Statistics in psychology

1. **Fill in the table below, outlining the definition, and strength and weakness of each descriptive statistic.**

Descriptive Statistics	Definition	Strength	Weakness
Mean			
Median			
Mode			

2. **Out of the three descriptive statistics, we tend to use MEAN the most. This is because it is slightly more informative. Complete the following question using the table below: 'Workout the mean for Team A'**

Team A	Team B
17	11
3	21
43	12
9	10
14	17
13	17
6	12
43	12

Mean =

Standard Deviation

Now we are going to move onto an even more sophisticated way of analysing data 'Standard deviation'. Before we have go….Define what standard deviation is"

3. **Standard Deviation:**

4. **Now watch the following tutorial:**

   https://www.youtube.com/watch?v=WVx3MYd-Q9w

Standard deviation – an example

Standard deviation is a measure of the average amount that scores differ from the mean; it is the **average variance.** Variance is the amount the results are spread around the Mean.

Raw results from one condition of a word recall test:

2, 6, 6, 6, 6, 6, 8, 10, 10, 10, 10, 10, 19

- Our mean number is 8
- We also have some extreme scores
- To work out the dispersion we could use range which is the top number minus the bottom (17), but this is skewed by those extreme scores
- SD is better as it just tells us ***on average*** how much the scores vary from the mean.
- Here the majority of the scores are 2 away from the mean, at each end there is an extreme score; the SD is 3.8.
- Therefore in our summary table if we reported a mean of 8 and an SD of 3.8 people would know that on average our results vary 3.8 scores on either side of the mean (from 4 – 14), **it is less skewed by extreme scores**
- We can now say which results are within one standard deviation of the mean. So, using the Standard Deviation we have a "standard" way of knowing what is normal, and what is extra-large or extra small.
- By looking at standard deviation we can also see how consistent score are in each condition – whether they are close together or spread apart.

5. **Now let's have a go: First let's look at the formula:**

   You will be given the following formula in the first few pages of the exam paper. Using a formula is easy if you know two things – what the symbols mean and what order to do the calculations in. Let's practise this now….

Standard deviation (sample estimate)

$$\sqrt{\left(\frac{\sum(x-\bar{x})^2}{n-1}\right)}$$

What do the symbols mean?

$\sum$ This means the 'sum of' – everything after it should be added together

X This means each individual score in the condition

$\bar{X}$ This means the mean score of all the scores in the condition

n This stands for 'number of' in this case it means the number of scores in the condition

^{2} A small '2' means that the number in front of it should be squared – this means multiplied by itself

$\frac{\quad}{\quad}$ This means that things on top of the line should be divided by things under the line

$\sqrt{\quad}$ This means the square root of everything inside the symbol should be taken

( ) Brackets mean that things inside the brackets should be calculated before things outside the brackets

What order should we tackle the formula in?

- Calculate anything inside brackets first
- Next calculate what is above the division line so you are only dividing one single number with another single number
- Finally you can square root now you have calculated what is inside the large set of brackets.

Let's try it…

Here is some example raw data from a memory experiment looking at how many numbers participants could recall from short term memory. In one condition participants were taught a chunking strategy and in the other they were simply told to memorise.

Pp.	Chunking	Pp.	No Chunking
1	9	11	5
2	8	12	9
3	7	13	4
4	8	14	6
5	8	15	8
6	9	16	9
7	8	17	3
8	7	18	4
9	8	19	4
10	9	20	5

From this raw data we need to create a summary table showing only one measure of central tendency and one measure of dispersion for each condition:

Table 1: A Table to show the mean number of numbers recalled for participants who used chunking compared to participants who did not use chunking.

	Chunking	*No Chunking*
Mean No. Of Numbers recalled		
Standard Deviation		

Step 1: For the summary table, and in order to work out standard deviation we first need to work out the mean for each condition.

Step 2: Working out standard deviation. Let's focus on condition A first, chunking. We need to do this part of the formula first $(X - \bar{X})^2$ For this part of the formula we need to take each result from condition A and **one at a time** subtract it from the mean score and then square it. Use the following table to help you:

Each result from condition A	Subtracted from mean score for condition A	Squared (multiplied by itself)
9		
8		
7		
8		
8		
9		
8		
7		
8		
9		

Step 3: We then need to add up all these results ($\sum$ = Sum of).

Step 4: We need to divide this number by $n - 1$, which is the number of scores minus one – in this case 9.

Step 5: We then need to square root this number to find the standard deviation for Condition A – enter this into the summary table.

Step 6: Repeat steps 2-5 for condition B – not chunked. Below is a table to help you:

Each result from condition B	Subtracted from mean score for Condition B	Squared (multiplied by itself)

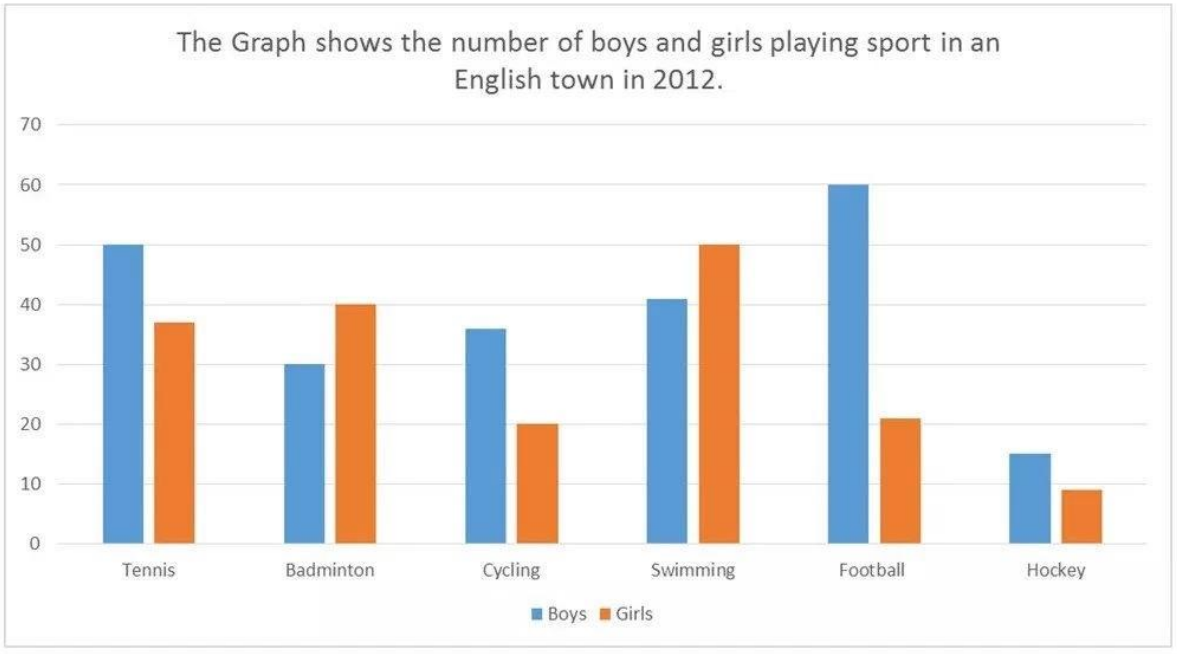
5		
9		
4		
6		
8		
9		
3		
4		
4		
5		

WELL DONE !!

Graphs and Charts

In psychology you may be asked to analyse and draw graphs and charts. Usually these will be scatter diagrams and bar charts so we need to know the basics otherwise we can lose marks in the exam.

6. **Let's have a go at analysing some bar charts**



Draw three conclusions about the bar chart above (don't forget use actual numbers)

Conclusion 1:

Conclusion 2:

Conclusion 3:

Now let's have a go at drawing a graph: Answer the following question:

Mandeep and Priya used a content analysis to investigate how gender is presented in two children's television programmes. To record the data a tally chart was used.

Table 3 shows the data they gathered.

	Programme 1	**Programme 2**	**Total**
Emotional female	𝍸 //	𝍸 ////	16
Emotional male	//	/	3
Strong female	𝍸	///	8
Strong male	𝍸 𝍸	𝍸 /	16
Sporty female	///	////	7
Sporty male	///	𝍸 𝍸	13

Draw a bar chart to show the total number of sporty males and sporty females shown in **Table 3**.