



Mixed Mode and Mixed Device Surveys: Why, When, and How

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Part 1

Mixed Mode Surveys

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Main Data Collection Methods in Surveys

- ☐ Face to Face Interviews (CAPI, PAPI)
- Telephone Interviews (mainly Centralized)
- Postal Mail Surveys
- Online Surveys

CASI Self-administered

- Panel Designs
- Mixed Mode Designs
- February 2020: Suspension of Face-to-Face and centralized CATI (e.g. SHARE, 2020)

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July 2020



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Many ongoing surveys had to work quickly

Easier for

- Panel Designs: have information on respondents
 - Can change to postal mail, decentralized telephone, online survey, or mix
- Mixed Mode Designs
 - Can change over to one of the available methods or mixes

Examples:

- UK: Understanding society from CAPI-CAWI mix to mainly CAWI with telephone follow-up if necessary Burton, 2020
- Europe: SHARE, forced to change during fieldwork from CAPI to CATI. Share 2020
 - Decentralized CATI, Face-to-Face interviewers from home
- https://ojs.ub.uni-konstanz.de/srm/issue/view/221

Terminology



- ■Mixed Mode
- Multi Mode, Multiple Mode
 - Often used interchangeably
- Mixed Mode
 - Any combination of survey data collection methods (modes)
 - In any part of the data collection process
 - Contact phase
 - Response phase

Note: Term mixed methods used in qualitative studies

About Mixed Modes



After 30 years, the norm and expected to increase

MIMOD, 2019, Biemer & Lyberg, 2003, Dillman & Tarnai, 1988

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

Why? We Need To!



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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
- COVID-19 changes

New and mixed ways of data collection now accelerated

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

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
- 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

Concurrent Mixed Mode

Sequential Mixed Mode

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 13

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 mode 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 15 Push to web approach (Dillman, 2017)

Free Lunch?



How about measurement / data quality?

It depends

Different response mode for specific questions to AII

- 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





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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 **Design equivalent questionnaires!** Estimate mode effects, separating wanted mode П. selection from unwanted mode measurement effects Need auxiliary data Adjust for unwanted mode measurement effects

I. Questionnaire Design



- 'Naively' mixing modes enhances measurement error as different modes have traditions of different question formats
 - Example: Do-not-know explicitly offered in web, not in interview!
 See also Dillman & Christian, 2005
 - BUT, Question format has effect on response distribution!
- As a consequence, designers routinely enhance unwanted mode measurement effects in mixed-mode survey
 - Question format effects may be the main cause for mode measurement effects in standard mixed-mode design
 - Try to avoid different question formats across modes
 Use equivalent questionnaires
- Special design needed for mixed-mode surveys!
 - Start with UNI(fied) mode design Dillman(2000)
 - □ If good reason to deviate do so (e.g., adapt instructions to medium)
 - □ Aim at optimal equivalence

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



- Separating mode selection and measurement effects requires additional information
- 1. Use available data
 - Demographic variables assumed unaffected by mode measurement effects
 - Use an existing single mode reference survey (considered equivalent)
 - Single mode data from previous measurement in longitudinal designs

Longitudinal data offer many opportunities

- 2. Design for it: collect additional data from random subsample
 - Subsample gets only a single mode, or is part of embedded randomized mode experiment
 - Subsample gets a follow-up single mode survey

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) 23

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







Wanted Mode Selection and Unwanted Measurement Effects





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Wanted Mode Selection and Unwanted Measurement Effects



I. Design Equivalent Questionnaires AVOID Unwanted Differential Question Format Effects Most (cost and time) Efficient Strategy

II. Estimate

(1)Wanted Mode Selection Effects(2) Unwanted Mode Measurement Effects

III Adjust ONLY for Unwanted Mode Measurement Effect



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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 <u>https://ojs.ub.uni-konstanz.de/srm/article/view/7402</u>
- 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_o r_survey_modes_On_mixed_mode_surveys

 Edith de Leeuw et al (2016) How to design and implement Mixed Mode surveys in cross national surveys: overview and guideline.
 <a href="https://www.researchgate.net/publication/342746632_How_to_Design_an_d_lmplement_Mixed_Mode_Surveys_in_Cross_National_Surveys_Overview_ew_and_Guideline?showFulltext=1&linkId=5f047a59a6fdcc4ca4530d71_DOI: 10.13140/RG.2.2.19016.96004

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 <u>https://www150.statcan.gc.ca/n1/pub/12-001-</u> 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

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- Don Dillman (2017) The promise and challenges of pushing respondents to the web in mixed-mode surveys. Survey Methodology, 43, 1 At https://www150.statcan.gc.ca/n1/pub/12-001-x/2017001/article/14836-³² eng.htm



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- Dillman, D. A., & Tarnai, J. (1988). Administrative issues in mixed mode surveys. In R. M. Groves, P. P. Biemer, L. E. Lyberg, J. T. Massey, W. L. Nicholls II, & J. Waksberg (Eds.), *Telephone survey methodology* (pp. 509-528. New York: John Wiley & Sons.
- 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 <u>https://www.researchgate.net/publication/313585673_Mixed-Mode_Research_Issues_in_Design_and_Analysis</u>

Jaeckle, A., Roberts, C., & Lynn, P. (2010). Assessing the effect of data collection on mode of measurement. *International Statistical Review*, 78, 1, 3-20.



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

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.: <u>https://www.researchgate.net/publication/276596592_Handling_Do-Not-Know_Answers_Exploring_New_Approaches_in_Online_and_Mixed-Mode_Surveys</u>
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https://www.researchgate.net/publication/308340930_Mixing_Online_Pan el_Data_Collection_with_Innovative_Methods

Section on adaptations of ongoing surveys to the lockdown policy, In special issue of Survey Research Methods, Vol 40, no2. available at <u>https://ojs.ub.uni-konstanz.de/srm/issue/view/221</u>

□ E.g. Share, Understanding Society, SOEP, PSID

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.

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?



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- 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 42

FAQ6: Coverage,Nonresponse, an 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

FAQ 7: How to handle Do-not-Know or Refuse-to-Answer categories

- Avoid doing one thing in one mode and another in another mode
- Design equivalent versions
 - Keep stimulus (that is question and answer categories) the same across modes
 - Present instructions and explanations similarly across modes (avoid superfluous long texts)
- Make an informed choice, based on
 What is important in your study
 What is your reference mode
 May lead to different choices in different surveys
 - Two examples



FAQ 7a: Example Do-not-Know

- Reference survey was interview
 - Standard practice was:
 - Not offer Do-Not-Know, and friendly probe after spontaneous do-not-know
 - Change to online survey as major mode
 - Decision: No explicit do-not-know option online
 - But question could be skipped (NOT mandatory)
 - Followed by friendly probe (based on interviewer texts as used in original interview survey)

Wine (2006) <u>https://www.rti.org/pubs/TSM2006_Wine_paper.pdf</u>

- Approach proved successful in experiments
 - De Leeuw et al (2016). Handling do-not-know answers: Exploring new approaches in online and mixed-mode surveys. Social Science Computer Review. DOI:10.1177/0894439315573744.

FAQ 7b: Example Refuse to Answ

- Reference survey was (mixed-mode)interview
 - Standard practice was:
 - CAPI (Computer-Assisted Personal Interviews)
 - CASI (Computer-Assisted-Self-Interview) module for part with sensitive questions
 - Change to CATI (Computer Assisted Telephone Interview) from interviewers home
 - Problem CASI module had explicit response option 'refuse to answer' to avoid social desirability bias
 - Decision: Also read out during telephone interview
 - Details: Will et al (2020) COVId-19 lockdown during fieldwork: Challenges and strategies in continuing the ReGES study. ⁴⁶ doi:10.18148/srm/2020.v14i2.7753

FAQ 8: Avoid Long Grids



- Online often grid (matrix) questions
 - Has disadvantages (e.g., straight-lining, satisficing)
 - Context effects: questions & answers may influence each other
- Interviews are sequential: one question at time
- Mobile (cell phone) surveys also often sequential Furthermore, longer grids difficult on small screen
- Question format source of difference between modes & devices

□ All modes sequential, one question at a time?

- Takes longer in online self-administered web surveys
- Having to click next many times, may add to response burden

Potential solution Auto Advance (carrousel)-formát

Example: Auto Advance-Forma



Horizontal Scrolling Matrix format (HSM or Carrousel with Auto-Advance)

- One question at a time
- Same response options all questions (replaces grid)
- Next question appears automatically: Auto advance

1. In hoeverre bent u het eens met de volgende uitspraken? Het gaat om uw eigen mening, om wat <u>u</u> vindt.

De toegang tot ons land wordt nu beperkt met een aantal maatregelen. In de toekomst moeten we strengere maatregelen nemen wat betreft toegang tot ons land.

	helemaal mee eens	mee eens	beetje mee eens	neutraal	beetje mee oneens	mee oneens	helemaal mee oneens
	С	C	С	С	0	С	C
			<< 1	2 3 4	5 >>		
. Mantan	Meleonde a						

Copyright de Leeuw, Hox, Klausch et al. (2012)

Web questionnaires: Matrix-Grid or HSM format?

Looks Like This



Auto Advance HSM Example

1. In hoeverre bent u het eens met de volgende uitspraken? Het gaat om uw eigen mening, om wat <u>u</u> vindt.

De toegang tot ons land wordt nu beperkt met een aantal maatregelen. In de toekomst moeten we strengere maatregelen. In de toekomst moeten we strengere maatregelen nemen wat betreft toegang tot ons land.



Looks Like This



Auto Advance HSM Example

1. In hoeverre bent u het eens met de volgende uitspraken? Het gaat om uw eigen mening, om wat u vindt.

Als immigranten bewust lange tijd werkloos zijn, moeten ze het land uitgezet worden.

helemaal mee eens	mee eens	beetje mee eens	neutraal	beetje mee oneens	mee oneens	helemaal mee oneens
	ß					
		1	2 3	4 5		

Looks Like This



Auto Advance HSM Example

1. In hoeverre bent u het eens met de volgende uitspraken? Het gaat om uw eigen mening, om wat <u>u</u> vindt.

Alle immigranten moeten dezelfde rechten krijgen als elke Nederlandse burger.

helemaal mee eens	mee eens	beetje mee eens	neutraal	beetje mee oneens	mee oneens	helemaal mee oneens
0			Ę,			
		- 1 2	2 3	4 5		

Adaptation Grids: Project Under Construction...



- Much research and development still needed
- A current example (ESRA 2019)
- Ipsos MORI Mobile friendly grids at ipsos.uk/demogrids
- Lucy Lindley: more development work needed to maximize accessibility and experience for respondents: <u>ipsos.uk/demogrids</u>