Math Virtual Learning

Probability and Statistics

May 6, 2020

Probability and Statistics
Lesson: May 6, 2020

Objective/Learning Target:
Students will be able to identify errors in survey writing and improve the questions to make them more reliable
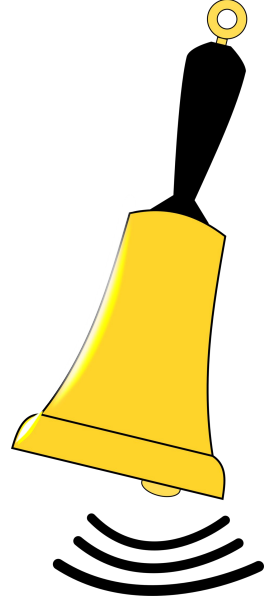
Let's Get Started!

A sample of students from an introductory psychology class were polled regarding the number of hours they spent studying for the last exam. All students anonymously submitted the number of hours on a 3 by 5 card. There were 24 individuals in the one section of the course polled. The data was used to make inferences regarding the other students taking the course. There data are below:

4.5, 22, 7, 14.5, 9, 9, 3.5, 8, 11, 7.5, 18, 20, 17.5, 9, 10.5, 15, 19, 2.5, 5, 9, 8.5, 14, 20, 8

Desmos Calculator

Compute a 95 percent confidence interval.

Write a sentence that tells us what this means.

Confidence Interval	Z
80%	1.282
85%	1.440
90%	1.645
95%	1.960
99%	2.576
99.5%	2.807
99.9%	3.291

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Compute a 95 percent confidence interval. Desmos Calculator
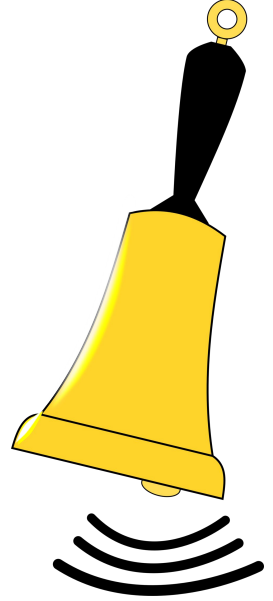
Mean: 11.33   **Standard Deviation: 5.70**   **Z-Score for 95%: 1.960**

Margin of Error: $1.960 * \dfrac{5.7}{\sqrt{24}} = 2.28$ **95% Confidence Interval:** $11.33 \pm 2.28 = 9.05 \; to \; 13.61$

Write a sentence that tells us what this means.

We are 95% Confident that the mean time that students spent studying for this exam was between 9.05 and 13.61 hours.

Gathering Research

This entire semester you have been hearing phrases like:

A research study showed…

Scientists found…

Data was collected…

By how did that research happen to make sure that you have valid results? Today we are going to look at the purpose of research and get some tips for how to write a good survey question.

WATCH THIS VIDEO TO LEARN ABOUT SURVEY WRITING

Video Tips Recap

Here is a summary of the tips listed in the video. Feel free to reference these when analyzing the survey questions

- Make sure every question is **NECESSARY**
- Keep it **SHORT** and **SIMPLE**
- Ask **DIRECT** questions
- Ask **ONE** question at a time
- Avoid **LEADING** questions
- Use **RELATABLE** language
- Use **RESPONSE SCALES**
- Avoid **TABLE** responses
- Avoid **BINARY** responses
- **TEST DRIVE** your survey

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

Did you enjoy our amazing new product option?

Survey Question Analysis

Did you enjoy our amazing new product option?

What tips were not followed?

TIP 5: This question is leading. By putting the word amazing in the question to describe their product, they are swaying you to believe more positively about the product than you may have originally

TIP 7: No Answer Choices opens up a variety of responses in a variety of directions that they author will not find valuable information.

SAMPLE Improved Question (yours may vary slightly)

How would you rate your level of enjoyment with our new product option?

A. Enjoyed greatly
B. Enjoyed slightly
C. No Opinion
D. Displeased slightly
E. Displeased greatly

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

When you drink Coke, do you prefer ice in your drink?

Survey Question Analysis

When you drink Coke, do you prefer ice in your drink?

What tips were not followed?

TIP 5: This question is leading and assumptive. The question is worded to assume that you drink Coke...what if you don't? How are you to answer the question if you don't drink Coke?

TIP 7: No Answer Choices opens up a variety of responses in a variety of directions that they author will not find valuable information.

**SAMPLE Improved Question
(yours may vary slightly)**

If you drink Coke, how much ice do you prefer in your drink?

A. A lot of ice
B. A little ice
C. No ice
D. Depends on the day
E. I don't drink Coke

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

True or False?

Your consultant was equipped for the job

Survey Question Analysis

True or False? Your consultant was equipped for the job

What tips were not followed?

TIP 8: This is a binary response...only two answer options. This would be difficult for a person to respond to if his/her consultant was equipped in some areas, but not all.

SAMPLE Improved Question (yours may vary slightly)

How equipped was your consultant for the job?

A. Completely Equipped
B. Mostly Equipped
C. Neither equipped nor unequipped
D. Mostly Unequipped
E. Completely Unequipped

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

Don't you think it is absurd that we are causing ourselves detriment through the consumption of carcinogens?

Survey Question Analysis

Don't you think it is absurd that we are causing ourselves detriment through the consumption of carcinogens?

What tips were not followed?

TIP 3 & 6: This question is not short and simple. It uses high level vocabulary that not all people can relate to

TIP5: This question is leading and assumptive. By adding the phrase "Don't you think it is absurd" you are swaying the reader's option.

SAMPLE Improved Question (yours may vary slightly)

Do you believe that Americans are impacting their health by putting cancer causing substances in their bodies? Describe your response.

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

What is the best and cheapest restaurant in town?

Survey Question Analysis

What is the best and cheapest restaurant in town?

What tips were not followed?

TIP 4: This is asking two different questions in one. A person may not believe that the best restaurant is also the cheapest. The cheapest restaurant in town may actually be very disgusting or unhealthy.

TIP 3: "Town" is not very descriptive. What is town? Independence? Kansas City Metro?

**SAMPLE Improved Question
(yours may vary slightly)**

Split into two questions and clarify the word town.

What is the best restaurant in Independence, MO?

What is the cheapest restaurant in Independence, MO?

Survey Question Analysis

Analyze the way the question below was written and determine which of the 10 tips were not followed (there may be more than one). Then rewrite the question so that it is a better survey question. Sample answers will follow on the next slide.

For each statement, select the option that best reflects your opinion of that statement.

	Agree Strongly	Agree Slightly	No Opinion	Disagree Slightly	Disagree Strongly
I prefer math					
I prefer science					
I prefer English					

Survey Question Analysis

For each statement, select the option that best reflects your opinion of that statement.

What tips were not followed?

TIP 8: This question used a table response. While it may not be as big of a deal with only three questions, table responses often have errors because respondents get off track on the rows.

SAMPLE Improved Question (yours may vary slightly)

Split the question into three separate questions with the same response options.

I prefer math
- A. Agree Strongly
- B. Agree Slightly
- C. No Opinion
- D. Disagree Slightly
- E. Disagree Strongly