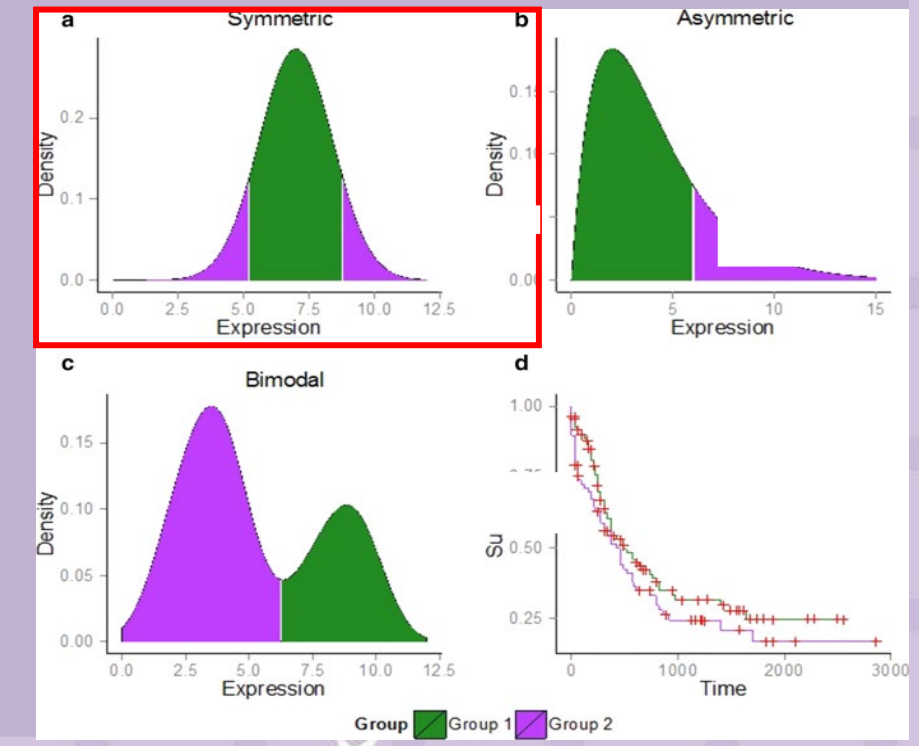
Excel tips and tricks

Descriptive statistics

- All about looks
- Examples:
  - Distributions
  - Central tendency
  - Variability

Descriptive Statistics - distribution

- Overall, how does the data look?
  - Normal distributions
    - Ideal



Descriptive Statistics – Central Tendency

- Average response
- Means, medians, modes (mostly mean in this class)

Central tendency

- Mean = sum of responses / total number of responses
- Example:

Take the mean of:

5
8
10
5
3
6

$$\frac{5 + 8 + 10 + 5 + 3 + 6}{6}$$

Mean = 6.16

Finding means in excel

=AVERAGE( )

Put the cells you want to average in the parentheses

Finding means in excel

- Look at your data first
- Here's an example:

A	B	C
Subj	Group A	Group B
1	6	4
2	9	5
3	8	3
4	7	2
5	9	5
6	6	3
7	8	4
8	7	6
9	6	4
10	5	3

Finding means in excel

- You can make a chart
- Like this:

	E	F	G
		Group A	Group B
	Average		

Finding means in excel

- Fill in the cells

	A	B	C
	Subj	Group A	Group B
	1	6	4
	2	9	5
	3	8	3
	4	7	2
	5	9	5
	6	6	3
	7	8	4
	8	7	6
	9	6	4
	10	5	3

	E	F	G
		Group A	Group B
	Average	=AVERAGE(B2:B11)	=AVERAGE(C2:C11)

Finding means in excel

- It will calculate them for you!

E	F	G
	Group A	Group B
Average	7.1	3.9

=AVERAGE( )

For means

Descriptive Statistics - Variability

- How much do responses differ from the average
- Standard deviation, standard error, variation range

Descriptive Statistics – Variability

- Standard deviation formula (ahhh!)

$$SD = \sqrt{\frac{(X1 - Mean)^2 + (X2 - Mean)^2 \ldots}{\text{Count of responses}}}$$

1. How much does each point differ from mean (by absolute value)?
2. Add all differences
3. Divide by # of differences

Average of DIFFERENCE FROM MEAN

Finding means in excel

=STDEV( )

Put the cells you want to find the standard deviation of in the parentheses

Finding SDs in excel

- You can add to your chart…

E	F	G
	Group A	Group B
Average	7.1	3.9
SD		

Finding means in excel

- Fill in the cells

A	B	C
Subj	Group A	Group B
1	6	4
2	9	5
3	8	3
4	7	2
5	9	5
6	6	3
7	8	4
8	7	6
9	6	4
10	5	3

E	F	G
	Group A	Group B
Average	7.1	3.9
SD	=STDEV(B2:B11)	=STDEV(C2:C11)

Finding means in excel

- It will calculate them for you!

	E	F	G	
		Group A	Group B	
	Average	7.1	3.9	
	SD	1.37032	1.197219	

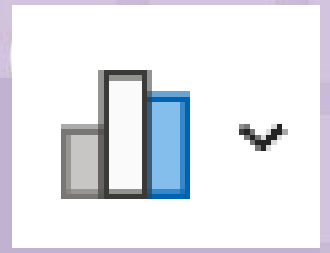
=STDEV( )

And you put the cells you want in those parentheses

Data visualization

- Lots of graphs
  - We'll use bar graphs pretty much

Making bar graphs in excel



- Select data -> insert -> 2D clustered column
- Select:
  - Groups
  - Averages
  - (orange box)

	E	F	G
		Group A	Group B
	Average	7.1	3.9
	SD	1.37032	1.197219

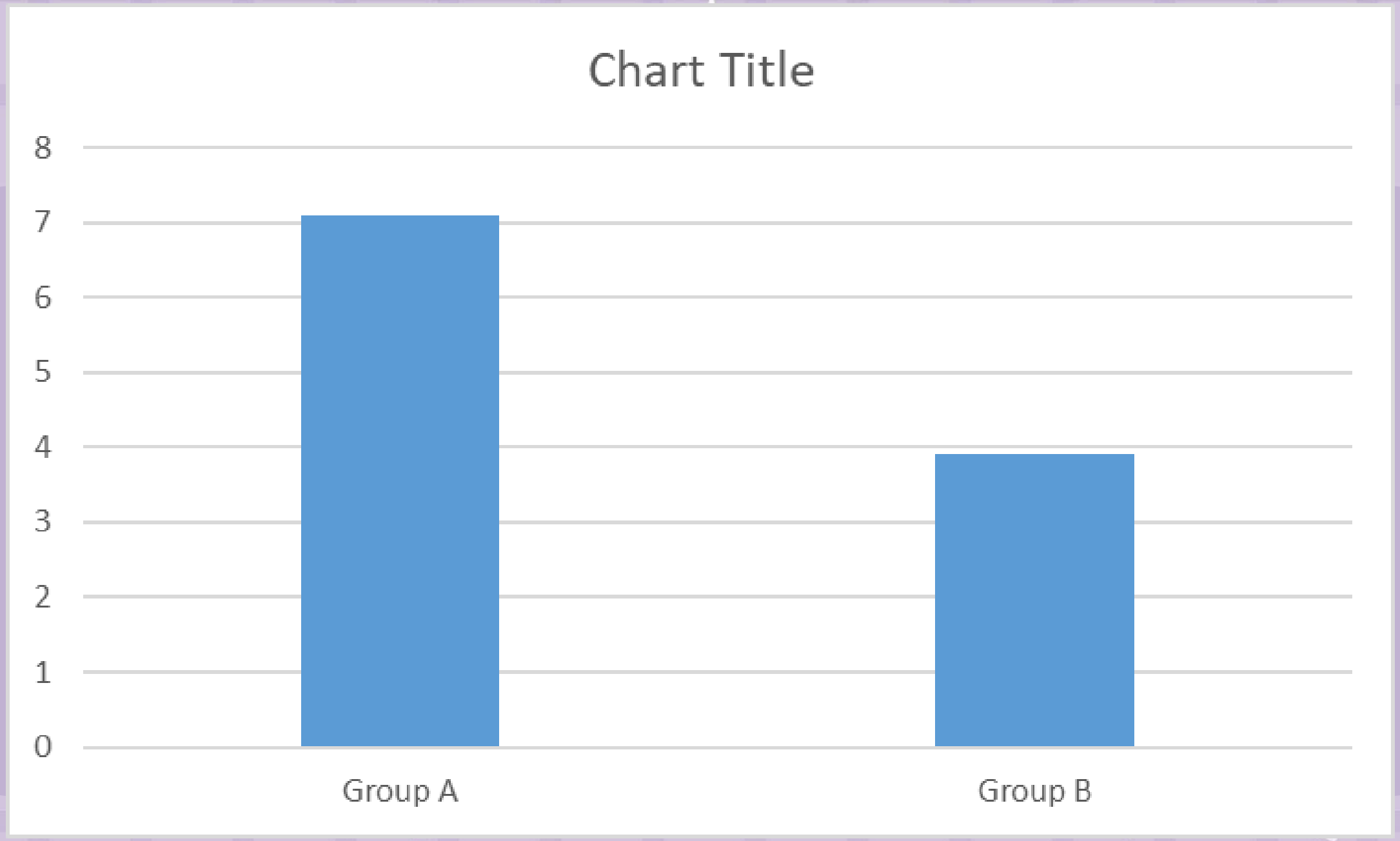


Chart Title
8
7
6
5
4
3
2
1
0
Group A
Group B

Graph things

- Titles
- Labels
- Error bars
  - Helps us infer significance
- Scale (y-axis)
  - Accurately represent differences

Give your graph a title

- Short but descriptive
- Mention IV & DV

Label your axes

- What are we looking at?
- DV
- IV

Adding error bars

- These also help us understand significance
- We will use standard error for these
- We need to calculate that first
  - SD / SQRT(N)

- N = number of participants

Adding error bars

- Add to your chart

	E	F	G
		Group A	Group B
	Average	7.1	3.9
	SD	1.37032	1.197219
	SE		
	N		
	SQRT(N)		

Adding error bars

- Find N first
- =count( )
  - Counts #s in column
  - Usually same N
    - In cog lab

E	F	G
	Group A	Group B
Average	7.1	3.9
SD	1.37032	1.197219
SE		
N	=count(B:B)	=count(C:C)
SQRT(N)		

Adding error bars

- Square root of N
- =sqrt( )
  - Select the cell with your N #

	E	F	G	
		Group A	Group B	
	Average	7.1	3.9	
	SD	1.37032	1.197219	
	SE			
	N	10	10	
	SQRT(N)	=sqrt(F5)	=sqrt(G5)	

Adding error bars

- SE
- SD / SQRT(N)
- = SD / SQRT(N)
  - Select those cells with your mouse

	E	F	G
		Group A	Group B
	Average	7.1	3.9
	SD	1.37032	1.197219
	SE	= F3 / F6	= G3 / G6
	N	10	10
	SQRT(N)	3.162278	3.162278

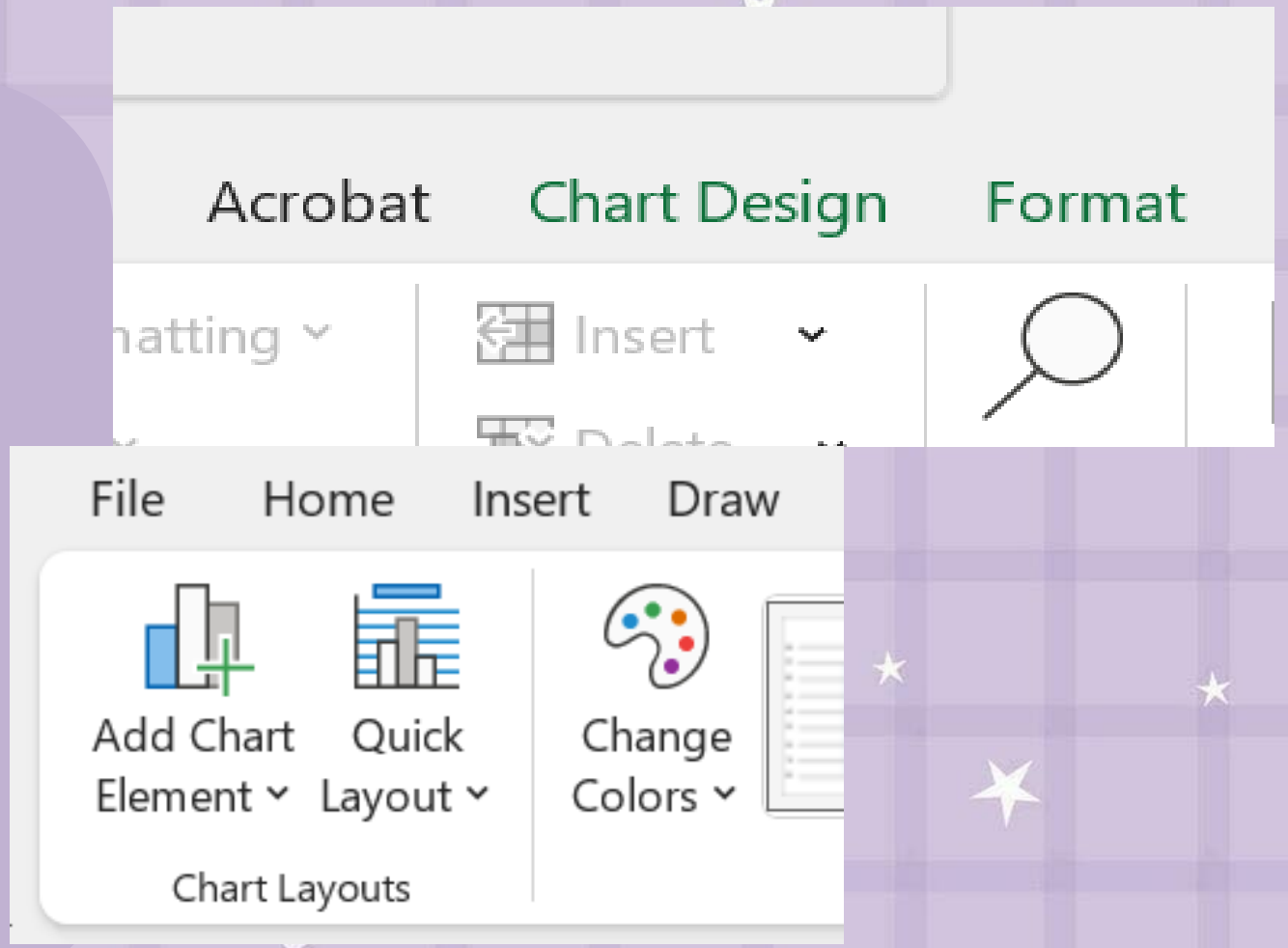
Adding error bars

- Now you actually add them to your graph
- Click on your graph
- At the top go to "Chart Design"

	E	F	G
		Group A	Group B
	Average	7.1	3.9
	SD	1.37032	1.197219
	SE	0.433333	0.378594
	N	10	10
	SQRT(N)	3.162278	3.162278

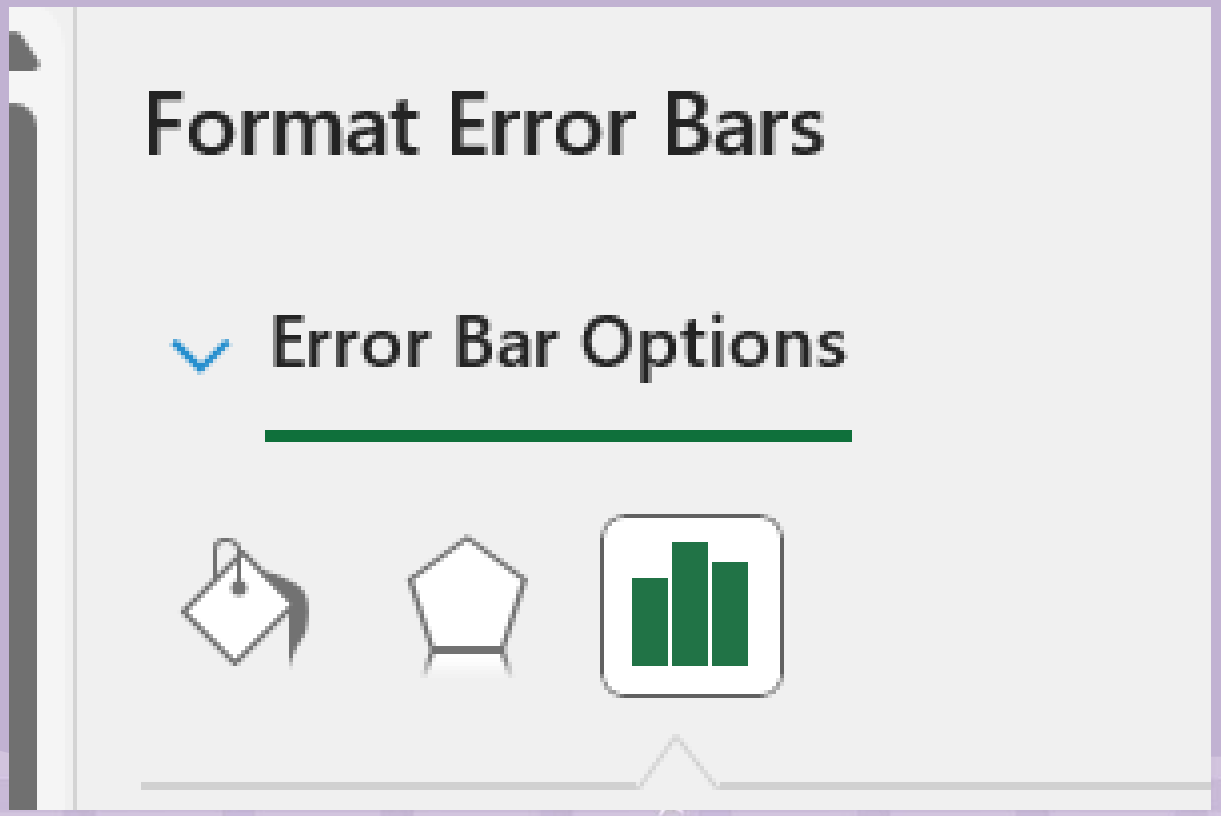
Adding error bars

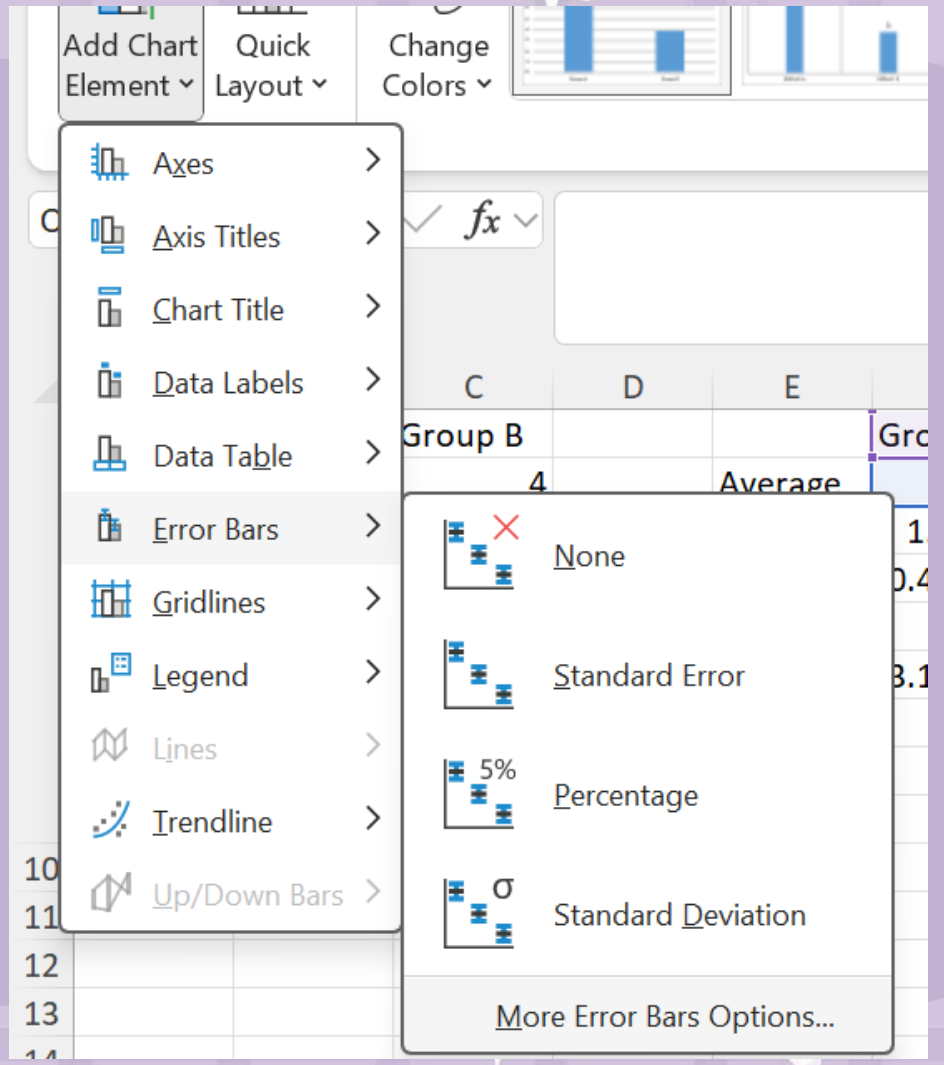
- "Add Chart Element"
- Error bars -> more options



Adding error bars

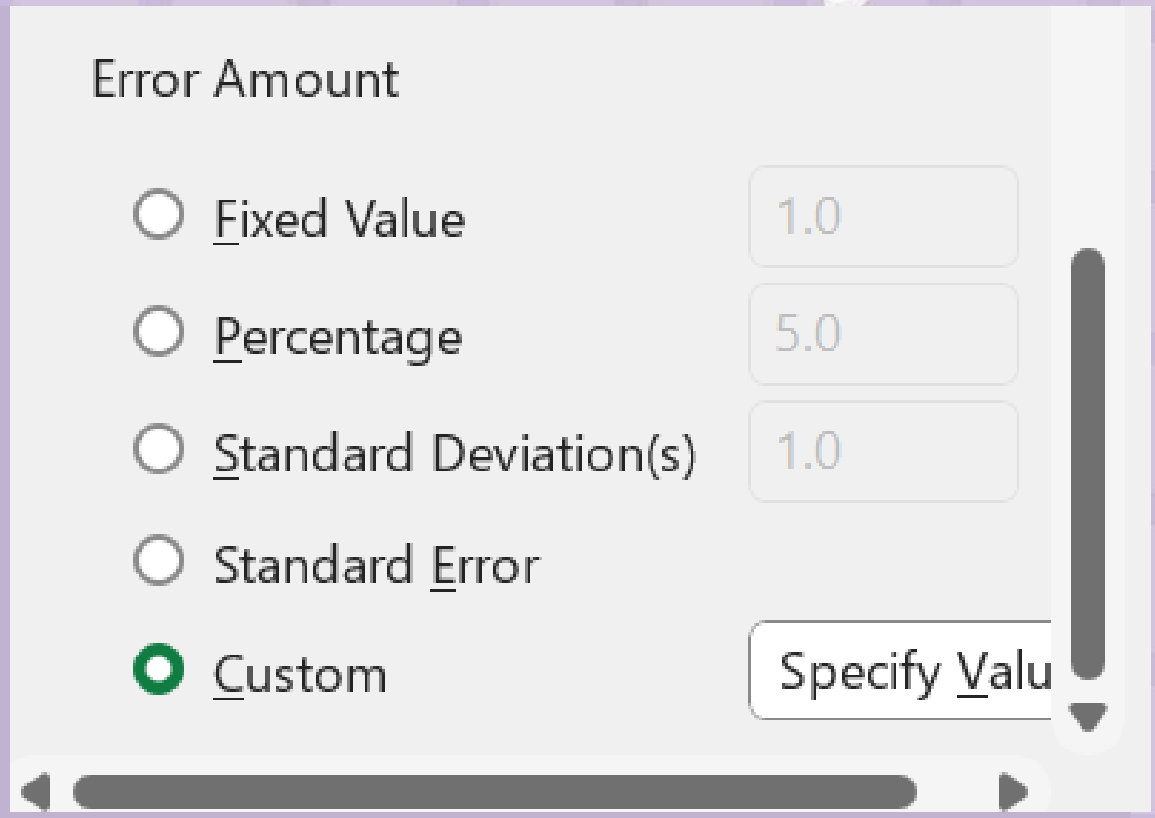
- Should open this:





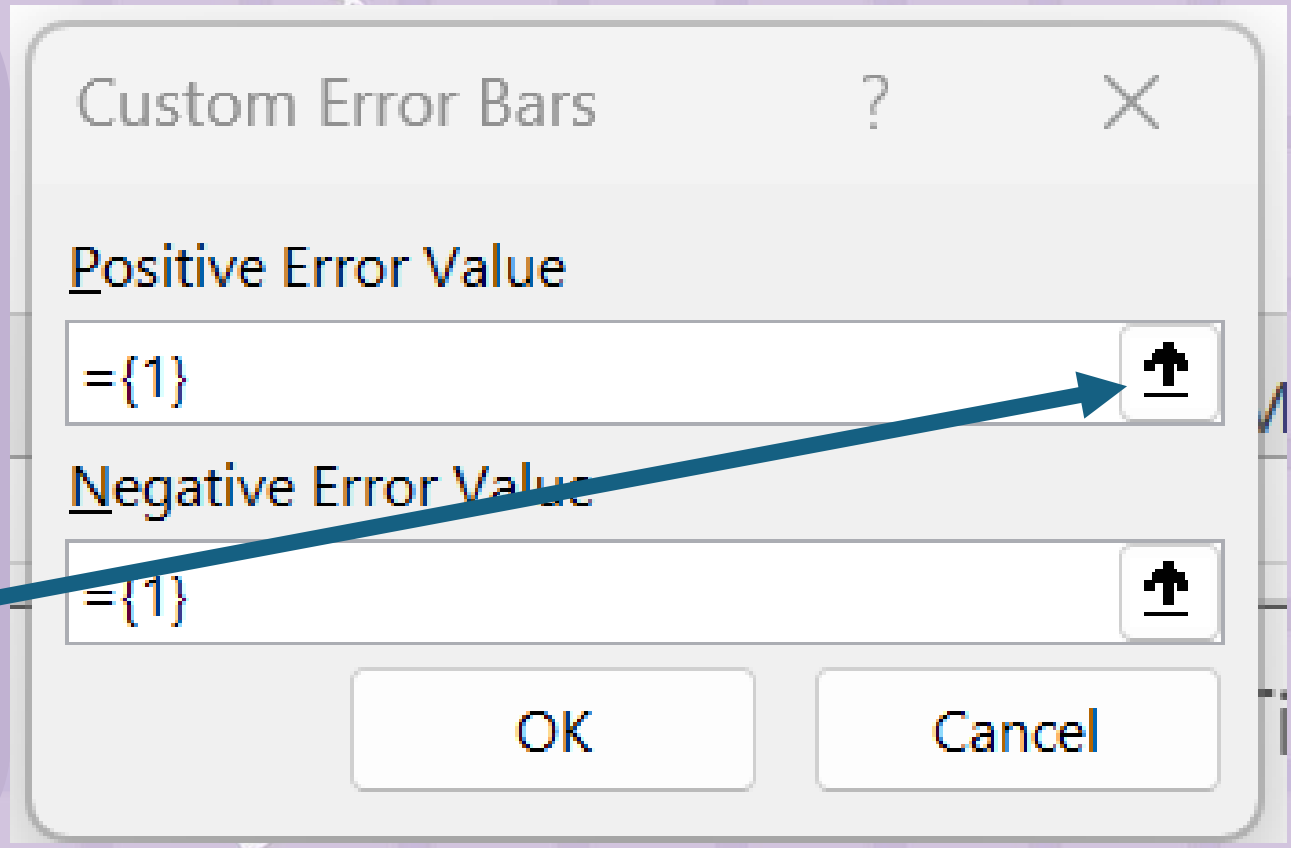
Adding error bars

- Scroll to bottom
  - Error amount
  - Click “Custom”
  - Then specify value



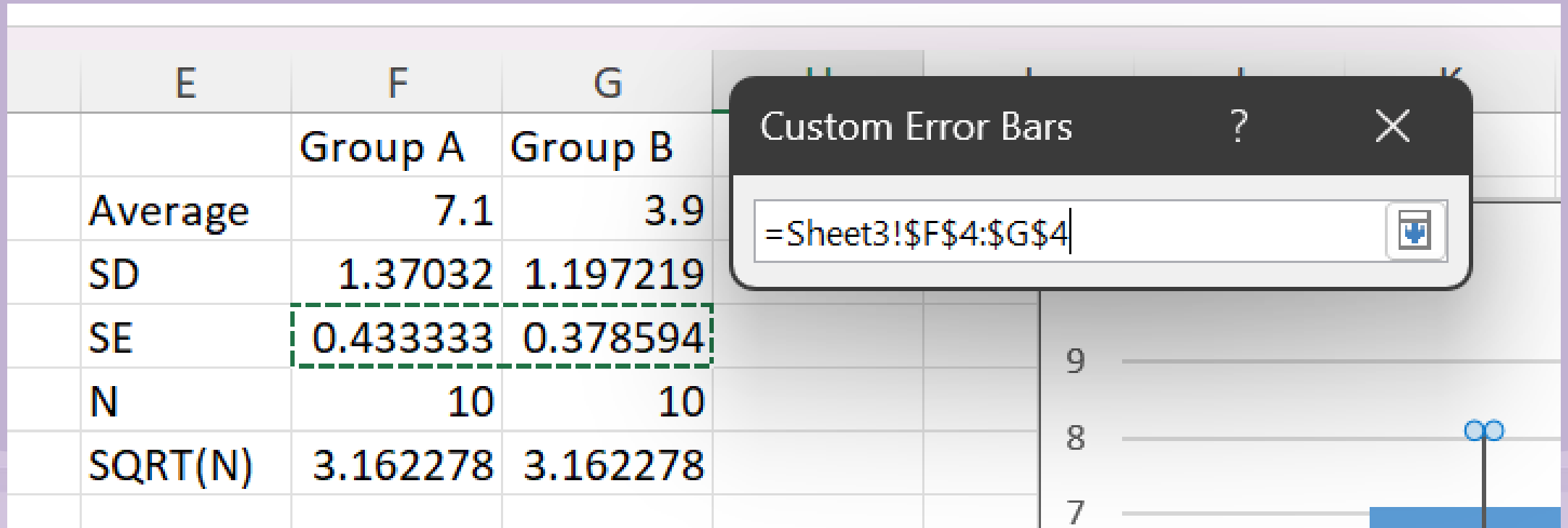
Adding error bars

- You'll put the same thing for both positive and negative
- Click the little arrow



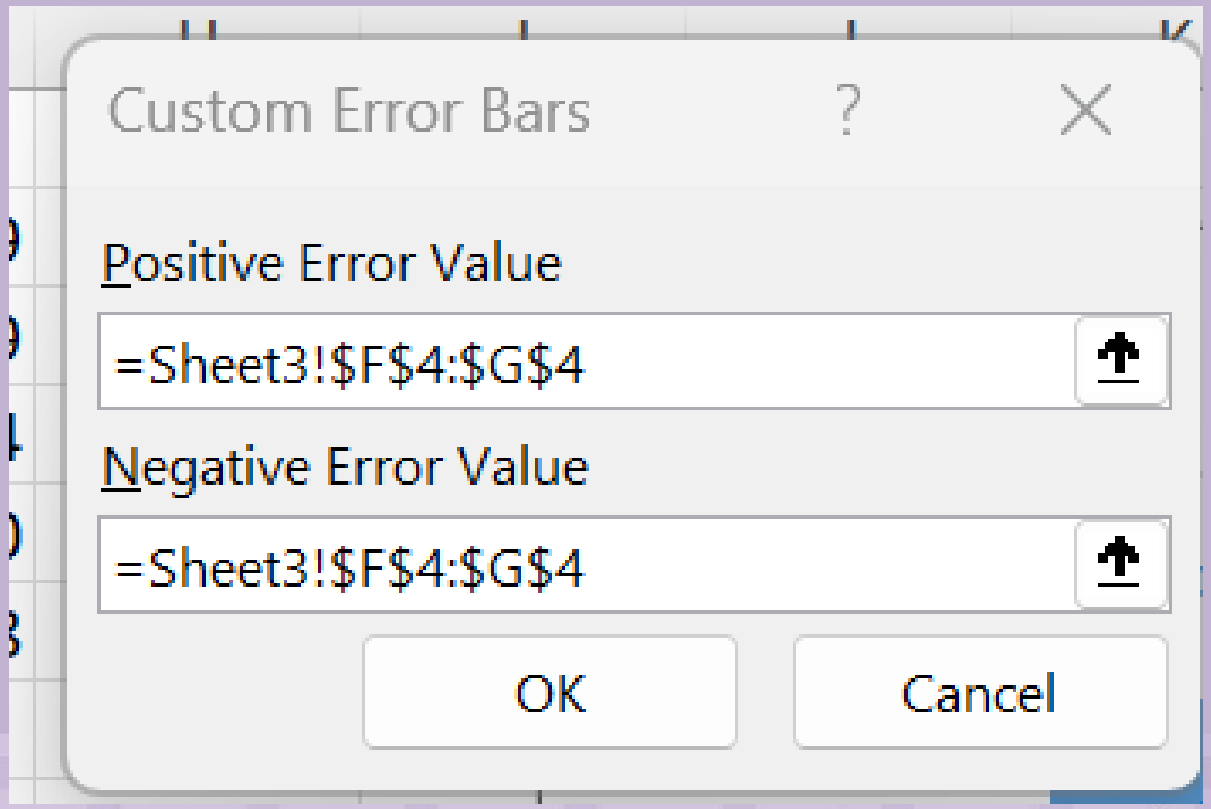
Adding error bars

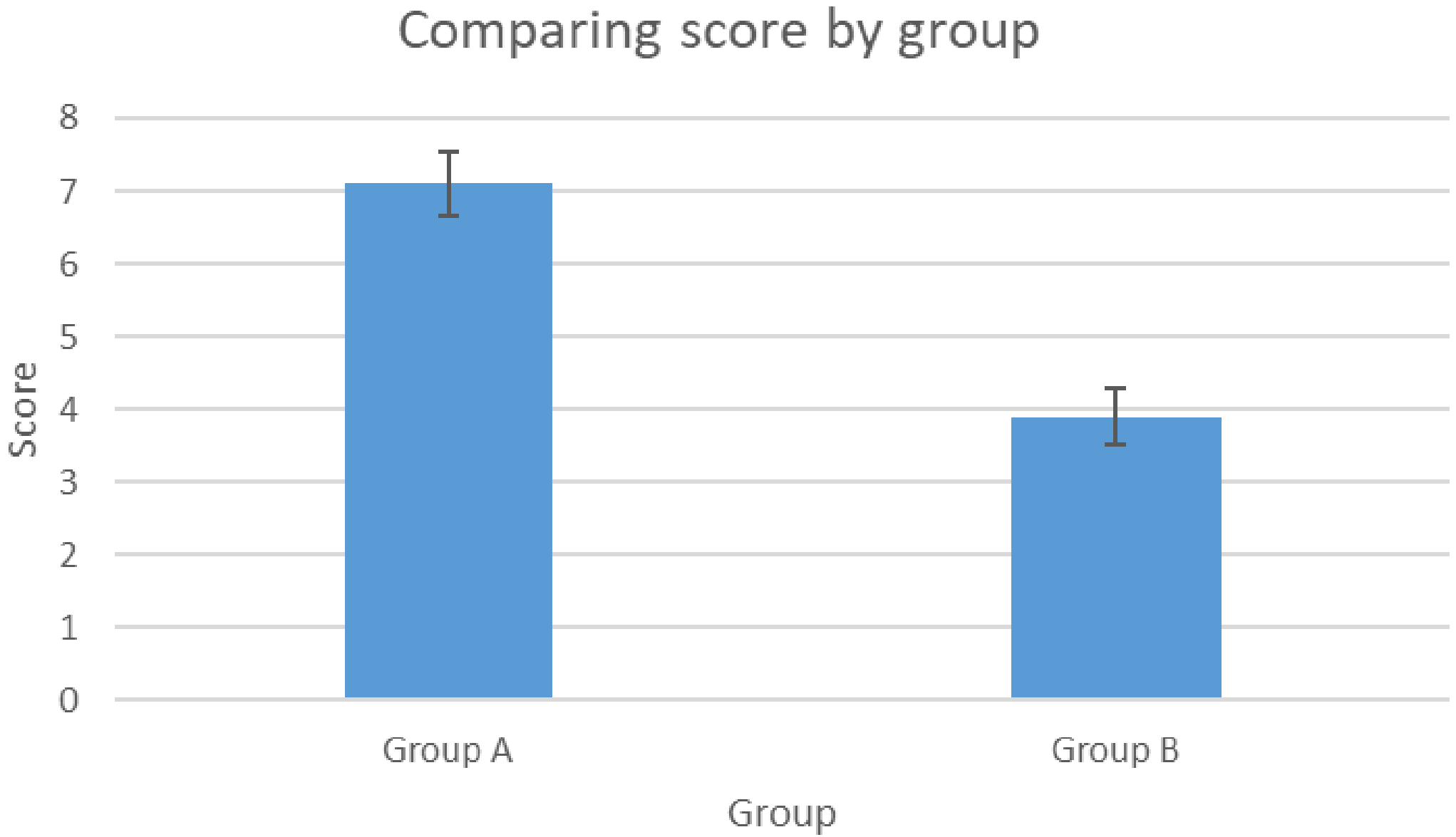
- Select your SE *values*
  - Then click the down arrow



Adding error bars

- Same pos & neg values
- Click “OK”




Comparing score by group
8
7
6
5
4
3
2
1
0
Score
Group A
Group B
Group

Making a scale

- Sometimes, the default graph gives us a weird y-axis
  - Can make it *look* like there's a difference when statistically, there is not
- We want ours *1.5 standard deviations above/below the overall mean*

Making a scale

- Make a new chart

SCALE	
Upper	
Mid	
Lower	

Making a scale

- Find overall mean

SCALE	
Upper	
Mid	=average(b:c)
Lower	

Making a scale

- Find the lower limit
- 1.5 SDs below mean
- Mean – 1.5(sd)
  - F10 = cell where 5.5 is

SCALE	
Upper	
Mid	5.5
Lower	=F10 – 1.5 * stdev(b:c)

Making a scale

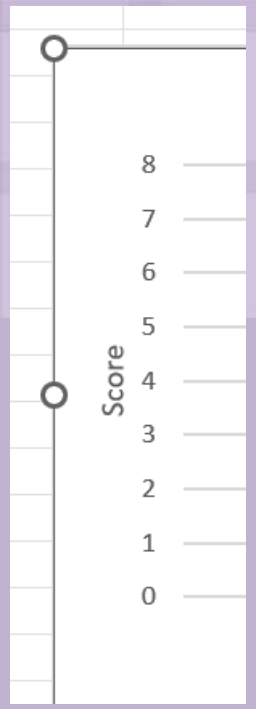
- Find the upper limit
- 1.5 SDs above mean
- Mean + 1.5(sd)
  - F10 = cell where 5.5 is

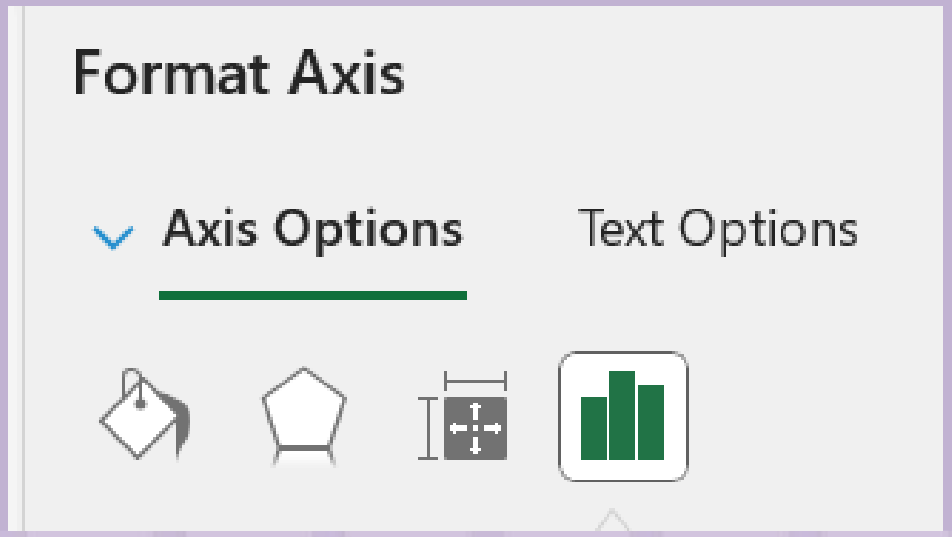
SCALE	
Upper	=F10+1.5*stdev(b:c)
Mid	5.5
Lower	2.402888

SCALE	
Upper	8.597112
Mid	5.5
Lower	2.402888

Setting the scale

- Click on your graph
- Double click the y-axis numbers

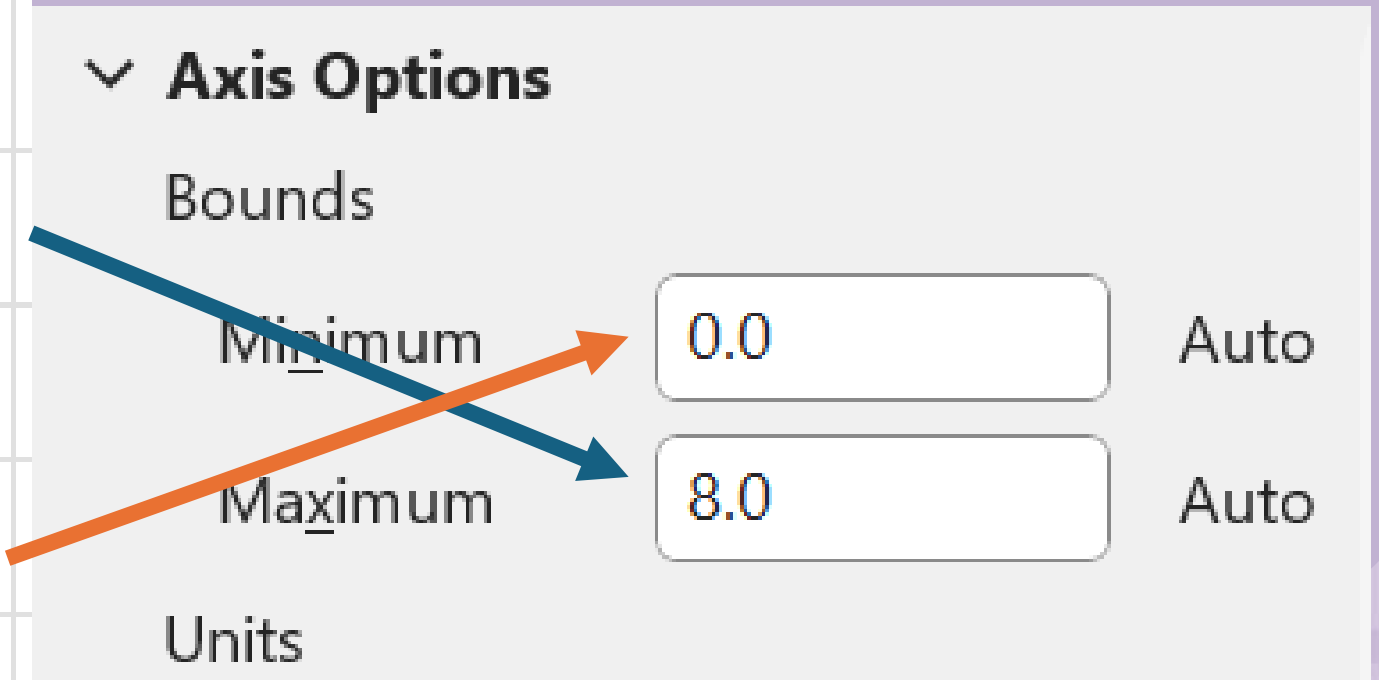




Setting the scale

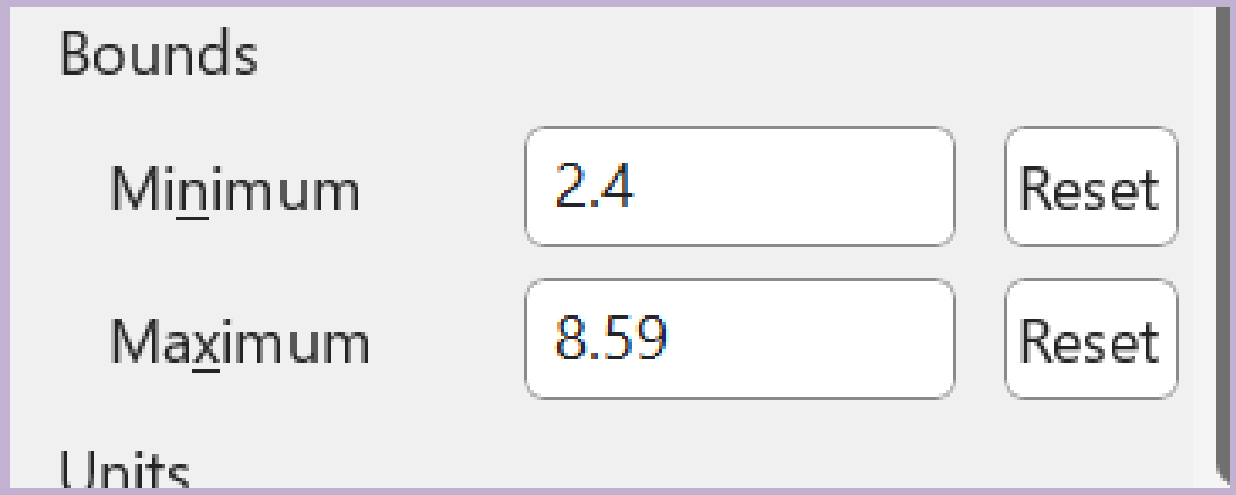
- Manually type your numbers
- Round to 2 decimals

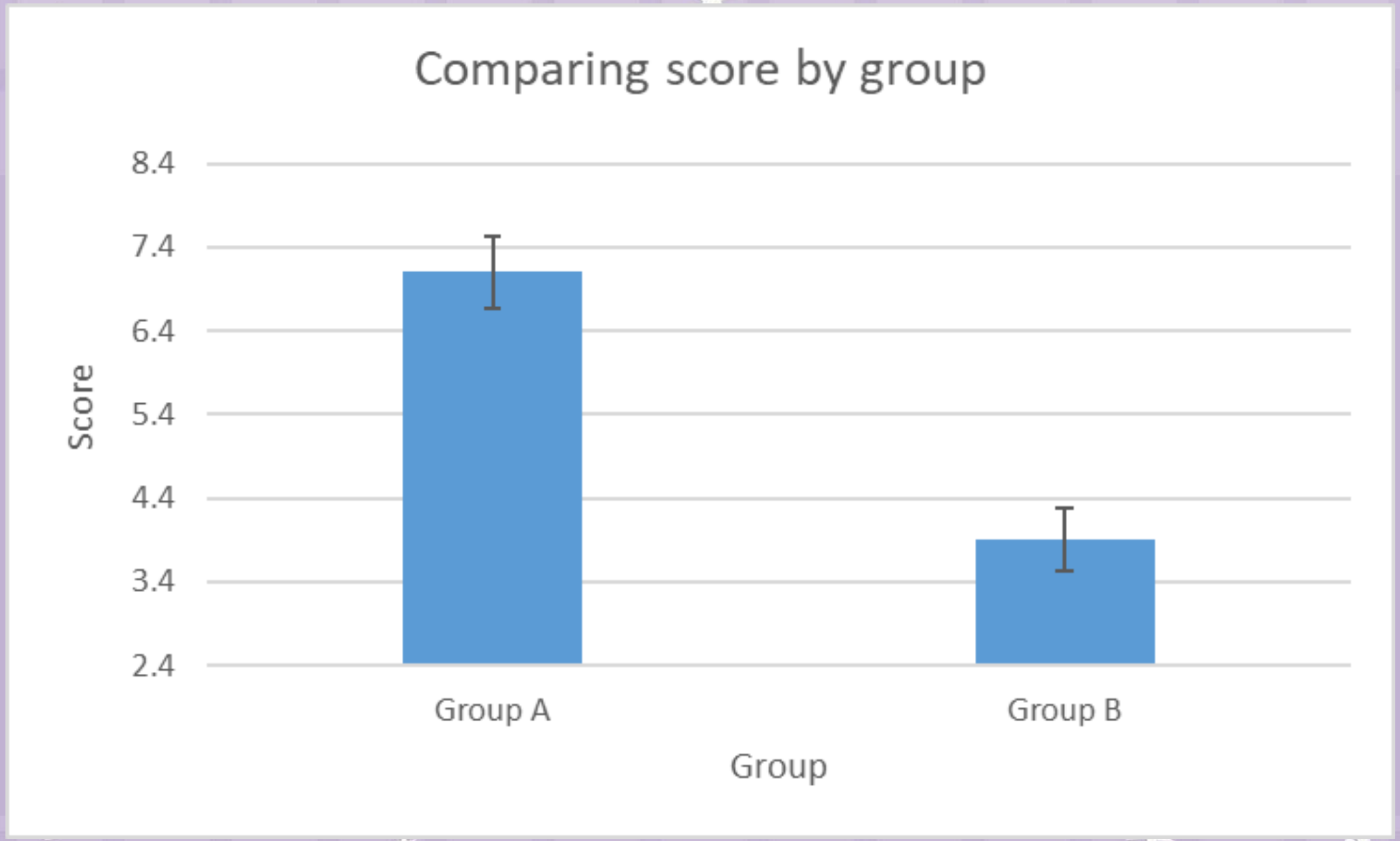
SCALE	
Upper	8.597112
Mid	5.5
Lower	2.402888



Setting the scale

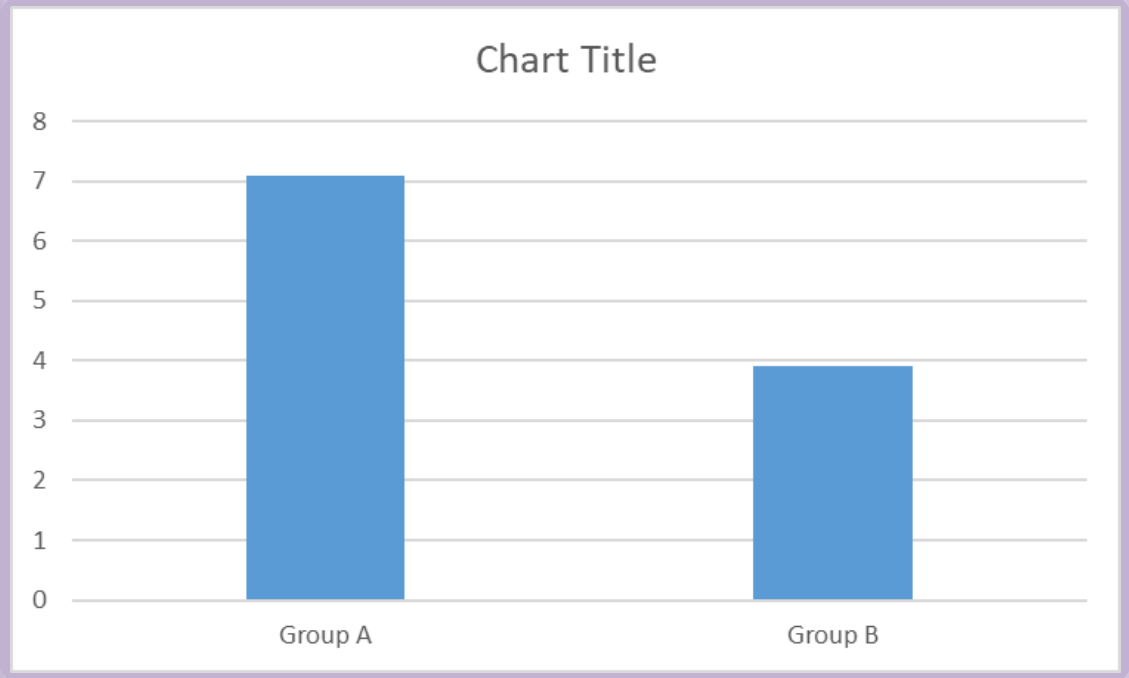
- If it auto populates a number, just go ahead and type in place of that



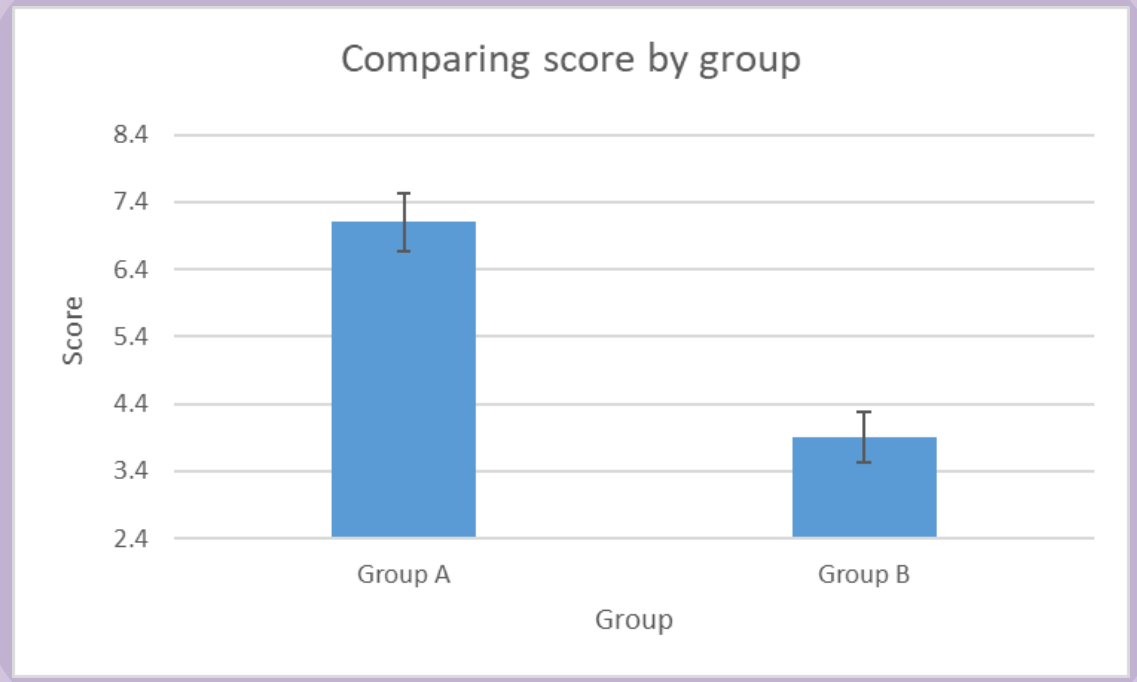

Comparing score by group
8.4
7.4
6.4
5.4
4.4
3.4
2.4
Score
Group A
Group B
Group

See the differences?

OG graph



Updated graph



Graphs

- You can change colors as you please
- As long as they’re readable >:(