

Level 1 Lab: Experimental Design

Part 2: Descriptive Statistics and Visualising Data

Exploring Data Using Excel

You have analysed data from the Bobo Doll Experiment in the pre lab activity SUMS tutorials using male children. Now we are going to look at data from male *and* female children observing aggressive adult models and investigate if any gender differences exist. Male and female children were exposed to adult models displaying either aggressive behaviour. After observing the aggressive models, the number of acts of physical aggression (e.g., kicking, hitting etc) was recorded while children were playing.

- **Independent Variables (IVs)** are :
 - Gender (Male/ Female)
- **Dependent Variable**
 - Number of Aggressive Acts.
- This study used a **between subjects design**.
- **Hypotheses:**

1) Predict that male children will display more aggressive acts than female children in the aggressive observation group.

In order to investigate these hypotheses, we are going to produce histograms, bar charts and descriptive statistics for the two groups-male aggressive and female aggressive observation conditions.

Getting Started

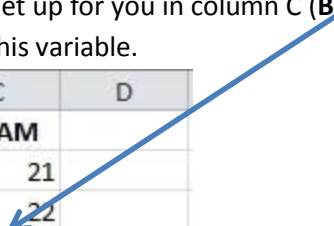
- Download the Excel file “Bobo Doll Data”.
- You will see 2 columns of data
 - **AM** (Aggressive observation condition male)
 - **AF** (Aggressive observation condition female)

Histograms

In order to visualise the data we are going to produce a histogram for the **AM** data. A histogram is a graph showing the frequency distribution of scores for each variable. The frequency distribution counts the number of times each value of your dependent variable occurs, which allows you check that your data is **Normally Distributed**. For more explanation of histograms, see the [Key Terms](#) and Level 1 Experimental Design and Statistics Lecture 3.

1. First we have to set up a “Bin” in Excel for each variable. A “Bin” is simply the different values of your Variable –in this case the number of aggressive acts.

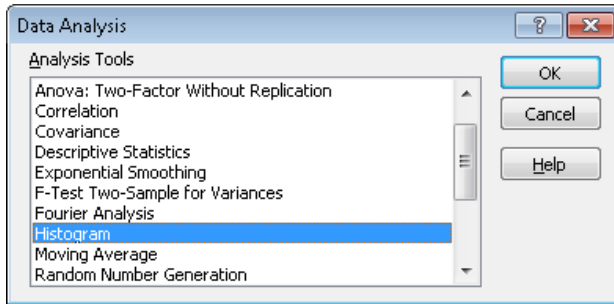
- A Bin for AM has already been set up for you in column C (**Bins AM**). So **Bins AM** tells us the different values that occur for this variable.



A	B	C	D
AM	AF	Bins AM	
21	5	21	
22	4	22	
23	8	23	

2. Now we are ready to produce a histogram.

- Go to the **Data Tab**, and select **Data Analysis**, and then **Histogram** from the Analysis Tools Box.

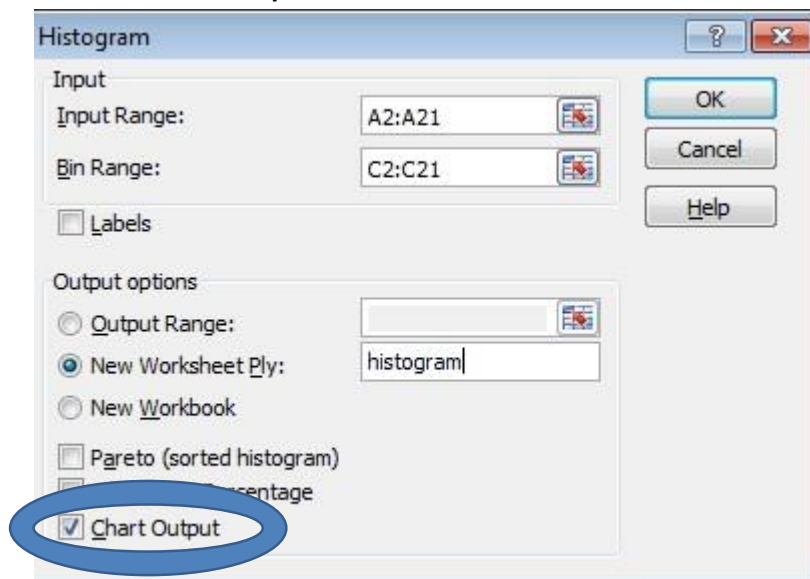


If you can't see the Data Analysis Tab, try the following:

- Go to **File**, select **Options**, then **Add Ins**
 - Select the **Analysis Toolpak**, then select **Go**
 - Check the **Analysis Toolpak box**, then **OK**.
- In the Histogram box the **Input Range** is your data. Simply click and drag to select the **AM** column. Do not select the first row (the text label AM)-Click and Drag from row A2 down to row A21 on the spreadsheet.
 - Enter the Bins AM column for the **Bin Range**. Click and drag on the spread sheet from row C2 downwards.

Input Range

- Alternatively you can enter the range of data by typing the cells in the **Input range** and **Bin range** boxes (see below).
- The histogram will appear on a new spreadsheet so we need to give this a name:
In **Output Options** enter **AM** in the **New worksheet Ply**.
Select the **Chart output** and click **OK**.



- You should now be able to see the Histogram and Frequency Distribution Table for AM in a new spreadsheet.
- **To Navigate back to the data spreadsheet, select the DATA tab at the bottom of the page.**

Save your spreadsheet to your student drive: Go to File-Save as and look on my computer for the drive with your matric number-this is your home drive.

Descriptive Statistics

Central Tendency

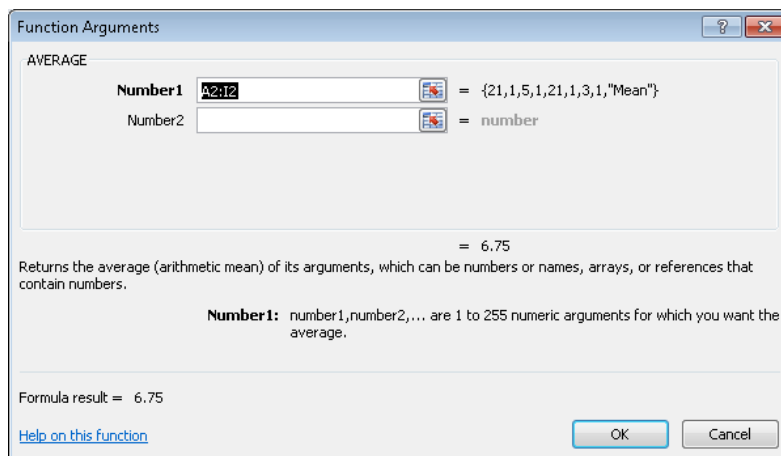
A measure of central tendency is the value that best represents each variable. We are going to calculate the, mean, median and the mode in Excel. For more explanation of measures of central tendency see the [Key Terms](#) and the [Level 1 Experimental Design and Statistics Lecture 3](#).

To calculate the mean for **AM**:

- Go to column H and select cell **H2**. You will see a table has been set up for you (column is labelled AM, (row is labelled mean).

	G	H	I
		AM	AF
Mean			
Median			
Mode			
SD			

- Go to the Formulas Tab, **Insert Function**. Select **AVERAGE from the menu** and click **OK**. **If you can't find the function on the menu, type it into the search box.**
- The AM data is in cells A2:A21. Click and Drag on the spread sheet to Select your data, or type A2:A21 in the box. Click **OK**



The mean should appear in the H2 cell.

- Now repeat the steps above to calculate the mean for **AF**. Cells have already been set up for you to enter the mean for each variable (see below). Remember to select the cell you want the mean to appear in before you Insert Function.

G	H	I
	AM	AF
Mean		
Median		
Mode		
SD		

- Then click and drag or type in the cells you want to calculate the mean for (e.g., B2:B21 for the AF data).

2. To Calculate the Median for **AM**:

- Select the cell you want the median to go in (see above).
 - Go to **Formulas, Insert Function**, and select **MEDIAN**. *If you can't find the function on the menu, type it into the search box.*
- Click and drag or type to select cells A2:A21 for the **AM** data Click **OK**.
- Now repeat these steps to calculate the median for AF.**

3. To calculate the Mode for **AM & AF**:

- Select the cell you want the mode to go in (see above).
- Select **MODE.SNGL** in the **Insert Function** box and repeat the steps above.

4. You should now have a summary table of means, medians and modes of your variables.

Standard Deviation

The Standard Deviation Measures how much your data varies. A large SD means that your data varies a lot, a small SD means that your data varies a little. *For more explanation of the standard deviation see the [Key Terms](#) and the [Level 1 Experimental Design and Statistics Lecture 3](#).*

We are going to calculate the SD for each variable in Excel.

1. To calculate the SD for **AM**:

- Select the cell you want the SD to appear in the summary table (see below).

G	H	I
	AM	AF
Mean		
Median		
Mode		
SD		

- Then go to **Formulas, Insert Function** and choose **STDEV.S** *If you can't find the function on the menu, type it into the search box.*
- Click and drag or type to select cells A2:A21 for AM. Click **OK**.




2. Repeat the steps above to calculate the SD for **AF**.

Graph of Means

In psychology lab reports you are expected to produce a graph and table of your descriptive statistics in your results section. To produce a Graph of means for the AM & AF data:

1. **You need to create a new table of means.** A table has been created for you on the Excel spread sheet (see columns **M & N**). Using the **means** from your summary table, complete this table (e.g., AM mean would be entered in the Male A column in the table of means (see below).

	M	N
	A	
Male		
Female		

2. **Select** this new table of means in your Excel spread sheet.
3. Go to the **Insert** tab, then the  **Insert Column Chart icon**, then select **2D column**.
4. Now you should label the axes of the graph. Click on the horizontal Axes of your graph. Click on the  **Chart Elements** icon and select **Axis Titles-Primary Horizontal Axes**. Alternatively, go to the Chart Tools Design Tab and Select Add Chart Element.
5. A text box containing the phrase **Axis Title** should now have appeared below the x (horizontal) axis. You should select this box and change the text to whatever you think is appropriate. **Clue** the title of the Horizontal axis should describe your **Independent Variable**.
6. You can apply steps 2 & 3 above and insert an informative label for the y (vertical) axis. Click on the  **Chart Elements** icon and select Axis Titles-Primary Vertical Axes.
7. The Vertical axes title normally includes what was measured (i.e. the name of the DV) and what the numbers presented actually are (totals, percentages, means, median, etc.).
8. Using the **Chart Elements Icon** you can insert a **Chart Title**. Try to think of the most informative title you can for the graph. This normally mentions both the IVs and the DV and the measure (totals, percentages, means, median, etc). If you need to change the size of the text then you can do so by selecting the text, clicking on the **Home tab** , and then changing the number in the font size box.
9. *Remember to save your spreadsheet on your Student Home drive. Go to File-Save as and look on my computer for the drive with your matric number-this is your home drive*
10. *The demonstrator will talk you through the results on Excel so you can check that your descriptive statistics and chart are correct.*
11. **NEXT STEP: LAB QUIZ**