

# Survey Design 101

## Part I: Introduction to Survey Design



---

**Okan Bulut, Ph.D.**

Centre for Research in Applied Measurement and Evaluation


University of Alberta



# Hello!

## I am **Okan Bulut**

Associate Professor in Measurement, Evaluation, and Data Science ([MEDS](#)) & Program Coordinator

You can find me (virtually) at:  [bulut@ualberta.ca](mailto:bulut@ualberta.ca)



[@drokanbulut](https://twitter.com/drokanbulut)



[www.okanbulut.com](http://www.okanbulut.com)



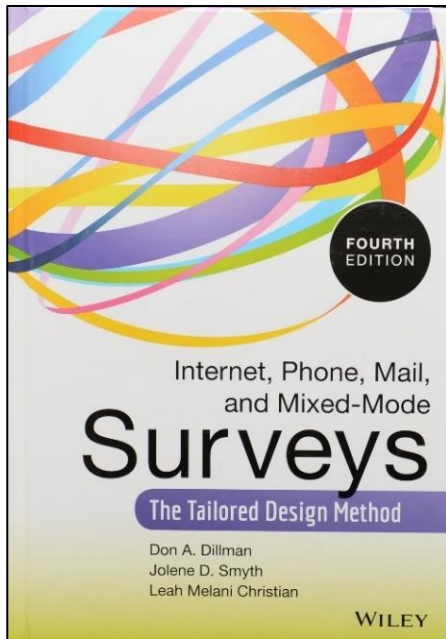
## Agenda

---

1. Developing a survey plan
2. Techniques for developing survey questions
3. Survey construction
4. Pilot testing surveys



## (Some) Survey Resources



Dillman et al. (2014)



EDPY 504 Survey Design  
and Implementation  
(Winter Term)



[Analyzing Survey Data with R](#)

1

## Developing a survey plan

Intended purpose, target population, construct(s) to be measured

Many researchers think that surveys are simply **a way of collecting information** by asking questions – nothing sophisticated or difficult, just ask and you will know.

-- [Gideon \(2012\)](#)





## Should you use a survey?

1. Do you have **enough time** to prepare and administer a high-quality survey?
  - **Advice:** If your estimate of the time needed to produce the survey exceeds your deadline date, you should avoid using a survey.
2. Do you have access to the needed **funds and resources** to conduct a survey research?
  - **Advice:** Surveys are very expensive to produce. The expenses include time, effort, cost of administration, etc. Without enough and stable funding, you may want to avoid survey research.
3. Are there any **existing data sources** that may answer your research questions?
  - **Advice:** Before you undertake a survey, you should first make sure the answer to your problem does not already exist. An existing survey data set may be adequate for your research.



# Why survey?



It is an efficient and effective way to collect information about a large group of people.



It is a flexible tool that can measure different types of constructs – such as attitudes, knowledge, and preferences.



It can be tailored exactly to the phenomenon that we aim to study.

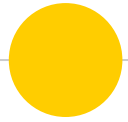


The smaller amount of data gathered by sampling as opposed to surveying an entire population can mean large cost savings.



By limiting the group to be surveyed, less time is involved in collecting, formatting, and analyzing the data.





## How to use surveys for research



### **One-time administration (Cross-sectional design):**

A brief survey to learn whether students are satisfied with online learning

A survey to understand parents' attitudes toward their children's use of technology



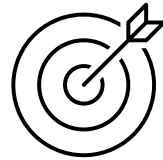
### **Multiple administrations over time (Longitudinal design):**

A patient-reported outcome measure to measure the improvement/change in patients' health condition over time



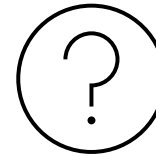
# Developing a survey plan

## Purpose



The intended purpose of the survey

## Big Questions



Big questions the survey is trying to answer

## Audience



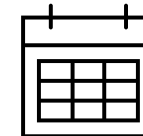
Intended audience (i.e., target population) for the survey

## Construct(s)

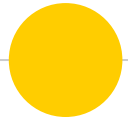


Target construct(s) the survey is going to measure

## Schedule



A tentative schedule with dates from design to reporting



# Survey development timeline



## Step 1

Purpose  
Big questions  
Construct(s)  
Target audience

(1 to 3 weeks)



## Step 2

Content selection  
Developing questions  
Iterative revisions  
Pilot study

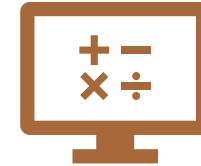
(Several weeks)



## Step 3

Survey mode  
Survey construction  
Data collection

(3-4 weeks to several months)



## Step 4

Data analysis  
Reporting findings

(2 to 4 weeks)

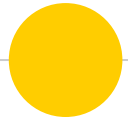


---

2

## Creating survey questions

How to create high-quality survey questions

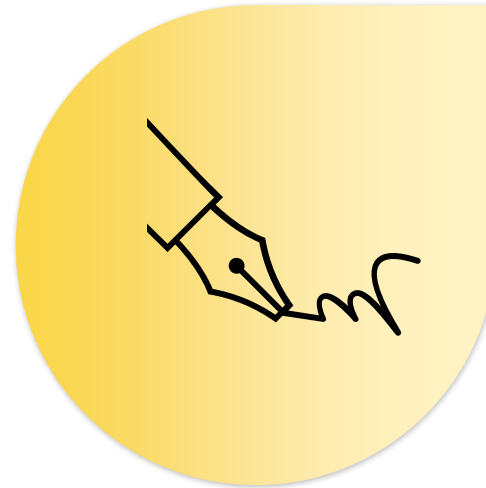


## Four Elements to Consider

Content



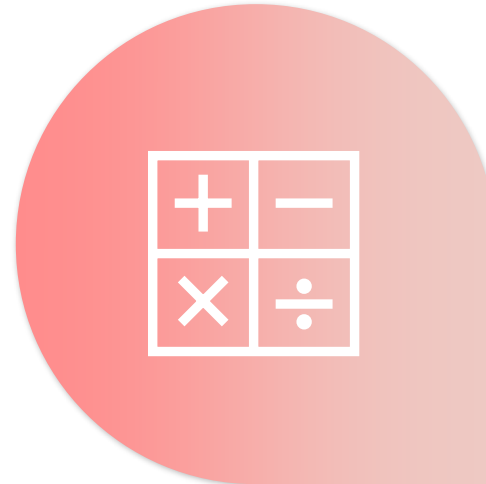
Wording

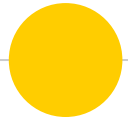


Response  
scale



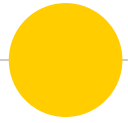
Number of  
questions



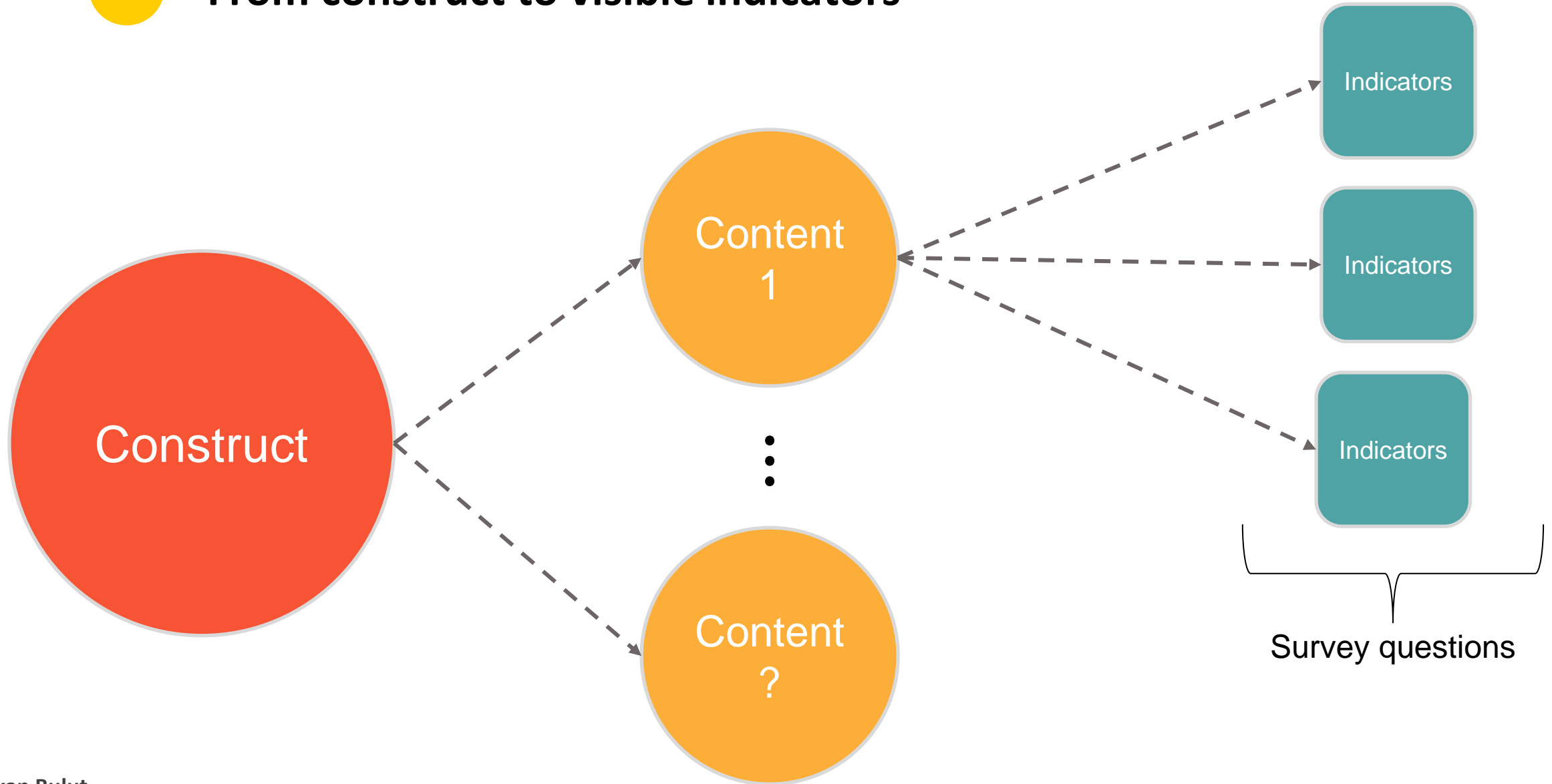


# How to select survey content





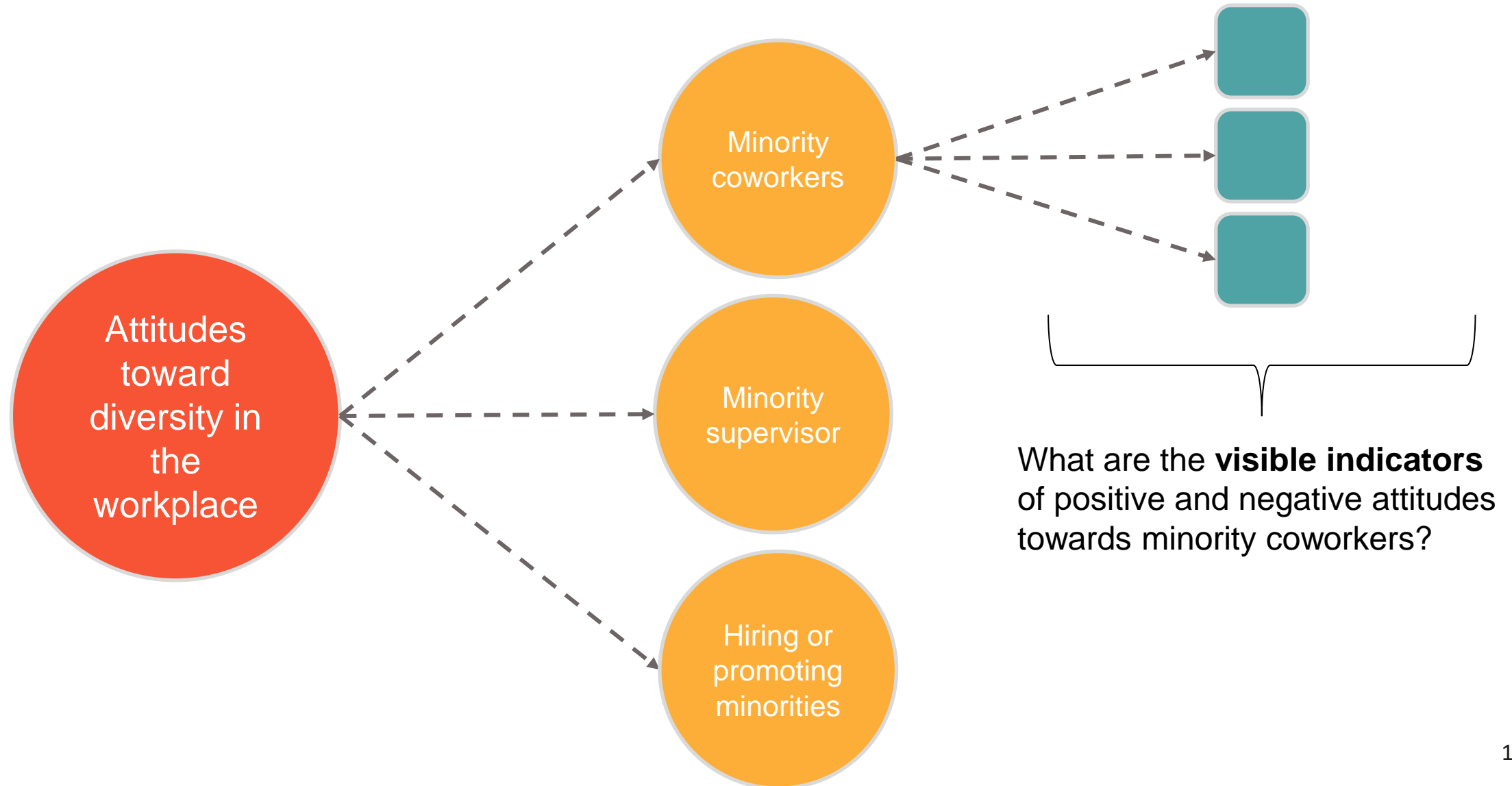
# From construct to visible indicators



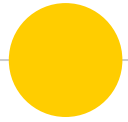




## From construct to visible indicators



What are the **visible indicators** of positive and negative attitudes towards minority coworkers?



## Wording

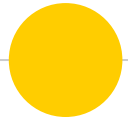
Primary goals of the question development process:



To get into a “**respondent state of mind**” to understand what the questions will look like from the respondent’s perspective



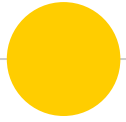
To write **clear and concise** questions that can differentiate respondents on the target construct



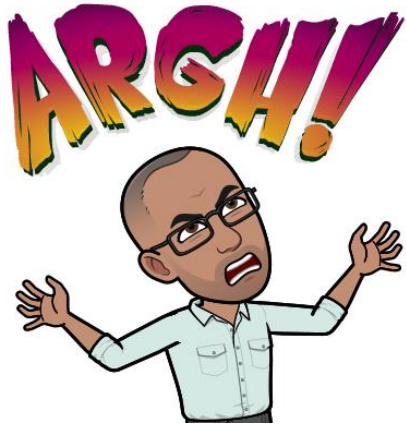
## General guidelines

---

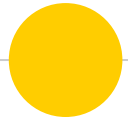
- Develop **multiple questions** that measure each content area on the survey.
- Keep the questions as **brief** and **concise** as possible.
- Avoid any words with **multiple** meanings or words from pop culture.
- Use **positive** phrasing instead of **negative** phrasing to reduce complexity.



## Avoid: Double-barreled questions



	Excellent	Very Good	Good	Fair	Poor	N/A
What was your overall satisfaction with the quality, taste, and presentation of the food offered?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you rate the amount of food and beverage offered?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How would you rate the speed at which you received your food and/or beverage?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## **Avoid:** Implicit Assumptions

What was the best book you read last year?

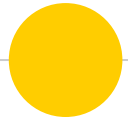
(What if the respondent did not read any books?)

How often do you go to church?

(What if the respondent never goes to church?)

During lunch break, our teacher meets with students who are having difficulty with their work.

(Can a student definitely know whether the teacher is helping others?)

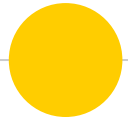


## **Avoid:** Specific determiners

Avoid using specific determiners (e.g., only, never, all, always) that would steer respondents towards choosing a particular response option.

As a 9th grade student, I come to school **ONLY** because my friends are here.

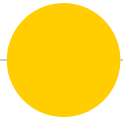
1-Strongly disagree   2-Disagree   3-Agree   4-Strongly Agree



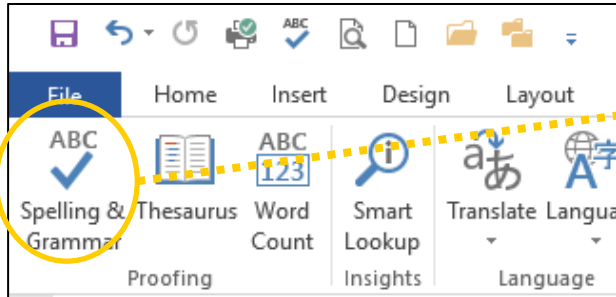
## Avoid: Abstractions

Abstraction occurs when a word is too abstract so that respondents don't know what the question is really asking.

- I found online math courses **useful**.
- What is the **typical** number of books you read each month?



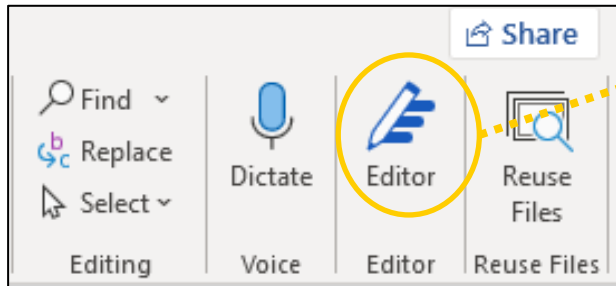
## Check readability of questions



- Click on “Spelling & Grammar” and run a spell check on the text (Microsoft 2016 or older)

or

- Click on “Editor” (Microsoft Office 365)



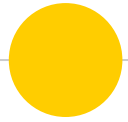
**Note:** If you can't see these statistics, then go to REVIEW → LANGUAGE → LANGUAGE PREFERENCES → PROOFING and check the “show readability statistics” option.

Averages	
Sentences per Paragraph	2.8
Words per Sentence	19.6
Characters per Word	4.2
Readability	
Flesch Reading Ease	68.5
Flesch-Kincaid Grade Level	8.3
Passive Sentences	10.0%

- 8.3 shows for the **Flesch-Kincaid Grade Level** indicates that an 8<sup>th</sup> grade student should be able to understand the content.

- High values of **Flesch Reading Ease** (e.g., 60 or above) would indicate better readability.





## Selecting a response scale

Potential response scales for surveys:

- 1. Knowledge scales:** TRUE/FALSE; YES/NO; Option 1/Option 2
- 2. Attitude scales:** Typically, Likert scales (e.g., strongly disagree to strongly agree; strongly dissatisfied to strongly satisfied)
- 3. Rating scales:** Numerical values to evaluate the degree of a construct (e.g., “what’s your level of pain on a scale of 1 to 10 where 1=no pain at all and 10=very high pain?”)
- 4. Nominal scales:** Multiple-choice or “select all that apply” type of questions



## Attitude scales

- ◎ **How many response options should you have?**
  - 4 (min) to 7 (max) response options typically yield a reliable scale ([Lozano et al., 2008](#))
- ◎ **Should you use either numeric or verbal response labels?**
  - Both numeric and verbal labels should be used (e.g., 1=Strongly Disagree, ....., 5=Strongly Agree)
- ◎ **Do you need a middle option (e.g., neutral, neither agree nor disagree)?**
  - Having a middle option might “muddy the waters”. Moderating options (e.g., somewhat, slightly) are better options than “neutral” or “neither ... nor ....”.
- ◎ **Should you use “Don’t know” or “No opinion” in your response scale?**
  - Yes, only if the questions require knowledge or unfamiliar options are included in the questions.



## Balanced response scales

Reasons for Selecting a Community College	⊘ NOT THIS				
	Two levels		Three levels		
	Not at all important	Somewhat important	Important	Very important	Extremely important
Career paths	1	2	3	4	5
Financial aid	1	2	3	4	5
Proximity to work	1	2	3	4	5

Reasons for Selecting a Community College	✓ BUT THIS			
	Two levels		Two levels	
	Not at all important	Somewhat unimportant	Somewhat important	Very important
Career paths	1	2	3	4
Financial aid	1	2	3	4
Proximity to work	1	2	3	4

Source: Johnson and Morgan (2016, p. 81)



## Ordering response options

- Response categories should be ordered from “**low**” to “**high**” and from “**negative**” to “**positive**”.



Source: Johnson and Morgan (2016, p. 82)



## Not sure/does not apply options

Thinking about your household's daily activities and expenditures, have each of the following increased, stayed about the same, or decreased during the past year?

	Increased a lot	Increased a little	Stayed the same	Decreased a little	Decreased a lot	Does not apply
A. Eating out at a restaurant	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>	<input type="radio"/> <sub>6</sub>
B. Traveling or vacationing	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>	<input type="radio"/> <sub>6</sub>
C. Going out for entertainment	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>	<input type="radio"/> <sub>6</sub>

Source: Washington Economy Survey

How much do you trust each of these groups to develop useful plans or strategies for preparing for and coping with possible rain/snow pattern changes...

In your community?

	Trust completely	Trust a lot	Trust somewhat	Trust a little	Not trust at all	Not sure
A. Scientists	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>	<input type="radio"/> <sub>6</sub>
B. Long-time residents	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>	<input type="radio"/> <sub>6</sub>

Source: Water in Nebraska Survey



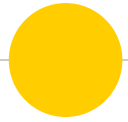
## Response scales

Types	4-point Scales			
	1	2	3	4
Frequency	Never	Seldom	Often	All the time
Endorsement	Very unfavorable	Unfavorable	Favorable	Very favorable
Endorsement	Strongly disapprove	Disapprove	Approve	Strongly approve
Endorsement	Not important at all	Unimportant	Important	Very important
Agreement	Strongly disagree	Disagree	Agree	Strongly Agree
Quality	Poor	Fair	Good	Excellent



## Response scales

Types	6-point Scales					
	1	2	3	4	5	6
Agreement	Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree
Frequency	Never	Rarely	Occasionally	Fairly often	Very often	All the time
Endorsement	Strongly oppose	Oppose	Somewhat oppose	Somewhat favor	Favor	Strongly favor
Endorsement	Very unlikely	Somewhat unlikely	Slightly unlikely	Slightly likely	Somewhat likely	Very likely
Quality	Very poor	Poor	Fair	Good	Very Good	Excellent
Quality	Worst possible problem	Very serious problem	Severe problem	Moderate problem	Minor problem	No problem



## Number of questions

- There is no “universal rule” for determining the optimal number of survey questions; but...

*Shorter = Better*

- Some general guidelines to consider:
  - Each content area requires **at least 3** questions.
  - Create more questions for “important” content areas.
  - Create as many questions as possible and retain the best ones after a pilot study.



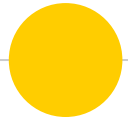


---

3

## Survey construction

Putting all the survey elements together



## Design elements

A survey typically consists of the following design elements:

1. The title of the survey
2. An introductory statement
3. Consent/information letter
4. Directions for completing the survey
5. Survey questions
6. Closing statement/thank you page



## Introductory statement

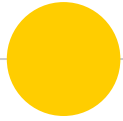
In the introductory statement, you can briefly explain that:

### Front page:

- ❖ You appreciate their participation in the survey
- ❖ The purpose of our survey is ..... (using a motivational language)
- ❖ The number of questions or expected time to complete the survey is .....
- ❖ You will receive ..... upon the completion of the survey (in case of using any incentives)

### After starting the survey:

- ❖ Respondents can exit the survey at any time
- ❖ Respondents can go back to their previous answers using the survey's BACK button (for web surveys)
- ❖ If respondents prefer not to answer a question, they can click the NEXT button and proceed without answering (for web surveys)



## Introductory page example (1)



Washington State University

### 2009 Student Experience Survey

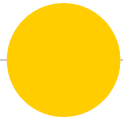
**Welcome to the Fall 2009 Washington State University Student Experience Survey!**

This brief survey is being conducted to understand how students feel about the quality of education they are receiving at WSU. We are particularly interested in whether or not you have been affected by the University's budget cuts.

We hope you will take a moment to complete the survey. Your participation is voluntary and your responses will be kept confidential. No personally identifiable information will be associated with your responses in any reports of the data. If you have any questions or comments about the survey please feel free to contact Thom Allen, the study director, by email at [ted@wsu.edu](mailto:ted@wsu.edu) or by phone at (509) 335-1722.

Thom Allen  
SESRC Study Manager

**Please enter your Access Code  
that we sent to you.**



## Introductory page example (2)



### Participant Feedback Form

The Public Engagement Section within Communications and Engagement appreciates your understanding during the COVID-19 pandemic.

We are always seeking ways to improve Public Engagement in the City of Edmonton. We are contacting you today because you have been identified as someone who has completed public engagement activity with our teams in the last 12 months. We ask for you to take roughly 5 minutes to complete a very quick survey on our services.

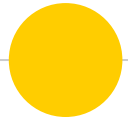
We want to hear from you. Please share your thoughts about the public engagement activity you recently participated in. All information provided will:

- Remain confidential
- Be considered by the City of Edmonton to improve public engagement activities

**Thank you for your participation!**

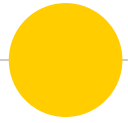
Next

Source: <https://bit.ly/3q8HZkL>



## (Some) online survey platforms

- ◎ Google Forms
  - Free; Supported by the U of A
  - Very easy to use
  - Not very customizable
  
- ◎ REDCap
  - Free; Supported by the U of A
  - Steep learning curve
  - Highly customizable
  
- ◎ Qualtrics
  - Paid; US-based (data privacy/security?)
  - Very easy to use
  - Highly customizable (with enhanced reporting/analysis features)
  
- ◎ formr (<https://formr.org/>)
  - Free; Google spreadsheets (indirect support from U of A)
  - Requires the use of R programming language
  - Very versatile and flexible



## Survey questions



Grouping the  
questions



Ordering the  
questions



Careless/fake  
responses







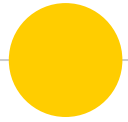
## Grouping the questions

- Questions that either cover the same content or are logically related should be presented together.

**Q22. How much training would you say your doctoral program has provided you in each of the following?**

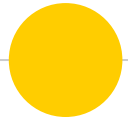
	None	A Little	Some	A Great Deal	Not Sure
Formulating original research questions	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Designing and conducting data analysis	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Designing and teaching your own classes	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Preparing and delivering presentations at conferences or meetings	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Preparing and submitting research manuscripts for publication	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Preparing and submitting grant proposals	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Preparing job application materials	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>
Interviewing for jobs	<input type="radio"/> <sub>1</sub>	<input type="radio"/> <sub>2</sub>	<input type="radio"/> <sub>3</sub>	<input type="radio"/> <sub>4</sub>	<input type="radio"/> <sub>5</sub>

**Source:** The Washington State University Doctoral Student Experience Survey (2013)



## Ordering the questions

- ◎ Proper ordering will motivate respondents to
  - complete the survey
  - minimize order effects
  
- ◎ Some general guidelines to consider:
  1. Begin the survey with the most interesting questions.
  2. The starting questions should **not** be too long, difficult, or sensitive.
  3. Place sensitive or potentially objectionable questions near the end of the survey.



## Careless and fake responses

- Careless responding occurs when respondents fail to read or attend to question content and thus provide inaccurate responses.
- Common types of careless responding:
  - **Primacy:** The tendency to more frequently select from among the first categories (e.g., selecting “strongly disagree” for all questions)
  - **Recency:** The tendency to more frequently select from among the last categories (e.g., selecting “strongly agree” for all questions)
  - **Random:** The tendency to select random response options due to various reasons (e.g., social pressure)



## Detecting careless/fake responses

- Asking respondents their engagement level during the survey
- Asking respondents if their survey data is of sufficient quality for use in research
- Adding **shadow** questions that are slightly different versions of the existing questions presented earlier in the survey.



---

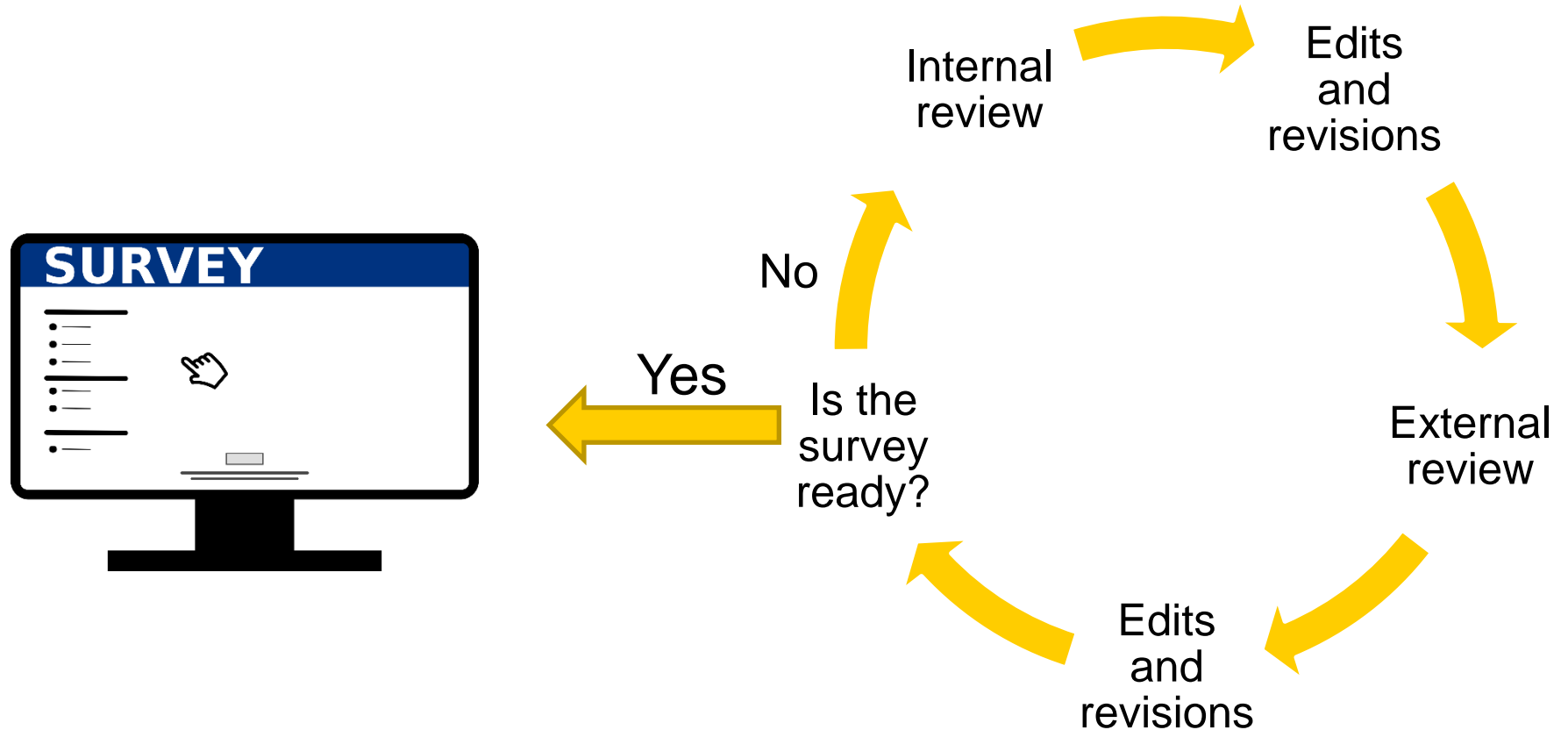
4

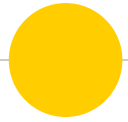
## Pilot testing surveys

How to evaluate the quality of survey questions

## Steps of conducting a pilot study

- A pilot study typically involves a cycle of multiple rounds of internal and external reviews.





## Internal review

### ○ Preliminary review of the questions:

- spelling errors
- grammar errors
- awkward wording
- punctuation errors



### ○ Do you have enough questions to measure each domain of your construct precisely?

- **Minimum three** high-quality questions are necessary for each content area.
- More critical content areas should have more questions to ensure content representation and higher accuracy in measurement.

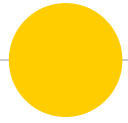




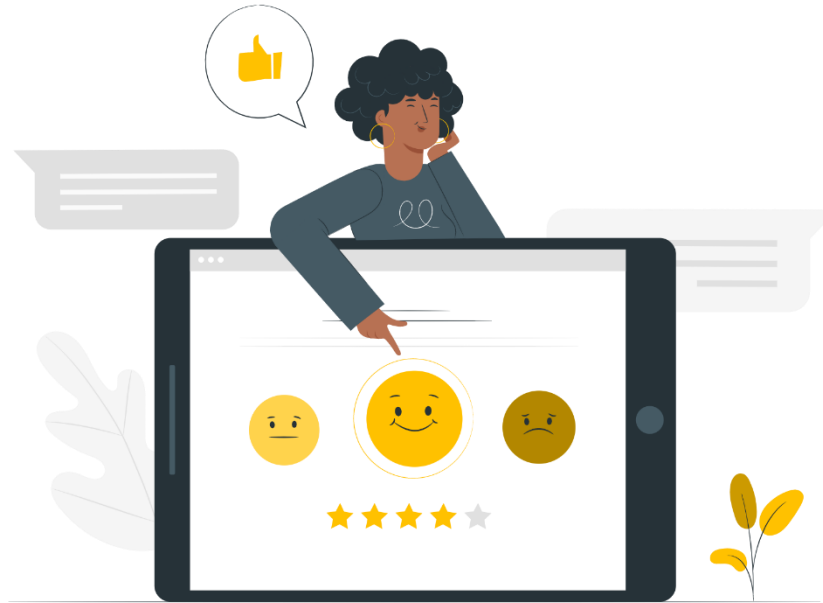
## External review

---

- Share the survey with reviewers who are not directly involved in your project
  
- Reviewers could include:
  - experts in the field of your study
  - people who are experienced with designing surveys
  - members of the target population to be surveyed
  
- You can ask the reviewers to comment on:
  - instructions to complete the survey
  - questions on the survey
  - response categories
  - visual design of the survey



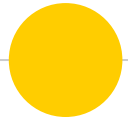
## Pilot study



Share the survey with potential respondents (> 30 participants)

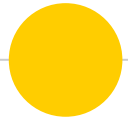


Conduct individual interviews with potential respondents (5-10 participants)



## Reviewing the pilot survey data

- Are there any questions that most respondents were not able to or willing to answer?
- Did you observe any of the following?
  - All respondents chose the same response option in a particular question
  - Most respondents chose “not sure”, “I don’t know”, or “Neutral” options
  - Most respondents chose the extreme response options (e.g., Strongly Disagree or Strongly Agree)
- Did the selected platform for survey administration worked properly for everyone?



## Conducting individual interviews

- The respondent is asked to
  - ✓ **think aloud\*** while answering the questions
  - ✓ comment on each question
  - ✓ explain how the final response was chosen
- Some probing questions
  - ✓ What do you think this question is asking you?
  - ✓ Can you repeat the question in your own words?
  - ✓ Can you explain what affected your choice?

\*See <http://bit.ly/surveythinkaloud> for a complete think-aloud protocol





# Thanks!

Any **questions** ?