



Session Handout

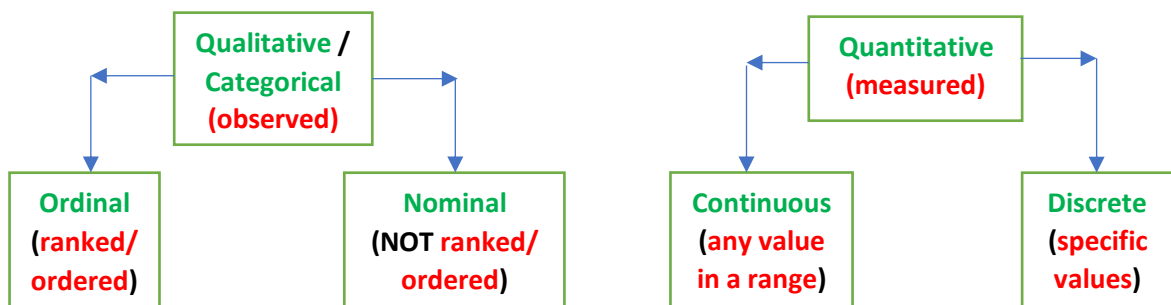
Study Skills Optional Workshop

Introduction to Statistics

Data Processing stages involved in Statistics:



Classification of Primary and Secondary data used in Statistics:

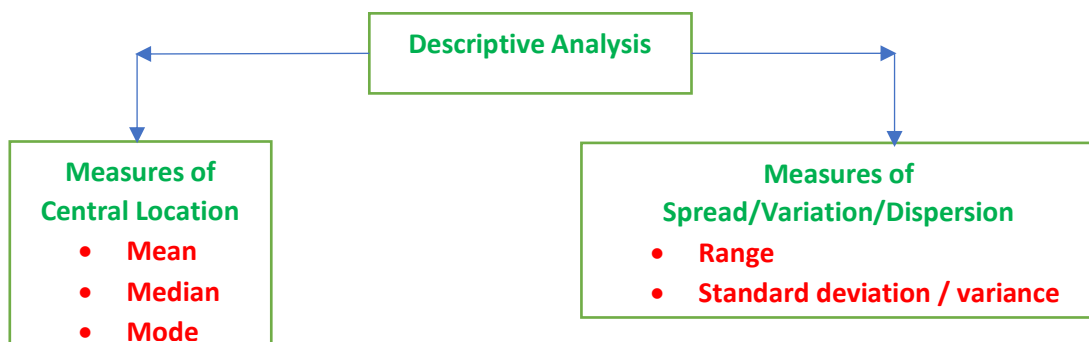


Examples of Sorting of data used in Statistics:

- **Coding** e.g. Male = 0, Female = 1, Neither = 2
- **Grouping** e.g. Age groups 25 – 34, 35 – 44, 45 – 54, 55 – 64, etc.  
(**COUNT**, **COUNTIF** & **COUNTIFS** Functions can be used to obtain frequency of grouped data in MS Excel)

Analysis of data used in Statistics:

- **Descriptive Analysis:** to describe the properties of data
- **Inferential Analysis:** to draw conclusions or take decisions about data



Measures	Ungrouped data	Grouped data	Excel Functions
<b>Mean</b>	$\frac{1}{N} \sum_{i=1}^N x_i$	$\frac{1}{\sum f} \sum_{i=1}^N f_i x_i$	<b>AVERAGE</b> (Ungrouped) <b>SUMPRODUCT &amp; SUM</b> (Grouped)
<b>Median</b>	<b>N is ODD number:</b> $\frac{N+1}{2}$ th data <b>N is EVEN number:</b> mean of $\frac{N}{2}$ th & $\frac{N+2}{2}$ th data	$l_m + \frac{\frac{\sum f}{2} - \sum f_{b,m}}{f_m} w_m$	<b>MEDIAN</b>
<b>Mode</b>	<b>Data that occurs MOST</b>		<b>MODE.SNGL</b> (First Mode only)  <b>MODE.MULT</b> (All Modes)
<b>Range</b>	<b>Highest data – Lowest data</b>		<b>MAX – MIN</b>
<b>Standard deviation</b>	$\sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N-1}}$ <b>(Sample)</b> $\sqrt{\frac{\sum_{i=1}^N (x_i - \bar{x})^2}{N}}$ <b>(Population)</b>	$\sqrt{\frac{\sum_{i=1}^n f_i (x_i - \bar{x})^2}{\sum f - 1}}$ <b>(Sample)</b> $\sqrt{\frac{\sum_{i=1}^n f_i (x_i - \bar{x})^2}{\sum f}}$ <b>(Population)</b>	<b>STDEV.S</b> (Sample)  <b>STDEV.P</b> (Population)

$x_i$ : Individual data value;  $N$ : Number of data;  $f_i$ : frequency of each class;  $\Sigma$ : Summation symbol;

$n$ : Number of classes;  $l_m$ : Lower class boundary of median class;  $\sum f_{b,m}$ : Cumulative frequency of class just before the median class;  $f_m$ : frequency of the median class;

$w_m$ : width of the median class; **Median Class**: The first class whose **cumulative frequency**  $\geq \frac{\sum f}{2}$

**Exercises** (Use the data in **Data for Exercises** tab of this Excel file <https://bit.ly/3pPqmYy> OR [https://ardenuni-my.sharepoint.com/:x/g/personal/mdada\\_arden\\_ac\\_uk/EZdQZKQnEWVOMGBwldpHmx4B-GzWOHEgfL2CtdOkYMT1Xg?e=CcfzST](https://ardenuni-my.sharepoint.com/:x/g/personal/mdada_arden_ac_uk/EZdQZKQnEWVOMGBwldpHmx4B-GzWOHEgfL2CtdOkYMT1Xg?e=CcfzST))

(1) Complete the descriptive statistics of **Weight, Height & BMI** for the **Ungrouped data** (Hint: **Body Mass Index, BMI** =  $\frac{\text{Weight (in kg)}}{\text{Height}^2}$  Height should be in metres (m).

(2) Complete the descriptive statistics of **Age** for the **Grouped data**

(3) Plot a **Scatter Plot** chart of BMI against Age

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