

- * mode: highest frequency
 - the only one for qualitative
 - might or might not exist
 - not necessarily unique
 - not practical with continuous

* median: $\frac{n+1}{2}$ ^{number of values}

- Always exists
- Unique
- not affected by skewness, outliers or extremes
- can be used with ordinal data
- it discards lots of information and focuses on the middle of data

لو صلاح على رقم عشري
مثال: 3.5 بروج لا value 3 و 4
بقسمهم على 2

* Arithmetic mean $\bar{x} = \frac{\sum x}{N}$ (Average)

- Unique
- always exists
- affected by skewness ...
- can't be used with ordinal

* weighted mean $\rightarrow \frac{w_1 \bar{x}_1 + w_2 \bar{x}_2}{w_1 + w_2}$ زي معدل الجامعة

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* Relative Frequency: $\frac{\text{Category number}}{\text{total number of all categories}}$

* percentage: Relative Frequency $\times 100$

* Cumulative Frequency: $\sum_{i=1}^n \text{Category number}$
جمع فئات فئاته

* Cumulative R.F: Relative frequency of category + the categories above

* % Cumulative R.F: Cumulative R.F $\times 100$

* Class marks: $\frac{\text{Highest number} + \text{Lowest number}}{2}$
of class interval

* pie charts: nominal + Ordinal
it shows frequency + percentage \Rightarrow For 1 variable
part + whole comparison

* Bar charts: ordinal/nominal + quantitative discrete
x axis \rightarrow frequency y axis \rightarrow percentage

* types of bar chart

1) simple: magnitude difference

2) clustered: easier comparison for data of different sizes

3) stacked:

* Histogram: continuous table + graph (polygon)

from - to

* Range : $\left(\begin{array}{c} \text{Highest} \\ \text{value} \end{array} - \begin{array}{c} \text{Lowest} \\ \text{value} \end{array} \right)$

- simplest and most obvious
- not affected by skewness
- sensitive to outliers
- not useful for measures of variability; because it's based on two values

* percentile: $p(N+1)$ data should be ordered from lowest to highest
(find the 20th percentile)

deciles : group of 10s

quantiles : group of 5s

quartile: 1/25 1/50

* sample error : deviation between sample mean and μ population mean.
 $S.E = \frac{S.D}{\sqrt{N}} \Rightarrow$ sample size

* S.D (standard deviation) : $\sqrt{\text{variance}}$

* variance : $\frac{\sum (x - \bar{x})^2}{N-1}$

* $M = \bar{x} \pm 1.96 S.E \Rightarrow$ within 1.95 // 2 S.D

* $M = \bar{x} \pm 2.58 S.E \Rightarrow$ within 1.99 // 3 S.D

* $C.V = \frac{S.D}{\bar{x}} \times 100$