

Survey tool development

GSTTP research mini-course

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20 April 2021

Learning objectives

- Understand basic principles of survey design and close-ended question formulation.
- Discuss example survey tools.

Goal of a survey:

- Collect data while minimizing error, bias, and burden
- We'll touch briefly on:
 - The different types of survey questions, and (broadly!) psychometrics
 - Points to consider in survey tool design
 - And then we'll discuss & critique some examples

Types of variables / response options

- Nominal: categorical with no sequence/ranking
 - Dichotomous is simplest type (Do you have blue eyes? Yes / No)
 - Or, What eye color do you have? Blue / Green / Brown / Hazel / Other
- Ordinal: categorical with an inherent sequence/ranking
 - How would you rate your eyesight? Terrible / Mediocre / Excellent
 - *Note: there is not a standard “unit” difference between these!*
 - Very common type: Likert questions (symmetric degree of agreement)
 - How much do you agree with the following statement: Chocolate is the best ice cream flavor.
Strongly agree / Somewhat agree / Neutral / Somewhat disagree / Strongly disagree
- Continuous (aka, interval or ratio): standard space between points

Indices, scales, composite measures

- Questions may be considered & analyzed independently, or their meaning may rely on other questions

Sometimes you need >1 question to be thorough:

Q3. Number of Tobacco Products Smoked Per Day

On average, how many of the following products do you currently smoke each (day/week)? Also, let me know if you smoke the product, but not every (day/week).

INTERVIEWER: IF RESPONDENT REPORTS SMOKING THE PRODUCT BUT NOT EVERY (DAY/WEEK), ENTER 888

a. Manufactured cigarettes? PER DAY/WEEK INT: VERIFY THIS IS # OF CIGARETTES, NOT PACKS

b. Hand-rolled cigarettes? PER DAY/WEEK

c. Kreteks? PER DAY/WEEK

d. Pipes full of tobacco? PER DAY/WEEK

e. Cigars, cheroots, or cigarillos? PER DAY/WEEK

f. Number of water pipe sessions? PER DAY/WEEK

g. Any others? PER DAY/WEEK Specify: _____

WHO & CDC, "Tobacco questions for surveys" 2nd edition

Multi-dimensional topics may need >1 question:

Bangladesh			
Does your household have:			
1	a television?	Yes	No
2	an electric fan?	Yes	No
3	electricity?	Yes	No
4	an almirah/wardrobe?	Yes	No
5	a refrigerator?	Yes	No
6	Does any member of this household have a bank account?	Yes	No
7	What is the main material of the floor in your household?	Cement floor	Earth or sand floor
8	What is the main material of the walls in your household?	Cement walls	Other

Benin			
Does your household have:			
1	electricity?	Yes	No
2	a television?	Yes	No
3	a VCD or DVD player	Yes	No
4	What is the main material of the walls in your household?	Cement walls	Bamboo, Cane, Palm or Trunk
5	What is the main fuel used by your household for cooking?	Wood	Other
6	What type of toilet do the members of your household usually use?	No toilet/nature	Other

Chakraborty et al. "Simplified asset indices to measure wealth and equity in health programs: A reliability and validity analysis using survey data from 16 countries" Global Health Science & Practice, 2016

Psychometrics

- Field of study focused on measurement (theory & approach)
 - How can we measure things with validity and reliability
- Construct validity: are we measuring the concept we mean to?
- Content validity: are we measuring everything that matters?
- Criterion validity: does our measure correlate to other known measures?
- Test-retest reliability: will the same person respond the same way if asked twice?
- Inter-rater reliability: will two different people appraise the same way?
- If you are interested in measuring something, especially if it is complex, I **strongly recommend** searching for already-validated measures!

Writing good surveys: Beware potential sources of bias!

Too formal
Too vague
 “Has it happened to you that over a long period of time, when you neither practiced abstinence, nor used birth control, you did not conceive?” Too complex

How often do you exercise?

- Regularly Too
- Occasionally vague

Source	Bias
1. Question Design	
Problems with wording	ambiguous question complex question double-barrelled question (two questions in one) short question technical jargon uncommon word vague word
Missing or inadequate data for intended purpose	belief vs behavior (hypothetical question, personalized question) starting time data degradation insensitive measure
Faulty scale	forced choice (insufficient category) missing interval overlapping interval scale format
Leading questions	framing leading question mind-set
Intrusiveness	reporting (self-report response) sensitive question
Inconsistency	case definition change of scale change of wording diagnostic vogue
2. Questionnaire Design	
Formatting problem	horizontal response format juxtaposed scale (questionnaire format) left alignment and right alignment
Questionnaire too long	no-saying (nay-saying) and yes-saying (yea-saying) open question (open-ended question) response fatigue

Source	Bias
Flawed questionnaire structure	skipping question
3. Administration of Questionnaire	
Interviewer not objective	interviewer nonblinding
Respondent's subconscious reaction	end aversion (central tendency) positive satisfaction (positive skew)
Respondent's conscious reaction	faking bad (hello-goodbye effect) faking good (social desirability, obsequiousness) unacceptable disease unacceptable exposure unacceptability underlying cause (rumination)
Respondent's learning	learning hypothesis guessing
Respondent's inaccurate recall	primacy and recency proxy respondent (surrogate data) recall telescope
Cultural differences	cultural

(continued, 1)

- **Belief vs. behavior:** beliefs/attitudes/etc. may be antecedents to behaviors
☐ be careful about which you want to ask about
- **Starting time (anchor consistently):** rather than “in the last 12 months” think about specifying e.g. “from January 1 to December 31 of 2020”
- **Data degradation:** maximize the precision of what you ask for (but consider what your respondents can report with validity!)
 - “What is your birth date” is more informative than “What is your age” which is better than “Which age category do you belong to”
- **Insensitive measures:** offer enough response options to pick up meaningful differences
 - “Do you agree.... Yes/No” is less sensitive than “To what extent do you agree... Strongly agree / somewhat agree / neutral / somewhat disagree / strongly disagree”

(continued, 2)

- **Forced choice:** Do you want to give people a “don’t know” or “refuse/prefer not to answer” option?
 - Also, “Other” ☐ how are you going to analyze these data?
- **Scale format:** Odd or even # of response options?
 - If odd # there will be a “middle” option (may be equivalent to “neutral”) – think about whether this is meaningful/useful
 - ** Also will need to be careful about this during analysis!! ****
 - Chocolate is the best ice cream flavor. Strongly agree / Somewhat agree / **Neutral** / Somewhat disagree / Strongly disagree

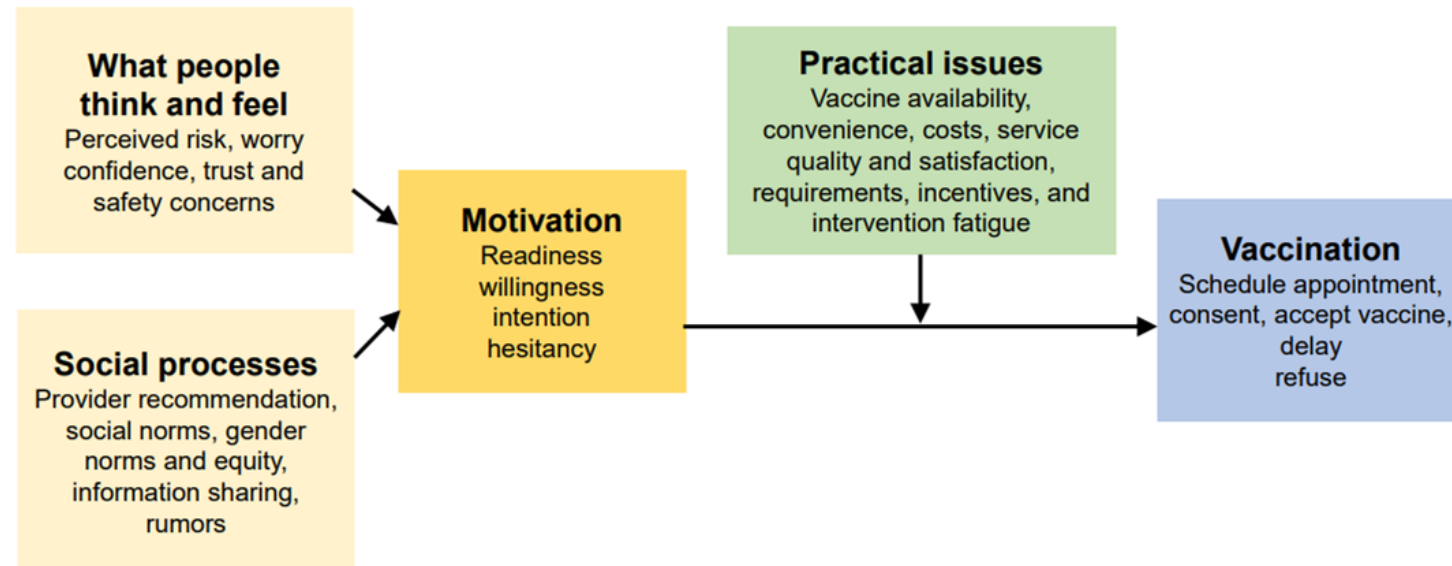
(continued, 3)

- Beware respondents' **subconscious reactions & biases!**
 - Faking bad or faking good (social desirability)
 - End aversion / central tendency bias: avoid the ends (seem too extreme)
 - Positive satisfaction (people don't like to hurt others' feelings)

A few additional thoughts

- Think hard about what you want to & can measure
 - Certain things may be better measured using other modalities – e.g., if you want to know someone’s most recent blood pressure, better to check their medical record (if you can) than ask them about it
 - Also, be thoughtful & precise about what you are observing (measuring) versus what might be “latent”

Increasing Vaccination Model



Source: The BeSD expert working group. Based on: Brewer NT, Chapman GB, Rothman AJ, Leask J, and Kempe A (2017). Increasing vaccination: Putting psychological science into action. *Psychological Science for the Public Interest*. 18(3): 149-207

Principles of instrument design – Redux!

- Questions should:
 - Be purposeful
 - Be concrete
 - Use relevant time periods
 - Use conventional phrasing/language
 - Not be double-barreled (only ask 1 question at a time!)
 - Use neutral phrasing or purposively use negative/positive phrasing

Survey tool flow

- **Sequence**: consider sandwiching your most meaningful questions between warm-up & wind-down questions
- **Beware fatigue & “no-saying”**: long blocks of questions are tiring! People may be tempted to skip, or pick the same response option all the way down
 - Mix positively- & negatively-worded questions (“valence”) to help avoid fatigue; and you can check later during analysis
 - Think about ways to signal duration to the respondent: progress bar on website, transition statements (“we’re about halfway through now... for our last set of questions I am going to ask about...”)

57.	Single select	Did you feel the provider you saw for family planning paid attention to you during your stay in the facility?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time
58.	Single select	Were you allowed to have someone you wanted to stay with you during your visit?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time 5. I did not want someone to stay with me. 99. No one accompanied me
59.	Single select	Did you feel the provider you saw for family planning cares about you as a person?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time
60.	Single select	Did you feel you could completely trust the provider you saw for family planning with regards to your care?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time
61.	Single select	In general, did you feel safe in the health facility?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time
62.	Single select	Did you feel the provider judged you?	<ol style="list-style-type: none"> 1. No, never 2. Yes, a few times 3. Yes, most of the time 4. Yes, all of the time

Modes of survey administration

- Interviewer- vs. Self-administered
 - Interviewer presence may increase: social desirability bias; response bias (sensitive topics)
 - May also increase survey response & completion rates; also self-administration may not be an option in certain settings
 - Face-to-face
 - Telephone (CAPI/CATI)
 - Via internet/app
 - Via mail
- Some considerations:* (incomplete list!)
- If you need visual media, telephone won't work
 - Hard-copy (mail) is least flexible/adaptable – skip patterns are tough
 - Mail surveys are often the cheapest approach but may suffer low response rate
 - For phone & internet: consider selection bias

Survey data collection software

- Lots of options! Depends on your needs & resources
 - Google Forms, Survey Monkey
 - Qualtrics, RedCap, CPro
 - SurveyCTO, Kobo Toolbox

Practice with actual surveys

1. Firouzbakht et al, “COVID-19 preventive behaviors and influencing factors in the Iranian population; a web-based survey” – BMC Public Health, 2021

Small groups: Discuss these questions – refer to potential sources of bias, such as:

- Ambiguous or vague questions/words
- Double-barreled questions
- Beliefs vs. behaviors
- Scale format
- Starting time / anchoring
- Framing and leading questions

Individual behaviors
I do NOT leave home, unless it is necessary
I avoid handshakes and hugging others
I keep a minimum distance of 1.5 meters from others
I avoid touching my face (eyes, nose and mouth)
I regularly wash my hands for AT LEAST 20 seconds
I wear disposable gloves when I leave the house
I cover my mouth and nose while sneezing or coughing
I dispose of tissue papers in a lidded trash can
I DO NOT visit friends and relatives
I DO NOT attend birthday parties, wedding parties, or any other parties
I DO NOT eat out
I DO NOT use public transportation
I disinfect my work space surfaces before anything else
Practices when entering the house
I wash my hands before taking off my clothes or do any other task
I dry my hands using tissue papers
I dispose of the tissue paper in a lidded trash can
I disinfect my belongings such as cellphone, keys, wallet, etc. using alcohol disinfectant (70% alcohol)
I hang my clothes separately from other clothes when I enter the house
I wash my hands again, after removing my clothes

Always / Often / Sometimes / Rarely / Never

(continued)
I wash my hands after using the WC and before eating
I disinfect all surfaces, everyday
Practices when leaving the house
I ask myself about the necessity, when I am leaving the house
I take alcohol disinfectant with me
I wear disposable masks
I wear disposable gloves
I do not leave the house in case I have symptoms of fever & cough
I always carry clean tissue papers
I do not touch elevator buttons with bare hands
Practices while using personal belongings
I do not take my cell phone out of my pocket when outside, unless there is an emergency
I do not remove my glasses or wrist-watch when outside
I do not place my belongings on surfaces I am not certain of their hygiene
I take food (Meat, chicken, eggs, etc.) only in a well done doneness

Practice #2

- Ismail et al, “Physicians’ attitude towards webinars and online education amid COVID-19 pandemic: When less is more” – PLOS One, 2021

- **What is your age?**
- **What is your gender?**
Male
Female
- **What is your country of practice?**
- **What is your medical/ surgical specialty?**
- **How many years of practice do you have in your specialty?**
- **How do you describe your role amid COVID-19 pandemic?**
Frontline healthcare worker
I continued to practice my usual work during the pandemic
I didn't work during the pandemic
I partially worked during the pandemic
I practiced through "telemedicine" services
- **Have you attended webinars or online meetings during the past 6 months?**
No
Yes
- **If yes, how many webinars or online meetings, in average, have you attended per month during the past 6 months?**
- **How many webinars or online meetings, in average, have you attended per month last year?**
- **In comparison to the last year, have you attended more meetings and conferences during the past 6 months?**
No
Maybe
Yes
- **What is your role in webinars and online meetings?**
Equally speaker and attendee
Mostly attendee
Mostly speaker
- **In average, what is the percentage of webinars or online meetings you attend in comparison to the number you are invited to?**

Strongly dissatisfied / Dissatisfied / Neutral / Satisfied / Strongly satisfied

- Since the beginning of COVID-19 pandemic, what is your general impression on shifting scientific meetings to webinars and online meetings?
- What is your impression on shifting international conferences to webinars and online meetings?
- What is your impression on shifting teaching courses to webinars and online meetings?
- What is your impression on shifting pharmaceutically-sponsored meetings to webinars and online meetings?
- In general, what is your impression on the scientific content of the International conferences as webinars and online meetings?
- In general, what is your impression on the scientific content of the pharmaceutically-sponsored meetings as webinars and online meetings?

Strongly disagree / Disagree / Neutral / Agree / Strongly agree

- Do you agree that webinars and online meetings can replace in-person meetings after the pandemic?
- Have you felt overwhelmed with the number and frequency of webinars and online meetings during the pandemic?
- Do you agree that webinars and online meetings need further regulations?

Resources

- Many (many many!) books, including:
 - The Survey Kit (Fink)
 - Research Design: Qualitative, Quantitative and Mixed Methods Approaches (Creswell)
 - Design, evaluation, and analysis of questionnaires for survey research. (Willem & Irmtraud)
 - Designing and Conducting Health Surveys: A Comprehensive Guide, 3rd Edition (Aday & Cornelius)