Survey Design & Development for Researchers

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Overview

► Survey vs. questionnaire
► Getting started with a survey
► Survey modes
► Anatomy of a question
► Guidelines for forming questions
► Pre-existing measures
► Formatting tips
► Testing questions

Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method
4th ed. Dillman et al. (Wiley, 2014)
Learning Objectives

1. Define common survey modes (pros and cons of interviewer administered vs. self-administered, aural vs. visual communication)

2. Describe how to structure open- and closed-ended questions using best practices

3. Describe how visual design of a survey can increase response rates
Survey vs. Questionnaire
Survey questionnaire

Survey

The measure of opinions or experiences of a group of people through the asking of questions

Responses to the questions asked are analyzed to draw a conclusion

Encompasses all aspects of the research process (survey construction, sampling method, data collection, response analysis, etc.)

Questionnaire

A set of printed or written questions with a choice of answers

Does not utilize collected data for the purpose of statistical analysis

Limited use cases for stand alone questionnaires

A tool to be used for a survey (the list of questions used when conducting a survey)
Getting Started
Consider...

- **Purpose of your survey:**
  - Research Objective – general contribution to knowledge and how it connects to previous research
  - Research Questions – specific questions this survey will answer about your specific population
    - The more specific the research questions the easier it is to develop the instrument
- **What you want to measure determines how you measure it**
  - Facts or demographics, attitudes and opinions, behaviors and events
  - Single vs. multiple survey items
- **Use research questions to inform measurement objectives chart**
## Measurement Objectives Chart

<table>
<thead>
<tr>
<th>Concept/domain</th>
<th>Specific measurement objectives</th>
<th>Operational definition</th>
<th>Level of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food security status</td>
<td>Classifying level of food</td>
<td>Self-reported food security status from responses to each question in the USDA 6-item</td>
<td>Ordinal or binary responses</td>
</tr>
<tr>
<td></td>
<td>security</td>
<td>food security scale</td>
<td></td>
</tr>
<tr>
<td>Stress/mental health indicators</td>
<td>Experience of mental health</td>
<td>Self-reported experience of feeling each of 7 indicators over the past 12 months</td>
<td>Ordinal (5 point scale)</td>
</tr>
<tr>
<td></td>
<td>indicators</td>
<td>(Martinez et al., 2018)</td>
<td></td>
</tr>
</tbody>
</table>
Survey Modes

INTERVIEWER-ADMINISTERED VS. SELF-ADMINISTERED
AURAL VS. VISUAL COMMUNICATION
Interviewer-administered

**Pros**
- Motivate and assist respondent
- Probe
- Can work well among low-literacy respondents

**Cons**
- Social desirability bias
- Interviewer bias
- Sensitive questions/topics
- Cost
Self-administered

**Pros**
- Potentially wide-coverage
- Inexpensive
- Anonymity
- No interviewer bias
- Standardized delivery

**Cons**
- Poor response rate
- Assumed literacy
- Item confusion/misunderstanding
Aural vs. Visual Communication

Aural (Interviews)

► Words, inflection, tone
► Memory required to answer question because respondent can’t refer to survey

Visual

► Presentation of words
  ► Less significance of memory
► Blocks of text (instructions and question stem)
► Symbols, graphics, font size

Q3 How would you describe the written information you received about diabetes when you were first diagnosed?

I received too little information □
I received about the right amount of information □
I received too much information □

Don’t know; a carer was given information for me

I can’t remember □

Q4 Were you put on insulin fairly soon after you were first diagnosed with diabetes?

Yes □ → Q5
No □ → Q6

Anatomy of a Question
What is an open-ended survey question? Please write your answer in the space provided below.
Open-ended

- Provides blank box or space for respondents to answer a question

BUT

- Are often skipped
- Short, irrelevant responses
- Challenges with data entry, analysis, and interpretation

**What is your favorite food?**
- Apple
- Spaghetti
- I don’t have a favorite food
- Pizza from Pizza Hut
- I really like Chinese food
Closed-ended

- Specified set of answer choices
- Levels of measurement (nominal vs. ordinal)
- Can be partially closed-ended
- Easier data analysis

**BUT**
- Are responses exhaustive?
- Are questions being misinterpreted?
  - And how would you know?
Guidelines for Forming Questions

- OPEN-ENDED
- CLOSED-ENDED
  - NOMINAL
  - ORDINAL
In general...

- Don’t ask more than one question at a time
- Use as few words as possible to pose the question
- Avoid double negatives
- Make sure all questions apply to the respondent
- Use words that are simple, familiar, and specific
Example: Using specific and concrete words

**Question with vague concepts**
How many times did you eat together as a family last week?
☐ Number of meals

**A revised question with more specific and concrete concepts**
How many meals did you eat together as a family at home last week?
☐ Number of meals

**A more specific revision**
How many meals did you sit down to eat at home as a family last week?
☐ Number of meals
Open-ended

- Provide extra motivation to respond
- In the question stem, specify the type of response you’re looking for

<table>
<thead>
<tr>
<th>Question Wording (Telephone)</th>
<th>% Reporting Month and Year</th>
<th>% Reporting Season/Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>When did you begin your studies at Washington State University?</td>
<td>13.4</td>
<td>57.3</td>
</tr>
<tr>
<td>What date did you begin your studies at Washington State University?</td>
<td>49.5</td>
<td>32.3</td>
</tr>
<tr>
<td>What month and year did you begin your studies at Washington State University?</td>
<td>83.7</td>
<td>11.0</td>
</tr>
</tbody>
</table>

Closed-ended

- Develop lists of answer choices that are mutually exclusive
- With either/or questions, state both the positive and negative in the question stem
- Make sure list of answer categories includes all reasonable possible answers
- Consider measurement intent with radio buttons or checkboxes
**Other examples: Closed-ended**

**FIGURE 5.4** State both positive and negative sides in the question stem.

<table>
<thead>
<tr>
<th>Poor Designs</th>
<th>Improved Designs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you favor congressional term limits of four years?</td>
<td>Do you favor or oppose congressional term limits of four years?</td>
</tr>
<tr>
<td>Favor</td>
<td>Favor</td>
</tr>
<tr>
<td>Oppose</td>
<td>Oppose</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How satisfied are you with the overall service you have received from your financial consultant?</th>
<th>How satisfied or dissatisfied are you with the overall service you have received from your financial consultant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>Very satisfied</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
<td>Somewhat satisfied</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
<td>Somewhat dissatisfied</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>Very dissatisfied</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How concerned are you that you will get a computer virus while using the Internet?</th>
<th>How concerned, if at all, are you that you will get a computer virus while using the Internet?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very concerned</td>
<td>Very concerned</td>
</tr>
<tr>
<td>Somewhat concerned</td>
<td>Somewhat concerned</td>
</tr>
<tr>
<td>Slightly concerned</td>
<td>Slightly concerned</td>
</tr>
<tr>
<td>Not at all concerned</td>
<td>Not at all concerned</td>
</tr>
</tbody>
</table>

**FIGURE 5.5** Exhaustive and mutually exclusive questions.

**A question that is not exhaustive or mutually exclusive**

From which one of these sources did you first learn about the tornado in Derby?

- Radio
- Television
- Someone at work
- While at home
- While traveling to work

**A revision that is exhaustive and mutually exclusive**

From which one of these sources did you first hear about the tornado in Derby?

- Radio
- Television
- Internet
- Newspaper
- Another person

Where were you when you first heard about it?

- At work
- At home
- Traveling to work
- Somewhere else

How do you usually get there? Please tell me all that apply. Do you... (SELECT ALL)

- Drive a car
- Get a ride with friend and/or family member
- Take a bus (RIPTA)
- Take a taxi or ride share service (e.g., Uber, Lyft)
- Walk or bike
- Housing authority ride, or
- Other (Please describe) [blank]
- DON'T KNOW
- REFUSED
Nominal closed-ended

- Avoid bias from unequal comparisons
- Randomize response options if there is a concern about order effects
- **When possible, use forced-choice questions instead of check-all-that-apply**
Example: Forced-choice questions

**Check-all-that-apply formatted question**

Which of the following items do you have? Please check all that apply.

- [ ] Desktop computer
- [ ] Laptop computer
- [ ] Cell phone
- [ ] E-reader
- [ ] Tablet computer
- [ ] iPod or MP3 player

**A revision converting to the forced-choice format**

Do you have each of the following items or not?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ]</td>
<td>[ ] Desktop computer</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ] Laptop computer</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ] Cell phone</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ] E-reader</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ] Tablet computer</td>
</tr>
<tr>
<td>[ ]</td>
<td>[ ] iPod or MP3 player</td>
</tr>
</tbody>
</table>
Ordinal closed-ended

- Choose appropriate scale length (usually 4-5 categories)
- Use balanced scales with similar spacing between categories
- Use natural metric instead of vague quantifiers
- **Choose between a unipolar or bipolar scale**
- **Consider collapsing bipolar scales**
- **Choose direct or construct-specific labels when possible**
### Examples: Scales and labels

#### Unipolar

*Includes only one dimension and the zero point is at the end of the scale.*

<table>
<thead>
<tr>
<th>How successful do you feel the Red Cross has been at getting assistance to natural disaster victims?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Completely successful</td>
</tr>
<tr>
<td>□ Very successful</td>
</tr>
<tr>
<td>□ Somewhat successful</td>
</tr>
<tr>
<td>□ Slightly successful</td>
</tr>
<tr>
<td>□ Not at all successful</td>
</tr>
</tbody>
</table>

#### Bipolar

*Includes two dimensions and the zero point is in the middle of the scale (i.e., where it switches from positive to negative).*

<table>
<thead>
<tr>
<th>How likely or unlikely are you to make a monetary donation to the Red Cross this year?</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Very likely</td>
</tr>
<tr>
<td>□ Somewhat likely</td>
</tr>
<tr>
<td>□ Neither likely nor unlikely</td>
</tr>
<tr>
<td>□ Somewhat unlikely</td>
</tr>
<tr>
<td>□ Very unlikely</td>
</tr>
</tbody>
</table>

### Questions with multiple constructs

**Construct of interest: accessibility of instructors**

**To what extent do you agree or disagree that your instructors are accessible outside of class?**

- □ Strongly agree
- □ Agree
- □ Neutral
- □ Disagree
- □ Strongly disagree

**How accessible or inaccessible are your instructors outside of class?**

- □ Very accessible
- □ Somewhat accessible
- □ Neutral
- □ Somewhat inaccessible
- □ Very inaccessible
Pre-Existing Measures
Sources

- Published Literature
- Colleagues
- Library/databases
- Large national surveys
- PsycTESTS (American Psychological Association)

Think about your measurement intent
**Poor design**

How much do you favor or oppose implementing a merit-based pay system for elementary school teachers? 1 Strongly favor 2 Somewhat favor 3 Neutral 4 Somewhat oppose 5 Strongly oppose

**Revision with improved design**

How much do you favor or oppose implementing a merit-based pay system for *elementary* school teachers?

- 1 Strongly favor
- 2 Somewhat favor
- 3 Neutral
- 4 Somewhat oppose
- 5 Strongly oppose

- Highlight question stem
- Use spacing
- Visual standardization
- Deemphasize unimportant elements
FIGURE 5.18 Fully labeled and polar-point labeled scales.

A fully labeled scale with verbal labels for all of the categories

Question 16 of 25

How satisfied are you with your decision to attend WSU?

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied

A polar-point labeled scale with verbal labels only for the endpoints

Question 16 of 25

How satisfied are you with your decision to attend WSU?

- 5 Very Satisfied
- 4
- 3
- 2
- 1 Very Dissatisfied

A polar-point labeled question with no visual display of the scale (as it might be read over the telephone)

Question 16 of 25

On a 5-point scale, where 5 means very satisfied and 1 very dissatisfied, how satisfied are you with your decision to attend WSU? You may use any of the numbers 5, 4, 3, 2, or 1 for your answer.

Adding “don’t know” and “no opinion” categories misaligns the conceptual and visual midpoints.

To what extent do you approve or disapprove of the way Democrats in Congress are handling their job?

- Very much approve
- Somewhat approve
- Neither approve nor disapprove [Conceptual midpoint]
- Somewhat disapprove
- Very much disapprove
- Don’t know
- No opinion

Visually separating the nonsubstantive categories realigns the conceptual and visual midpoints.

To what extent do you approve or disapprove of the way Democrats in Congress are handling their job?

- Very much approve
- Somewhat approve
- Neither approve nor disapprove [Conceptual midpoint]
- Somewhat disapprove
- Very much disapprove
- Don’t know
- No opinion
**FIGURE 6.22** Example of a grid format using the same response options for multiple items.

**Top labeled grid**

14. Please indicate how satisfied or dissatisfied you are with the availability of each of the following in your community.

<table>
<thead>
<tr>
<th></th>
<th>Very Dissatisfied</th>
<th>Dissatisfied</th>
<th>Neither Satisfied nor Dissatisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle paths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor areas to hunt, fish, or hike</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sporting events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine arts (museums and theatres)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell phone service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Libraries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fully labeled grid**

14. Please indicate how satisfied or dissatisfied you are with the availability of each of the following in your community.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle paths</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor areas to hunt, fish, or hike</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sporting events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine arts (museums and theatres)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Cell phone service</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Libraries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE 6.7** Examples of font variations that affect reading difficulty.

<table>
<thead>
<tr>
<th>Name of Font</th>
<th>Appearance of Font</th>
<th>How Font Affects Reading Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush Script</td>
<td><em>In what year were you born?</em></td>
<td>Script fonts are very difficult to read</td>
</tr>
<tr>
<td>Edwardian Script</td>
<td><em>In what year were you born?</em> In what year were you born?</td>
<td></td>
</tr>
<tr>
<td>Freestyle Script</td>
<td><em>In what year were you born?</em></td>
<td></td>
</tr>
<tr>
<td>Courier New</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucida Console</td>
<td><em>In what year were you born?</em></td>
<td>Monospace fonts make the shape of words harder to recognize</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibri</td>
<td><em>IN WHAT YEAR WERE YOU BORN?</em></td>
<td>Using all capital letters makes reading inefficient because the words lack shape</td>
</tr>
<tr>
<td>Times New Roman</td>
<td><em>IN WHAT YEAR WERE YOU BORN?</em></td>
<td></td>
</tr>
<tr>
<td>Arial</td>
<td><em>IN WHAT YEAR WERE YOU BORN?</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibri</td>
<td><em>In what year were you born?</em> In what year were you born?</td>
<td>Proportionally spaced fonts and lowercase letters make the shape of words easier to recognize</td>
</tr>
<tr>
<td>Times New Roman</td>
<td>*In what year were you born? In what year were you born?</td>
<td></td>
</tr>
<tr>
<td>Arial</td>
<td>*In what year were you born? In what year were you born?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Times New Roman</td>
<td><em>In what year were you born?</em> In what year were you born?</td>
<td>Added detail at the end of letters (i.e., serifs) in serif fonts can make them hard to read on some computer monitors</td>
</tr>
<tr>
<td>Garamond Century</td>
<td>*In what year were you born? In what year were you born?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibri</td>
<td>*In what year were you born? In what year were you born?</td>
<td>Sans serif fonts are easier to read on computer monitors because they do not have serifs</td>
</tr>
<tr>
<td>Arial</td>
<td>*In what year were you born? In what year were you born?</td>
<td></td>
</tr>
<tr>
<td>Tahoma</td>
<td>*In what year were you born? In what year were you born?</td>
<td></td>
</tr>
</tbody>
</table>
Testing Questions
Testing Questions

1. Expert review
2. Cognitive interview
3. Pilot study

*Important to test the survey in the way that’s planned for administration*
Thank you!

Eliza.Hallett@bmc.org

Internet, Phone, Mail, and Mixed Mode Surveys: The Tailored Design Method 4th ed. Dillman et al. (Wiley, 2014)