

# Designing The Optimal Questionnaire: Day 1

Presentation 1:  
Overview  
Sources of Error

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## Overview Day 1: Morning

9.30-10.00	Getting to know each other
10.00-10.30	Sources of Errors
10.30-11.00	Writing Questions
11.00-11.20	Coffee/tea break
11.20-12.00	Exercise 1: Outline of questionnaire
12.00-12.30	Different Questions, different formats
12.30-13.20	Exercise 2: Writing questions
13.20-14.30	Lunch break

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## Overview Day 1: Afternoon

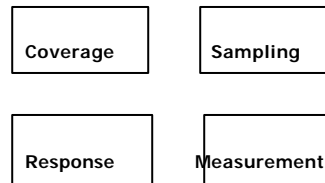
13.20-14.30	Lunch break
14.30-15.00	Cognitive issues in construction and testing
15.00-15.45	Exercise 3: Pretesting
15.45-16.00	Tea/coffee break
16.00-16.30	Modes of Data collection
16.30-16.45	Special populations
16.45-17.15	Exercise 4: Tailoring the questionnaire
17.15-17.30	Winding-up
17.30	Social event

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## Corner Stones of Data Quality: Data Collection



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## Building for Quality = Reducing Errors

<p>Coverage: Every member of <b>intended</b> population has chance of selection Quality= Reducing Coverage Error</p>	<p>Sampling: Sample vs total population <b>sample size &amp; statistics</b> adequate methods Quality=Reducing Sampling Error</p>
<p>Response: Respondents are like Nonrespondents on <b>key vars.</b> Quality= Reducing Nonresponse Bias</p>	<p>Measurement: Respondents understands questions and answers correctly + recorded correctly Quality= Reducing Measurement error</p>

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## Data Collection and More

- Errors in Designing Survey:
  - Coverage, frame errors
  - Sampling errors
  - Nonresponse errors
  - Measurement errors
    - Specification errors
- Errors in Processing survey
  - Editing, data entry, coding, weighting, etc
- Concentrate on Designing Questionnaire

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## Measurement Errors (Morning sessions)

- Main Sources of Error
  - Researcher
    - Misspecification, question utility
  - Questionnaire
    - Question wording, response categories, etc.
  - Respondent
    - Misunderstands, does not want to answer, etc

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## Measurement Errors (Afternoon and tomorrow)

- Main Sources of Error
  - Interviewer
    - Deviates from instruction, mistake, cheating
  - Mode of Data Collection
    - Auditory vs visual presentation, etc
  - Interactions
    - Elderly respondent \* retrospective question
    - Unclear question\*interviewer's explanation

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## Researcher

- Misspecification
  - Concept implied in question differs from concept that should be measured (intended)
  - Wrong parameter is estimated!
  - Example (Biemer & Lyberg, 2003):
    - Intended concept is 'value of a parcel of land if it were sold on a fair market today'
    - Q1: "For what price would you sell this parcel of land?"
    - Q2: "What do you think is the current market value of this piece of land? "

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## Specification Error

- Concepts Measured/Objective Survey
- Limited Length of Questionnaire
  - Select items carefully!
- From research question to survey item
  - Which items to include?
  - Do items measure dimension of interest?
- Knowledge research objectives
- Planned Analyses

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## Question Utility Key Decisions (Czaja & Blair, 1996)

1. Does question measure aspect of research question?
2. Does question provide information needed in conjunction with other variable (analysis)?  
↓
3. Will most respondents understand question?
4. Will most respondents have information?  
↓
5. Will most respondents be willing to answer?  
↓

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## Question Utility Key Decisions 2 (Czaja & Blair, 1996)

7. Should this question be asked to all or to subset
8. Is subset identifiable?  
↓
9. Is other information needed to analyze the question?  
↓
10. Add necessary question (go back to 2)

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## Useful References

- Biemer & Lyberg (2003): Introduction to Data Quality, Wiley
- Czaja & Blair (1996): Designing Surveys, Sage
- Salant & Dillman (1994): How to Conduct your own Survey, Wiley
- Brochures ASA-series *What is A Survey?*
  - *Designing a Questionnaire*
  - <http://www.amstat.org/sections/srms/whatsurvey.html>

# Designing The Optimal Questionnaire: Day 1

## Presentation 2: Writing Questions

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## Operationalization

- From Theoretical Concept to Measurement
  - That is from research question to survey question(s)
- Specify
  - What is goal research
  - What do you want to know
  - For whom are the data
- List important aspects concept

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## Operationalization 2

- From research question to survey question(s)
- Limited Length of Questionnaire
  - Select questions carefully!
  - Which questions to include?
  - One question or more for each concept (reliability, precision)?
  - Do questions measure dimension of interest (validity)?
- Needed:
  - Knowledge research objectives
  - Knowledge planned analyses

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## Outline Questionnaire

- Specify sections in questionnaire
  - Topics/Concepts
- Specify questions within topics
  - Keywords
- Specify type of information
  - Knowledge
  - Experience
  - Opinion
  - Background

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## Outline Questionnaire 2

- Specify auxiliary variables
  - Needed for statistical analysis
- Background variables
- Screening questions
- Group in new section(s) or existing section
- Order all sections

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## Recap Question Utility

- Utility of background questions
  - Needed in conjunction with other variable?
  - Needed for nonresponse adjustment?
- Utility of survey questions
  - Relevant aspect of research?
    - Specification
  - TAP (Foddy)
    - Topic, Applicability, Perspective

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## Example: Topics Maryland Crime Survey (Czaja & Blair, p.86)

- A. Background (demographic) questions
- B. Personal experience with crime
- C. Opinions about criminal justice system
- D. Fear that they or their families will be victims of crime
- E. Perceptions of violent crime problem in neighbourhood or state
- F. Perceptions of non violent crime problem
- G. Things done to protect themselves from crime
- H. Opinions on alternative sentencing
- I. Perceptions of crime problem generally  
(neighborhood/state)

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## TAP-Principle (Foddy, 1993)

- 'TAP'-ping valid, reliable respondent information
- Topic
  - Topic properly defined so that each respondent clearly understands
- Applicability
  - Ask only information that respondents have
- Perspective
  - Perspective (context) should be specified so that each respondent interprets question in the same way

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## TAP-Principle & Utility

- Clearly defined?
- Have respondents knowledge?
  - Can answer with *reasonable* effort?
  - Will they be willing to answer?
- Will they understand question?
  - In same way?

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## Ordering Questions

- Questionnaire is more than questions!
  - Order & context
- First question important
  - Relevant to topic
  - Easy to answer
    - Cognitive burden, memory
    - Closed format
  - Interesting
  - Applicable to most
- Motivates respondent

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## Ordering Questions 2

- Order logical and smooth for *respondent*
  - Ease process, motivate, willingness
- This reduces respondent burden & cognitive effort
- Principles first question also for total ordering
  - Relevant
  - Ease
  - Interest
  - Applicable

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## Ex.: Order topics Maryland Crime Survey (Czaja & Blair, p.86)

- A. Background (demographic) questions
- B. Personal experience with crime
- C. Opinions about criminal justice system
- D. Fear that they or their families will be victims of crime
- E. Perceptions of violent crime problem in neighbourhood or state
- F. Perceptions of non violent crime problem
- G. Things done to protect themselves from crime
- H. Opinions on alternative sentencing
- I. Perceptions of crime problem generally  
(neighborhood/state)

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## Example: Ordered topics MCS (Czaja & Blair, p.88)

1. Perceptions of crime problem generally in (first question your neighborhood, second in state)
2. Perceptions of violent crime problem in neighbourhood or state
3. Perceptions of non violent crime problem
4. Personal experience with crime
5. Fear that they or their families will be victims of crime
6. Things done to protect themselves from crime
7. Opinions about criminal justice system
8. Opinions on alternative sentencing
9. Background (demographic) questions

# Designing The Optimal Questionnaire: Day 1

## Presentation 3: Different Questions Different Formats

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## Types of Information

- Factual
  - Knowledge
  - Behaviour
  - Experiences
  - Attributes, background characteristics
- Subjective
  - Attitudes
  - Opinions
  - Intentions
  - Evaluations

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## Factual Vs Subjective

- Factual
  - In principal true value
  - Retrieve from memory
  - May be collected through other means
    - Observation, records
- Subjective
  - 'True value'?
  - Often has to be 'constructed', not ready
  - Only way to collect data is by asking

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## Factual Vs Subjective 2 Response scales

- Factual information often UNI-POLAR
  - Zero (0) has meaning
- Examples
  - Frequencies, number
    - Behaviour: Never, sometimes, always
    - Attribute: ..... children
  - Evaluation
    - Excellent, good, fair, poor
    - Number from 10-0 (10 excellent, 0 as worse as can get)

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## Factual Vs Subjective 2 Response scales

- Subjective information often BI-POLAR
  - Zero no meaning
  - Neutral mid-point has meaning
- Examples (two dimensions)
  - Agree/Disagree
  - Satisfied/Dissatisfied
  - Positive/Negative
  - Delighted/Terrible
  - Favorable/Unfavorable

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## Number of Scale points

- Optimal: around 7-points (Krosnick & Fabrigar, 1997)
- But:
  - Depends on question
    - Uni vs. bipolar
  - Should always have clear label
- Depends on method
- Depends on population
  - Cognitive development, language

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## Neutral vs. 'do-not-know'

- Neutral midpoint has meaning
  - Bi-polar questions such as attitude
  - One has thought about it, has a meaning, is neutral
  - Example: abortion
- 'Do-not-know' is absence of information
  - Substantive in knowledge questions
  - Not substantive (missing data) other questions
- Offer explicit 'do-not-know' ONLY
  - If chances very high most people 'do-not-know'
- Always allow answer, but...
  - Interviewer does not read aloud do not know
  - But accepts it (probing)

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## Factual Information

- Define **key**-terms
- Make task as simple as possible
  - Memory!
    - Introduction to put in right frame
    - Memory aids
    - Specific reference periods
- Long questions better than short
  - Long question build from SHORT sentences
  - Introduction to question
- Label **all** response categories
- Do-not-know may be a substantive answer
  - Include do-not-know

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## Subjective Information

- Use more than one question if possible
  - Multiple question for one concept
- Subjective information extra sensitive for
  - Context
  - Question wording
    - Forbid vs. do not allow
  - Response categories
    - Numbers may convey meaning (negative numbers, schoolgrades)
- Do-not-know is **not** a substantive answer
  - Do not explicitly offer do-not-know

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## Question Wording: TAP

- Topic
  - Topic properly defined so that each respondent clearly understands
- Applicability
  - Ask only information that respondents have
- Perspective
  - Perspective (context) should be specified so that each respondent interprets question in the same way

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## Question Wording

- Aim at **intended** respondent
- Understanding question/words
  - Clear meaning
- Words should have same meaning
  - Everyone answers same intended question
- Word in such a way everyone is willing to answer
  - Beware of 'sensitive' or 'offensive' words
  - Cultural
- Do not ask two things in one question
  - One thing at the time!

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## Questionnaire: Context

- Questionnaire is more than questions!
  - Order, context, lay-out
- Perspective (TAP)
  - Introduction/instruction
- Order/Context effects
  - Between questions
    - First general, than specific
    - Example: attitudes
  - Between blocks of questions

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## Useful References

- Salant & Dillman (1994): How to Conduct your own Survey, Wiley
- Fowler (1995) Improving Survey Questions: Design and Evaluation, Sage

# Designing The Optimal Questionnaire: Day 1

## Presentation 4: Cognitive Issues Question-Answer Model Pretesting

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## Question-Answer Model

What happens when a respondent is posed a question?

### Phases in Question-Answer Model

1. Comprehension
2. Information retrieval
3. Judgment
4. Communication

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## Question-Answer Model 2

- Question is posed
  - Comprehend Question?
    - Open question also comprehend instruction
    - Closed question also comprehend response categories
  - Pitfalls for comprehension
    - Complexity of wording, Ambiguity, etc
    - Reading and language skills
  - Retrieve relevant information from memory
    - Factual
    - Subjective
  - Pitfalls for retrieval
    - Retrospective, unclear time period, etc
    - Memory capacity, speed

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## Question-Answer Model 3

Question is posed: comprehension, retrieval

- Judgment
  - Combine different pieces of information
  - Formulate tentative answer
  - Closed question:
    - Choose between available response categories
    - Adapt answer
  - Open question
    - Acceptable or not: adapt
- Pitfalls for judgment
  - Response strategies
  - Social desirability, self-presentation
  - Group norms

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## Question-Answer Model 4

- Question is posed: comprehension, retrieval, judgment
- Communication
  - Answer is given
  - Pitfalls communication
    - Misunderstanding, interviewer error, respondent error, typing error, etc

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## People are nice and try,....

- Unclear question
  - Meaning from context
    - Unwanted context effects
  - Meaning from question itself, labels, response scale
    - Unwanted scale effects, question effects
  - Interviewer tries to explain
    - Interviewer effects, interviewer variance
- Memory fails
  - Context may be help, but...
  - Response categories suggest range of answers

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## People try,....

- Real answer does not fit offered response categories
  - Respondent skips question
  - Answers 'do-not-know'
  - Falls back on response tendency
  - Shifts answer to best fitting
    - Noise/error added to 'real' answer
- Adapt to situation (others in room etc)

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## Testing Questionnaires

- Write good questions and Always Pretest
  - New questions
  - Tried-out questions
    - Mode differences: e.g. from mail to phone
    - Population differences
- Pretest vs. Pilot Survey
  - Pretest
    - Small qualitative study on questions/questionnaire **only**
  - Pilot survey
    - Dress rehearsal to gain information on **total** survey process

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## Pre-Testing Questionnaires

- Pretest Methods
  - Expert evaluation
  - In-depth interview
    - Think aloud, probing etc (Cognitive lab)
  - Focus group
  - Observation
  - Behavior coding
    - Interviewer-respondent interaction

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## Expert Evaluation

- Simple, quick, economic
- Describe study: goal, type of respondents, mode etc
- Ask 'experts' to critically go over questionnaire and give comment
- Methods to comment
  - Expert sends Word-file with 'track changes on'
  - Discuss questionnaire with expert
  - Use coding schedule

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## In-Depth (cognitive) Interview

- Real respondents
  - Small number (5-50)
  - No random sample, but convenience sample
  - Stratified according to important variables for study
    - Age, education, etc
- Goal
  - Find problems in Q-A process
  - Suggest solutions
- Mix of methods used

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## In-Depth Interview 2

- Instruct respondent clearly
  - Explain respondent helps to improve questions
  - Explain that saying "I do not understand this" is helpful
  - Error is error questionnaire not respondent!
- Mix of methods used
  - Thinking aloud of respondent
  - Interviewer asks open questions, probes
    - What does ..... mean to you
  - Paraphrasing, etc
- Reward respondent during process continually
  - "Yes this is very useful", nod, etc

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## Focus groups

- Discuss questions in small groups
  - More efficient than individual interviews
  - Less detailed picture of Q-A process
  - Gives global information, suggestions
  - Group members may stimulate each other
- Needed
  - One moderator to stimulate process and explain
  - One note taker
- Procedure
  - Moderator explains goal
  - Starts with question
  - Guards process (stimulate quiet members etc)

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# Designing The Optimal Questionnaire: Day 1

Presentation 5:  
Modes of data Collection  
Channel Capacity  
Communication  
Social Norms

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## Modes of Data Collection

- Face-to-Face Interview
  - Oldest Mode
    - CAPI
- Telephone Interview
  - Since 80's main production USA
    - CATI
- Mail Surveys
  - Fall back method, respectable since Dillman78
    - Web surveys, Disk by Mail

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## Modes of Data Collection 2

- Mixed Modes
  - Several forms possible
    - CAPI + CASI
- Interviewer-Assisted:
  - Drop-off-pick-up, mall intercept, on premises (e.g. health center)
  - CASI or A-CASI
- Diary Surveys
  - Specific goals, Specific needs
    - CASI or ACASI, Computer panel, Scanning

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## Modes of Data Collection 3

- Administrative Records
  - Government, Privacy, Quality
    - Data bases, Data mining, EDI
- Direct Observation
  - Behavioral sciences, Agriculture, Media, Marketing
    - TV: people meters, CADE
- Note: no questionnaire

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## How do modes differ?

- Optimize questionnaire for modes
- Know how modes differ!
  
- Main differences
  - Channels of communication
  - Presentation of stimuli
  - Social norms

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## Channels of Communication

- Verbal Communication
  - Spoken word
- Nonverbal Communication
  - Meaning of gestures, expressions, posture
- Paralinguistic Communication
  - Nonverbal auditory signals
    - Emphasis, tone, timing, mhm-hmm

*This influences the tools for presenting questions and for help and instructions*

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## Presentation of Stimuli

- Visually
  - Printed questionnaire
  - Flash card/response card with response categories
- Show material
  - Mail, web, CAPI
- Auditory
  - Verbal, read aloud, paralinguistic
  - Music
    - Telephone, face-to-face (web)
- Auditory + Visually
  - 'show & tell'

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## Presentation of Instructions

- Visually
  - In questionnaire
  - Accompanying letter
  - E-mail
  - Help buttons
- Auditory
  - Verbal
  - Paralinguistic (Emphasis)
- Auditory + Visually
  - 'show & tell'

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## Necessary Skills Respondents

- Visually
  - Printed questionnaire: Literacy
  - Flash card/response card: Helps reduce memory burden
- Auditory
  - Listening
    - Danger of overburden with complex questions
  - Memory
    - Long lists
- Motoric
  - CASI/Web: Typing, using Mouse

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## Optimizing for Modes

- Face-to-face interview has most flexibility
  - Visual + Audio
    - Non verbal communication + para-lingual
  - Interviewer help/instruction
    - Number of response categories
    - Open questions
    - Special task e.g. sorting
- Telephone absence visual cues
  - Verbal + Para lingual
  - Interviewer help/instruction
    - Limits number of response categories
    - Limits complexity
    - Limits length

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## Optimizing for Modes

- Self-Administered
  - Visual only
    - Must compensate for non verbal communication + para-lingual
      - Lay-out
      - Graphical tools
    - Visual presentation: response categories like face-to-face
    - Visual presentation/stimuli like face-to-face
  - No interviewer help/instruction
    - Instruction at beginning
    - Guidance through questionnaire
      - CASI/Internet
    - Give extra instruction/explanation at specific places questionnaire
    - Limits open questions

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## Social Norms/Customs

- Differ for different cultures
  - Japan: phone sub-ordinates, visit superiors in person
- Differ over time
  - New, interesting vs. well-known
    - Telephone in 1930
    - Disk by mail 1990
- Confidentiality, privacy
- Self-presentation

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## Social Desirability

- Sensitive Questions
  - What is sensitive?
  - Depends from culture to culture
  - Self-administered questionnaires best!
- Important factors
  - Confidentiality, privacy
    - Assure, safety precautions (interviewer, internet)
  - Self-presentation
    - Interviewer
    - Others in household, bystanders

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# Designing The Optimal Questionnaire: Day 1

## Presentation 6: Special Populations Cognitive and Social Restrictions Need for Additional Questions

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## Special Populations

- Analyse why special population is special
- Question-Answer Process
  - Cognitive
    - Memory (elderly, children)
  - Language skills
  - Communicative
    - Social norms
    - Social skills

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## Why is Group Special? Checklist for Optimizing

- How well are the cognitive skills of the respondent developed?
  - For instance, consider the different developmental stages in children or the potential for reduced mental capacity in elderly
- Which channel capacities can be used during data collection?
  - For instance, can one use visual stimuli or only audio, as in the case of visually impaired respondents
- What are acceptable social customs for the group under study
  - Example, North-African immigrants in Holland longer introduction period

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## Why is Group Special? Checklist for Optimizing 2

- How well are language skills developed?
  - Different developmental stages in children
  - Non-native speakers
  - Immigrants
- What are the consequences of responding?
  - 'Illegal' immigrants
  - Homeless
  - Drug addicts
- Privacy and protection!

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## Questionnaire Construction

- Questionnaire should be experienced as
  - Simple, short, and structured
- Point of reference is the respondent
  - What is simple and logical for the respondent is not necessarily logical or easy for the designer
- Compensate for potentially lesser cognitive skills and smaller channel capacity
  - Number of response categories
  - Short sentences
  - Readability check

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## Questionnaire Construction2

- Questions grouped in a logical order
- Questions grouped in blocks of questions that use the same question format
- Ergonomical text presentation
  - Lay-out
  - Graphical design
  - Extra instruction build in
- Allow for more time
  - Fewer questions/longer interview
- Pretest, pretest, pretest!

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## Example: Elderly

- What makes group special
  - Different age groups (e.g., young elderly vs elder elderly)
  - Contacting (e.g., own house, homes for elderly)
  - Cognitive functioning, memory
  - Health
- Method adapted: Interview
  - Special interview training
  - Large letters on response cards

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## Example: Elderly continued

- Self-Administered Questionnaires
  - Print in larger letter
  - Clear lay-out
  - CASI, beware of screen contrast
    - Audio-CASI
- Short modules
  - Allow for breaks + resume
- Longer fieldwork period

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## Questionnaire Itself

- Start with screening/test cognitive functioning
  - Questionnaire full version
  - Short version: key questions
  - Proxy version
- Make Question-Answer Process as simple as possible
  - Blocks
  - Introductions
  - Texts to go from one block to the other
  - Reinforcements, thank you's between blocks

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## Questionnaire Itself 2

- Limited number of response categories
- Two-steps: dividing response categories
  - Satisfied-Neither satisfied Nor dissatisfied-Dissatisfied
  - If Satisfied: Very satisfied, Quite satisfied, Somewhat satisfied
- Response Cards
  - Even with limited categories

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## Pretesting

- Certain standard questions did not work
- Example: Well-being
  - If you compare yourself with others are you....
- Retrospective questions extra care
  - Longer introductions
  - Time lines
- Stimulate looking up
  - Income
  - Birth dates children

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