

Week 4: Questionnaire Design

Andrew Stokes

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Review: Week 1

- ▶ Research best practices
- ▶ Value of mixed methods approaches
- ▶ Importance of replication and reproducibility
- ▶ Practical implication of these principles for implementing your study

Review: Week 3

- ▶ Refining the research question and translating it into a set of testable hypotheses.
- ▶ Visualizing the research question using a problem diagram
- ▶ Defining research objectives and variables and devising measurement strategies
- ▶ Carrying out a literature review
- ▶ Critically evaluating research studies

Overview of Today

- ▶ Mode of data collection
- ▶ Types of questions
- ▶ Asking effective questions
- ▶ Survey Design
- ▶ KoBoToolbox Demo

Mode of data collection

Survey data are collected in a variety of ways

- ▶ Face-to-face interviews (e.g. NHANES)
- ▶ Telephone (e.g. BRFSS)
- ▶ Mail
- ▶ Internet (e.g. GBD Disability Weights Survey)

Strengths of self administered questionnaires

- ▶ cheap and easy to administer
- ▶ preserve confidentiality
- ▶ can be completed at respondent's convenience

Strengths of interview administered questionnaires

- ▶ Allow participation of illiterate people
- ▶ Allow clarification of ambiguity
- ▶ May yield higher quality data (e.g. research has shown that weight data collected in the NHANES has less bias than that in the BRFSS)

Mode of data collection continued

The approach used in a given context depends on,

- ▶ Type of population being sampled
- ▶ Resources that are available
- ▶ Nature of the data being collected.

The basic principles of questionnaire design we will discuss below are similar across different modes of collecting data.

Survey data vs. qualitative data collection

- ▶ Today's focus is on collecting *quantitative* survey data. Qualitative approaches will be discussed in Week 5.
- ▶ The goal of quantitative surveys is to collect data on a small number of well-defined topics from a large number of people.
- ▶ Most of the data collected will be numeric (e.g. amount of alcohol consumed last week) or categorical (DHS wealth index).

Types of questions

- ▶ Open vs. closed questions
- ▶ Recall questions
- ▶ Likert scales

Open vs. closed questions

The two basic types of questions are open-ended and closed questions

Open questions

- ▶ Open questions permit free responses recorded in the respondent's own words
- ▶ Useful for areas that are unfamiliar to the researcher, for eliciting data on opinions, attitudes and perceptions and for sensitive issues
- ▶ Sometimes a comprehensive range of alternative choices cannot be compiled
- ▶ Limitations?

Closed questions

- ▶ Respondents are given a list of possible answers from which they must choose
- ▶ Appropriate for well-defined studies in which the range of responses is known.

Closed questions: advantages

- ▶ Easy and quick to fill in
- ▶ Reduce challenges for those who are less literate
- ▶ Easy to code, record and analyze results quantitatively
- ▶ Easy to report results

Hybrid of Open and Closed

- ▶ A third type, a hybrid of the first two, uses a closed form but poses it to the respondent as an open-ended question
- ▶ The difference between this and the closed question is that here the response categories are not read or seen by the respondent.
- ▶ In some cases, this type of question may produce more valid answers, because respondents are not primed by the choices they receive.

Recall questions

- ▶ Survey questions can ask about the past as well as the present
- ▶ Recall questions are an inexpensive way to collect historical data on respondents, but potential for recall error should be carefully evaluated
- ▶ Recall bias tends to increase as the time horizon grows and depends on the salience of the event to the individual.

Recall questions: Examples

- ▶ DHS birth histories. In birth history modules, questions relating to children are asked for each child, including time of birth and survival status.
- ▶ NHANES weight histories. These ask respondents to report their weight and height at various past ages, such as at age 25. The survey also asks respondents about weight ten years ago and at maximum.
- ▶ Smoking histories are used in many surveys to determine when an individual began smoking and when they quit (if they quit). Information is also frequently gathered on intensity of smoking in the past.
- ▶ Others you can think of?

Likert scales¹

- ▶ Commonly used in survey research to scale responses (e.g. attitudinal scale may be used to assess the extent to which a respondent agrees with a statement).
- ▶ Example categories could include strongly agree, agree, neutral, disagree and strongly disagree.
- ▶ Sometimes likert scales are further expanded to include seven categories.
- ▶ Regardless of the number of categories, likert scales should be balanced.
- ▶ Another key consideration for likert scales is whether to include the neutral category

¹See Figure 18-4 on p. 130 of Health Research Methods for examples of Likert scales

Likert scales: Example

Self-reported health is a very common variable collected in health surveys. This information is usually collected using a Likert Scale. For example, see this question from the NHANES.

Likert scales: Example

“Statistics is an interesting topic” (strongly disagree/disagree/cannot decide/agree/strongly agree)

Other types of closed format questions

- ▶ Choice of categories
- ▶ Differential scales
- ▶ Checklists
- ▶ Rankings

Choice of categories

“What is your marital status?” (single/married/divorced/widowed)

Differential scales

“How would you rate the presentation” (scale of 1 to 10 with 1 being extremely interesting and 10 being extremely dull)

Checklists

“Circle the clinical specialties you are particularly interested in”
(present list of options)

Rankings

“Please rank your interests in the following specialities” (list eight options and have them rank from 1=most interesting to 8=least interesting)

Asking effective questions

- ▶ Time Location of behavior
- ▶ Use of “always” and “never”
- ▶ Avoid double negatives
- ▶ Avoid double-barreled questions
- ▶ Avoid leading questions
- ▶ Limit the range of responses

Time location of behavior

Longer recall periods can be risky and increase recall bias. There are several steps you can take to improve the chances of accurate recall:

- ▶ Reduce the reference period for recall
- ▶ Ask for average, not specific time periods
- ▶ Use landmark events as a reference

For example, if you'd like the respondent to report on frequency of physical activity, use a reference period of the last week rather than the last month.

Use of “always” and “never”

Few things meet these conditions, so avoid using them. For example, consider the question:

“I always study hard for my exams” (always, sometimes, often, never).

Instead of always and never, consider substituting “almost always” and “almost never”

Avoid double negatives

Examples:

- ▶ Children don't spend enough time outside these days (yes/no)
- ▶ Do you agree or disagree with the following statement? Should the instructor not schedule an exam the same week a paper is due?

Avoid double-barreled questions

Each item should ask only one question. For example, consider the question:

In your opinion, how would you rate the speed and accuracy of your work? (Excellent/good/fair/poor)

If your question has “and” in it, it might be a double-barreled question.

Avoid leading questions

Example: The Macintosh operating system rarely gets infected by viruses and therefore Boston University should only purchase Mac computers (agree/disagree).

Limit the range of responses

For closed questions, make the choices

- ▶ exhaustive
- ▶ mutually exclusive
- ▶ few as necessary

Examples

Meet these criteria?

- ▶ What type of restaurants would you like to see in the BU medical campus (fast food/asian/chinese/mexican)?
- ▶ Which age group is more likely to use contraceptives (12-17, 18-24, 25-35, 35-50, 50+)

Asking effective questions: other tips

- ▶ Spell out acronyms and define terms that are difficult to understand
- ▶ Underline, italicize, use bold for important terms
- ▶ Limit the responses “other” and “don’t know”
- ▶ Make the questionnaire experience as straightforward as possible

Asking effective questions: tips from Jacobsen text

- ▶ jargon (avoid complicated medical terms)
- ▶ ambiguity (meanings should be absolutely clear)
- ▶ vagueness
- ▶ Too sensitive (questions about intimate partner violence or suicidal ideation)

Asking effective questions: tips from Jacobsen text continued

- ▶ Overly hypothetical (Asking respondents if they ever thought about changing their behavior (quitting smoking or weight loss))
- ▶ Specificity (if the question asks generally about income, some respondents may report weekly income while others report monthly or yearly)
- ▶ Poorly designed categorical scale. Categories should be constructed to avoid a disproportionate number of answers in any given category. Categories should be split finely enough so they are informative.
- ▶ Embedded assumptions (asking a question such as do you eat corn flakes or rice krispies for breakfast, presupposing that they eat breakfast at all)

What's wrong with this question

“Please rate the lecture in terms of its content and presentation”

Better question

- ▶ “Please rate the lecture in terms of its content”
- ▶ “Please rate the lecture in terms of its presentation”

What's wrong with this question

“Small group teaching should not be abolished (Agree/Disagree)”

Better question

“Small group teaching should continue (Agree/Disagree)”

What's wrong with this question

“How often did you borrow books from your library?”

Better question

“How many books have you borrowed from the library within the past six months altogether?”

What's wrong with this question

“Do you agree with the recommendations in the Dearing report on higher education?”

Better question?

What's wrong with this question

“Have you ever copied other students' answers in an exam?”

Better questions

One alternative is the **other people** approach:

- ▶ “John copies answers in a degree exam from Jean.” “Do you feel John is wrong?”
- ▶ “What penalty should be imposed for John?”
- ▶ “Have you done or would you consider doing the above?”

What's wrong with this question

“Within the past month, how many lectures have you missed due to your evening job?”

Better questions

- ▶ “Within the past month, how many times did your evening job commitment clash with lectures?”
- ▶ “How many times did you give priority to your evening job?”

Designing the survey

- ▶ **Content.** Start with your objectives and variables. Which questions will measure which variables? Note that if variables are added, dropped or changed, objectives may need changing.
- ▶ **Formulating questions.** One or more questions can be used to provide information on each variable.

Designing the survey

Sequencing questions. You should strive to make the survey as consumer friendly as possible. To this end, modules and questions within them should flow logically and transitions can be used to bridge between sections. Here are some rules of thumb:

- ▶ go from general to particular
- ▶ go from easy to difficult
- ▶ go from factual to abstract
- ▶ start with closed format questions
- ▶ start with questions most relevant to the main subject
- ▶ do not lead with controversial or sensitive questions

Designing the survey

Formatting. The survey should be easy to read and follow and instructions should be clear. Each question should have a clear and logical unique identifier. A plan for coding “garbage” codes should be devised.

Use other surveys as source material

- ▶ Many surveys have been carried out and you should use these as a reference for designing your own.
- ▶ Existing surveys have often been through extensive pre-testing and validation, so consider them a valuable resource as you put together your survey.

Major Health Surveys

- ▶ National Health and Nutrition Examination Survey
- ▶ National Health Interview Survey
- ▶ Behavioral Risk Factors Surveillance System
- ▶ Health and Retirement Study
- ▶ Demographic and Health Survey

Sources for today's lecture notes

- ▶ Peter G. Smith. Field Trials of Health Interventions: A Toolbox
- ▶ CM Varkevisser. Designing and Conducting Health Systems Research
- ▶ Kathryn H. Jacobsen. Health Research Methods: A Practical Guide

KoBoToolbox demo

For next time

- ▶ First draft of questionnaire due Sunday, February 24 at 5 PM
- ▶ Reminder- no class next week, but lab will meet

Group Work

- ▶ Revise existing deliverables
- ▶ Begin drafting questions and responses for your questionnaire