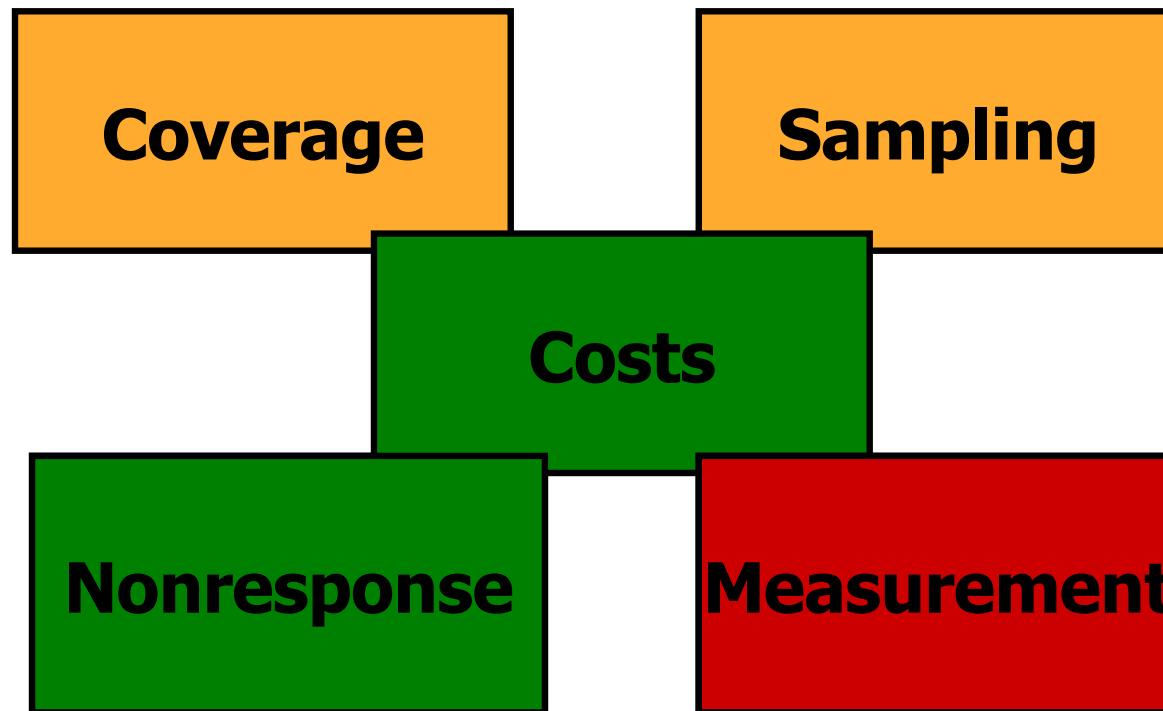
Sequential Mixed Mode 1: Nonresponse Reduction

- Different modes implemented in sequence during data collection phase
- Successful for nonresponse reduction
 - Inexpensive mode first main mode
 - More expensive mode as follow-up
- Example: American Community Survey
 - Mail, telephone, face-to-face
- Example: US census
 - Mail, face-to-face (since 1969)
- Example: Canadian Census
 - Mail/Internet, face-to-face

Full Example ACS

- American Community Survey
 - Sponsor: U.S. Census Bureau, compulsory survey
- Target population: Households in U.S.
 - 2.9M addresses sampled
- Focus: social, housing, & economic characteristics
- Frame: Census Master Address File
- **Sequential mixed-mode design:**
 - Mail
 - CATI Telephone follow-up
 - CAPI In-person follow-up
- Field period: 3 months
- Response rates: **80-90%** between 2010-2020

Solution Nonresponse Sequential Mixed Mode



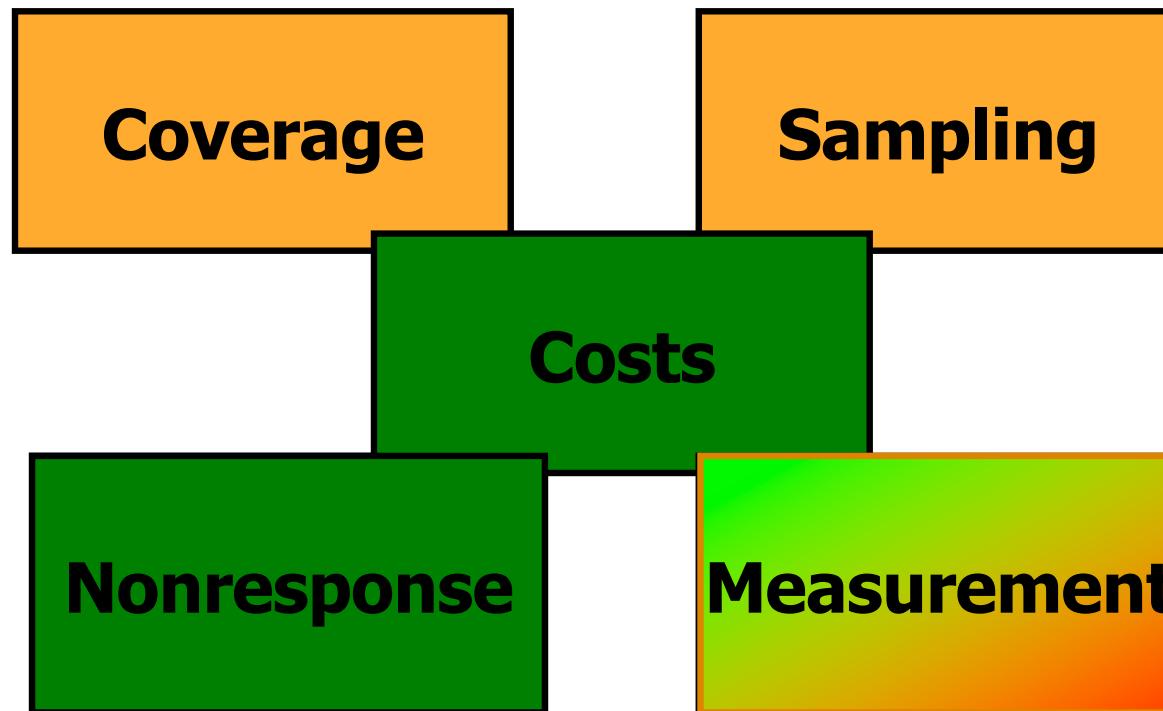
Sequential: One method after another

Sequential Mixed Mode 2: Longitudinal Studies

- Different modes implemented in sequence at multiple time points in longitudinal study
 - Cost reduction and practical considerations
 - More expensive mode
 - Selection and screening for panel
 - Base-line study
 - Next waves less expensive study
- Example: Swedish Labour Force Survey
 - First wave (including recruitment) face-to-face
 - Next waves: telephone interviews
- Example: US Current Population Survey
 - Face-to-face in wave 1 & 5; Telephone in wave 2-4 & 6-9
- Example: NESTOR study, longitudinal survey of elderly
 - Face-to-face but in between mail surveys

Longitudinal Study Panels

Sequential Mixed Mode



Longitudinal: Different and expensive first mode!

In Sum: Common Mixed-Mode Designs

- Cross-sectional
 - Offer two or more modes at same time
 - To overcome coverage problems
 - Cross-national
 - Different countries have different traditions re: main modes
 - 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
- 
- Concurrent Mixed Mode**
- Sequential Mixed Mode**

2. TSE and Mixed-Mode

Skip to: 3. why modes differ

Implications Mixed Mode in Data Collection Phase

- Goal Mixed-Mode Surveys
 - Reduction of Coverage and Nonresponse Error
 - Costs reduction
 - Comparable measurements
 - Want to have similar data in all modes
- Do we reach our goals?
- What do we know empirically?

Reducing Coverage Error

- Few empirical studies:
 - Kappelhof: Study of immigrants at Dutch Socio cultural planning office (under review)
 - Single mode CAPI vs sequential mixed-mode (Web, CATI/CAPI) survey among ethnic minorities
 - Socio-demographic different respondents participate in different modes
 - Younger & second generation ethnic minorities more in web
 - Older, and first generation immigrants CAPI/CATI
 - But, single mode CAPI best reflection of immigrants

Reducing Coverage Error 2

- Second study:
 - Klausch et al: Statistics Netherlands, general population (conditionally accepted)
 - Three sequential mixed-mode surveys implemented
 - First three random groups: telephone, mail, and web. All three were followed by F2F
 - For socio-demographics the F2F follow up increased overall R-indicators of mail and telephone single-mode response. After the follow up they had representativeness similar to a single-mode F2F survey.
 - Representativeness of single-mode web was already at the level of single-mode F2F and could not be increased any further by F2F follow-up.

Reducing Coverage Error

- Third study:
 - Messer & Dillman (2011) Washington State University, General population using address-based sampling of paper postal addresses.
 - Web only exclude important segments of population.
 - Web plus mail better representation

Reducing Nonresponse

- General conclusion:
 - Danger offer a choice can lower response rates
 - Do not give a concurrent choice
- Fulton & Medway (2012). Meta-analysis of 19 experimental comparisons of concurrent choice option of web in mail surveys
 - Choice significantly reduces response rates.
- However, if you give people their preferred mode (based on answer in first survey), they respond better (Olson et al, 2012).

Why not Offering A Choice?

- Concurrent Multiple modes implemented at same time
 - Usually one mode less costly
 - E.g., web vs mail, asthma awareness study
 - Respondent is offered choice of mode
- Researcher's viewpoint
 - Client centered to reduce nonresponse
 - Respondent friendly, establish good-will
 - (and reduce costs)

Respondents Viewpoint:

Offering A Choice Makes Life More Difficult

- BUT Respondent's viewpoint is different
 - More information to read and process
 - Higher 'costs' in social exchange
 - Increased cognitive burden
 - Two decisions to make instead of one
 - From "will I participate" to "will I participate and what method do I want to use"
 - Harder task so simplest thing is opt-out
 - May concentrate on choice, not on survey
 - Distracts from message and arguments on why to cooperate
 - Weakens saliency
 - Respondents postpone, procrastinate, and finally

Mixed mode Surveys: Coverage and Nonresponse Reduction

- Sequential mixed-mode approach may be more effective than giving respondents a choice
- Sequential for nonresponse reduction better than concurrent
- Also can be used for coverage problems
- If you know the mode preference of respondents (e.g., previous study), giving the preferred mode helps!

Literature

- Kappelhof, J.W.S. (under review). Face-to-face or sequential mixed mode surveys among non-western minorities in the Netherlands: The effect of different survey designs on the possibility of nonresponse bias
- Klausch, T., Hox, J., & Schouten (2013). Selection error of single- and mixed-mode surveys of the Dutch general population. Conditionally accepted for Journal of the Royal Statistical Society: Series A
- Messer, B & Dillman, D. (2011). Surveying the general poulation ovr the Internet using address-based sampling and mail contact procedures. POQ, 75, 3, 429-457.
- Tourangeau, R. Confronting the challenges of household surveys by mixing modes. Keynote at the 2013 Federal Committee at the SMRC

Literature

- Olson et al. Does giving people their preferred survey mode actually increases participation rates? *POQ* 76, 4.
- Medway, R.L., & Fulton, J. (2012). When More Gets You Less: A Meta-Analysis of the Effect of Concurrent Web Options on Mail Survey Response Rates. *Public Opinion Quarterly*, 76, 733-746.

3. Why and How Modes Differ

Self-Administered vs. Interviewer-Guided

Visual vs. Aural

Media-related customs

measurement

[Skip to: 4. questionnaire design](#)

Why modes differ:

- Interviewer Impact
 - Face-to-face > Telephone > S.A.Q
- Media-related Factors
 - Social customs differ
 - Knowledge, use
- Information Transmission
 - Presentation stimuli
 - Aural vs visual

Interviewer Impact +

Self-Administered vs. Interviewer guided

- Interviewer administered questions help to:
 - Motivate respondent
 - Guide through complex questionnaire
 - Facilitate Question-Answer process
 - Clarify questions, instructions
 - Probe for detailed answers
 - Accurate recording
 - Trained interviewer notes down answers
- Face-to-face interviewer has more cues and opportunities than telephone interviewer
 - Nonverbal, visual

Self-Administered +/-

Interviewer absence helps to:

- Ensure privacy
- Makes interview respondent-paced instead of interviewer- paced (media related)
 - Conduct survey at time and place convenient to respondent
- Interviewer absence limits:
 - Ensuring that intended (correct) respondent completes survey
 - Requesting assistance by respondent
 - Correct stray/out-of-range responses (PAPI only)
 - Means to assess cognitive engagement of respondent

How Modes Differ

Overviews: De Leeuw 1992, 2005; Dillman & Christian, 2005

- Empirical Evidence Interviewer Impact
 - More social-desirability in interview
 - E.g., drinking, fraud
 - More open in self-administered modes
 - More positive in interview
 - Less lonely, better health in interview
 - More acquiescence in interview
 - Tendency to agree
 - Easier to agree than disagree with another person
 - Less missing data/more detailed answers open questions in interview
 - In general interviewer probes help

Social convention/customs

- Socio-cultural but influence cognitive processing in question-answer process
 - Use of medium
 - Customs, associations, familiarity
 - Personal conversation, Spam/selling, web-use
 - Pace/locus of control
 - Interviewer vs. respondent
 - Initiative
 - Single vs. Multi-task oriented
 - Convey legitimacy, sincerity of purpose
 - Fears, spam, identity-theft

Information Transmission

- Presentation Stimuli
 - Visual vs. Aural
 - Visual may lead to primacy effects, aural to recency effects
 - Visual more response categories (longer list) possible
- Delivering answer
 - Spoken vs. written vs. typed
 - Difference in ease dependent on subgroup (e.g. elderly spoken)
- Channels of communication
 - Verbal, nonverbal, paralinguistic
 - Graphical language
- Questionnaire and Segmentation
 - Question by question vs Blocks of questions (page) at once
 - Freedom to go back

How Modes Differ

- Some evidence recency effect in telephone surveys
 - More often last offered answer category is chosen
- Context and order effects less likely in self-administered (paper) than interview
 - Overview / segmentation
 - No empirical studies including web surveys, segmentataion depends on implementation (e.g., potential to go back and forth)
- Visual presentation & design & quality
 - Growing body of evidence that respondents use all information including visual cues to decide what answer they are going to report.
 - Cf Dillman, 2007; Toepoel, 2008
 - Beware of using pictures in web surveys
 - Cf Couper et al 2004; Das, 2009

4. Questionnaire Design

Traditional Designs for Specific Modes

[Skip to: 5. questionnaire design](#)

Cognitive stages when answering

Psychological model based on:

Tourangeau, Roger, Lance J. Rips, and Kenneth Rasinski (2000). *The Psychology of Survey Response*. New York: Cambridge University Press.

The process of reading/hearing the question and answering the question is translated into a 'stimulus response' model.

- ⇒ Stimulus = questions
- ⇒ Response = answer

Model of Tourangeau

In between the stimulus and response is the cognitive information processing task.

“Do you think the better has become a better or worse place to live under the presidency of Biden?”



Model of Tourangeau

Four stages of cognitive information processing after reading/hearing question:

- ▶ Comprehension
- ▶ Retrieval
- ▶ Judgment
- ▶ Reporting

“Do you think the better has become a better or worse place to live under the presidency of Biden?”



Model of Tourangeau

Respondent is unaware of the model.

The four steps in the cognition phase happen more or less simultaneously in very short time.

The model helps us to understand the process of
questions ⇒ answers

⇒ This helps us to design a questionnaire of high quality.

Model of Tourangeau

Stage 1: Comprehension

Respondent interprets the question.

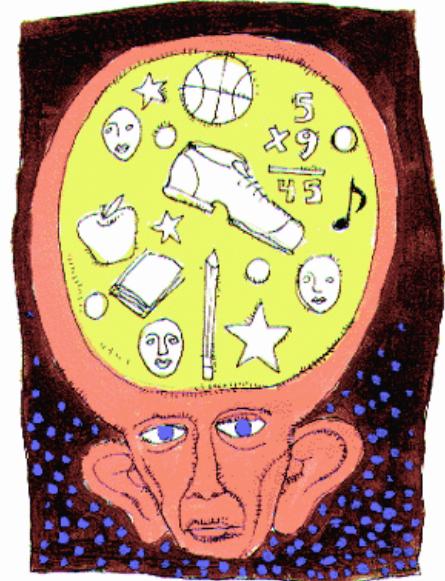


Interpretation can be affected by the clarity of the question, previous questions, respondent's prior knowledge.

Model of Tourangeau

Stage 2: Retrieval

The respondent has to retrieve the information from memory.



Retrieval enhancing techniques

- ▶ Ordering
- ▶ Priming
- ▶ Framing
- ▶ Prompts and probes

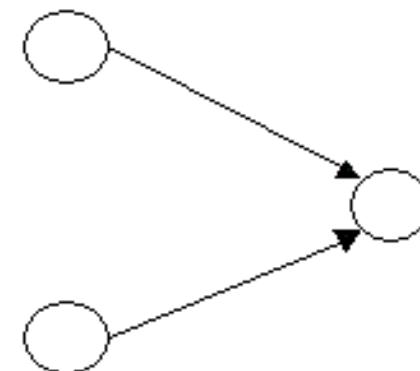
Model of Tourangeau

Stage 3: Judgment

Can the retrieved information be used to answer the question?

All different pieces of information result
in an internal answer.

?



Model of Tourangeau

Stage 4: Reporting

The final response is a compromise between the internal answer and the response categories.

Judgment maybe changed if no answer category fits the internal answer.

Why differentiate between the internal answer and reported answer?

Model of Tourangeau

Stage 4: Reporting

Final response determined by available response categories and social desirability.

This social desirability bias is especially important when measuring sensitive constructs.

Traditional Design F2F

- Face-to-face: Visual + Aural
 - Show cards with answer choices
 - Long lists of answers, long scales with each point labelled
 - Open-ended questions on wide variety of topics
 - Trained interviewers are carefully instructed to probe in order to get detailed and complete information
 - No opinion etc not explicitly offered, but accepted when given. Interviewers often trained to accept ‘no answer’ only after a standard ‘probe’
 - Transitional texts to guide interview

Traditional Design Tel

- Telephone: Aural only
 - Shorter answer scales (2-5 point scales)
 - Often only anchored end-points
 - On a scale from 1 to 5 with 1 being not at all satisfied and 5 being completely satisfied
 - Visual analogue questions
 - Imagine a ladder with 7 steps
 - Imagine a thermometer with a scale from 0 to 100
 - Unfolding for longer scales
 - Satisfied, dissatisfied or somewhere in the middle
 - Completely, mostly, somewhat (dis)satisfied

Traditional Design Tel2

- Telephone design
 - Difference with face-to-face
 - In general breaking up questions in parts to accommodate loss of visual channel
 - Like face-to-face
 - Open-ended questions and probes
 - No opinion / no answer not explicitly offered
 - But is accepted after probe by well-trained interviewer

Traditional Design Postal Mail Surveys

- Mail survey: Visual only, no interviewer present
 - In general, no breaking up of questions in parts
 - Use longer list of response categories
 - Fully labelled scales
 - Check all that apply instead of yes/no answers
 - Only ‘no answer’ when person skipped question, instead of interviewer coded ‘refused, do not know, no opinion’
 - Go back and forth: more context available
 - Use illustrations / visuals

Example Traditional Design Mail vs Telephone

Mail

- Is the home in which you live:
 - Owned free & clear
 - Owned with a mortgage
 - Rented
 - Occupied under some arrangement

Telephone

- Do you own or rent a home?
 - Follow-ups accordingly, e.g. when owns a home
 - Do you have a mortgage or is it owned free and clear

Traditional Design Web

- Web survey:
 - Visual only, but audio/video potential
- Many similarities with mail
- Differences
 - More sequential offering of questions
 - Check all that apply almost standard format
 - Radio buttons (but...)
 - Evidence Christian et al (2008) check-all-that apply not optimal
 - Grids often used for groups of questions
 - What is best visual design?

Traditional Web 2

- Also many differences in question design
 - Special formats
 - Slider bars
 - Drop down menus
 - Open questions influenced by box size, dynamic space (cf Dillman)
- Nowadays, mixed device
 - Mobiles, small screen, no keyboard, touch-entry
 - Navigation using apps is ‘different’
 - See bonus slides on mixed-device

Visual Illustrations

- Visual Illustrations are attractive
- May motivate respondent
 - Cover mail survey positive on response (e.g. Dillman's work)
- Help question/word meaning
- BUT: May influence respondent's answer!!
 - Example "How often do you eat out "
 - Illustration 1: small table, candlelight, rose in vase
 - Illustration 2: picture of MacDonald
 - Visuals/illustrations and their influence (Couper, 2007)

Exercise: design for mixed-modes

5. Designing Questionnaires for Mixed-Mode Surveys

[Skip to: 6. logistics](#)

Design For Mix

- Two Situations / two major distinctions:
 1. One main method that accommodates the survey situation best
 - Main method is used to maximum potential
 - Other methods auxiliary
 - Example panel formation
 2. Truly multiple mode design
 - All modes are equally important
 - Example: International surveys
 - Example: Concurrent mixed-mode and respondent is offered choice

One Main Method:
Other data collection modes
auxiliary

Optimization

- One Main Method, other methods auxiliary (cf Biemer&Lyberg 2003)
- Identify main method
 - Use main method optimal and to its maximum potential
 - Auxiliary methods designed as **equivalent as possible**
 - To avoid measurement error
 - May be perhaps sub-optimal for auxiliary method
 - Example: less response categories
- Note: Dillman et al (2009) coined this ‘mode-enhancement-construction’

One Main Mode: Use Design for Optimization Mix

- **Preferred-mode-specific design.**
 - Aka mode-enhancement
 - Designing a mixed-mode study where one mode is the primary or preferred mode, and other modes are seen as auxiliary. In this design the questionnaire is optimized for the primary mode and the questionnaires for the other (auxiliary) modes are adapted to the optimal design for the main mode.

Example Swedish LFS

- Longitudinal face-to-face & telephone
- Identify main method
 - Main method not necessary first method
 - **Main method telephone**
 - **Face-to-face** auxiliary from longitudinal point of view
- Main design for telephone interview
 - Longitudinal questions perhaps suboptimal from face-to-face interview option
 - E.g., no visuals, showcards

One Main Method: Cases

• Telephone with Face-to-Face Mixes

- If telephone main method
 - Relatively easy to design optimally with a **preferred-mode-specific design**.
 - Interviewer assistance in both modes
 - Do not use the 'extra' visual channel in face-to-face
- If face-to-face main method
 - Absence of visuals makes it more complicated
 - Carefully balance pro and cons
 - Optimize for one? (preferred-mode specific design, aka mode-enhancement construction)
 - Or use 'uni-mode' design?
 - Implement a small experiment within one mode if possible!
 - Example ESS experiment on show card influence

One Main Method 2

- **Self-Administered Questionnaires and Interviewer Mixes**

- SAQ or Interview Main Method?
 - Complexity of questionnaire
 - Big issue in mixes with paper-mail not in mixes with web
 - Are visuals essential?
 - Face-to-face in mix may accommodate visuals, phone does not
 - CAWI-CATI may have problems, CAWI-CAPI not
 - Sensitive questions
 - Social desirability differences, interviewer influence
 - Is interviewer probing essential or not?
 - Paper mail problems, but web can emulate some probes

Truly Multiple Mode Surveys: Modes are Equivalent

Three Approaches in Design

Modes Are Equivalent

- Three schools of thought:
 - Mode Specific Design or Method Maximization
 - Optimize each mode *separately*
 - Unified Mode Design or Uni-mode design
 - Provide the same stimulus (question format) in each mode, same *offered* stimulus
 - Generalized Mode Design
 - Purposively constructing questions to be different to achieve cognitive equivalence, same *perceived* stimulus
 - This can be seen as a sophisticated form of mode specific design

I. Mode Specific Design or Method Maximization

- Optimize each method individually
 - If one method has an extra use it
- Rationale
 - Reduces overall error
 - Best of all possible worlds
- Assumption
 - Same concept is measured in both modes but with different accuracy
 - Differences between methods only affect random error! (*no systematic bias*)
 - E.g. Some, factual items (Tourangeau, 2013)

II. Unified Mode Design

- To minimize data integrity problems Dillman (2000) proposes UNI-mode design for all modes
- **Uni-mode design.** From **unified** or **uniform** mode design; designing questions and questionnaires to ***provide the same stimulus*** in all survey modes in order to reduce differences in the way respondents respond to the survey questions in the different modes.
 - Write and present questions the same or almost the same
 - Same offered stimulus in each mode

Sound Basic Strategy

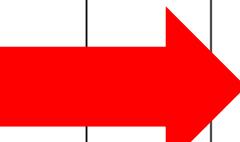
- Uni-Mode (unified) mode construction
 - Writing and presenting questions the same to ensure respondents receive a common mental stimulus
 - Same question structure across modes
 - Same response categories across modes
 - Dillman, 2000, chapter 6, pp.232-240
- Easier for some mixes than for others
 - Mail & web
 - Both visual, both self-administered
 - Helps question presentation, private

How to write 1

- Mix of Web (mail) and face-to-face
 1. Face-to-face can handle show cards (visual)
 1. So longer list of response options possible in mix
 1. Note Interviewer should show question show card!

QA14	For each of the following statements, please tell me whether you ...					
(SHOW CARD WITH SCALE – ONE ANSWER PER LINE)						
	(READ OUT – ROTATE)	Totally agree	Tend to agree	Tend to disagree	Totally disagree	DK
1	Poverty in (OUR COUNTRY) is a problem that needs urgent action by the Government	1	2	3	4	5
2	Nowadays in (OUR COUNTRY) income differences between people are far too large	1	2	3		
3	The (NATIONALITY) Government should ensure that the wealth of the country is redistributed in a fair way to all citizens	1	2	3		





Stimme voll und ganz zu
Stimme eher zu
Stimme eher nicht zu
Stimme überhaupt nicht zu

How to write 2

- Mix of Web (mail) and telephone
 - 1. Telephone not visual, auditory only
 - 2. Telephone may cause problems with certain questions
 - 1. Limited number of response categories
 - 1. Use uniform response scales if possible, thus use as less different response scales as possible (save interview time and respondent-effort)
 - 2. Design with a special format and use in ALL modes
 - 1. Yes-no instead of mark all that apply
 - 2. Endpoint labeling, instead of full scale, etc

How to write 3

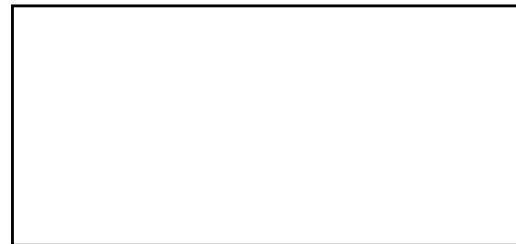
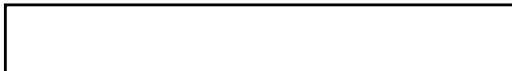
- Mix of Web (mail) and interview (ftf/tel)
- What to do with ‘do-not-know’
 1. Not offering (implicit) in all modes
 1. Make sure that online respondent can skip questions, like in mail
 2. No forced (mandatory) answer!!!
 2. Offer explicit do-not-know
 1. If interviewer is instructed to probe, then also program in a friendly probe (same wording) online
 2. Mail is problem here (probing not possible)

Open-ended 1

- Open-ended questions are applicable in all modes, but keep in mind some effects:
- Modes with interviewer (CATI, CAPI):
 - Advantage, probing by interviewer
 - But interviewer writes down the open answers – big filter! Most effects derive due to that.
 - Potential for social-desirability effects
 - Easy probe after open question “anything else you want to add?”
 - Interviewer administered, but also possible in web surveys

Open-ended 2

- Online:
 - Give good instruction/motivate
 - If important, add a friendly probe
 - Usually rich in amount of words comparing with other modes
 - Check for nonsense and fake answers (like “asd hakshfkjhsadfk”) before analysis, maybe eliminate people with fake answers
 - Size of box contains information



III. Generalized Mode Design

- From unified (uni) mode design to an integrated, generalized mode design
- **Generalized mode design.**
 - Purposively constructing questions and questionnaires to be different in different modes with the goal of **achieving cognitive equivalence** of the perceived stimuli, thereby resulting in equivalent answers across modes.
 - The **same** offered stimulus is not necessarily the same **perceived** stimulus!
 - Analogous to translation issues: literal versus in context translation
 - But again burden of proof of equivalence on researcher!

Generalized Mode Design

continued

- Designer understands
 - How differences between modes affect the question-answer process
 - How they affect the way respondents *perceive* the question, process the information and select and communicate the response
- Burden on the researcher to demonstrate that different questions elicit equivalent responses.
- Example Pierzchala et al, 2003
 - CATI: Are you {name}?
 - Web: Is your name {name}?

6. Logistics & Mixed-Mode

[Skip to: 7. evaluation of errors](#)

Consequences

Mixed Mode Strategy

Coverage

Costs

Nonresponse

Measurement

Sampling

Logistics

Main Issues

- In-House Expertise
 - Communication
 - Implementation and Timing
 - Data Processing
 - Quality Control
 - Paradata information
 - Cost
-
- Many of these issues well-known in International and Comparative Research
 - See for example CSDI International Workshop on Comparative Survey Design and **Implementation & Cross-cultural survey guidelines** at <http://ccsg.isr.umich.edu/>

Risk

“Risk of errors, delays, and increased costs arising from the duplication of efforts or additional work inherent in conducting research across different modes” Macer 2003

- How to avoid /limit
 - Coping with operational complexity

Operational Complexity

- Different recruitment and screening strategies
 - Designed, programmed, tested
 - Integration needed
- Survey instrument
 - Designing and programming
 - Duplication or integrated software
- Data handling
 - Ideal relational data base
 - Practice mixed-mode puts penalty during data analysis: reformatting disparate data files
- To meet needs of operational complexity.....

Expertise needed

- Expertise on all modes
 - In-House Expertise
 - Subcontractors
- General expertise for all modes on
 - Questionnaire development
 - Questionnaire testing
 - Field work implementation
 - Sampling issues
 - Data management
 - Analysis issues
 - Adjustment, complex sampling

Communication

- Between experts on mode
 - Field work departments
- Between questionnaire developers and programmers, statisticians and data analysts
- Between divisions
 - Sampling
 - Question development
 - Implementation/fieldwork
 - Data entry and coding
 - Data merging, adjustment, & analysis

Total Quality Approach

- Total survey design
- Document information
- Disseminate information
- Information on:
 - Survey process & quality
 - Methodologies
 - Software
 - Para data
 - Adjustment weights

7. Evaluation & Mixed-Mode

[Skip to: 8. mixed-device](#)

Evaluation of mixed-mode survey

- Total Survey Error
- Decompose
 - Selection error
 - Measurement error

Missing data pattern (Klausch, 2016)

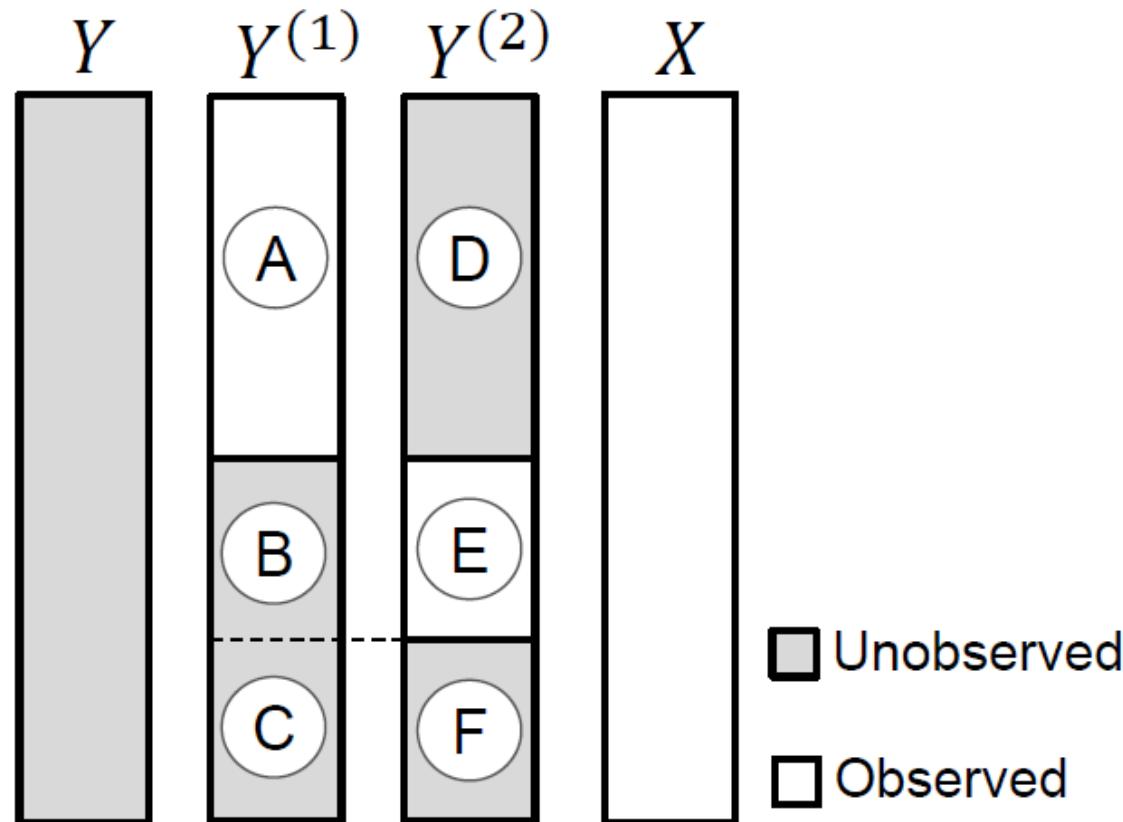


Figure 2 Illustration of the missing data pattern of a sequential design with two modes. The true score vector Y is unobserved and instead measurements $Y^{(1)}$ and $Y^{(2)}$ are observed from respondents to the survey. Some institutes, like Statistics Netherlands, have available sampling frame information (X) on all units.

A Potential Design for Diagnosis and Estimation Effects

<i>Build in overlap</i>	Method 1	Method 2
Country X	Main Data Collection	Some Data
Country Y	Some Data	Main Data Collection

A Potential Design (2) for Diagnosis and Estimation Effects

<i>Build in overlap</i>	Method 1 e.g. f2f	Method 2 e.g. web
Wave 1	Main Data Collection	Some Data
Wave 2	Some Data	Main Data Collection

Klausch (2014):

- Basic estimation techniques for causal effects
 - ANCOVA estimation
 - Regression estimation
 - Propensity score weighting
 - Propensity score stratification
- More advanced estimation techniques
 - Matching
 - Double-Robust Regression Estimation
 - Multiple Imputation

Recommended reading

- Klausch, T., Schouten, B., & Hox, J. J. (2014). The Use of Within-Subject Experiments for Estimating Measurement Effects in Mixed-Mode Surveys (Discussion Paper No. 2014-06). The Hague, The Netherlands: Statistics Netherlands. Retrieved from <http://www.cbs.nl/NR/rdonlyres/181793AC-94B8-4748-9C2B-E541DCF9CFB7/0/201406x10pub.pdf>
- Klausch, T. (2014). Informed Design of Mixed-Mode Surveys: Evaluating Mode Effects on Measurement and Selection Error (Unpublished PhD Thesis). Utrecht University: Utrecht, The Netherlands.
- Schouten, B., van den Brakel, J., Buelens, B., van der Laan, J., & Klausch, T. (2013). Disentangling mode-specific selection and measurement bias in social surveys. *Social Science Research*, 42(6), 1555–1570.
- Vannieuwenhuyze, J., & Loosveldt, G. (2013). Evaluating Relative Mode Effects in Mixed-Mode Surveys: Three Methods to Disentangle Selection and Measurement Effects. *Sociological Methods & Research*, 42(1), 82–104.

More Recommended reading

- Buelens, B., & Brakel, J. A. van den. (2014). Measurement Error Calibration in Mixedmode Sample Surveys. *Sociological Methods & Research*.
- Klausch, T., Hox, J. J., & Schouten, B. (2013). Measurement Effects of Survey Mode on the Equivalence of Attitudinal Rating Scale Questions. *Sociological Methods & Research*, 42(3), 227–263.
- Klausch, T., Schouten, B., & Hox, J. J. (2014). The Use of Within-Subject Experiments for Estimating Measurement Effects in Mixed-Mode Surveys (Discussion Paper No. 2014-06). The Hague, The Netherlands: Statistics Netherlands. Retrieved from <http://www.cbs.nl/NR/rdonlyres/181793AC-94B8-4748-9C2BE541DCF9CFB7/>
- 0/201406x10pub.pdf
- Kolenikov, S., & Kennedy, C. (2014). Evaluating Three Approaches to Statistically Adjust for Mode Effects. *Journal of Survey Statistics and Methodology*, 2(2),
- Vannieuwenhuyze, J., Loosveldt, G., & Molenberghs, G. (2010). A Method for Evaluating Mode Effects in Mixed-mode Surveys. *Public Opinion Quarterly*, 74(5), 1027 –1045.
- Vannieuwenhuyze, J., Loosveldt, G., & Molenberghs, G. (2014). Evaluating Mode Effects in Mixed-Mode Survey Data

9. Mixed-device surveys

Skip to: end



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.

Design for mobile

- Questionnaires should be mobile friendly
- If it fits a mobile screen, it fits any other screen
 - 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

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

Grids: don't 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 (collapsible chunks)
- Carousel format (items pass by)



Visual relief: (vertical) accordion versus traditional grid

The image shows a Windows desktop environment with two overlapping windows from a survey application.

Left Window (Accordion Design):

- Title:** Mijn werkplezier
- Header:** Let op! Dit is een voorbeeldvraaglijst. De antwoorden worden niet opgeslagen.
- Content:** Mijn organisatie, alles bijeengenomen. A horizontal scale from "Zeer ontevreden" (far left) to "Tevreden" (center) to "Zeer tevreden" (far right). The "Tevreden" button is highlighted with a green outline.
- Text:** Weet niet/ Geen ervaring

Right Window (Grid Design):

- Title:** University Login Utrecht University Logout Web Slice Gallery
- Header:** Opslaan, nog niet verzonden
- Content:** De verre u er tevreden of. A vertical list of questions, each with a "Zeer tevreden" and "Weet niet/ Geen ervaring" option. The "Weet niet/ Geen ervaring" option is highlighted with a dark blue border in the last row.

Taskbar:

- Icons: Internet Explorer, Microsoft Word, Microsoft Excel, Google Chrome, File Explorer, Task View, and others.
- Date and Time: 22/05/2017, 16:29

Bottom Taskbar:

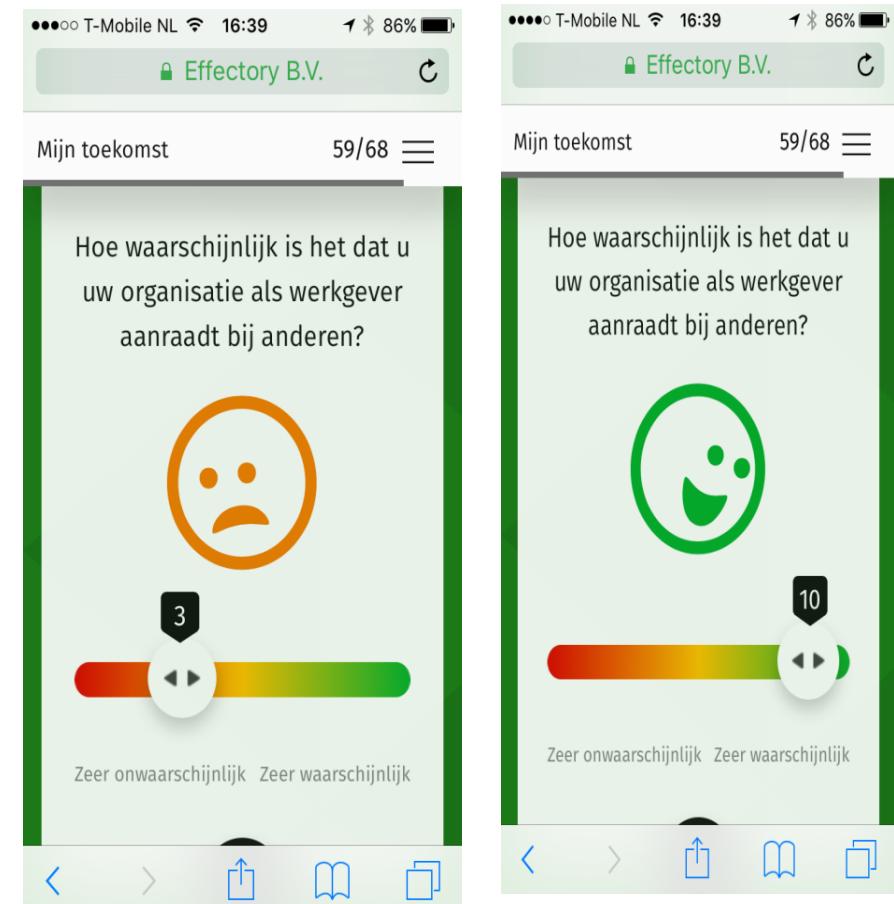
- Icons: Internet Explorer, Microsoft Word, Microsoft Excel, Google Chrome, File Explorer, Task View, and others.
- Date and Time: 22/05/2017, 16:30

Bars

- Better evaluated on mobile (see Toepoel and Funke, forthcoming)
- Visual analogue scale
 - Point and click

versus

- Slider bar
 - Drag and drop
 - Initial position handle might influence results
 - Special design



Visual, buttons, touch (no mouse)

••••• KPN NL 20:55 78% 🔋

blauw-survey.com

bla u w

Voor de start met insuline voelde ik mij...

heel veel weet niet

Voor de start met insuline maakte ik mij zorgen...

heel veel heel weinig weet ik niet

Voor de start met insuline was ik over de behandeling...

heel ontzreden heel tevreden

< > ⌂ ⌃ ⌄ ⌅

••••• KPN NL 20:53 79% 🔋

blauw-survey.com

bla u w

Antwoorden als button

Nuon NS ANWB

Philips Jumbo Ziggo

ING Heineken kpn

anders, nl...

< > ⌂ ⌃ ⌄ ⌅

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
- Apps and sensors can give additional insights
 - Only 40% allows to use their GPS coordinates (Toepoel and Lugtig, SSCORE, 2015)
 - CONSENT!
- 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, SSCORE 2015)

Next week

- Non-probability inference
- READ the literature!
 - Important, exercise is technical