Quantitative Evaluation Methods

June 9, 2026

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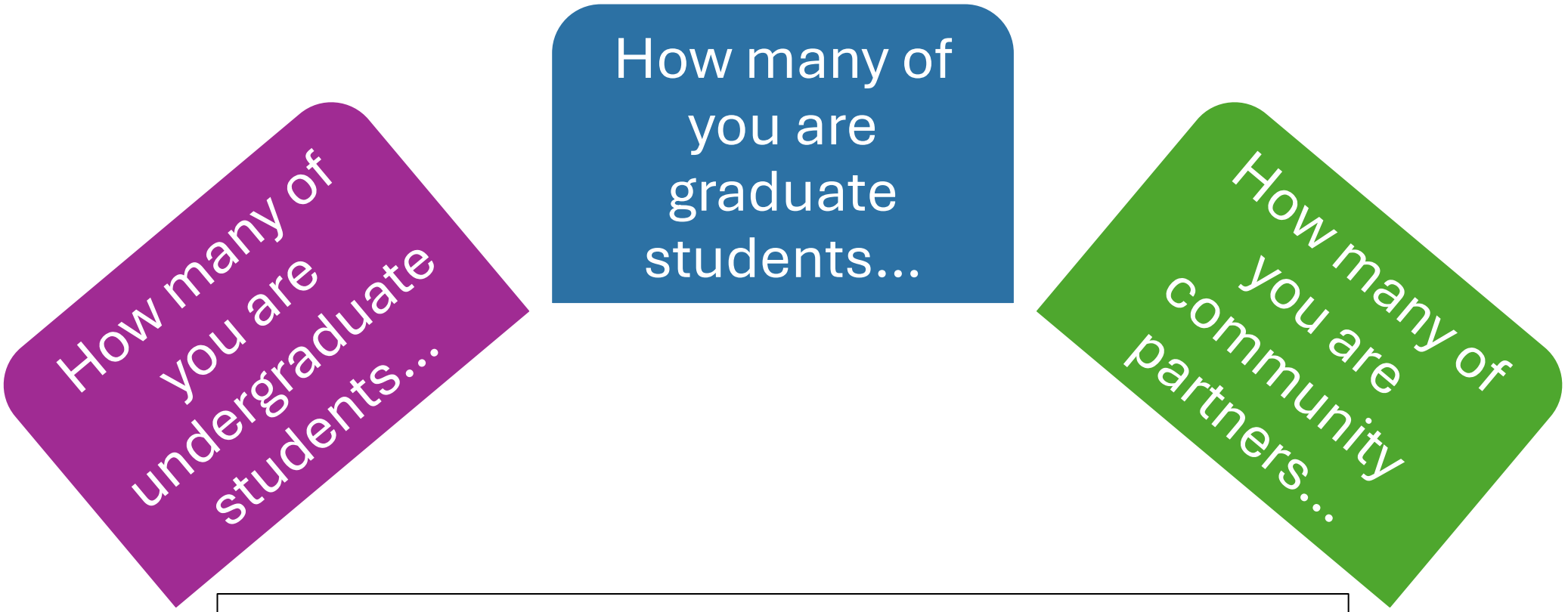
Introductions



and have taken a course in statistics?

Lesson Objectives

- To enhance your skills and confidence using Excel to summarize and analyze data
- To increase your knowledge of basic descriptive and inferential statistics in the context of an example

What are different sources of data for evaluation purposes?

Sources of Data: Quantitative & Qualitative

Primary Data
Secondary Data

- Surveys & Polls (closed or open-ended)
- Interviews, Focus Groups, Sharing Circles
- Observation (direct, participatory) (e.g., field notes, audio/video recordings)
- Art (e.g., drawings, photos, stories)
- Administrative Data (e.g., HR, Financial, attendance records)
- Documents (e.g., policies, protocols, guidelines, reports, journals, meeting minutes, training manuals)
- Social media, websites, intranet
  - Analytics: clicks, downloads, likes, tweets, shares, etc.
- Physical Artifacts (e.g., scheduling wall, equipment)
- Wearables (e.g., Fitbit, smart watches)
- Geographic (GPS)

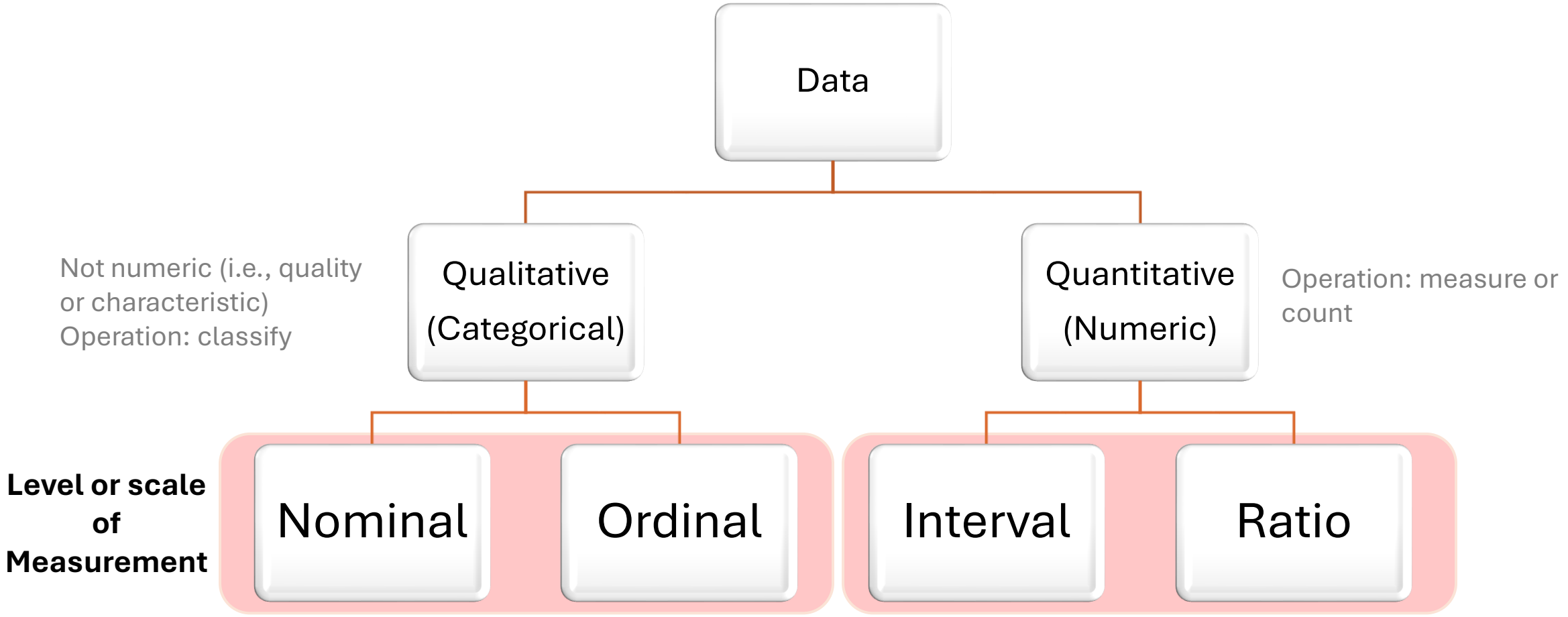
Others?

Data Collection Considerations

- No ‘right’ method
- Choose based on purpose/objective, participants, setting, resources, etc.
- Consider existing sources of data to minimize burden/less intrusive
- Trustworthy, authentic, and credible evidence collected in a good way

Never lose sight of the fact that in human research/evaluation the data represents people.

Types of “Quantitative” Data



*****Scale of measurement is the key to knowing the correct method for summarizing, graphing, & analyzing data*****

Transforming Variables

- Can transform data
  1) Nominal
  2) Ordinal
  3) Interval
  4) Ratio

Example

Age	Age Group
14	Youth
22	Adult
35	Adult
7	Child
65	Older Adult
89	Older Adult

Categories
Child: 0 to <13 years
Youth: 13 to <18 years
Adult: 18 to < 64 years
Older Adult: 65+ years

What types of variables are age and age group?

Evaluating the Summer Institute in Program Evaluation

An Example

Purposes of the Evaluation

- To determine how “good” the Summer Institute is (*judgement oriented*)
- To gather ideas on how to make the Summer Institute better next time it is delivered (*improvement-oriented*)

- The evaluation will
  - provide the information the committee needs to plan the next Summer Institute
  - be of use to Drs. Stewart-Tufescu & Mignone to demonstrate teaching effectiveness (annual activity report, promotion/tenure)

Evaluation Questions

1. How do attendees benefit by participating in the Summer Institute in Program Evaluation?

2. How can the Summer Institute be enhanced to better meet the needs of attendees?

Evaluation Questions… Breaking it down

1. How do attendees benefit by participating in the Summer Institute in Program Evaluation?

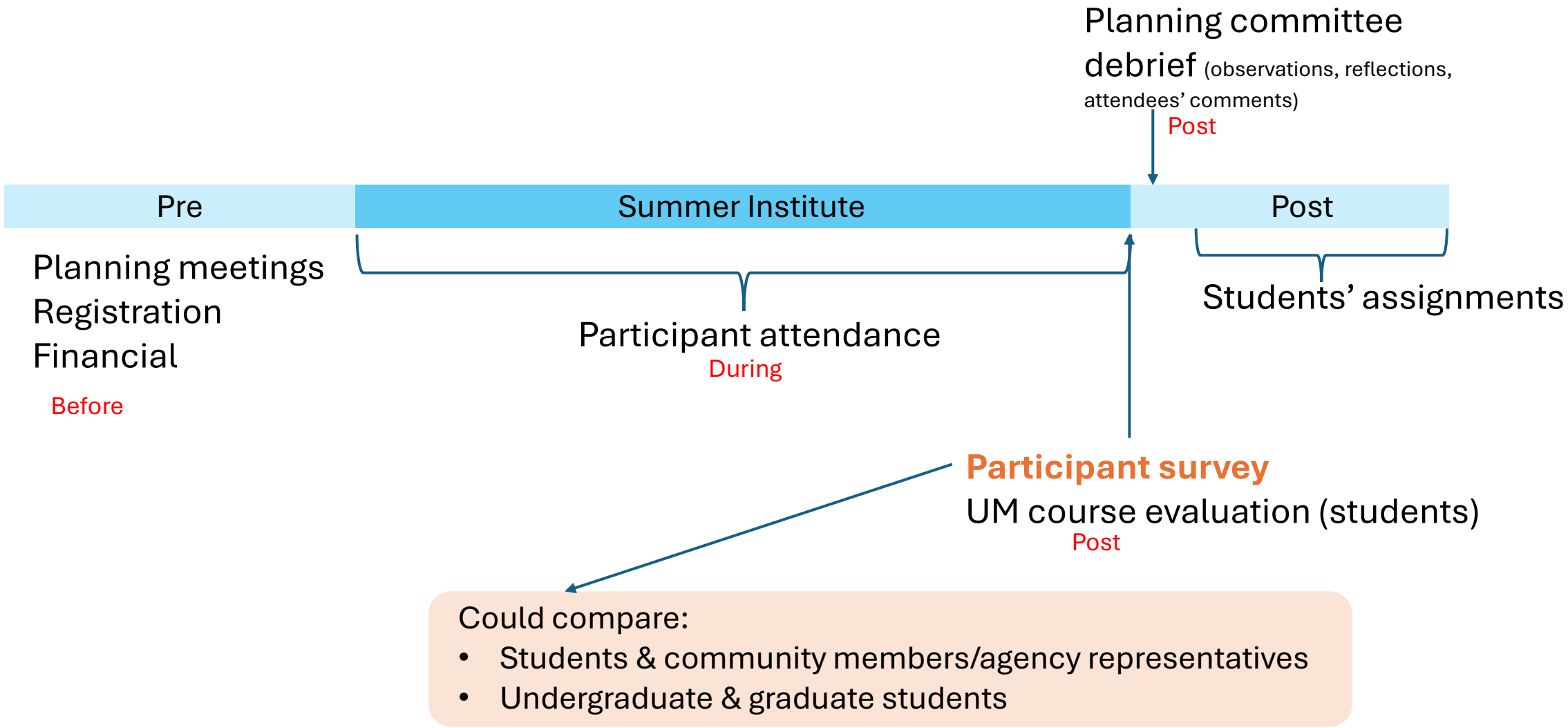
- **Attendees** – undergraduate students, graduate students, community members/agency representatives, faculty, lecturers, volunteers
- **Benefit** – the "things" attendees' gain; advantages (e.g., knowledge, skills, confidence, connections, etc.)
- **Participating** – attending lectures, participating in the group work case studies
- **Summer Institute in Program Evaluation** – one-week intensive course in program evaluation, consisting of lectures and case studies, offered at the University of Manitoba

Evaluation Questions… Breaking it down

2. How can the Summer Institute be enhanced to better meet the needs of attendees?

- **Enhanced** – improved and/or increased
- **Needs**
  - Content-related needs
    - Knowledge of program evaluation topics
    - Understanding of how to design and implement an evaluation of a program
    - Skills to design and implement an evaluation
    - Confidence to undertake the steps involved in an evaluation
  - Adult learning-related needs
    - Format of the Institute (e.g., length, diversity of topics/presenters/activities, location, timing)
  - Interpersonal needs (e.g., networking, relationship building)

Evaluation Design



Post-Evaluation Survey

Thank you for attending the 2023 Summer Institute in Program Evaluation. We are grateful for your participation, and hope you enjoyed the experience.

Please take a few minutes to provide your thoughts and feedback to **help us learn and improve future Institutes**. This survey should take approximately 10 minutes to complete. There are four sections - general feedback, lessons, group work, and final thoughts.

Please fill this out as candidly as possible. All information will be held in confidence. We do not ask for any identifying information, so we will not be able to connect you to your responses. Your responses will be combined with the other respondents. Only Marianne Krawchuk and Aynslie Hinds will have access to individual-level responses.

If you have any questions about this survey, please contact:

Marianne Krawchuk
204-924-4227
mkrawchuk@unitedwaywinnipeg.ca

General Feedback Section

Attendees

1. Did you attend the Institute as:

- ○ An undergraduate student
- ○ A graduate student
- ○ A community member/agency representative
- ○ Another role (please specify):

_____

What type of variable is this?

Categorical/Qualitative
Nominal

For context

2. How many lectures did you attend (including the panel)?

- ○ All of them
- ○ Most of them
- ○ Some of them
- ○ None of them

What type of variable are these?

Categorical/Qualitative
Ordinal

3. How many teamwork meetings did you attend?

- ○ All of them
- ○ Most of them
- ○ Some of them
- ○ None of them

What type of variables are these?

General Feedback

Did the Institute meet attendees needs?

4. What were you hoping to get out of attending and participating in the Institute?
   Open-ended (qualitative)

5. The Institute…
   - ○ Did not meet my expectations (1)
   - ○ Met my expectations (2)
   - ○ Exceeded my expectations (3)

   Ordinal

6. Overall, how satisfied are you with the Institute?
   - ○ Very dissatisfied (1)
   - ○ Somewhat dissatisfied (2)
   - ○ Somewhat satisfied (3)
   - ○ Very satisfied (4)

   Ordinal

How effective is the Institute?

7. How likely would you be to recommend the Institute to a colleague, classmate, or friend who is interested in learning about evaluation? Ordinal
   - ○ Very unlikely (1)
   - ○ Somewhat unlikely (2)
   - ○ Somewhat likely (3)
   - ○ Very likely (4)

8. Please provide any general comments you have.
   Open-ended (qualitative)

Analyzing and Interpreting Data From Likert-Type Scales - PMC (nih.gov)
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3886444/

Learning

This section asks questions about the lectures.

9. How much did the Institute contribute to your knowledge of…

Evaluation Topics	None at all (1)	To some extent (2)	To a great extent (3)	Not applicable / Don't know (4)
Evaluation in general	O	O	O	O
Ethics & Evaluation	O	O	O	O
Indigenous approaches to evaluation	O	O	O	O
Evaluation theory	O	O	O	O
Evaluation designs, indicators, & measures	O	O	O	O
Quantitative evaluation methods	O	O	O	O
Qualitative evaluation methods	O	O	O	O
How to create an evaluation plan	O	O	O	O
How to enhance the chances evaluation results get used	O	O	O	O
Evaluation in practice (i.e., panel discussion)	O	O	O	O

How did attendees benefit?

What type of variable are these?

Ordinal

10. Please rate the following.

What needs to be improved?

Aspects of the lectures	Excellent (1)	Good (2)	Fair (3)	Poor (4)	Not applicable / Don't know (5)
Clarity of lecture presentations	O	O	O	O	O
Quality of lecturers (individuals who taught the lesson)	O	O	O	O	O
Relevance of lecture material	O	O	O	O	O
Opportunities to actively participate/ask questions during the lectures	O	O	O	O	O
Order/sequencing of the lectures	O	O	O	O	O

What type of variable are these?

Ordinal

What type of variables are these?

For context

Did the Institute meet attendees needs?

11. Please describe the relevance of the Institute for you as a student or agency/community member (or another role).

Open-ended (qualitative)

12. How likely are you to work in (the field of) evaluation in the future?

- ○ Very unlikely (1)
- ○ Somewhat unlikely (2)
- ○ Somewhat likely (3)
- ○ Very likely (4)

Ordinal

13. Please explain your response.

Open-ended (qualitative)

Case Study Group Work

This section asks about your experience working on the case study.

14. Please rate the following aspects about the Case Studies.

What needs to be improved?

Aspects of the case studies	Excellent (1)	Good (2)	Fair (3)	Poor (4)	Not applicable / Don't know (5)
Clarity of instructions	O	O	O	O	O
Quality of facilitators	O	O	O	O	O
Teamwork process				O	O
Case study group presentations		O	O	O	O
Overall satisfaction with the case study project	O	O	O	O	O

What type of variable are these?

Ordinal

15. Please explain your responses.

Open-ended (qualitative)

What type of variables are these?

Final Thoughts

What (does not) needs to be improved?

16. What was the BEST thing about the Institute?

Open-ended (qualitative)

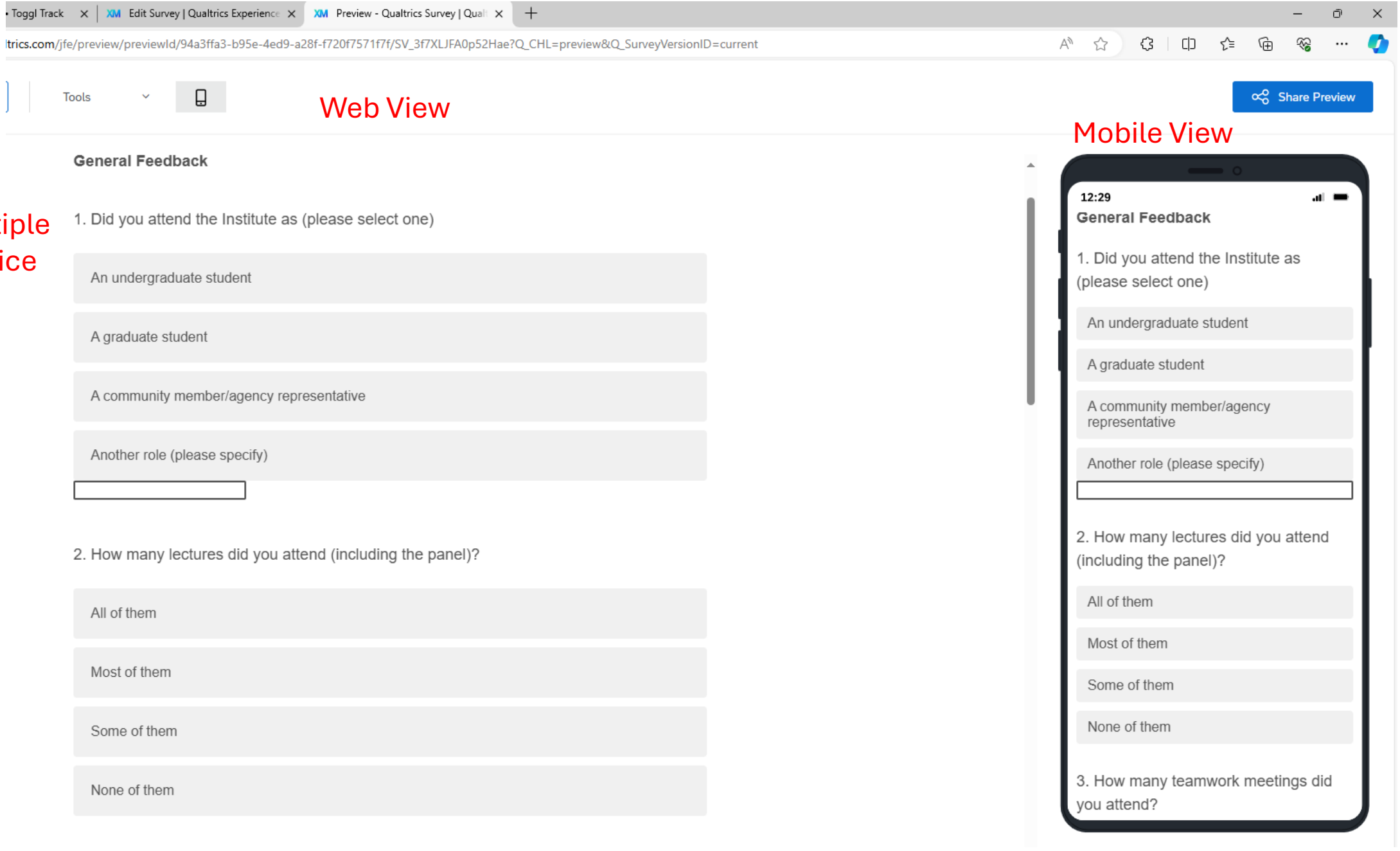
17. What can we do to improve the Institute? Please consider things such as outreach, communication, timing, fees, follow-up support implementing the evaluation plan, relevancy to your job/career aspirations, etc.. Open-ended (qualitative)

18. Please share any other thoughts you would like to tell us about the Institute and your experience.

Open-ended (qualitative)

Thank you very much for participating in the Institute and for completing this evaluation form!

Qualtrics – University of Winnipeg's ethics-approved survey platform



Qualtrics – continued...

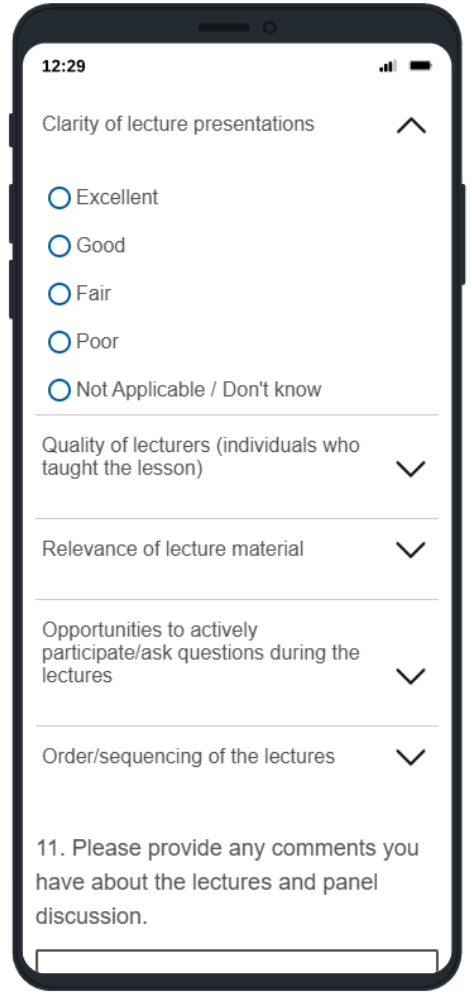
Matrix

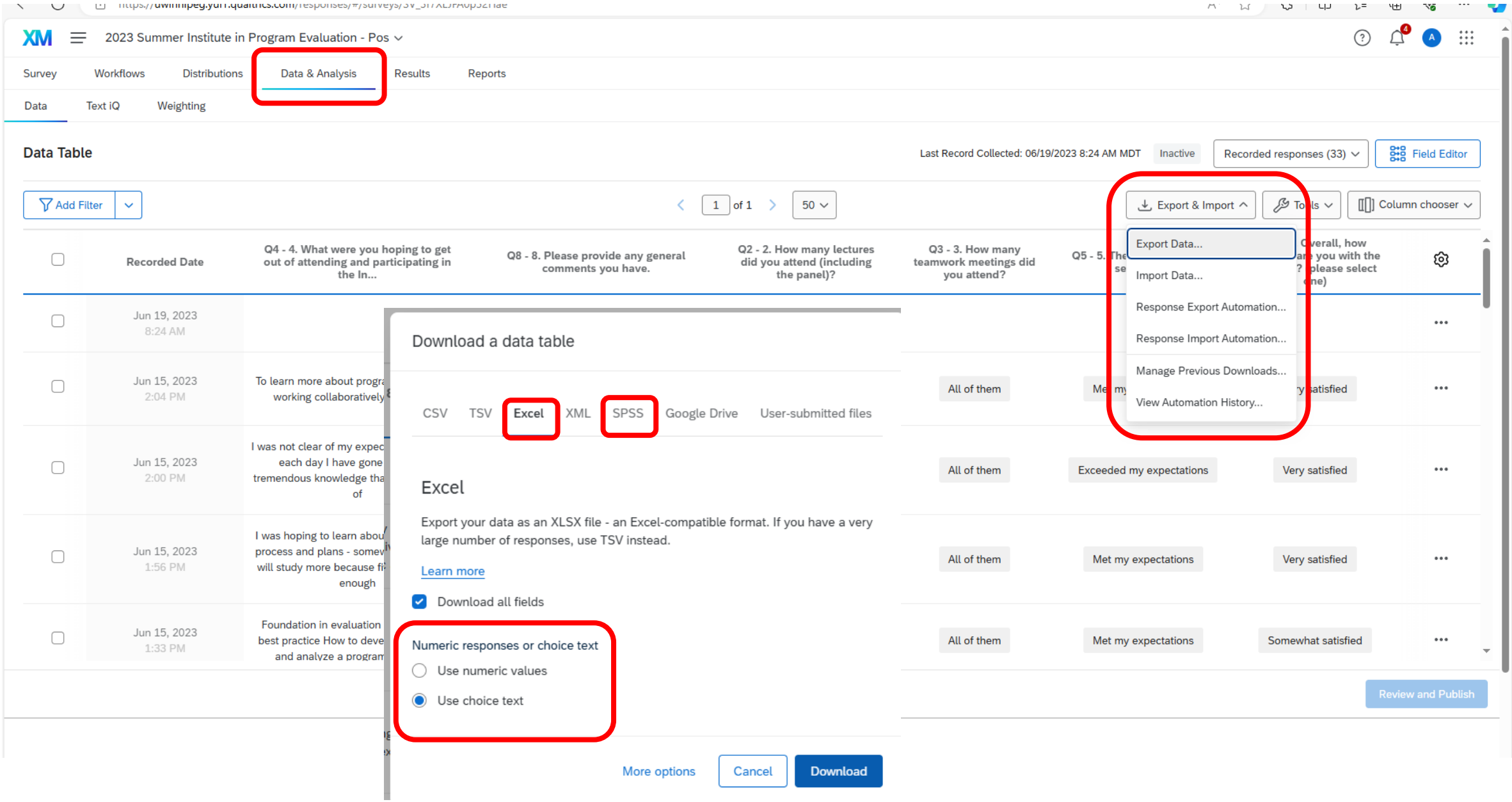
	Excellent	Good	Fair	Poor	Not Applicable / Don't know
Clarity of lecture presentations	○	○	○	○	○
Quality of lecturers (individuals who taught the lesson)	○	○	○	○	○
Relevance of lecture material	○	○	○	○	○
Opportunities to actively participate/ask questions during the lectures	○	○	○	○	○
Order/sequencing of the lectures	○	○	○	○	○

Long Answer

11. Please provide any comments you have about the lectures and panel discussion.

12. Please describe the relevance of the Institute for you as a student or agency/community member (or another role).

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View Automation History...
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Q4 - 4. What were you hoping to get out of attending and participating in the In...
Q8 - 8. Please provide any general comments you have.
Q2 - 2. How many lectures did you attend (including the panel)?
Q3 - 3. How many teamwork meetings did you attend?
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Export your data as an XLSX file - an Excel-compatible format. If you have a very large number of responses, use TSV instead.
Learn more
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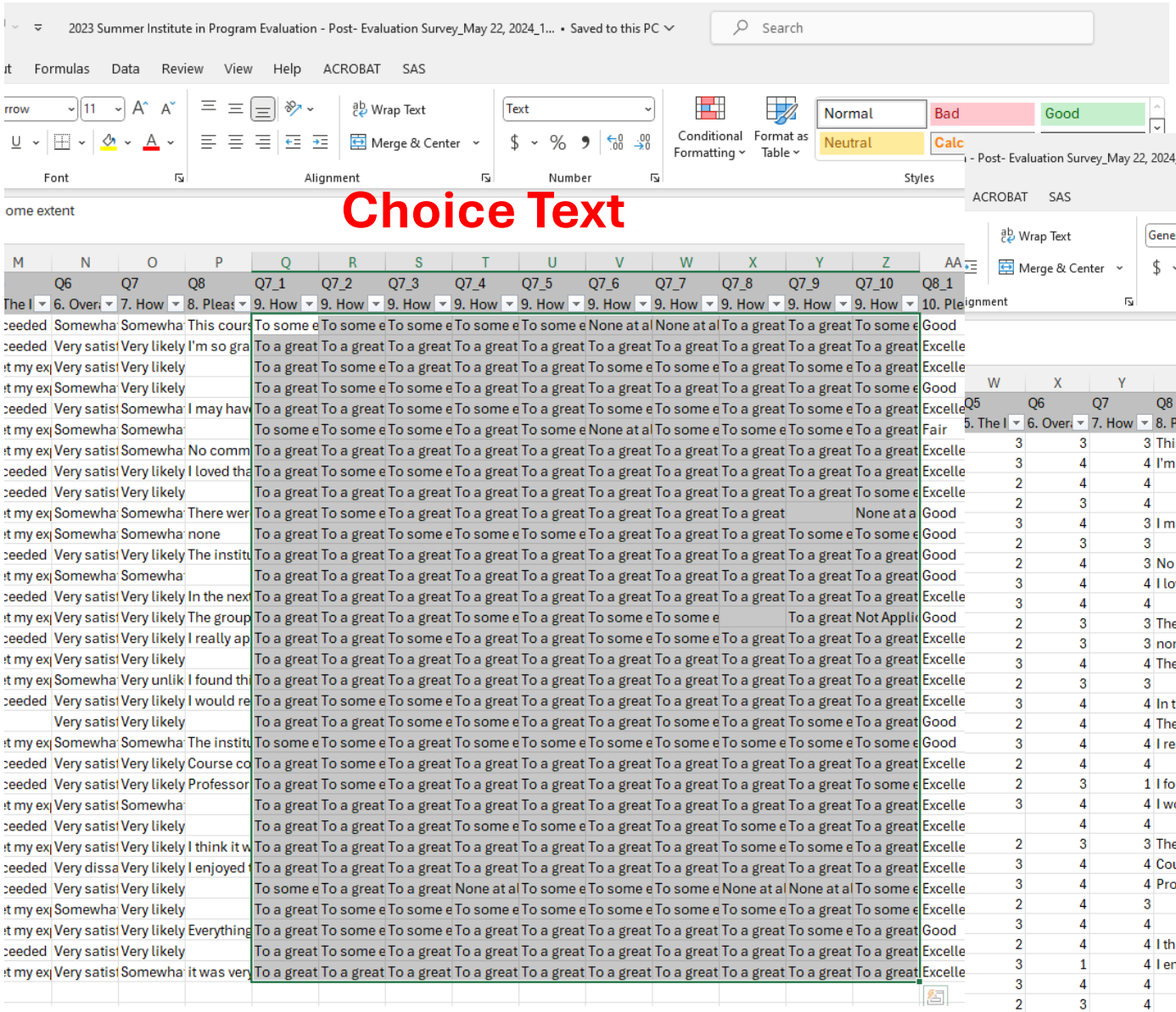
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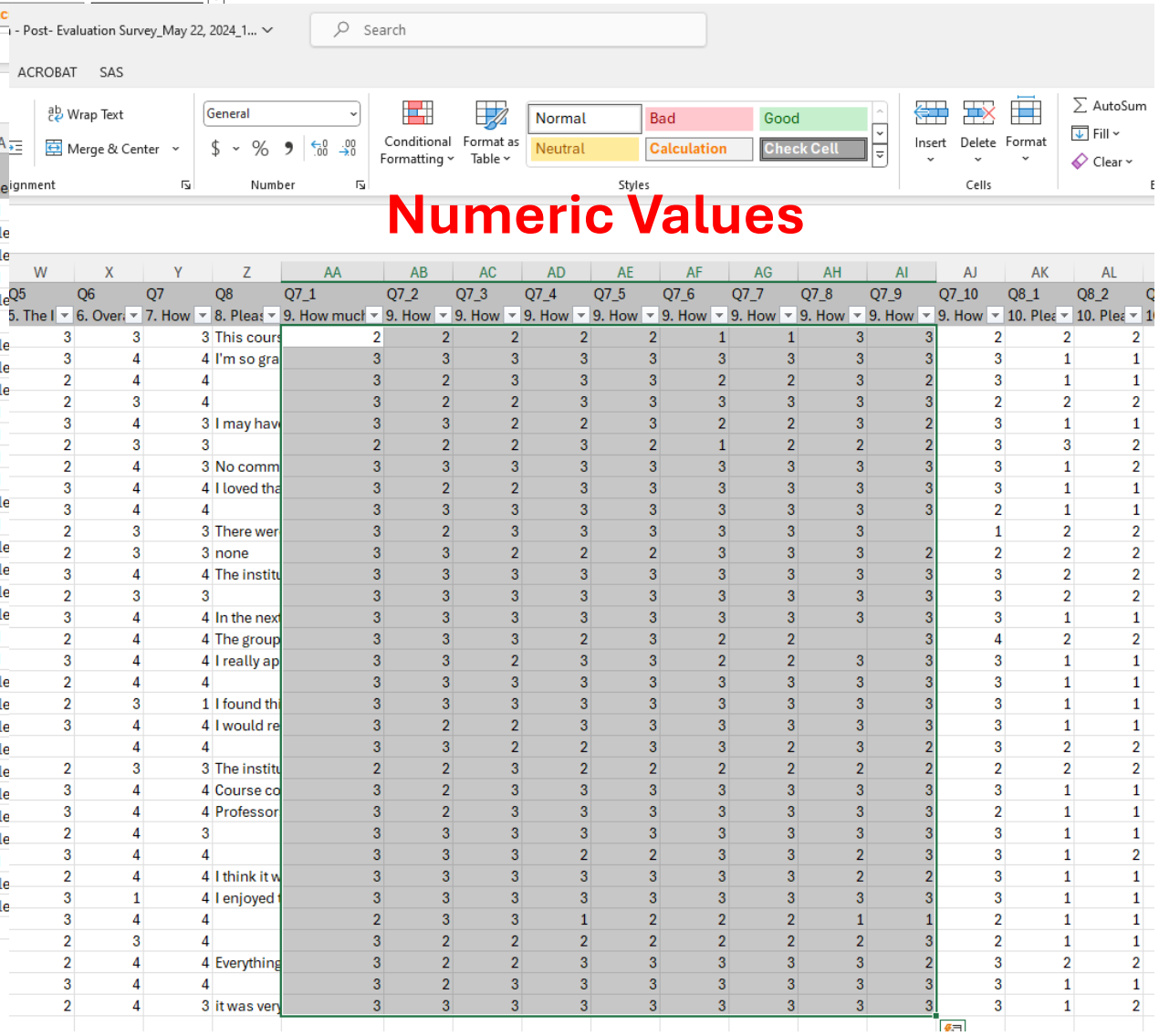
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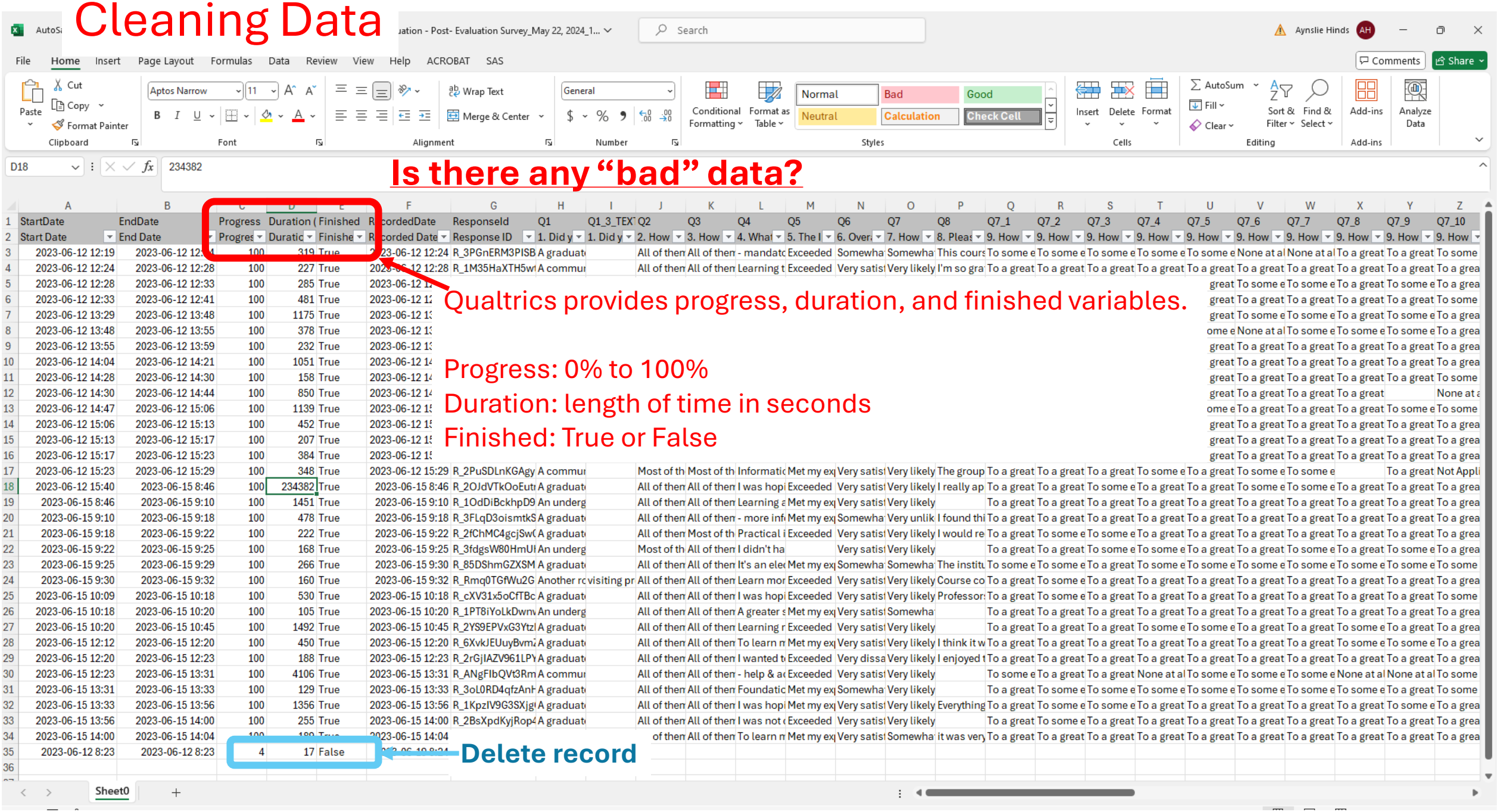
Cleaning Data

Is there any "bad" data?



Qualtrics provides progress, duration, and finished variables.

Progress: 0% to 100%

Duration: length of time in seconds

Finished: True or False

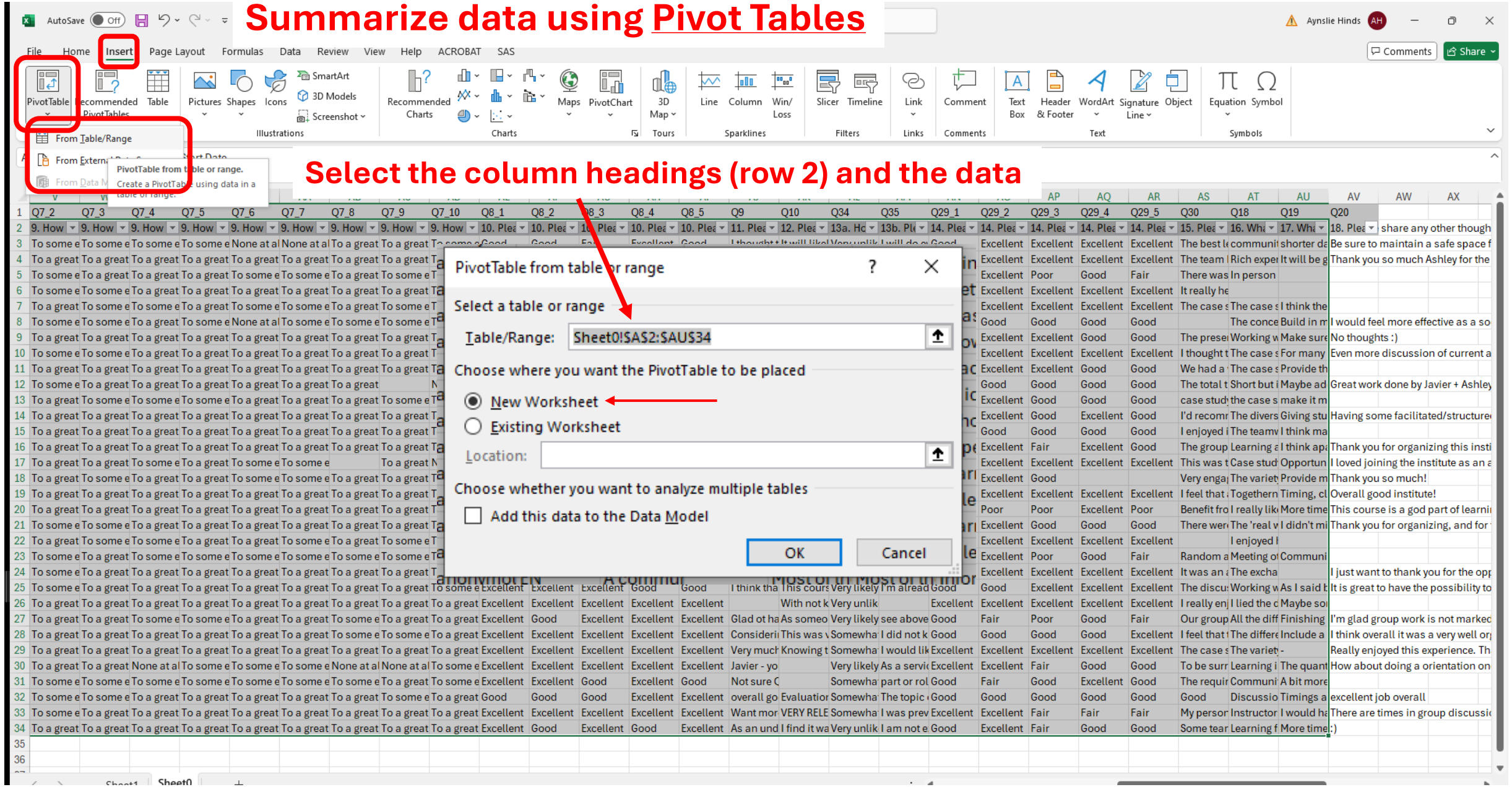
Delete record

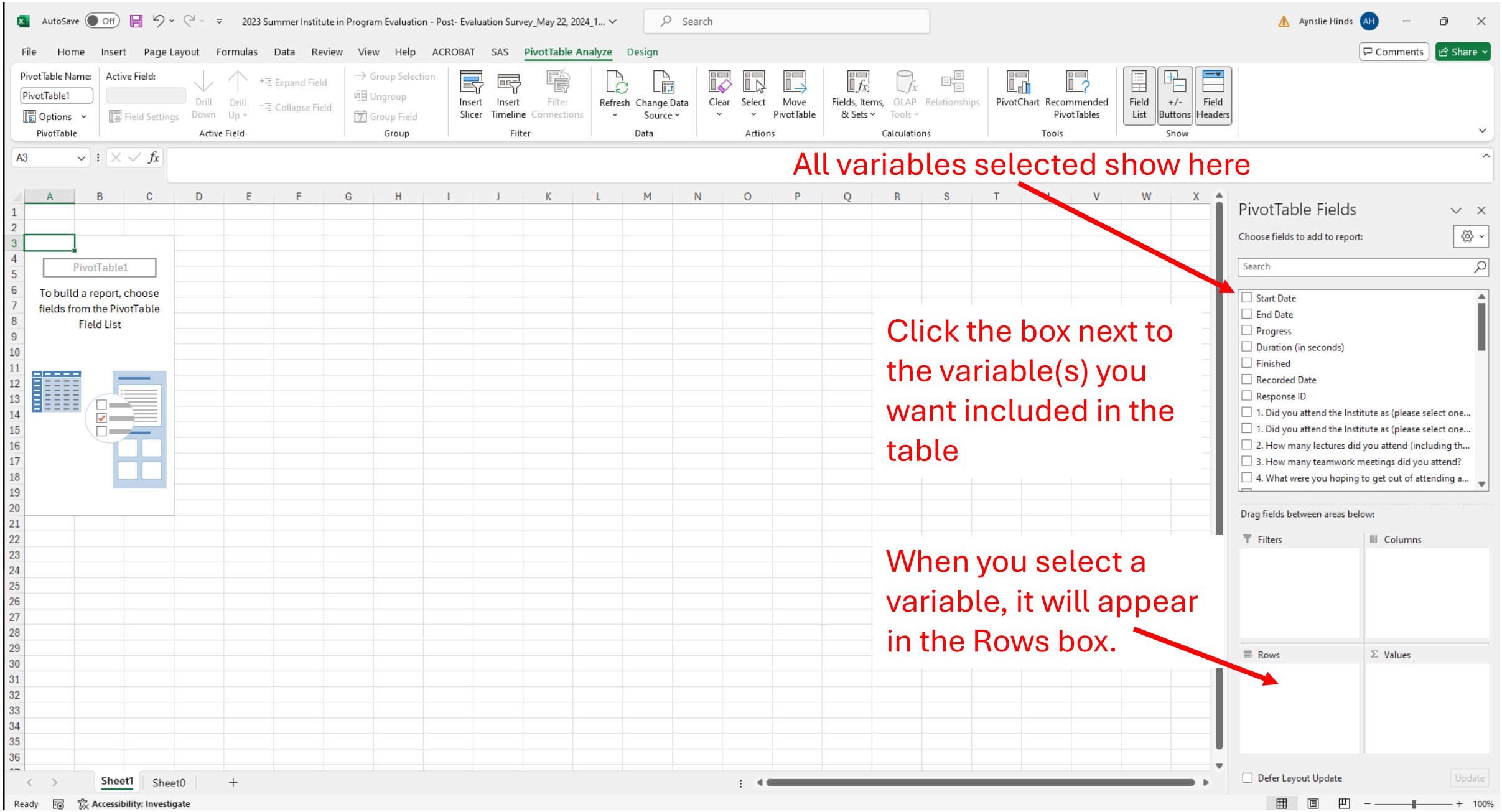
What would you do first?

Describing the data

- Summarize by determining frequencies and percentages for all the closed-ended questions

Choice Text Version




All variables selected show here
Click the box next to the variable(s) you want included in the table
When you select a variable, it will appear in the Rows box.
PivotTable Fields
Choose fields to add to report:
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1. Did you attend the Institute as (please select one...
1. Did you attend the Institute as (please select one...
2. How many lectures did you attend (including th...
3. How many teamwork meetings did you attend?
4. What were you hoping to get out of attending a...
Drag fields between areas below:
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Defer Layout Update
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PivotTable1
To build a report, choose fields from the PivotTable Field List
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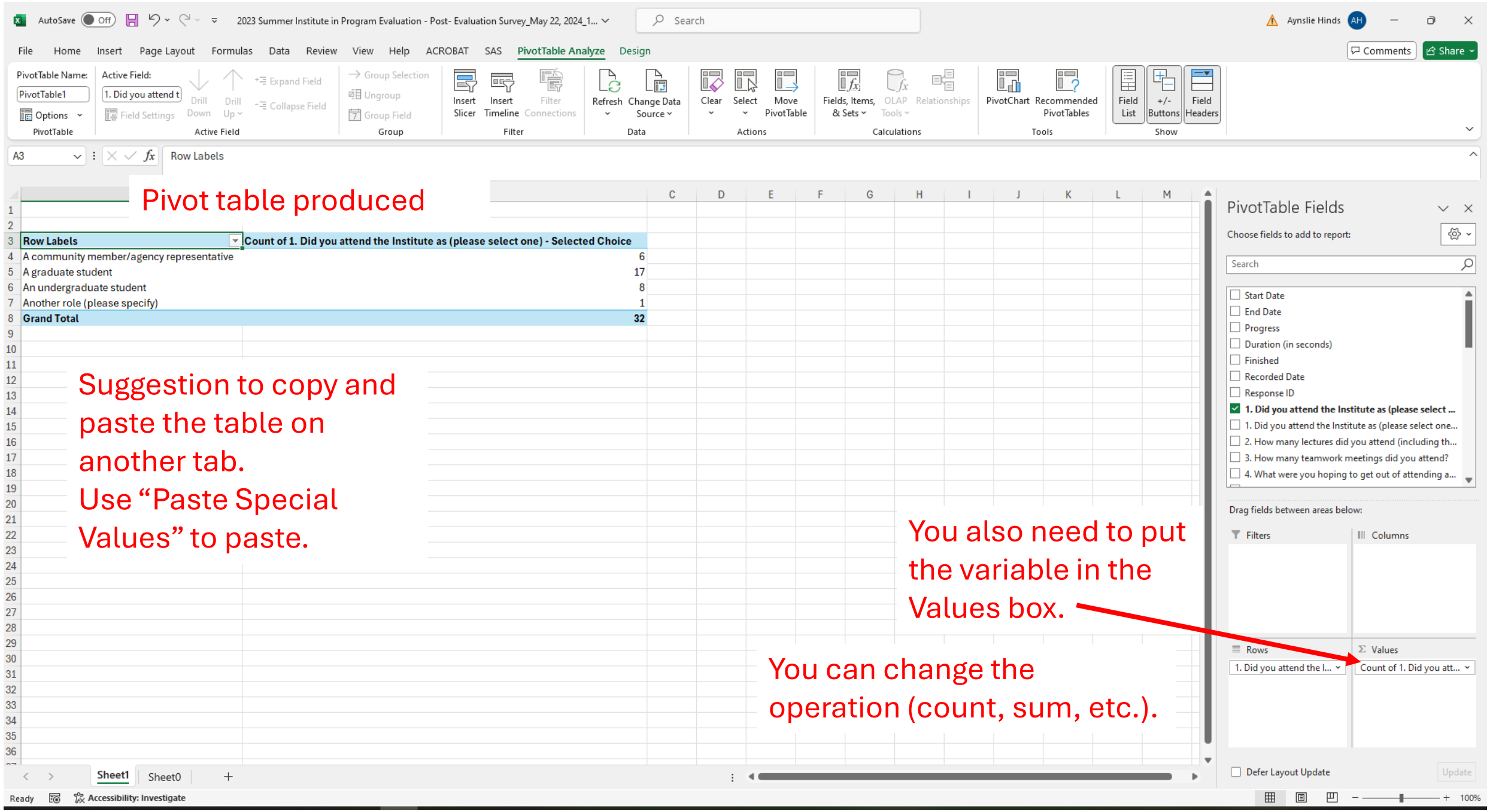
Accessibility: Investigate


2023 Summer Institute in Program Evaluation - Post- Evaluation Survey_May 22, 2024_1...
Search
Aynslie Hinds
File Home Insert Page Layout Formulas Data Review View Help ACROBAT SAS PivotTable Analyze Design
Comments
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PivotTable Name: PivotTable1
Active Field: 1. Did you attend t
Options
Field Settings
Drill Down
Drill Up
Expand Field
Collapse Field
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Ungroup
Group Field
Insert Slicer
Insert Timeline
Filter Connections
Refresh
Change Data Source
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PivotChart
Recommended PivotTables
Field List
+/- Buttons
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Filter
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A3
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Pivot table produced
Row Labels
Count of 1. Did you attend the Institute as (please select one) - Selected Choice
A community member/agency representative 6
A graduate student 17
An undergraduate student 8
Another role (please specify) 1
Grand Total 32
Suggestion to copy and paste the table on another tab.
Use “Paste Special Values” to paste.
You also need to put the variable in the Values box.
You can change the operation (count, sum, etc.).
PivotTable Fields
Choose fields to add to report:
Search
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1. Did you attend the Institute as (please select ...
1. Did you attend the Institute as (please select one...
2. How many lectures did you attend (including th...
3. How many teamwork meetings did you attend?
4. What were you hoping to get out of attending a...
Drag fields between areas below:
Filters
Columns
Rows
Values
1. Did you attend the I...
Count of 1. Did you att...
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Sheet1
Sheet0
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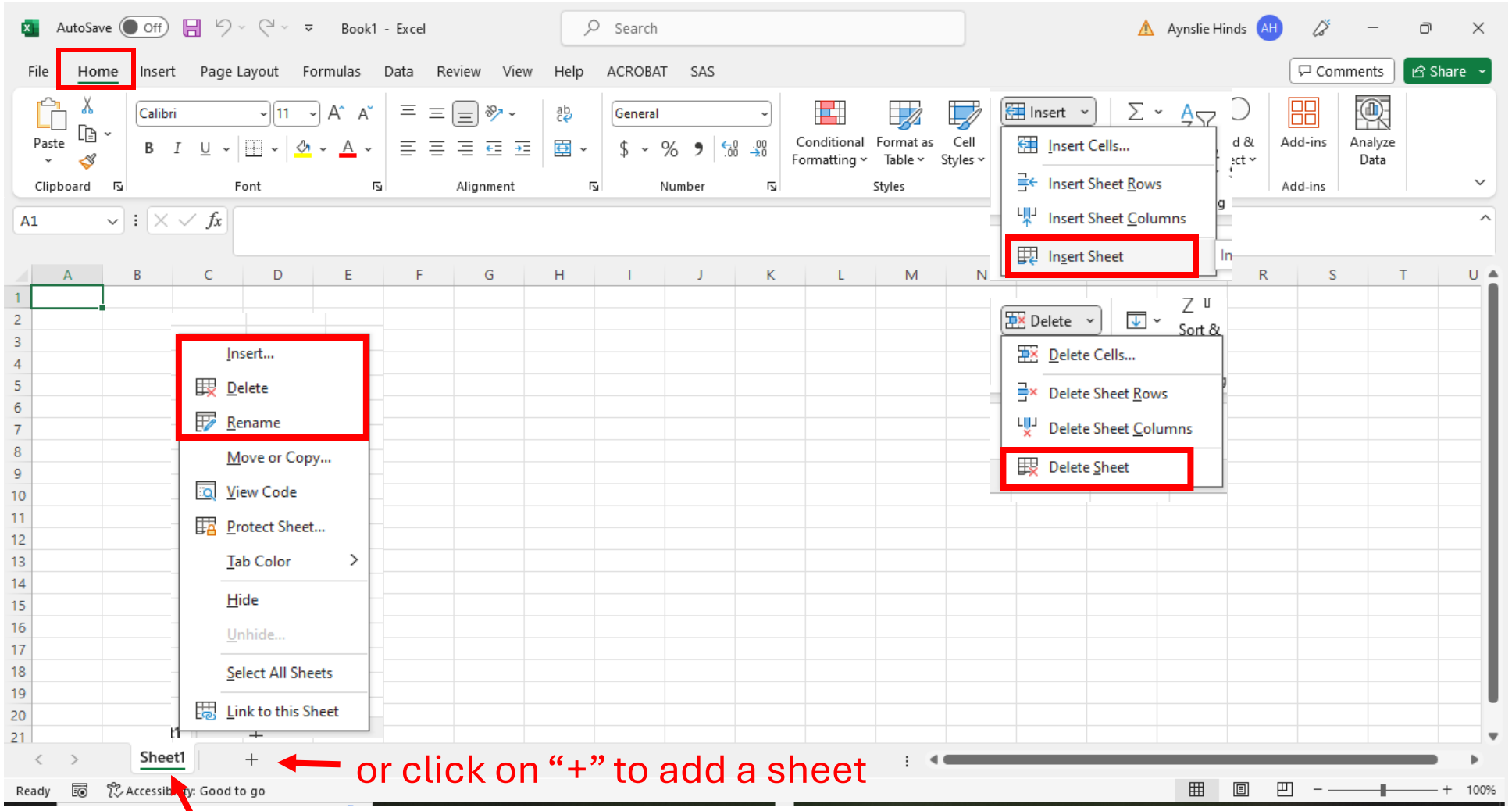
100%

Can have multiple sheets in an Excel workbook

Name the sheets for organizational purposes



Right click on "Sheet1" to get menu

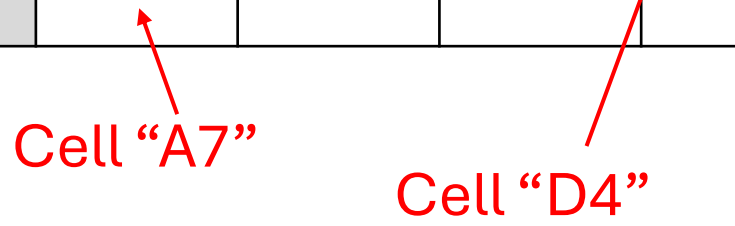
Double click on "Sheet1" to rename

Right click on "Sheet1" to delete sheet

Referencing Cells

Column letter and then row number

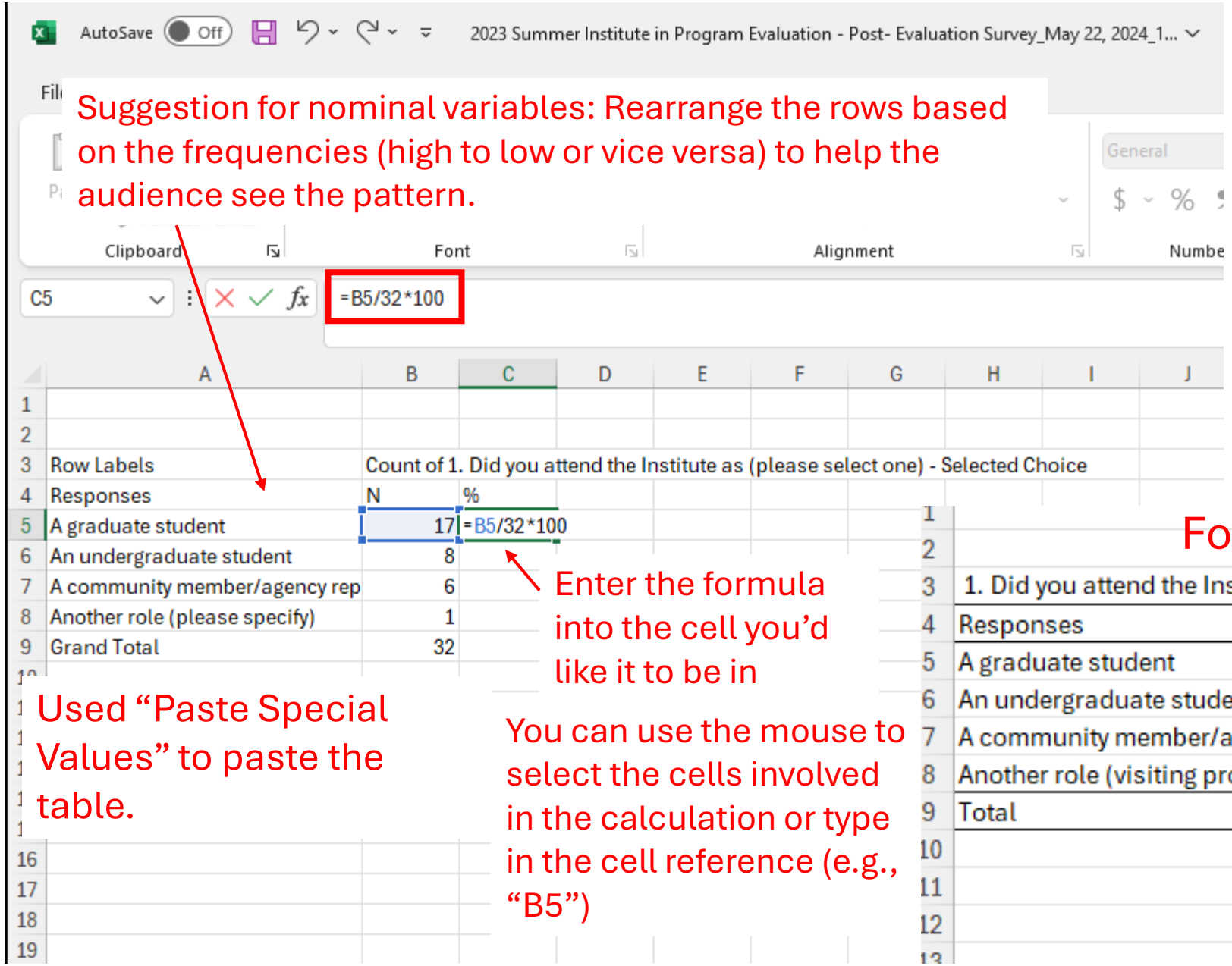
	A	B	C	D
1				
2				
3				
4				
5				
6				
7				



Calculating Values

- All formulae start with an “=“ sign

Operation	Formula Example	Alternate Formula
Addition	=D2+E2+F2+G2	=sum(D2:G2)
Subtraction	=H2 – D2	
Multiplication	= D2*2	
Division	= D2/H2	



Formatted table

1. Did you attend the Institute as...		
Responses	N	%
A graduate student	17	53.1
An undergraduate student	8	25.0
A community member/agency representative	6	18.8
Another role (visiting professor)	1	3.1
Total	32	

Don't rearrange rows based on frequencies for ordinal variables.

Pivot Table

Row Labels	Count of 2. How many lectures did you attend (including the panel)?
All of them	28
Most of them	4
Grand Total	32

Formatted Tables

2. How many lectures did you attend (including the panel)?

Responses	N	%
All of them	28	87.5
Most of them	4	12.5
Some of them	0	0.0
None of them	0	0.0
Total	32	

3. How many teamwork meetings did you attend?

Responses	N	%
All of them	30	93.8
Most of them	2	6.3
Some of them	0	0.0
None of them	0	0.0
Total	32	

Final Table

Table 1. Attendance in the Summer Institute components (*N* = 32).

Components	Responses	*N*	%
Lectures (including the panel) attended	All of them	28	87.5
	Most of them	4	12.5
	Some of them	0	0.0
	None of them	0	0.0
Teamwork meetings attended	All of them	30	93.8
	Most of them	2	6.3
	Some of them	0	0.0
	None of them	0	0.0

OR

Responses	Lectures		Teamwork meetings	
	N	%	*N*	%
All of them	28	87.5	30	93.75
Most of them	4	12.5	2	6.25
Some of them	0	0	0	0
None of them	0	0	0	0

General Feedback

Example of a "final" version

Table 2. Thoughts about the Summer Institute overall (*N* = 32).

Questions	Responses	*N*	%
The Institute ...[a]	Exceeded my expectations	15	48.4
	Met my expectations	16	51.6
	Did not meet my expectations	0	0.0
Level of satisfaction with the Institute overall	Very satisfied	22	68.8
	Somewhat satisfied	9	28.1
	Somewhat dissatisfied	0	0.0
	Very dissatisfied	1	3.1
Likelihood of recommending the Institute to a colleague, classmate, or friend who is interested in evaluation	Very likely	21	65.6
	Somewhat likely	10	31.3
	Somewhat unlikely	0	0.0
	Very unlikely	1	3.1

Note. [a]*N* = 31

Suggestion to collapse:
Very satisfied + Somewhat satisfied = Satisfied
Very dissatisfied + Somewhat dissatisfied = Dissatisfied
Very likely + Somewhat likely = Likely
Very unlikely + Somewhat unlikely = Unlikely

General Feedback

Example of a “final” version

Table 2. Thoughts about the Summer Institute overall (*N* = 32).

Questions	Responses	*N*	%
The Institute …[a]	Exceeded my expectations	15	48.4
	Met my expectations	16	51.6
	Did not meet my expectations	0	0.0
Level of satisfaction with the Institute overall	Satisfied	31	96.9
	Dissatisfied	1	3.1
Likelihood of recommending the Institute to a colleague, classmate, or friend who is interested in evaluation	Likely	11	96.9
	Unlikely	1	3.1

Note. [a]*N* = 31

What insights can you gain from this table?

Table 6. Quality ratings of aspects of the case studies (*N* = 32).

Responses	Clarity of instructions		Quality of facilitator(s)		Teamwork process		Case study group presentations[a]		Overall satisfaction with the case study project[a]	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Excellent	12	37.5	23	71.9	14	43.8	16	51.6	13	41.9
Good	16	50.0	6	18.8	10	31.3	14	45.2	4	12.9
Fair	3	9.4	2	6.3	4	12.5	1	3.2	13	41.9
Poor	1	3.1	1	3.1	4	12.5	0	0.0	1	3.2

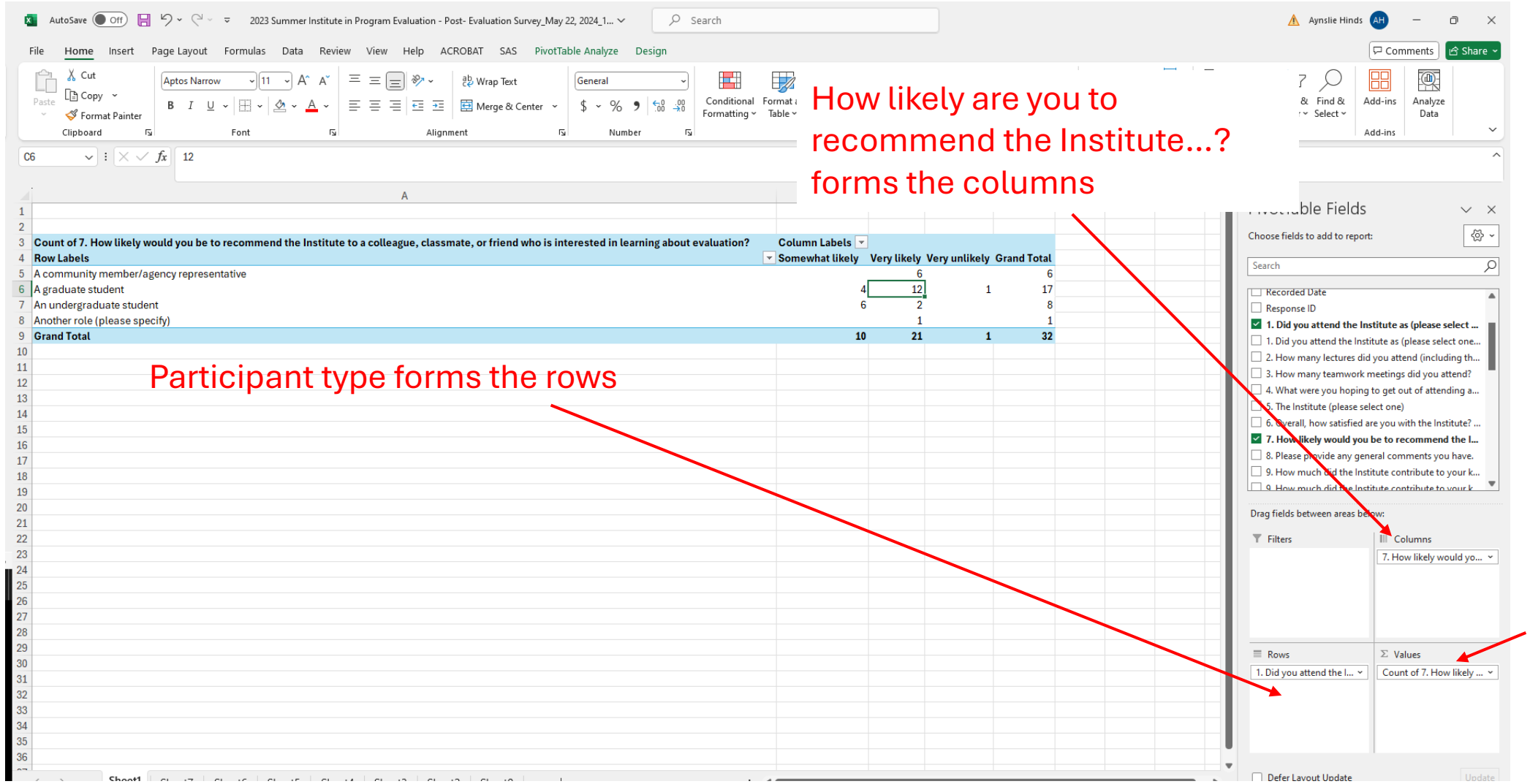
Note. [a]*N* = 31.

It may be helpful to collapse the response options and/or graph the results to "see" the story.

Responses	Clarity of instructions		Quality of facilitator(s)		Teamwork process		Case study group presentations[a]		Overall satisfaction with the case study project[a]	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Excellent/Good	28	87.5	29	90.7	24	75.1	30	96.8	17	54.8
Fair/Poor	4	12.5	3	9.4	8	25.0	1	3.2	14	45.1

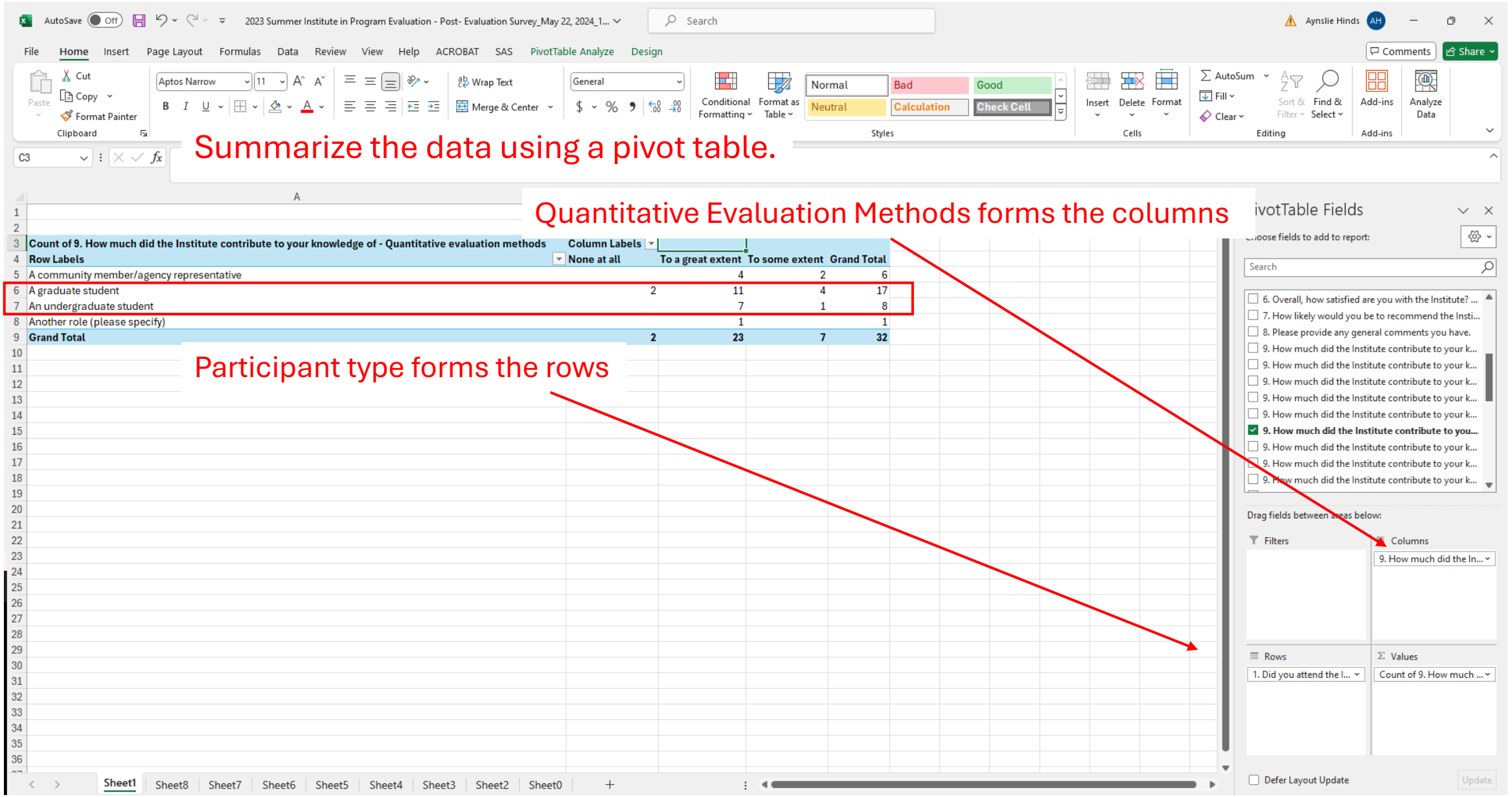
Do different types of participants respond differently?

Using Pivot Tables to Cross Variables



It doesn't matter which variable you put here (row or column) to some extent.

Did undergraduate and graduate students respond differently on how much they got out of the Quantitative Evaluation Methods lesson?



Count of 9. How much did the Institute contribute to your knowledge of - Quantitative evaluation methods	Column Labels			
Row Labels	None at all	To a great extent	To some extent	Grand Total
A community member/agency representative		4	2	6
A graduate student	2	11	4	17
An undergraduate student		7	1	8
Another role (please specify)		1		1
Grand Total	2	23	7	32

Measures of Center (or Central Tendency)

- Tendency for values to accumulate / cluster about a central value
- “Typical” value

- **Mean (or average)**
- **Median**
- **Mode**

Mean or Average

- Numeric data

$$\text{mean} = \frac{\text{sum of all values}}{\text{number of values}}$$

Sensitive to extreme values

Examples

- Mean annual rainfall
- Average household size
- Grade point average

Notation

$\bar{x}$ = *sample* mean ('x bar')

μ = *population* mean
(Greek letter 'mu')

Example

- The birth weights in pounds of 5 babies born in a hospital on a certain day are:

  9.2, 6.4, 10.5, 8.1, 7.8

- Calculate the sample mean

$$\bar{x} = \frac{9.2 + 6.4 + 10.5 + 8.1 + 7.8}{5} = \frac{42.0}{5} = 8.4 \text{ lbs}$$

Median

- Can be determined with ordinal, interval, or ratio data
- Middle value when data is arranged from smallest to largest
- Value at the 50^{th} percentile
- Value in the $\frac{n+1}{2}$ position
- Less sensitive to extreme values/outliers (than the mean)
- Use when the data are skewed

Examples – What is the median value?

Even # of Values

- Data: 0, 1, 3, 7, 2, 4
- Ordered: 0, 1, 2, 3, 4, 7

mean of the two middle values when the # of values is even

$$\text{Median} = \frac{2+3}{2} = 2.5$$

$$\text{Location} = \frac{n+1}{2} = \frac{6+1}{2} = \frac{7}{2} = 3.5$$

Median is between the 3rd & 4th value in the ordered dataset

Odd # of Values

- Data: 1, 0, 3, 2, 4
- Ordered: 0, 1, 2, 3, 4

middle value when the # of values is odd

Median = 2

$$\text{Location} = \frac{n+1}{2} = \frac{5+1}{2} = \frac{6}{2} = 3$$

Median is the 3rd value in the ordered dataset

Example – Calculate the Mean & median?

Data: 2, 4, 5, 5, 6, 7, 20 → outlier

Which is a "better" measure of centre?

Mean

$$\bar{x} = \frac{2 + 4 + 5 + 5 + 6 + 7 + 20}{7}$$

$$= \frac{49}{7}$$

$$= 7.0$$

Median

2 4 5 5 6 7 20

Median

- All but one value centres about 5
- One relatively large value, 20, does not affect the median, but it shifts the mean to the right of most values

What would be a better typical value for the salaries of employees at a company, the mean or median? Why?

Mode

- Can be determined for all types of data
- Value which occurs most often
- Not sensitive to extreme values

- *A retailer of men's clothing would be interested in the modal neck size and sleeve length of potential customers*
- *A supermarket manager would be interested in the cereal brand with the largest market share – the modal brand*

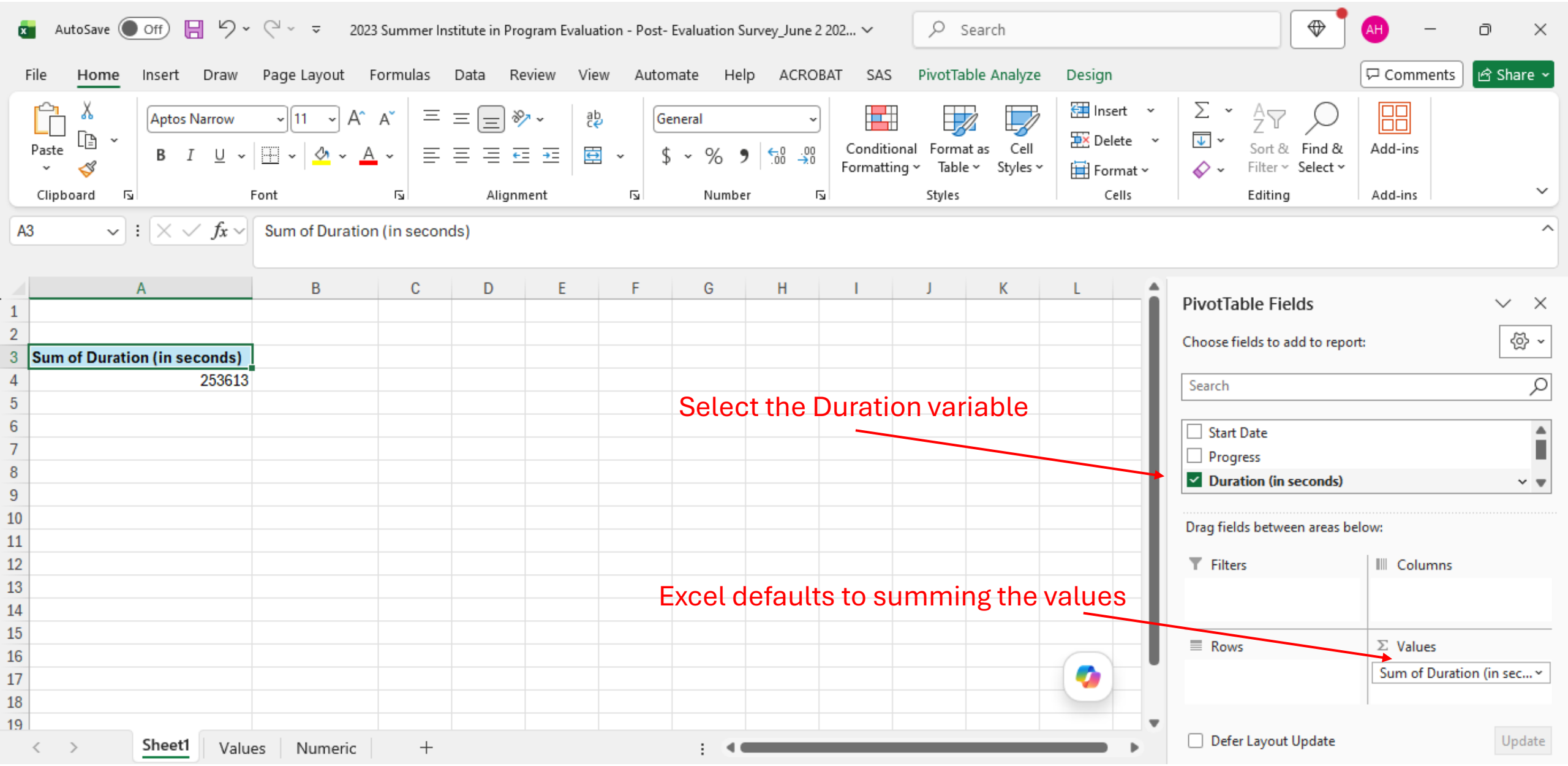
Examples

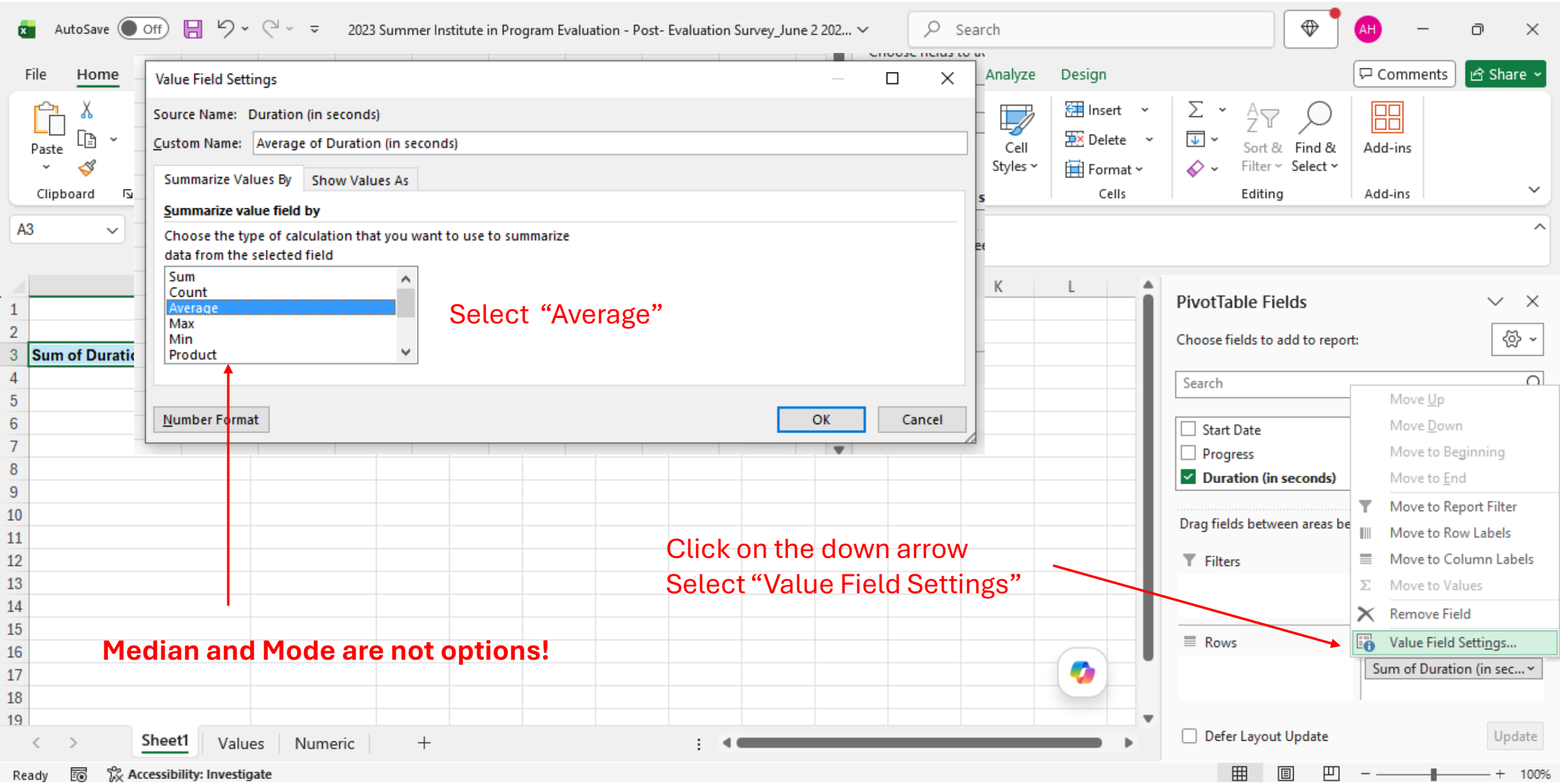
0, 0, 1, 2, 3 → Mode = 0 (**unimodal**)

0, 0, 1, 2, 3, 3 → Modes = 0, 3 (**bimodal**)

0, 1, 2, 3 → No mode (all values occur equally often)

What was the typical length of time it took respondents to complete the survey?

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Min
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Search
Start Date
Progress
Duration (in seconds)
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Move Down
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Move to Row Labels
Move to Column Labels
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Click on the down arrow
Select "Value Field Settings"
Median and Mode are not options!
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Values
Numeric
Ready
Accessibility: Investigate
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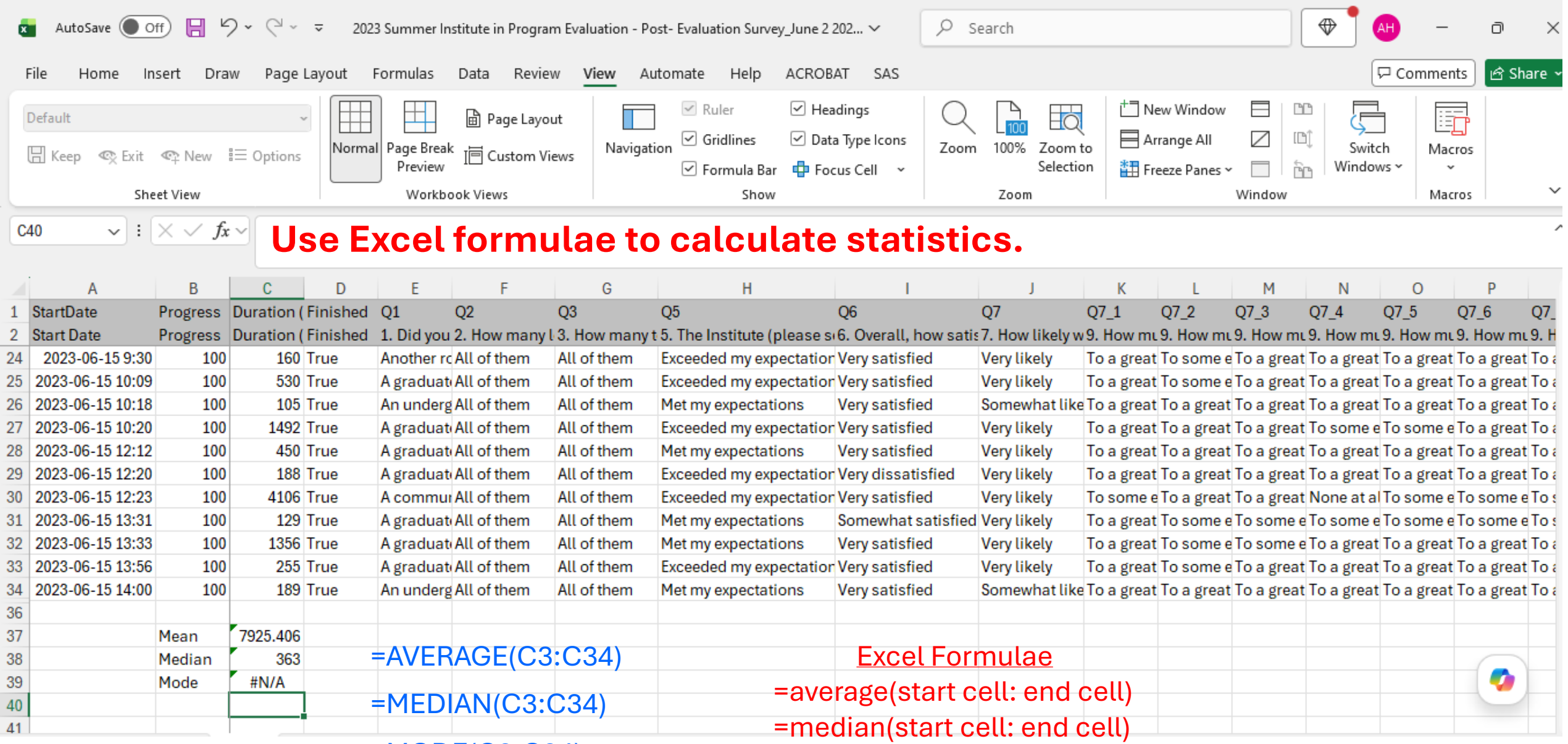

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1	StartDate	Progress	Duration (	Finished	Q1	Q2	Q3	Q5	Q6	Q7	Q7_1	Q7_2	Q7_3	Q7_4	Q7_5	Q7_6	Q7_
2	Start Date	Progress	Duration (	Finished	1. Did you	2. How many l	3. How many t	5. The Institute (please s	6. Overall, how satis	7. How likely w	9. How mu	9. How mu	9. How mu	9. How mu	9. How mu	9. How mu	9. H
24	2023-06-15 9:30	100	160	True	Another rc	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
25	2023-06-15 10:09	100	530	True	A graduati	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
26	2023-06-15 10:18	100	105	True	An underg	All of them	All of them	Met my expectations	Very satisfied	Somewhat like	To a great	To a great	To a great	To a great	To a great	To a great	To a
27	2023-06-15 10:20	100	1492	True	A graduati	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To a great	To a great	To some e	To some e	To a great	To a
28	2023-06-15 12:12	100	450	True	A graduati	All of them	All of them	Met my expectations	Very satisfied	Very likely	To a great	To a great	To a great	To a great	To a great	To a great	To a
29	2023-06-15 12:20	100	188	True	A graduati	All of them	All of them	Exceeded my expectatior	Very dissatisfied	Very likely	To a great	To a great	To a great	To a great	To a great	To a great	To a
30	2023-06-15 12:23	100	4106	True	A commur	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To some e	To a great	To a great	None at al	To some e	To some e	To s
31	2023-06-15 13:31	100	129	True	A graduati	All of them	All of them	Met my expectations	Somewhat satisfied	Very likely	To a great	To some e	To some e	To some e	To some e	To some e	To s
32	2023-06-15 13:33	100	1356	True	A graduati	All of them	All of them	Met my expectations	Very satisfied	Very likely	To a great	To some e	To some e	To a great	To a great	To a great	To a
33	2023-06-15 13:56	100	255	True	A graduati	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
34	2023-06-15 14:00	100	189	True	An underg	All of them	All of them	Met my expectations	Very satisfied	Somewhat like	To a great	To a great	To a great	To a great	To a great	To a great	To a
36																	
37		Mean	7925.406														
38		Median	363														
39		Mode	#N/A														
40																	
41																	

=AVERAGE(C3:C34)

=MEDIAN(C3:C34)

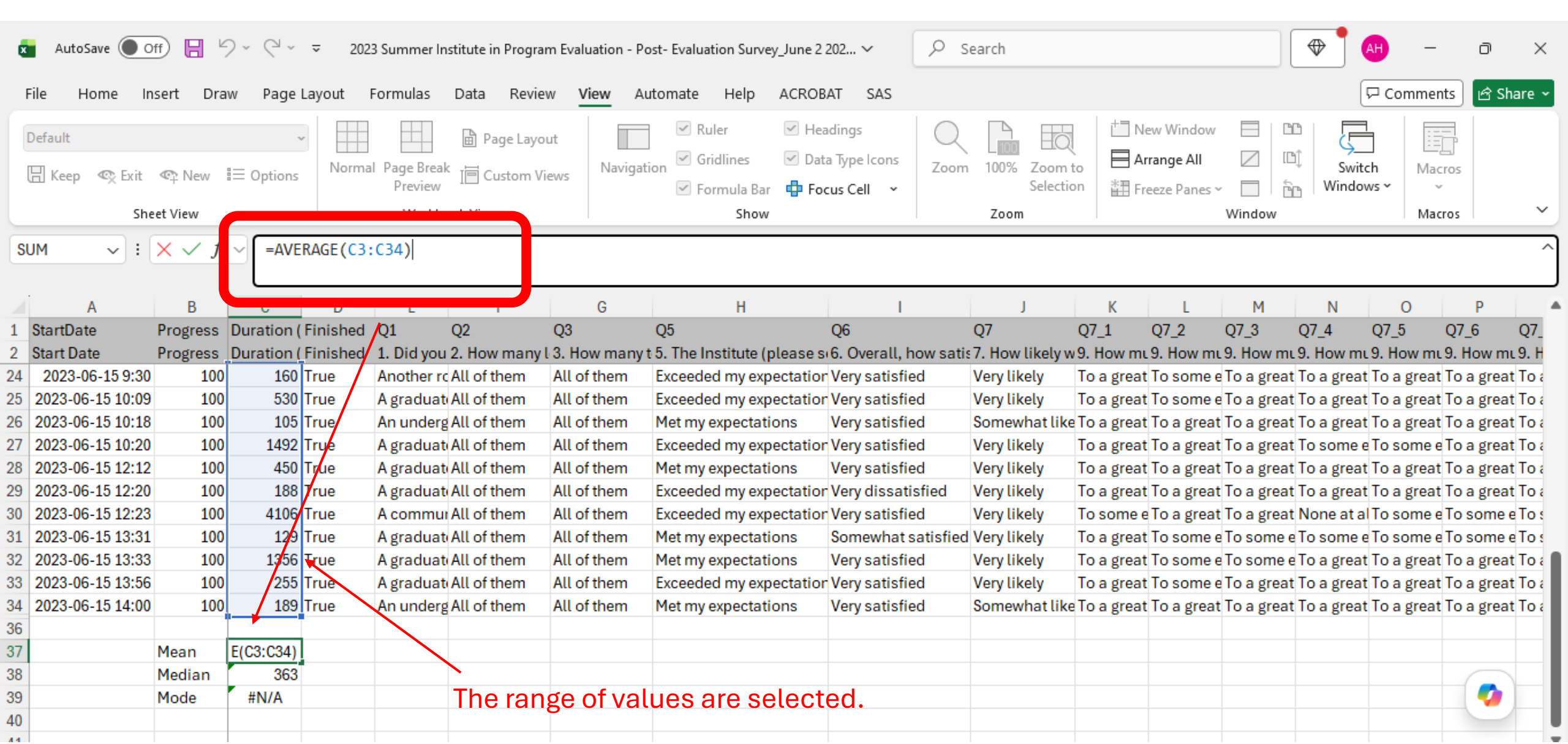
=MODE(C3:C34)

Excel Formulae

=average(start cell: end cell)

=median(start cell: end cell)

=model(start cell: end cell)

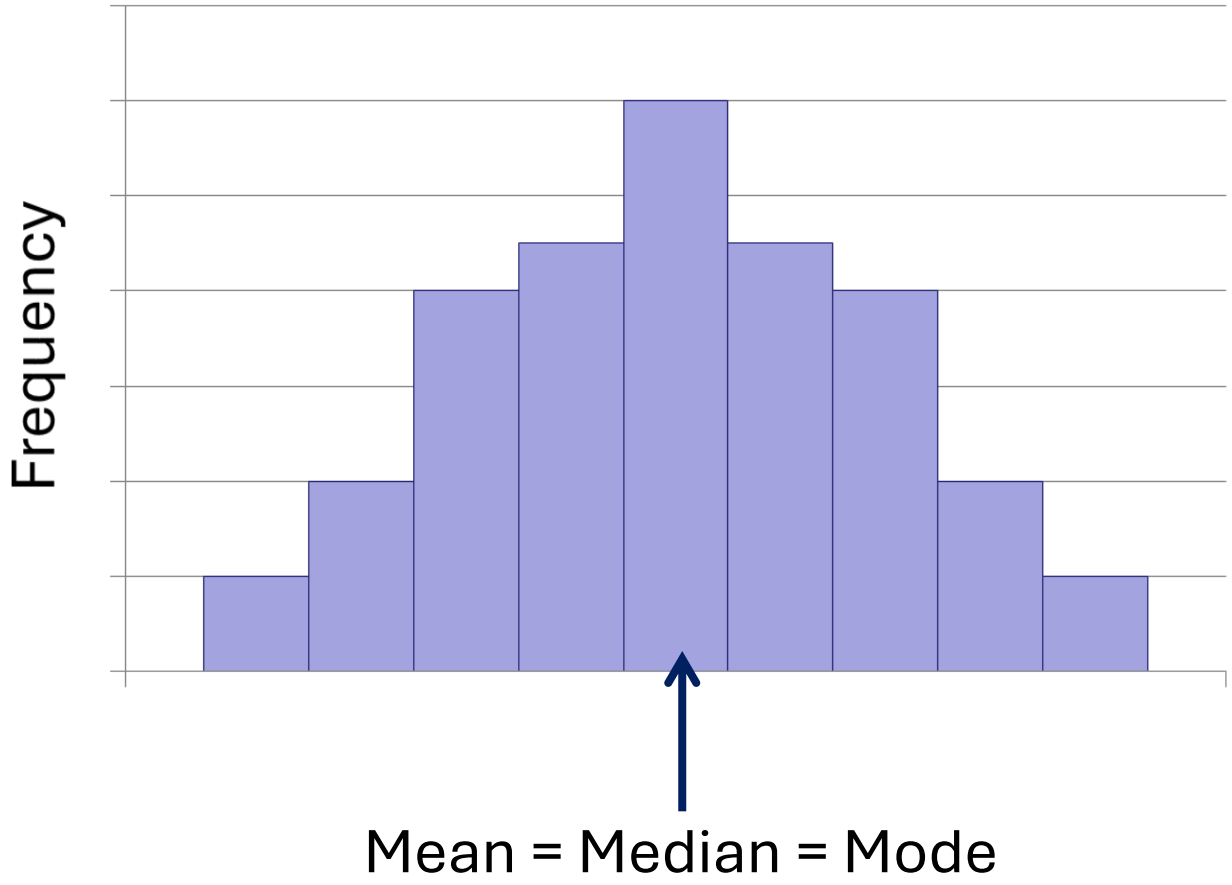


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	StartDate	Progress	Duration (	Finished	Q1	Q2	Q3	Q5	Q6	Q7	Q7_1	Q7_2	Q7_3	Q7_4	Q7_5	Q7_6	Q7_
2	Start Date	Progress	Duration (	Finished	1. Did you	2. How many l	3. How many t	5. The Institute (please s	6. Overall, how satis	7. How likely w	9. How mu	9. How mu	9. How mu	9. How mu	9. How mu	9. How mu	9. H
24	2023-06-15 9:30	100	160	True	Another rc	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
25	2023-06-15 10:09	100	530	True	A graduat	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
26	2023-06-15 10:18	100	105	True	An underg	All of them	All of them	Met my expectations	Very satisfied	Somewhat like	To a great	To a great	To a great	To a great	To a great	To a great	To a
27	2023-06-15 10:20	100	1492	True	A graduat	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To a great	To a great	To some e	To some e	To a great	To a
28	2023-06-15 12:12	100	450	True	A graduat	All of them	All of them	Met my expectations	Very satisfied	Very likely	To a great	To a great	To a great	To a great	To a great	To a great	To a
29	2023-06-15 12:20	100	188	True	A graduat	All of them	All of them	Exceeded my expectatior	Very dissatisfied	Very likely	To a great	To a great	To a great	To a great	To a great	To a great	To a
30	2023-06-15 12:23	100	4106	True	A commur	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To some e	To a great	To a great	None at al	To some e	To some e	To s
31	2023-06-15 13:31	100	129	True	A graduat	All of them	All of them	Met my expectations	Somewhat satisfied	Very likely	To a great	To some e	To some e	To some e	To some e	To some e	To s
32	2023-06-15 13:33	100	1356	True	A graduat	All of them	All of them	Met my expectations	Very satisfied	Very likely	To a great	To some e	To some e	To a great	To a great	To a great	To a
33	2023-06-15 13:56	100	255	True	A graduat	All of them	All of them	Exceeded my expectatior	Very satisfied	Very likely	To a great	To some e	To a great	To a great	To a great	To a great	To a
34	2023-06-15 14:00	100	189	True	An underg	All of them	All of them	Met my expectations	Very satisfied	Somewhat like	To a great	To a great	To a great	To a great	To a great	To a great	To a
36																	
37		Mean	E(C3:C34)														
38		Median	363														
39		Mode	#N/A														
40																	

Comparison of Measures of Central Tendency

Symmetrical Distribution

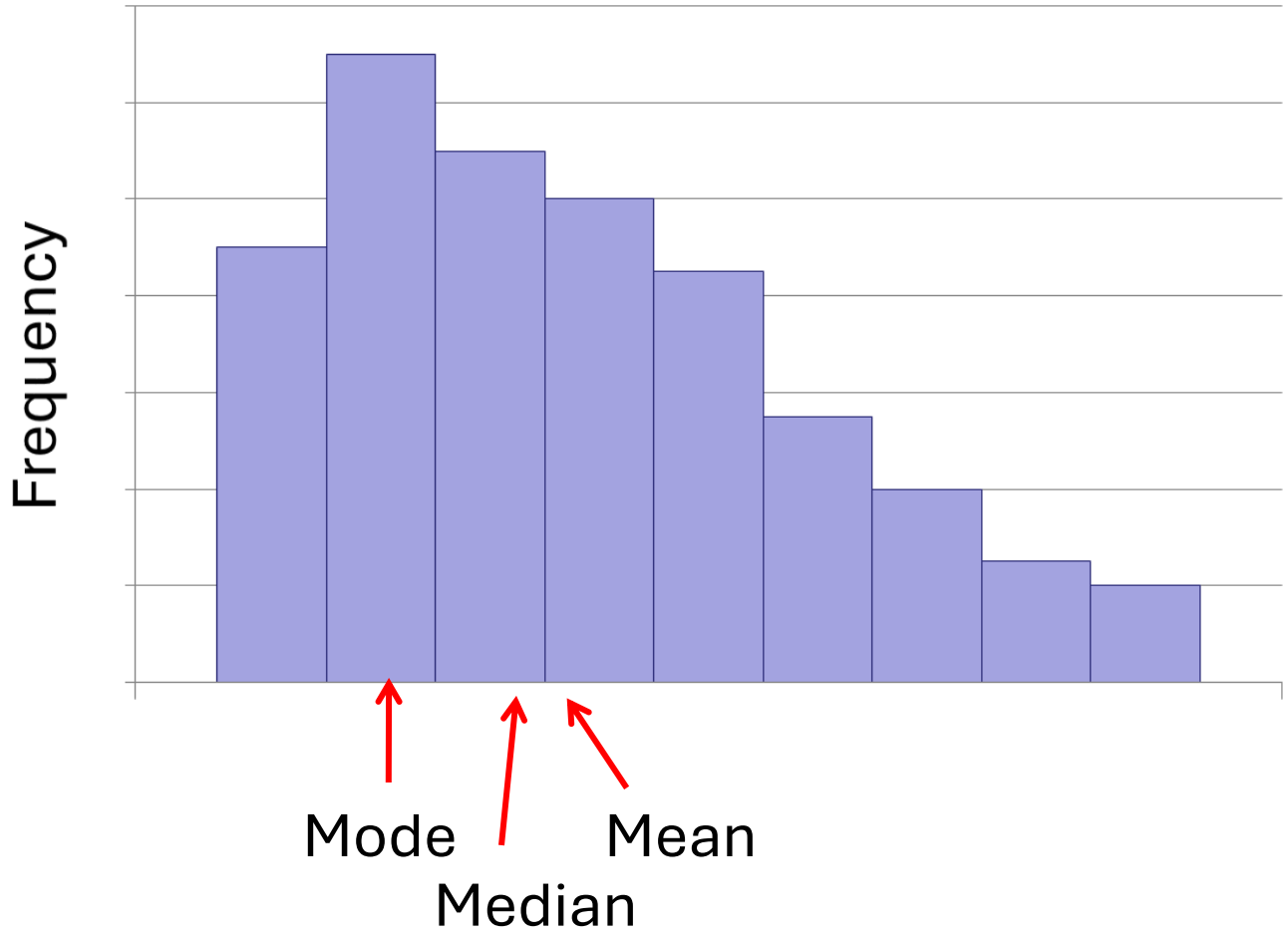
- Symmetric if when folded along a vertical axis the two halves coincide (identical on both sides of a central point)
- If not, asymmetric



Comparison of Measures of Central Tendency

Skewed to the right

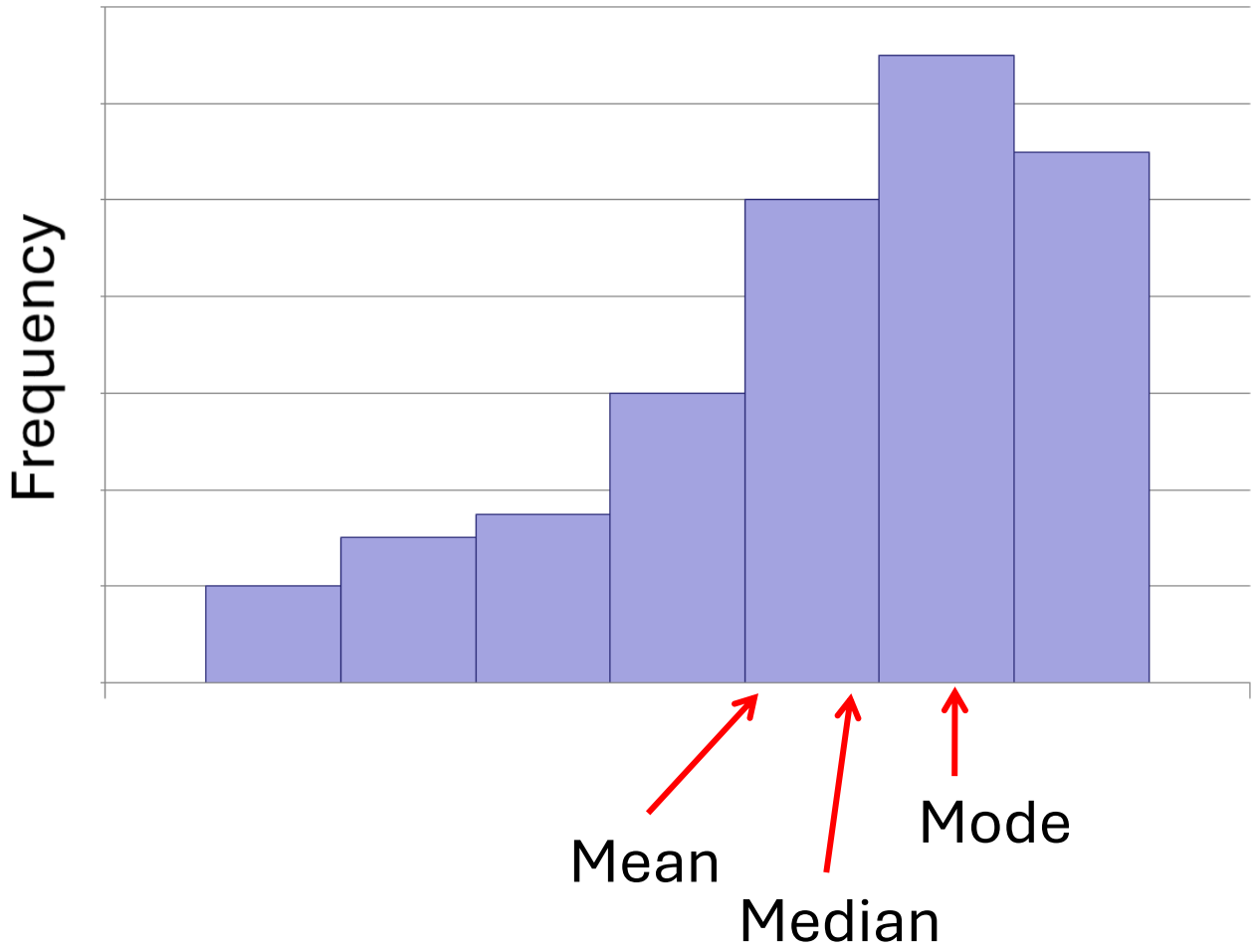
Long tail on right



Comparison of Measures of Central Tendency

Skewed to the left

Long tail on left



What do these statistics tell us about the duration variable?

Mean	7925.41
Median	363.00
Mode	#N/A

What is the ‘better’ measure of central tendency?

Are the measures of central tendency all we need to know?

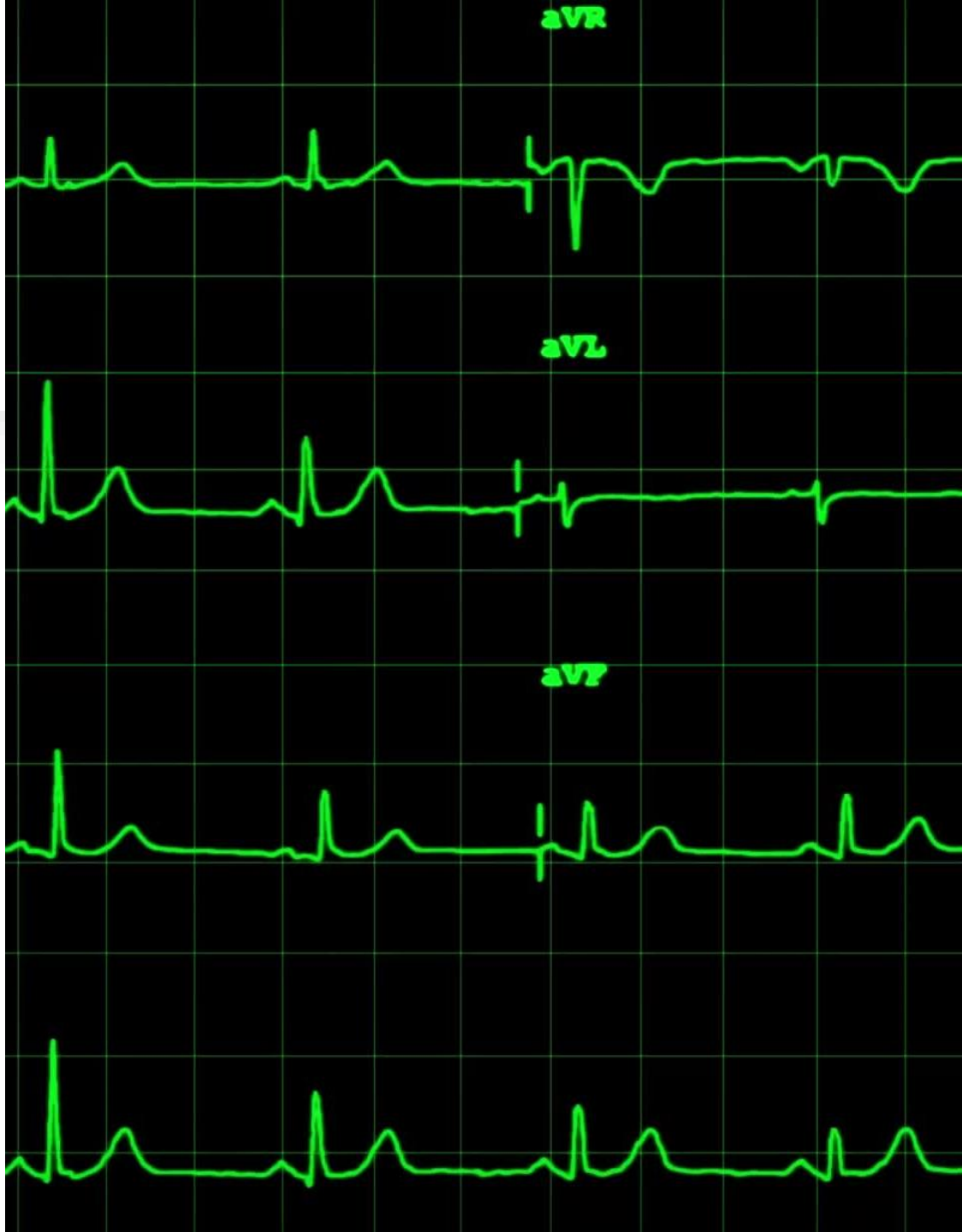
Section 001	Section 002
56	30
58	35
60	60
60	60
60	60
64	90

Mean = Median = Mode = 60

Measures of Spread or Variation

- Extent to which values are different from each other or spread out (i.e., scattered or dispersed)

- **Range**
- **Variance**
- **Standard Deviation**



Range = Maximum - Minimum

Examples

Data: 5, 6, 8, 9, 10, 12, 14, 15, 17, 18

Range = 18 – 5 = 13

Data: 5, 5, 5, 5, 5, 5, 5, 5, 6, 18

Range = 18 – 5 = 13

Positives	**Negatives**
Easy to compute and to understand	Ignores intermediate values
	Affected by extreme values

Variance & Standard Deviation

- Numerical measures of the overall amount of variation or spread
- Indicator of how close or far values are from the mean
- Always positive (or zero)

- Variance (s^2)
  - Average of squared deviations from the mean
  - Measurement units are the square of the measurement units of original data
  - $s^2 \geq 0$
- Standard deviation (s)
  - Positive square root of the variance
  - Same measurement units as the original data
  - $s \geq 0$

Quantity	Units of Measure
$x_1, x_2, \ldots, x_n$	cm
$\overline{x}$	cm
s^2	cm^2
s	cm

Variance & Standard Deviation of a Sample

add

$$\text{Variance} = s^2 = \frac{\sum (x - \bar{x})^2}{n-1}$$

Average squared deviation

$$\text{Standard Deviation} = s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

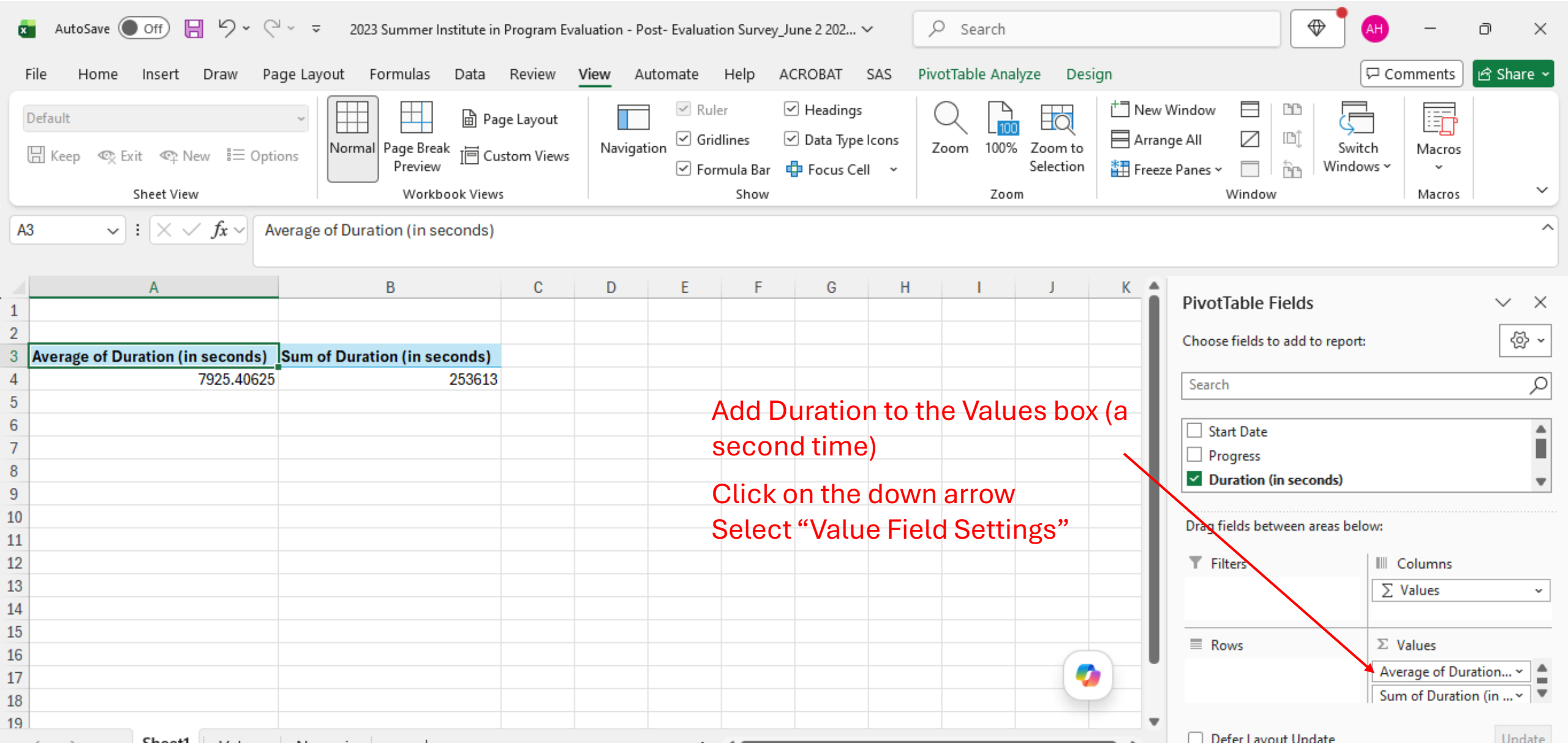
Need to “unsquared” the answer

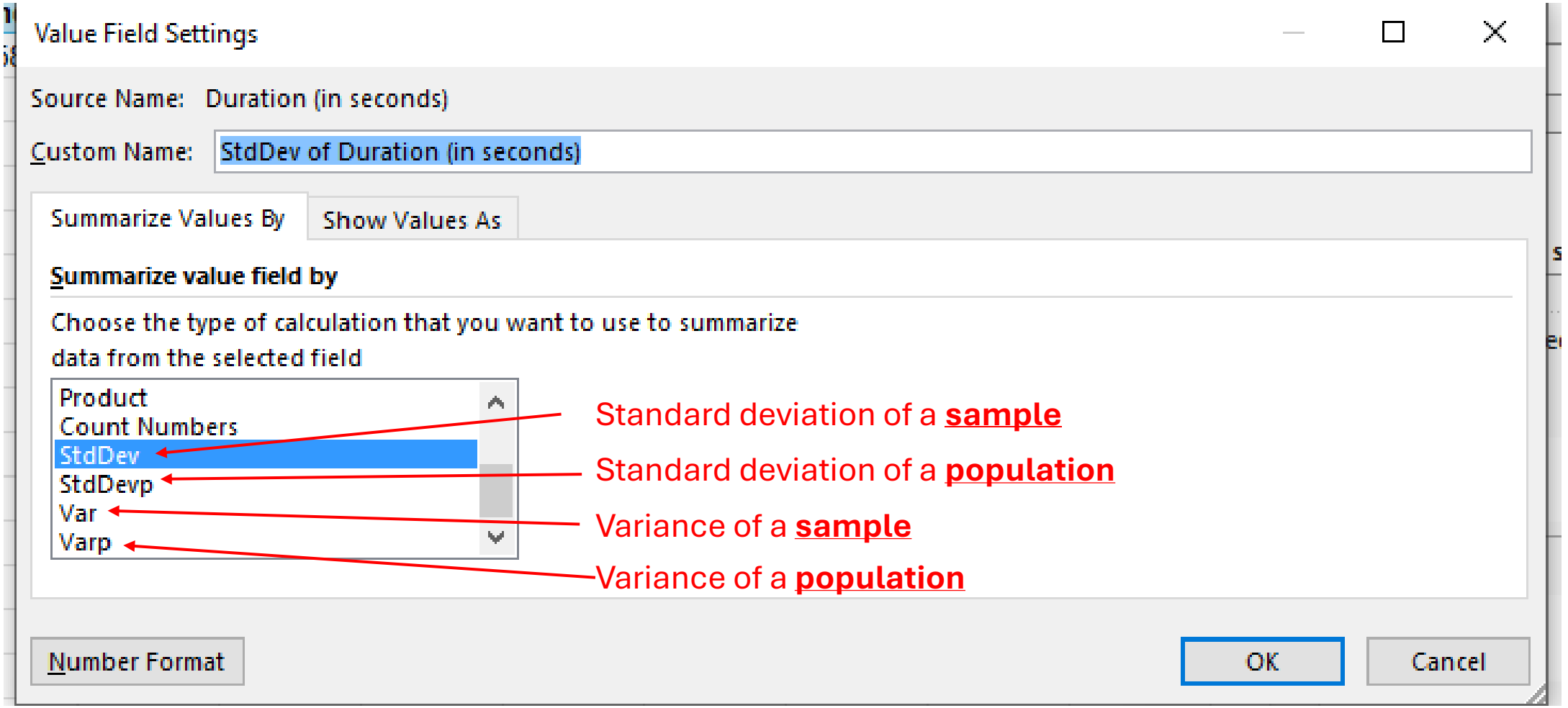
Summary

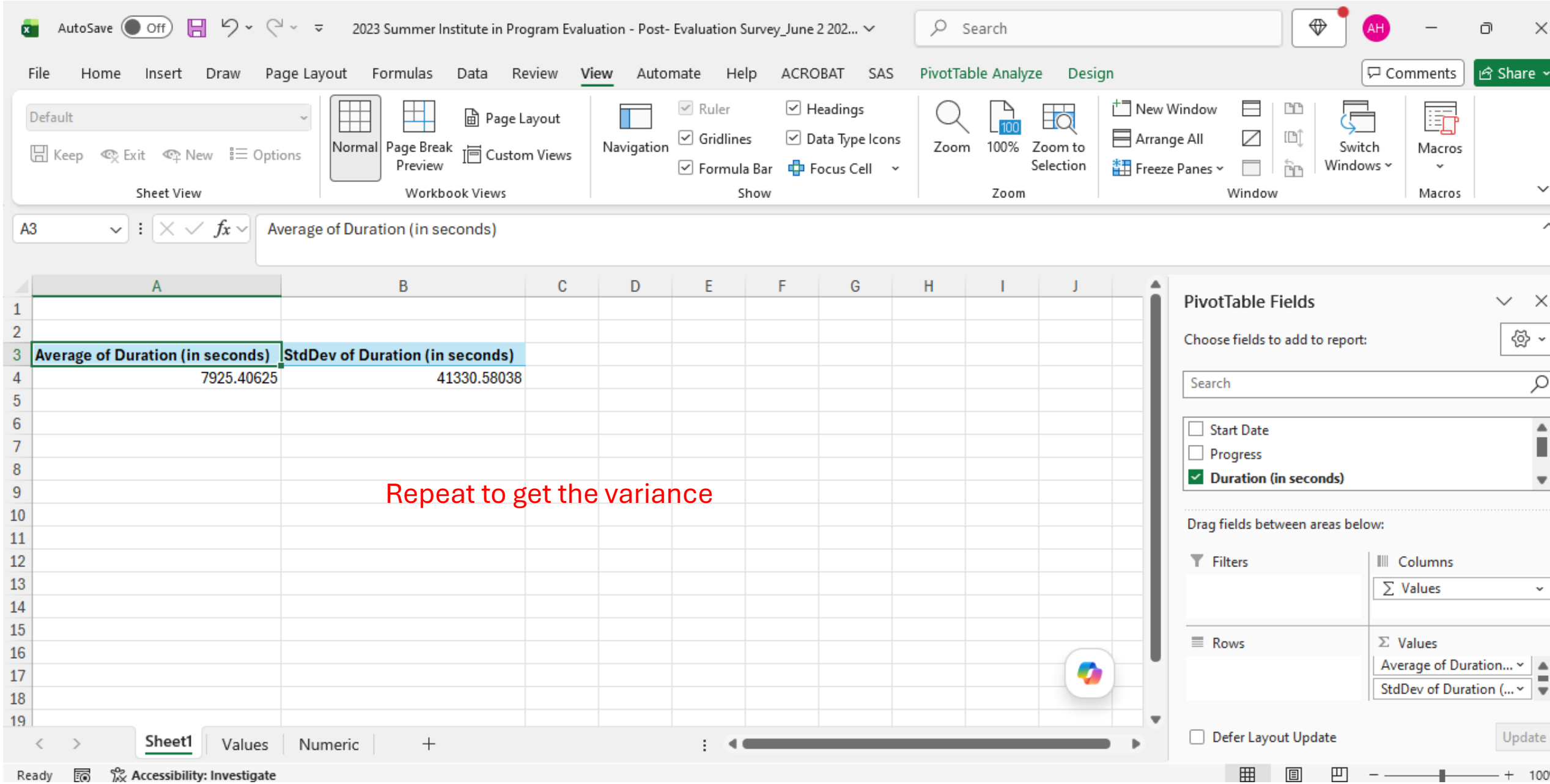
- Standard deviation and variance
  - Are sensitive to each value
  - Can increase with the inclusion of one or more outliers

- Large standard deviation/variance indicates a greater amount of variation (or spread)

Determine the standard deviation and variance of the duration variable.




Value Field Settings
Source Name: Duration (in seconds)
Custom Name: StdDev of Duration (in seconds)
Summarize Values By
Show Values As
Summarize value field by
Choose the type of calculation that you want to use to summarize data from the selected field
Product
Count Numbers
StdDev
StdDevp
Var
Varp
Standard deviation of a sample
Standard deviation of a population
Variance of a sample
Variance of a population
Number Format
OK
Cancel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2023 Summer Institute in Program Evaluation - Post- Evaluation Survey_June 2 202...
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Zoom to Selection
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New Window
Arrange All
Freeze Panes
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Average of Duration (in seconds)
A B C D E F G H I J
1
2
3 Average of Duration (in seconds) StdDev of Duration (in seconds)
4 7925.40625 41330.58038
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Repeat to get the variance
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100

Why do Hypothesis Testing?

- Goal:
  - To make statements (i.e., inferences) about a population of interest when we only have access to information from a random sample from that population

- Logic of Hypothesis Testing demonstration

Statistical Hypotheses

Null Hypothesis	Alternative Hypothesis
Initial belief	Complement of the Null hypothesis
Hypothesis tested (for possible rejection)	*Usually* what we hope to find support for Research hypothesis
"no difference", "the same", "no change"	1. "a difference" , "a change" Non-directional 2. "increase", "more", "better", "higher" Directional 3. "decrease", "less", "worse", "lower" Directional

Statistical Decision

- In hypothesis testing, the null hypothesis receives the benefit of the doubt and is not rejected unless the data provides considerable support for alternative hypothesis

Based on the evidence, either

- **Reject the null hypothesis** → Support for the alternative hypothesis
  → Results are statistically significant
- **Do not reject the null hypothesis** → NO support for the alternative hypothesis
  → Results are NOT statistically significant

Statistical significance says little about being practically or theoretically important.

Logic of Hypothesis testing: the basic idea

- Assume the null hypothesis is true

- If, under a given assumption, the probability of a particular observed event is *extremely small*, we conclude that the initial assumption probably is not correct

Line in the Sand (cut-off)

- But what degree of rarity of occurrence is so great that it seems better to reject the null hypothesis than to not reject it?

What probability would you consider indicative of a rare event?

- Level set by the researcher
- Common practice is a probability of less than or equal to 0.05
  - Also, sometimes 0.01 or 0.10
- Level of significance (alpha, α) or critical probability

Decision rules

Derived from the data

Set ahead of time by the researcher (also called the level of significance)

- If the *p*-value is **equal or less than** the critical probability, **reject the null hypothesis**

- If the *p*-value is greater than critical probability, **fail to reject the null hypothesis**

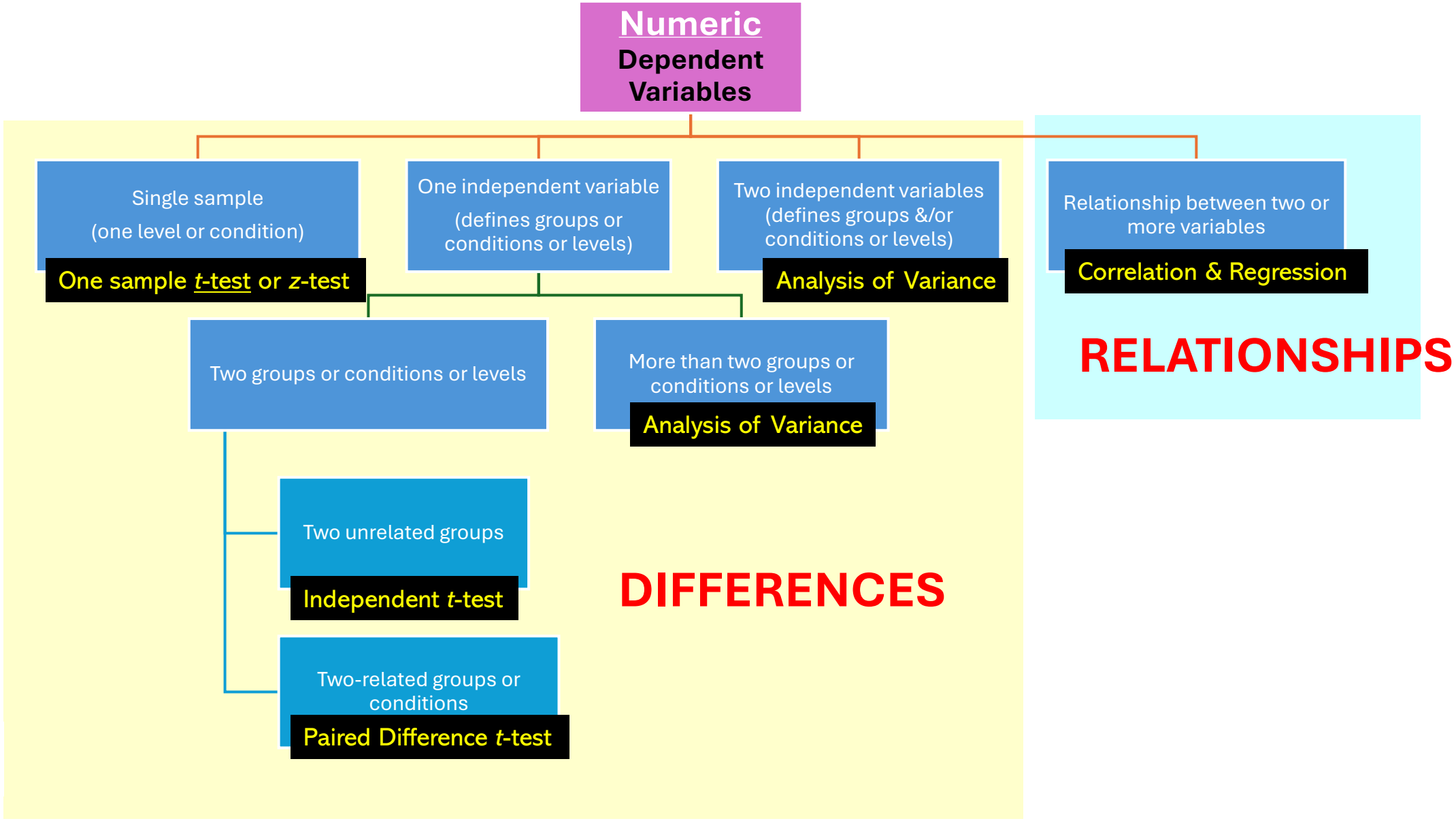
p-value is the probability of getting an outcome as extreme or more extreme than the one observed if the null hypothesis is true.

Statistical Tests

(to test hypotheses & calculate the p-value)

- Lots of different statistical tests
- Need to choose the appropriate one
- Many statistical tests assume the data are distributed normally
  - Parametric VS Non-Parametric

Decision Tree for Statistical tests



Hypothesis Testing

Descriptive Questions: To identify key features of individuals or groups	• What sociodemographic characteristics describe the sample of graduate students?
Difference Questions: To identify how individuals in different groups differ	• What differences exist between the undergraduate students group compared to the graduate students group?
Relationship Questions: To determine the degree to which two or more variables covary	• Does a person with greater levels of social connection and support have greater feelings of well-being?

Hypothesis testing Steps

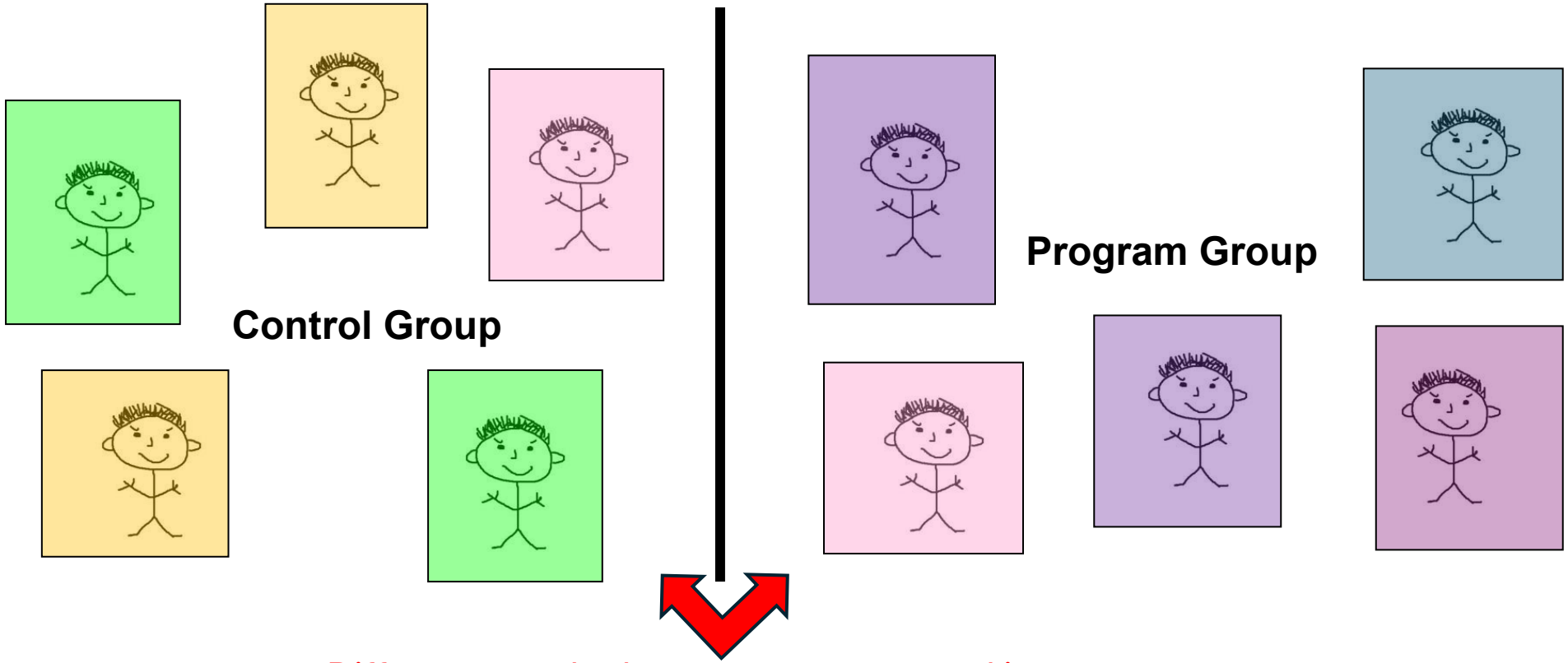
1. Identify the appropriate statistical test to perform
2. State the null and alternative hypotheses
3. Using SPSS or Excel, determine the statistical test value and the *p*-value
4. Make a decision to reject or not reject the null hypothesis based on the *p*-value
5. Interpret the result

Two Unrelated Groups

Two groups are independent if the values selected from one population are not related to / paired / matched with the values selected from another population

Is there a statistically significant difference in the means between the two conditions/groups?

Test Statistic = Independent t-test



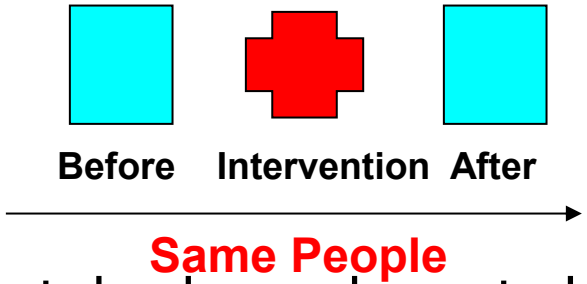
Different people that are not connected in any way

Two Related Groups

Is there a statistically significant difference in the means between the two conditions?

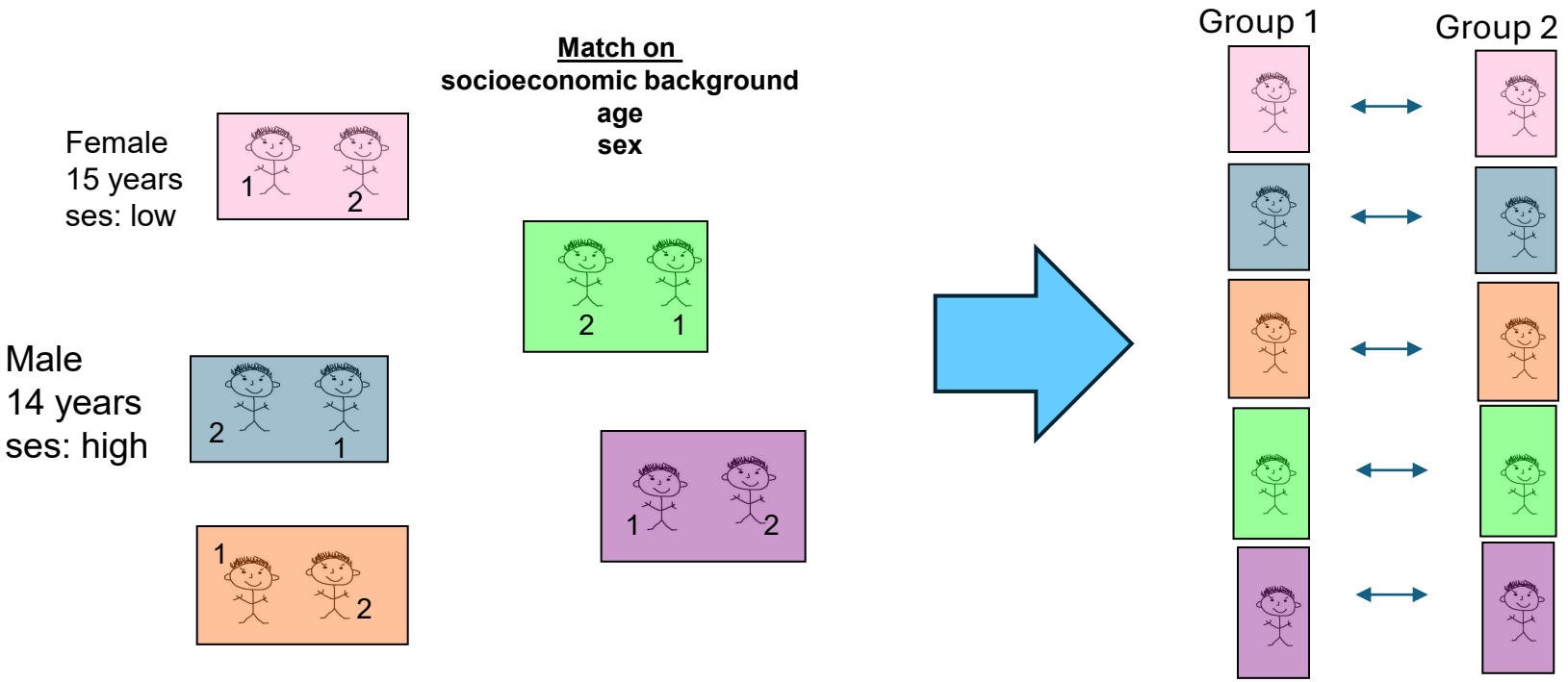
1. Pre-Post Study

   Same people
   Repeated Measures Design



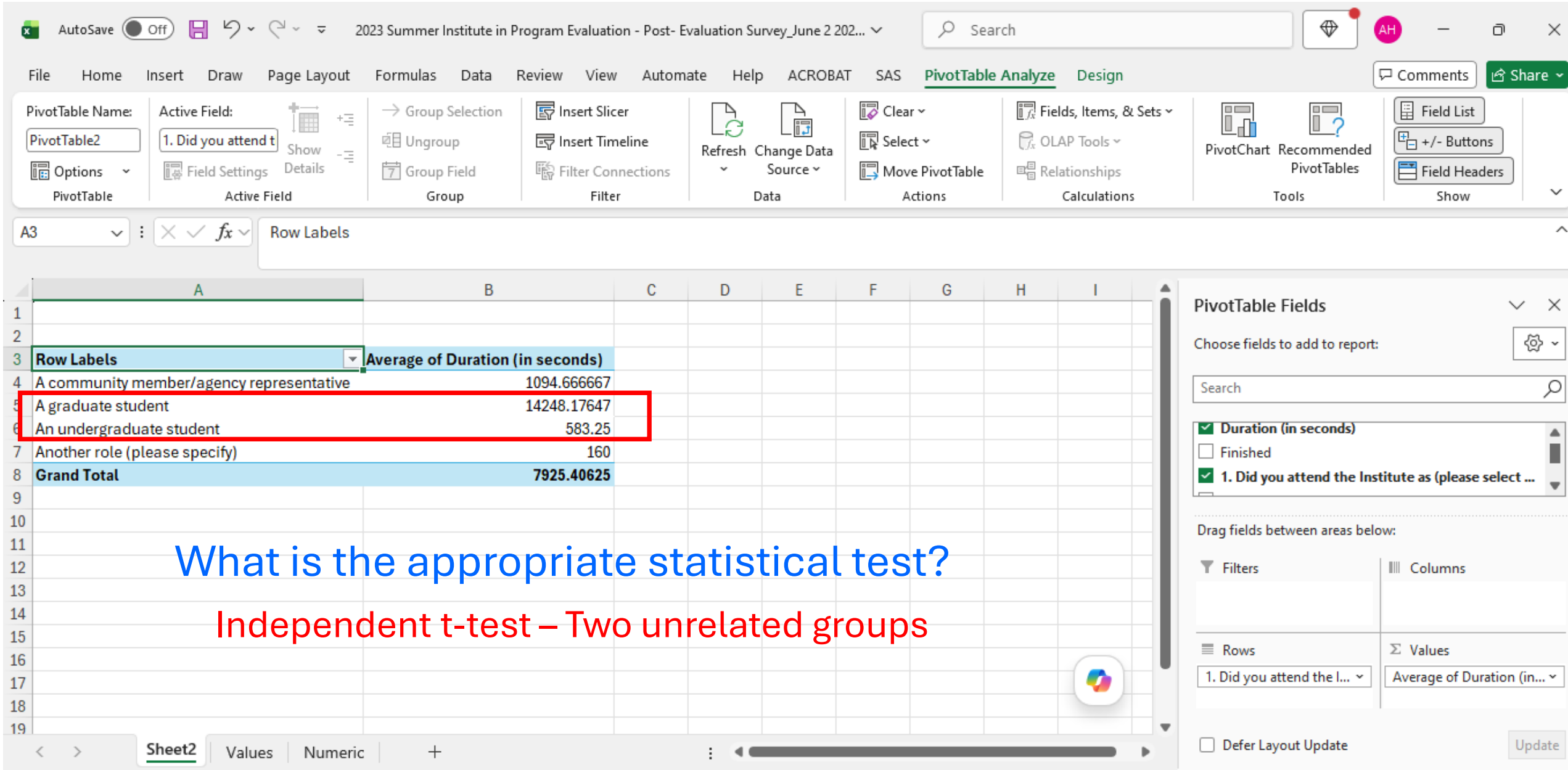
Test Statistic = Paired Difference *t*-test

2. Different people but matched on relevant characteristics



The two groups are identical in terms of sex, age, and ses; therefore, they are related.

Did undergraduate and graduate students take different lengths of time to complete the survey?

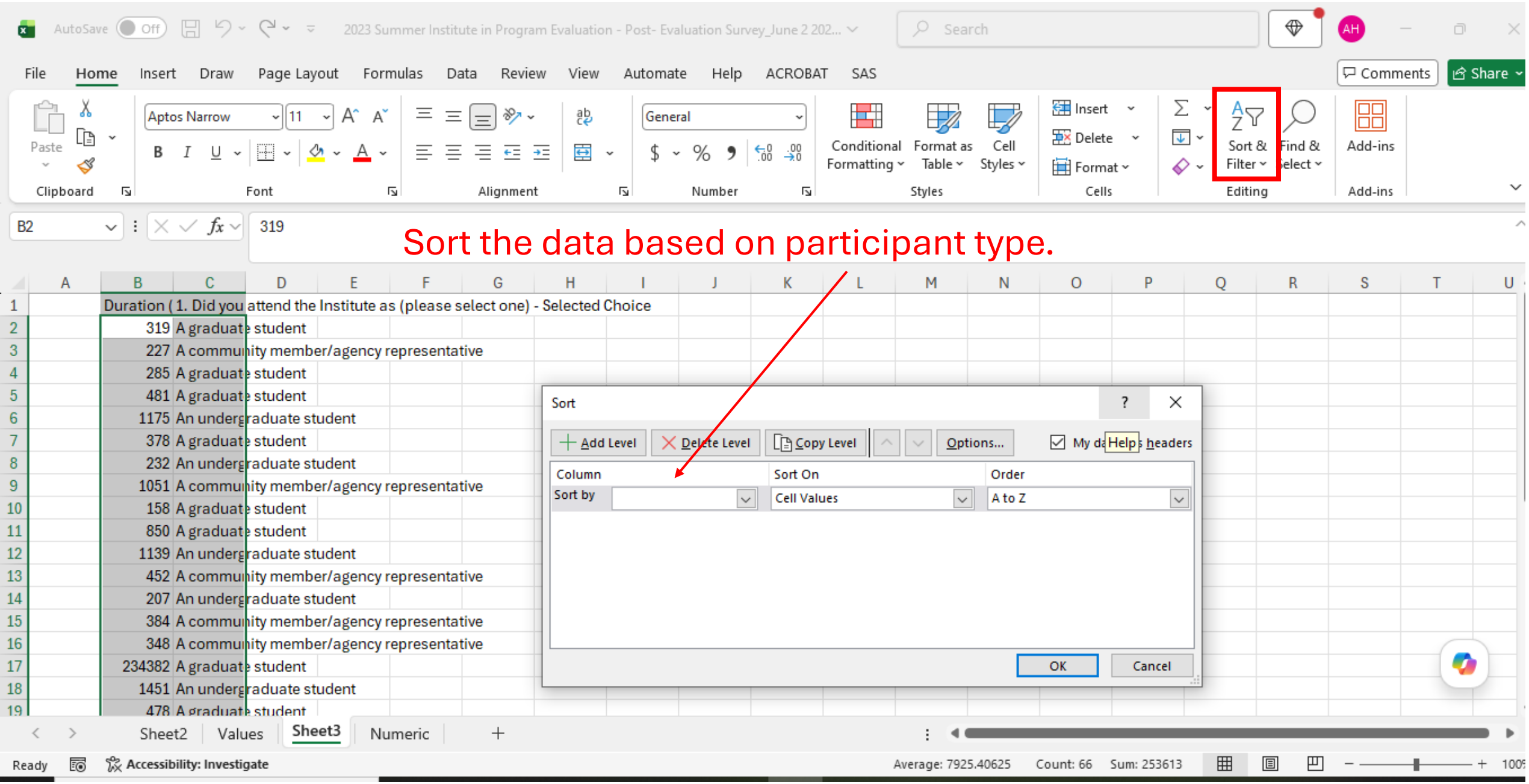


What is the appropriate statistical test?

Independent t-test – Two unrelated groups

Copy the relevant columns of data into a new sheet

Sort the data based on participant type.



What are the null and alternative hypotheses?

Null hypothesis: Undergrad students and graduate students took a similar amount of time to complete the survey

Alternative hypothesis: They differed on how long they took

# of tails can be either 1 (directional) or 2 (non-directional) (based on the alternative hypothesis)

- t-test type can be:
  - 1 = paired difference
  - 2 = independent assuming equal variances
  - 3 = independent assuming unequal variances

=T.TEST(group1range,group2range,# of tails, t-test type)

L9

	A	B	C	D	E	F	G	H	I	J
1		Duration (in seconds)	1. Did you attend the Institute as (please select one) - Selected Choice							
2		319	A graduate student							
3		285	A graduate student							
4		481	A graduate student							
5		378	A graduate student							
6		158	A graduate student							
7		850	A graduate student							
8		234382	A graduate student							
9		478	A graduate student							
10		222	A graduate student							
11		266	A graduate student							
12		530	A graduate student							
13		1492	A graduate student							
14		450	A graduate student							
15		188	A graduate student							

=AVERAGE(B19:B26)
=STDEV.S(B19:B26)
=COUNTA(B19:B26)

B19:B26 is the range for the undergrad data.

=AVERAGE(B2:B18)
=STDEV.S(B2:B18)
=COUNTA(B2:B18)

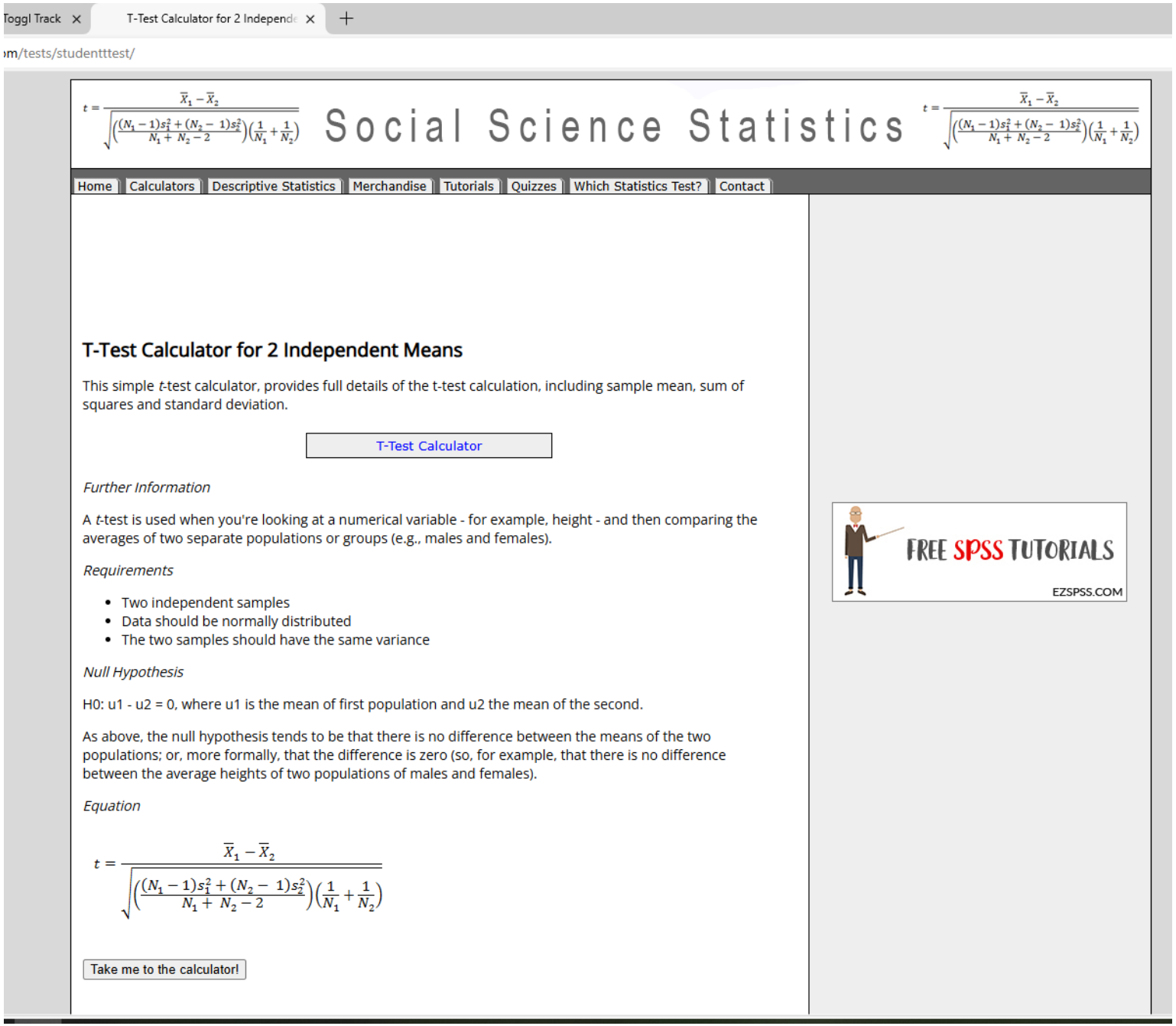
B2:B18 is the range for the grad data.

What is the decision and why?

Since the p-value > 0.05, do not reject null hypothesis. The result is not statistically significant.

Utilize online calculators

https://www.socscistatistics.com/tests/studentttest/default2.aspx



https://www.socscistatistics.com/tests/studentttest/calculator/

T-Test Calculator for 2 Independent Means

Enter the values for your two treatment conditions below.

Enter the data

Treatment 1 (*X*)

```
478
222
266
530
1492
450
188
129
1356
255
```

Graduate

At least 2 values required

Treatment 2 (*X*)

```
1175
232
1139
207
1451
168
105
189
```

Undergraduate

At least 2 values required

Significance Level:

Select options

- ○ 0.01
- ◉ 0.05
- ○ 0.10

One-tailed or two-tailed?

- ○ One-tailed
- ◉ Two-tailed

Quick Links

- T-Test Calculator
- ANOVA Calculator
- Chi-Square Test
- Pearson Correlation

About

Free statistical calculators for students and researchers in the social sciences. No registration required.

Type here to search

27°C

ENG

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Monday
2026-06-08

https://www.socscistatistics.com/tests/studentttest/calculator/

Summary Statistics

Treatment 1 Graduate

N = 17

Mean = 14248.18

SS = 51490061296.47

Sample Variance = 3218128831.03

Treatment 2 Undergraduate

N = 8

Mean = 583.25

SS = 2233545.50

Sample Variance = 319077.93

T-Test Results

Pooled Variance = 2238795427.91

Standard Error = 20286.53

t = **0.6736**

df = 23

Solution

Uses the t-test formula for equal variances

P-Values

One-tailed:	**0.253641**
Two-tailed:	**0.507281**

✗ Result: Not Statistically Significant

The difference between the two groups is NOT statistically significant (p = 0.507).

At the 0.05 significance level, we fail to reject the null hypothesis. The observed difference could plausibly be due to random chance.

The effect size (Cohen's d = 0.29) suggests a small effect.

A non-significant result doesn't prove there's no effect — it may indicate insufficient sample size or a small effect.

Report This Result

Citation Style:

APA (Parenthetical) | APA (Narrative) | Chicago | Plain English

```
(t(23) = 0.67, p = .507, Cohen's d = 0.29)
```

Copy

Note: You may need to adjust this citation based on your specific context and reporting requirements.

Do attendees rate the clarity of the lectures differently than the clarity of instructions for the case studies?

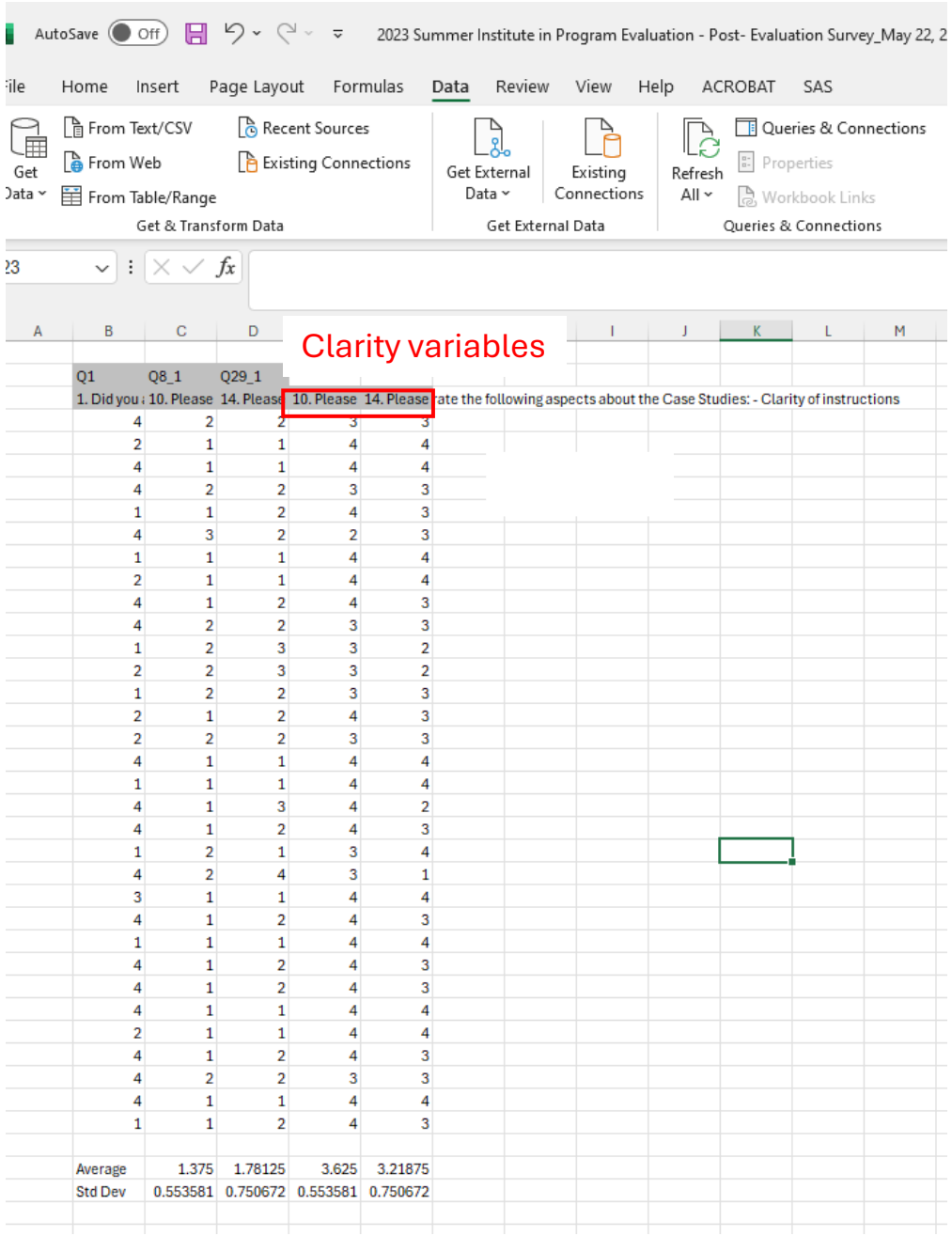
What is the appropriate statistical test?

Paired difference t-test
(aka dependent t-test)

What are the null and alternative hypotheses?

Null hypothesis: Average ratings of the clarity of the lectures and instructions for the case studies do not differ

Alternative hypothesis: Average ratings of the clarity of the lectures and instructions for the case studies differ



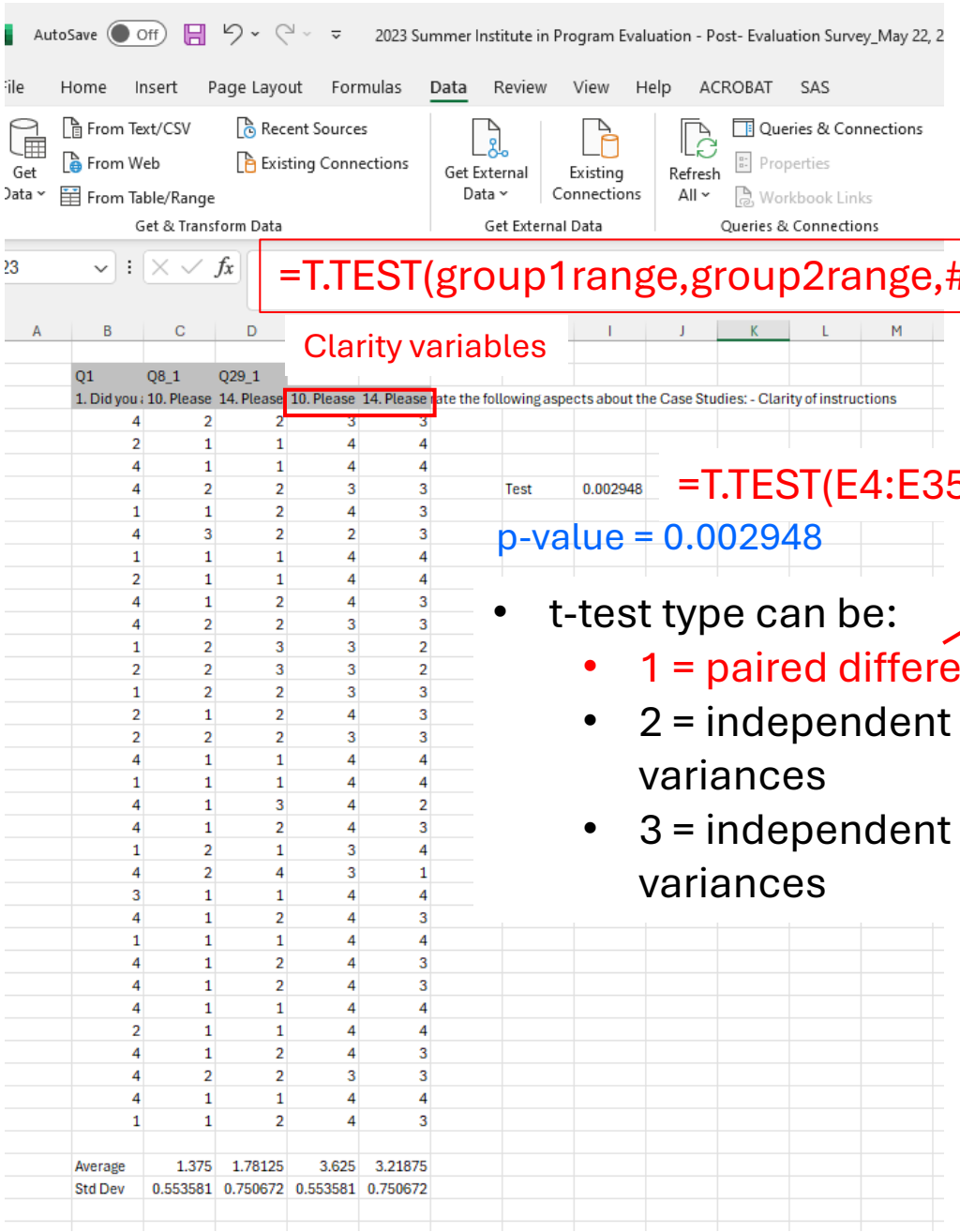
Q1	Q8_1	Q29_1		
1. Did you	10. Please	14. Please	10. Please	14. Please ate the following aspects about the Case Studies: - Clarity of instructions
4	2	2	3	3
2	1	1	4	4
4	1	1	4	4
4	2	2	3	3
1	1	2	4	3
4	3	2	2	3
1	1	1	4	4
2	1	1	4	4
4	1	2	4	3
4	2	2	3	3
1	2	3	3	2
2	2	3	3	2
1	2	2	3	3
2	1	2	4	3
2	2	2	3	3
4	1	1	4	4
1	1	1	4	4
4	1	3	4	2
4	1	2	4	3
1	2	1	3	4
4	2	4	3	1
3	1	1	4	4
4	1	2	4	3
1	1	1	4	4
4	1	2	4	3
4	1	2	4	3
4	1	1	4	4
2	1	1	4	4
4	1	2	4	3
4	2	2	3	3
4	1	1	4	4
1	1	2	4	3
Average	1.375	1.78125	3.625	3.21875
Std Dev	0.553581	0.750672	0.553581	0.750672

Do attendees rate the clarity of the lectures differently than the clarity of instructions for the case studies?

Null hypothesis: Average ratings of the clarity of the lectures and instructions for the case studies do not differ

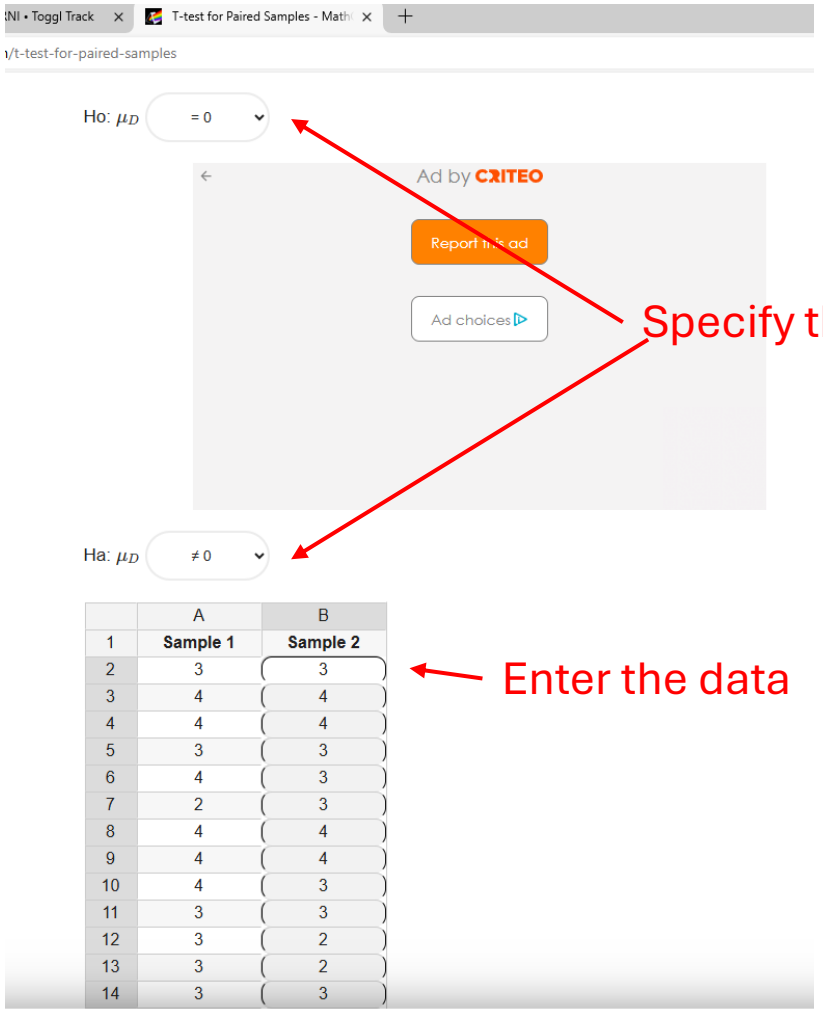
Alternative hypothesis: Average ratings of the clarity of the lectures and instructions for the case studies differ

Since the p-value < 0.05, reject H_0. The result is statistically significant. Thus, there is evidence that the clarity ratings for the two components of the Summer Institute differ. Students tended to rate the clarity of the lectures (*M* = 3.63, *SD* = 0.55) higher than the clarity of the instructions for the case studies (*M* = 3.22, *SD* = 0.75).



- t-test type can be:
  - 1 = paired difference
  - 2 = independent assuming equal variances
  - 3 = independent assuming unequal variances

https://mathcracker.com/t-test-for-paired-samples



	A	B
1	**Sample 1**	**Sample 2**
2	3	3
3	4	4
4	4	4
5	3	3
6	4	3
7	2	3
8	4	4
9	4	4
10	4	3
11	3	3
12	3	2
13	3	2
14	3	3

Solution

Toggl Track | T-test for Paired Samples - Math

test-for-paired-samples#results

	Sample 1	Sample 2	Difference = Sample 1 - Sample 2
	3	3	0
	4	4	0
	4	4	0
	3	3	0
	4	3	1
	2	3	-1
	4	4	0
	4	3	1
	4	4	0
	4	3	1
	4	3	1
	4	4	0
	4	4	0
	4	3	1
	3	3	0
	4	4	0
	4	3	1
Average	3.625	3.219	0.406
Standard Deviation	0.554	0.751	0.712
n	32	32	32

From the sample data, it is found that the corresponding sample means are:

$$\bar{X}_1 = 3.625$$

$$\bar{X}_2 = 3.219$$

Also, the provided sample standard deviations are:

$$s_1 = 0.554$$

$$s_2 = 0.751$$

and the sample size is n = 32. For the score differences we have

$$\bar{D} = 0.406$$

$$s_D = 0.712$$

MBRNI • Toggl Track | T-test for Paired Samples - Math

com/t-test-for-paired-samples#results

(1) *Null and Alternative Hypotheses*

The following null and alternative hypotheses need to be tested:

$$H_0 : \mu_D = 0$$

$$H_a : \mu_D \neq 0$$

This corresponds to a two-tailed test, for which a t-test for two paired samples be used.

(2) *Rejection Region*

Based on the information provided, the significance level is $\alpha = 0.05$, and the critical value for a two-tailed test is $t_c = 2.04$.

The rejection region for this two-tailed test is $R = \{t : |t| > 2.04\}$

(3) *Test Statistics*

The t-statistic is computed as follows:

$$t = \frac{\bar{D}}{s_D/\sqrt{n}}$$

$$= \frac{0.406}{0.712/\sqrt{32}}$$

$$= 3.227$$

(4) *Decision about the null hypothesis*

Since it is observed that $|t| = 3.227 > t_c = 2.04$, it is then concluded that *the null hypothesis is rejected.*

Using the P-value approach: The p-value is $p = 0.0029$, and since $p = 0.0029 < 0.05$, it is concluded that the null hypothesis is rejected.

(5) *Conclusion*

It is concluded that the null hypothesis Ho *is rejected.* Therefore, there is enough evidence to claim that the population mean difference $\mu_D = \mu_1 - \mu_2$ is different than 0, at the $\alpha = 0.05$ significance level.

Summary

How do we choose which statistical test to use?

Nature of the question/study design

Distribution of the data

Level of measurement of the variables

Number of variables

APPENDIX

- PSPP

- PSPP IS A PROGRAM FOR STATISTICAL ANALYSIS.

  IT IS A FREE-AS-IN-FREEDOM REPLACEMENT FOR THE PROPRIETARY PROGRAM SPSS AND APPEARS VERY SIMILAR TO IT WITH A FEW EXCEPTIONS.

TO DOWNLOAD PSPP

HTTPS://WWW.GNU.ORG/SOFTWARE/PSPP/

Downloading PSPP

As with most GNU software, PSPP can be found on the main GNU ftp server: http://ftp.gnu.org/gnu/pspp/ (via HTTP) and ftp://ftp.gnu.org/gnu/pspp/ (via FTP). It can also be found on the GNU mirrors; please use a mirror if possible.

There are some additional ways you can download or otherwise obtain PSPP.

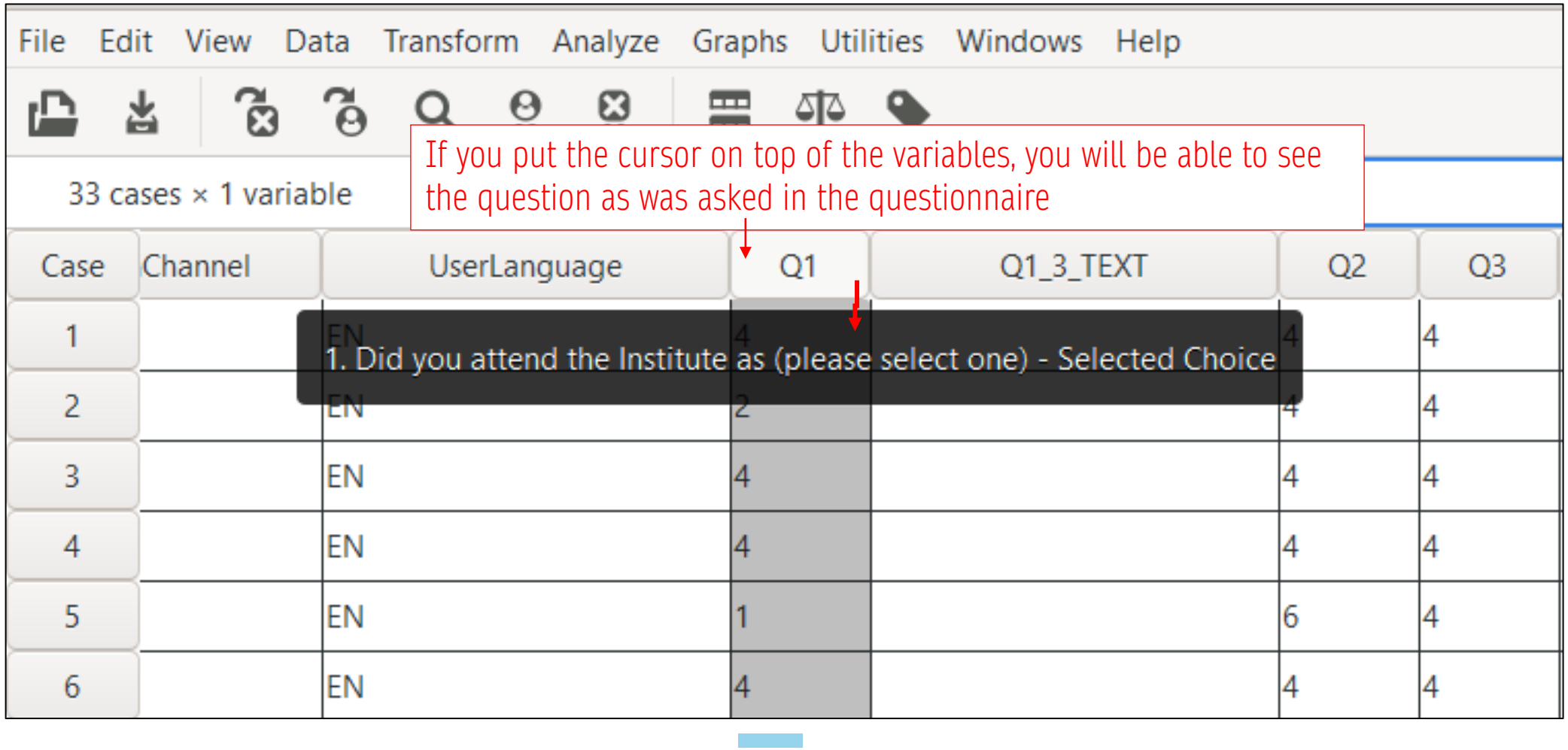
Documentation

Documentation for PSPP is available online, as is documentation for most GNU software. You may also find more information about PSPP by running *info pspp* or *man pspp*, or by looking at */usr/share/doc/pspp/*, */usr/local/doc/pspp/*, or similar directories on your system. A brief summary is available by running *pspp --help*.

A developer's manual is also available in various formats. Developers of software designed to interoperate with PSPP or SPSS will find this manual's appendices particularly valuable, because they specify the data file formats in great detail.

A tutorial independently published by Prof. Gary Fisk may also be helpful to those first starting out with PSPP.

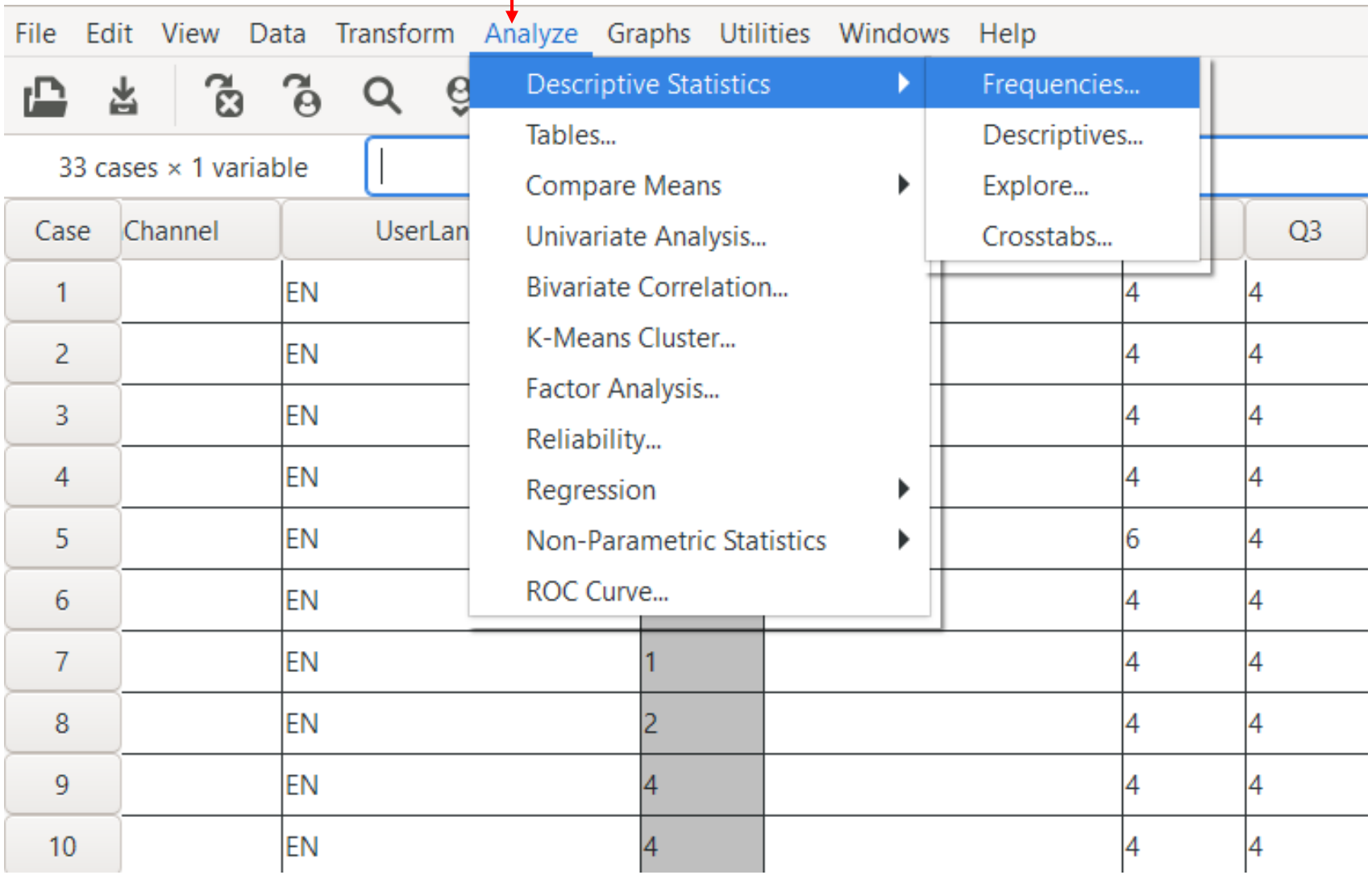
IN PSPP



Case	Channel	UserLanguage	Q1	Q1_3_TEXT	Q2	Q3
1		EN	4		4	4
2		EN	2		4	4
3		EN	4		4	4
4		EN	4		4	4
5		EN	1		6	4
6		EN	4		4	4

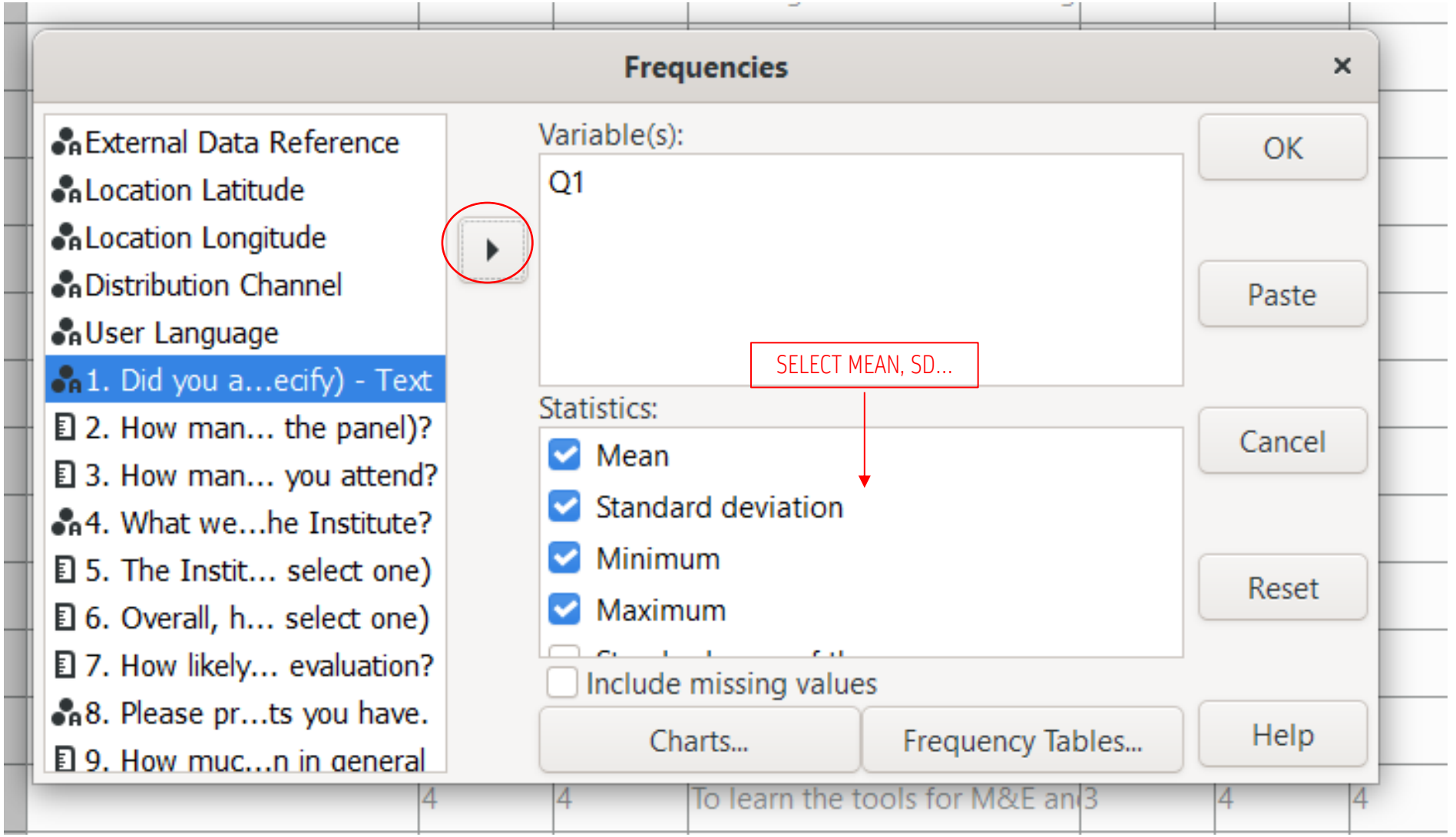
IN PSPP

TO RUN FREQUENCIES



IN PSPP

SELECT THE VARIABLE



IN PSPP

PSPP OUTPUT

Statistics

		1. Did you attend the Institute as (please select one) - Selected Choice
N	Valid	32
	Missing	1
Mean		2.84
Median		4.00
Mode		A graduate student
Std Dev		1.32
Minimum		An undergraduate student
Maximum		A graduate student

1. Did you attend the Institute as (please select one) - Selected Choice

		Frequency	Percent	Valid Percent-	Cumulative Percent
Valid	An undergraduate student	8	24.2%	25.0%	25.0%
	A community member/-agency representative	6	18.2%	18.8%	43.8%
	Another role (please specify)	1	3.0%	3.1%	46.9%
	A graduate student	17	51.5%	53.1%	100.0%
Missing	.	1	3.0%		
Total		33	100.0%		

The rows are **not arranged**

IN PSPP

PSPP OUTPUT

The rows are **rearranged**

Statistics

		1. Did you attend the Institute as (please select one) - Selected Choice
N	Valid	32
	Missing	1
Mean		2.84
Median		4.00
Mode		A graduate student
Std Dev		1.32
Minimum		A graduate student
Maximum		Another role (please specify)

1. Did you attend the Institute as (please select one) - Selected Choice

		Frequency	Percent	Valid Percent-	Cumulative Percent
Valid	A graduate student	17	51.5%	53.1%	53.1%
	An undergraduate student	8	24.2%	25.0%	78.1%
	A community member/-agency representative	6	18.2%	18.8%	96.9%
	Another role (please specify)	1	3.0%	3.1%	100.0%
Missing	.	1	3.0%		
Total		33	100.0%		

IN PSPP

File Edit View Data Transform Analyze Graphs Utilities Windows Help

33 cases × 1 variable

Case	Channel	UserLanguage	Q1	Q1_3_TEXT	Q2	Q3	Q4
1		EN	4		4	4	- mandatory for masters degr
2		EN	2		4	4	Learning the tools of creating
3		EN	4		4	4	Gain an understanding o how
4		EN	4		4	4	- better understanding of eval
5		EN	1		6	4	I wasn't really expecting anyth
6		EN	4		4	4	Knowledge on how to effectiv

2. How many lectures did you attend (including the panel)?

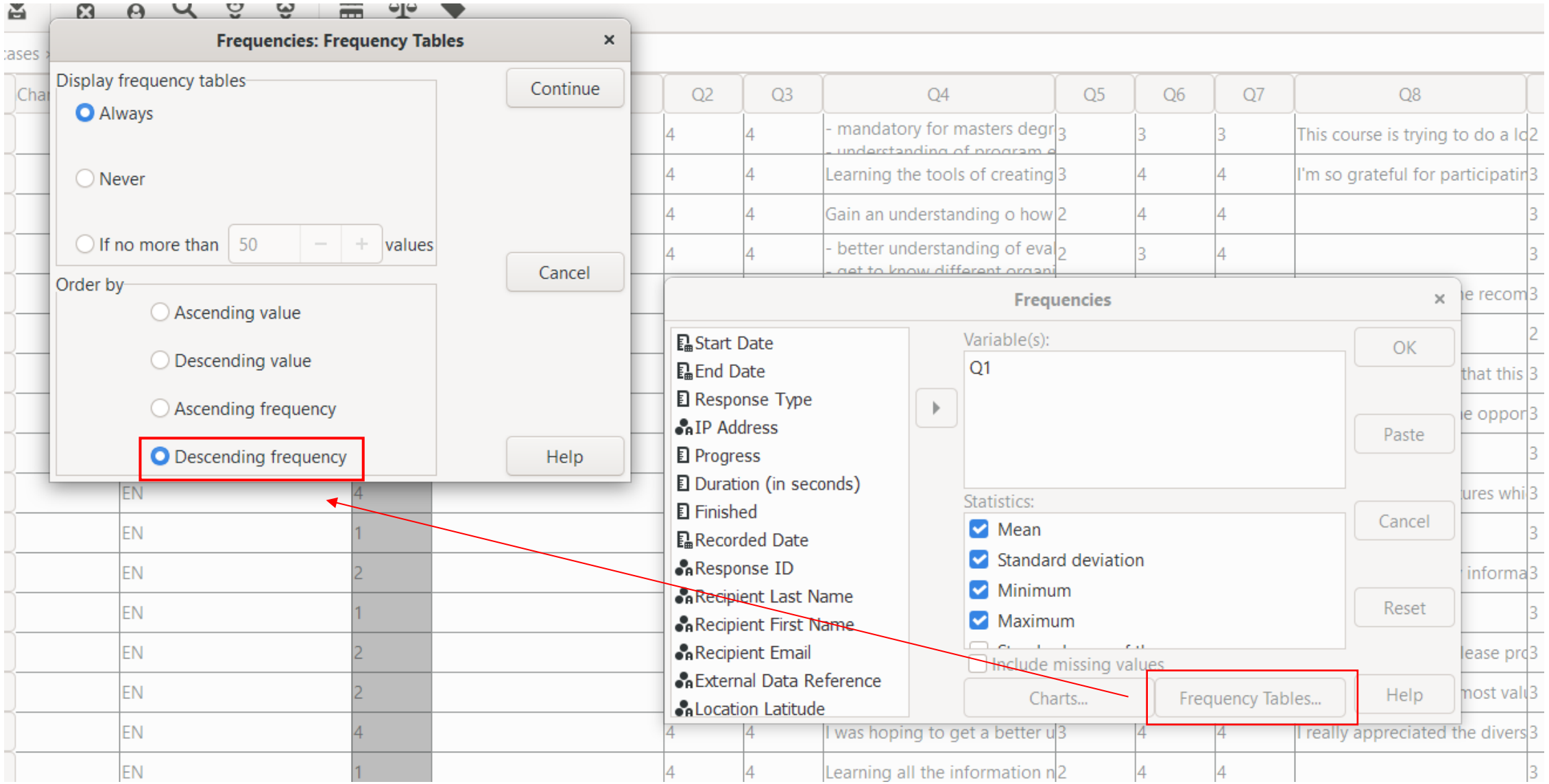
File Edit View Data Transform Analyze Graphs Utilities Windows Help

33 cases × 1 variable

Case	Channel	UserLanguage	Q1	Q1_3_TEXT	Q2	Q3	Q4
1		EN	4		4	4	- mandatory for masters deg
2		EN	2		4	4	Learning the tools of creatin
3		EN	4		4	4	Gain an understanding o hov
4		EN	4		4	4	- better understanding of eva
5		EN	1		6	4	I wasn't really expecting anyt
6		EN	4		4	4	Knowledge on how to effect

3. How many teamwork meetings did you attend?

IN PSPP


Frequencies: Frequency Tables
Display frequency tables
Always
Never
If no more than 50 values
Order by
Ascending value
Descending value
Ascending frequency
Descending frequency
Continue
Cancel
Help
Frequencies
Start Date
End Date
Response Type
IP Address
Progress
Duration (in seconds)
Finished
Recorded Date
Response ID
Recipient Last Name
Recipient First Name
Recipient Email
External Data Reference
Location Latitude
Variable(s):
Q1
Statistics:
Mean
Standard deviation
Minimum
Maximum
Include missing values
Charts...
Frequency Tables...
OK
Paste
Cancel
Reset
Help

IN PSPP

Statistics

		2. How many lectures did you attend (including the panel)?	3. How many teamwork meetings did you attend?
N	Valid	32	32
	Missing	1	1
Mean		4.25	4.06
Median		4.00	4.00
Mode		All of them	All of them
Std Dev		.67	.25
Minimum		All of them	All of them
Maximum		Most of them	Most of them

2. How many lectures did you attend (including the panel)?

		Frequency	Percent	Valid Percent-	Cumulative Percent
Valid	All of them	28	84.8%	87.5%	87.5%
	Most of them	4	12.1%	12.5%	100.0%
Missing	.	1	3.0%		
Total		33	100.0%		

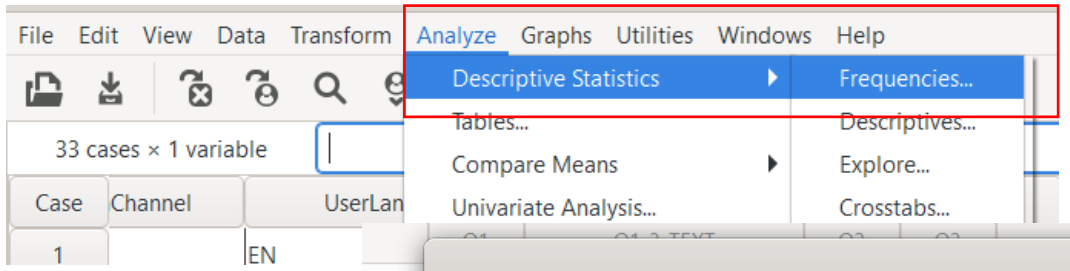
3. How many teamwork meetings did you attend?

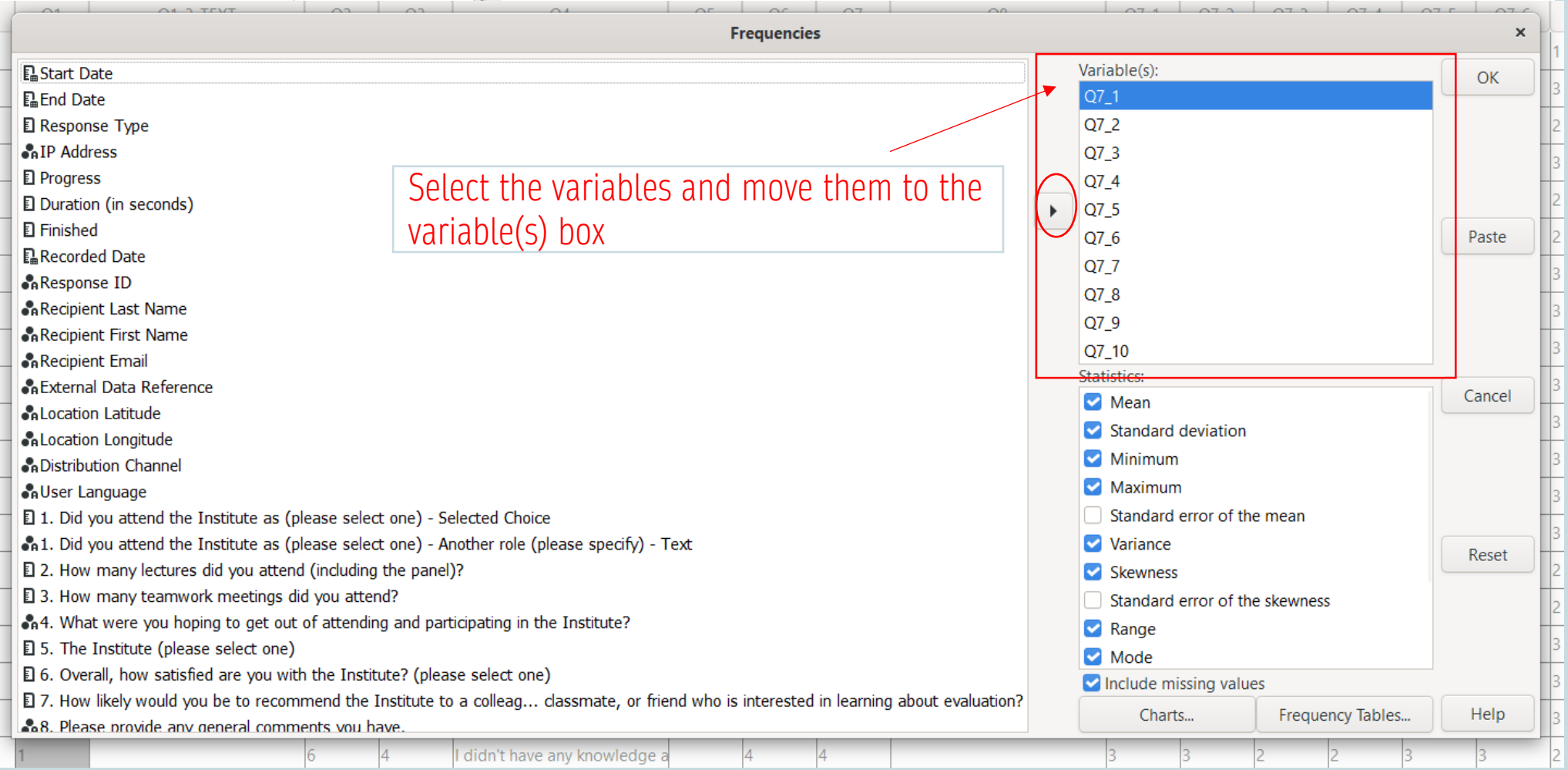
		Frequency	Percent	Valid Percent-	Cumulative Percent
Valid	All of them	30	90.9%	93.8%	93.8%
	Most of them	2	6.1%	6.3%	100.0%
Missing	.	1	3.0%		
Total		33	100.0%		

IN PSPP, frequencies with values of zero are not included in the output

IN PSPP

TO RUN FREQUENCIES OF SEVERAL VARIABLES AT THE SAME TIME





IN PSPP

PSPP OUTPUT

Statistics

		9. How much did the Institute contribute to your knowledge of - Evaluation in general	9. How much did the Institute contribute to your knowledge of - Ethics & Evaluation	9. How much did the Institute contribute to your knowledge of - Indigenous approaches to evaluation	9. How much did the Institute contribute to your knowledge of - Evaluation theory	9. How much did the Institute contribute to your knowledge of - Evaluation designs, indicators, and measures	9. How much did the Institute contribute to your knowledge of - Quantitative evaluation methods	9. How much did the Institute contribute to your knowledge of - Qualitative evaluation methods	9. How much did the Institute contribute to your knowledge of - How to create an evaluation plan	9. How much did the Institute contribute to your knowledge of - How to enhance the chances evaluation results get used	9. How much did the Institute contribute to your knowledge of - Evaluation in practice (i.e., the panel discussion)
N	Valid	32	32	32	32	32	32	32	31	31	32
	Missing	1	1	1	1	1	1	1	2	2	1
Mean		2.88	2.59	2.66	2.69	2.78	2.66	2.66	2.77	2.68	2.72
Median		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Mode		To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent
Std Dev		.34	.50	.48	.54	.42	.60	.55	.50	.54	.58
Variance		.11	.25	.23	.29	.18	.36	.30	.25	.29	.34
Kurtosis		3.91	-1.97	-1.63	1.52	.04	1.67	.89	4.51	1.36	1.39
Skewness		-2.38	-.40	-.69	-1.51	-1.43	-1.60	-1.31	-2.21	-1.46	-.96
Range		-1.00	-1.00	-1.00	-2.00	-1.00	-2.00	-2.00	-2.00	-2.00	1.00
Minimum		To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent	To a great extent
Maximum		To some extent	To some extent	To some extent	None at all	To some extent	None at all	None at all	None at all	None at all	Not Applicable / Don't know

SUMMER INSTITUTE 2024
QUANTITATIVE RESEARCH METHODS
PSPP SYNTAX

TO INSERT COMMENTS IN PSPP, USE /*

/******TO OPEN THE FILE IN PSPP*****/
- CHANGE THE PATH TO WHERE YOU HAVE SAVED THE FILE ON YOUR LAPTOP. AFTER THE ="<INSERT PATH>".

```
GET FILE="C:\USERS\XXXX\ONEDRIVE\DESKTOP\UOFM\SUMMER INSTITUTE\2024\DR. HINDS LECTURE\SI DATA\2023 SUMMER INSTITUTE IN PROGRAM EVALUATION - POST- EVALUATION SURVEY_MAY 22, 2024_13.35.SAV".
```

```
/******TO RUN FREQUENCIES********/
FREQUENCIES
        /VARIABLES= Q1  /*(Q1 IS THE NAME/LABEL OF THE VARIABLE: NAME OF THE VARIABLE(S) YOU
WANT TO EXAMINE)*
        /FORMAT=AVALUE TABLE
        /STATISTICS=DEFAULT MODE MEDIAN.

/******TO RUN FREQUENCIES WITH REARRANGED ROWS AS FREQUENCIES (AS WE DID IN EXCEL)*****/
FREQUENCIES
        /VARIABLES= Q1
        /FORMAT=DFREQ TABLE /*THIS ROW TELLS PSPP TO ARRANGE FREQUENCIES IN DESCENDING
ORDER*/
        /STATISTICS=DEFAULT MODE MEDIAN.


/*** TO RUN FREQUENCIES FOR ORDINAL VARIABLES, WE DO NOT REARRANGE THE ROWS***/
FREQUENCIES
        /VARIABLES= Q2 Q3
        /FORMAT=AVALUE TABLE
        /STATISTICS=DEFAULT MODE MEDIAN.

/**RUN FREQUENCIES OF SEVERAL VARIABLES AT ONCE TO CREATE A 'FINAL TABLE' AS WE DID IN EXCEL
(SLIDE 63) ORGANIZING BY MEAN***/

FREQUENCIES
        /VARIABLES= Q7_1 Q7_2 Q7_3 Q7_4 Q7_5 Q7_6 Q7_7 Q7_8 Q7_9 Q7_10
        /FORMAT=DFREQ TABLE
        /STATISTICS=DEFAULT VARIANCE SKEWNESS RANGE MODE KURTOSIS MEDIAN
        /MISSING=INCLUDE
```