



Survey Design & Development for Researchers

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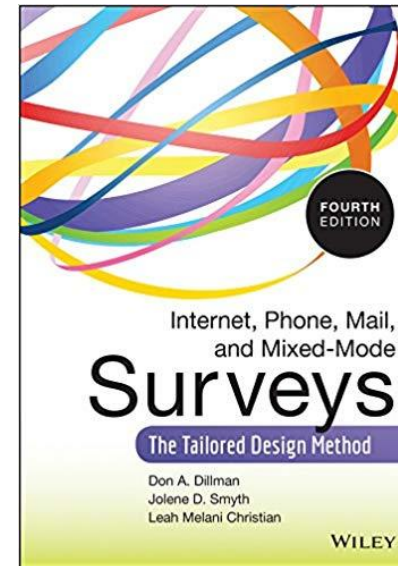
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MARCH 11TH 2020

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

- ▶ 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)

Survey questionnaire

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

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

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

QUESTION STEM
INSTRUCTIONS
ANSWER SPACE

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?

Closed-ended ordinal question

Question stem **Overall, how satisfied are you with living in Nebraska?**

- Answer choices*
- ☐ Completely satisfied
 - ☐ Very satisfied
 - ☐ Somewhat satisfied
 - ☐ Not too satisfied
 - ☐ Not at all satisfied

Closed-ended nominal question

Question stem **What is your current marital status?**

- Answer choices*
- ☐ Married
 - ☐ Living with a partner
 - ☐ Divorced
 - ☐ Separated
 - ☐ Widowed
 - ☐ Never married

Partially closed-ended question

Question stem **What are your favorite women's sports at the University of Nebraska?**

- Answer choices*
- ☐ Basketball
 - ☐ Cross Country
 - ☐ Gymnastics
 - ☐ Soccer
 - ☐ Softball
 - ☐ Swimming and Diving
 - ☐ Tennis
 - ☐ Volleyball
 - ☐ Other; Please specify

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**

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

Source: "Helping Respondents Get It Right the First Time: The Influence of Words, Symbols, and Graphics in Web Surveys," by L. M. Christian, D. A. Dillman, and J. D. Smyth, 2007b, *Public Opinion Quarterly*, 71(1), pp. 113–125.

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.

<u>Poor Designs</u>	<u>Improved Designs</u>
Do you favor congressional term limits of four years? <input type="radio"/> Favor <input type="radio"/> Oppose	Do you favor or oppose congressional term limits of four years? <input type="radio"/> Favor <input type="radio"/> Oppose
How satisfied are you with the overall service you have received from your financial consultant? <input type="radio"/> Very satisfied <input type="radio"/> Somewhat satisfied <input type="radio"/> Somewhat dissatisfied <input type="radio"/> Very dissatisfied	How satisfied or dissatisfied are you with the overall service you have received from your financial consultant? <input type="radio"/> Very satisfied <input type="radio"/> Somewhat satisfied <input type="radio"/> Somewhat dissatisfied <input type="radio"/> Very dissatisfied
How concerned are you that you will get a computer virus while using the Internet? <input type="radio"/> Very concerned <input type="radio"/> Somewhat concerned <input type="radio"/> Slightly concerned <input type="radio"/> Not at all concerned	How concerned, if at all, are you that you will get a computer virus while using the Internet? <input type="radio"/> Very concerned <input type="radio"/> Somewhat concerned <input type="radio"/> Slightly concerned <input type="radio"/> Not at all concerned

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)
- ☐ 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?

- | Yes | No | |
|-----------------------|-----------------------|--------------------|
| <input type="radio"/> | <input type="radio"/> | Desktop computer |
| <input type="radio"/> | <input type="radio"/> | Laptop computer |
| <input type="radio"/> | <input type="radio"/> | Cell phone |
| <input type="radio"/> | <input type="radio"/> | E-reader |
| <input type="radio"/> | <input type="radio"/> | Tablet computer |
| <input type="radio"/> | <input type="radio"/> | iPod or MP3 player |
-

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.

How successful do you feel the Red Cross has been at getting assistance to natural disaster victims?

- ☐ Completely successful
- ☐ Very successful
- ☐ Somewhat successful
- ☐ Slightly successful
- ☐ Not at all successful

Zero point

Bipolar

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

How likely or unlikely are you to make a monetary donation to the Red Cross this year?

- ☐ Very likely
- ☐ Somewhat likely
- ☐ Neither likely nor unlikely
- ☐ Somewhat unlikely
- ☐ Very unlikely

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

Construct-specific questions

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

Visual Design & Formatting Tips

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.

Source: *The Influence of Visual Layout on Scalar Questions in Web Surveys*, by L. M. Christian, 2003. Unpublished master's thesis, Washington State University, Pullman, WA.

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
- ☒ Somewhat disapprove
- ☐ Very much disapprove
- ☐ Don’t know
- ☐ No opinion

**Visual
midpoint**

Conceptual midpoint

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
- ☐ Somewhat disapprove
- ☐ Very much disapprove
- ☐ Don’t know
- ☐ No opinion

**Visual
midpoint**

Conceptual midpoint

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.

	Very Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Very Satisfied
Parks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bicycle paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor areas to hunt, fish, or hike	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sporting events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restaurants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fine arts (museums and theatres)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cell phone service	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Libraries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fully labeled grid

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

	Very Dissatisfied	Dissatisfied	Neither Satisfied nor Dissatisfied	Satisfied	Very Satisfied
Parks	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Bicycle paths	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Outdoor areas to hunt, fish, or hike	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Sporting events	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Restaurants	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Fine arts (museums and theatres)	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Cell phone service	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Internet access	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.
Libraries	<input type="checkbox"/> Very Diss.	<input type="checkbox"/> Diss.	<input type="checkbox"/> Neither	<input type="checkbox"/> Sat.	<input type="checkbox"/> Very Sat.

Source: "Exploring the Impact of Mode Preference on Measurement," by A. Kasabian, K. Olson, and J. D. Smyth, 2012, May. Paper presented at the annual conference of the American Association for Public Opinion Research, Orlando, FL.

FIGURE 6.7 Examples of font variations that affect reading difficulty.

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

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)

