

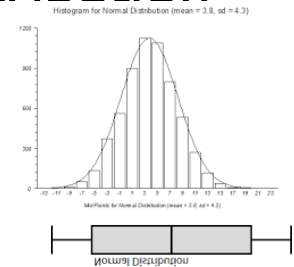
How to choose?

Descriptive statistics, graphs, tests

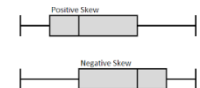
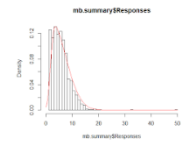
Descriptive statistics and Visuals

► Dependent on measurement type and shape of distribution

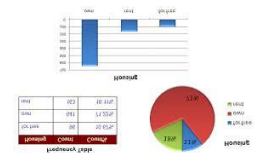
- For continuous (Normally distributed) variables
 - Count, mean, standard deviation (minimum, maximum)
 - Histograms, dot plots, box plots, scatter plots

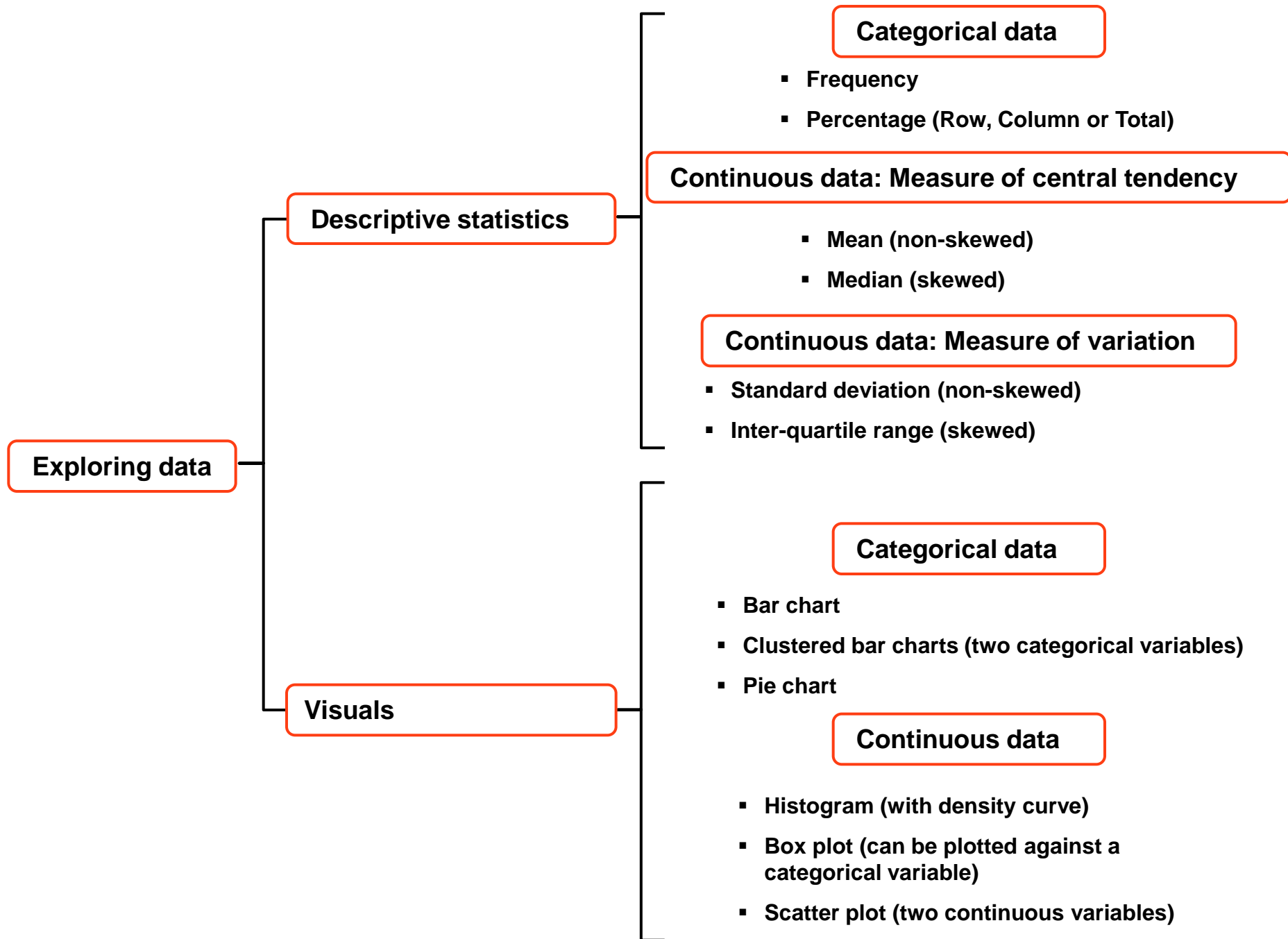


- For continuous (skewed) variables
 - Count, median, inter-quartile range (minimum, maximum,)
 - Histograms, dot plots, box plots, scatter plots



- For categorical variables
 - Frequency counts, percentages
 - One-way tables, two-way tables
 - Bar charts, pie charts





Deciding Normality

Visual

- Inspect
 - Histogram with density curve
 - QQPlot

Skew

- Calculate standardised skew
 - Approaching normality if between ± 2

Kurtosis

- Calculate standardised kurtosis
 - Approaching normality if between ± 2

Z Scores

- Create standardised scores for variable (Z scores)
 - Approaching normality if 95% between
 - ± 3.29 (sample size > 80)
 - ± 2.5 (sample size ≤ 80)



Deciding Normality

- ▶ There are statistical tests for normality
 - ▶ Shapiro-Wilks for small samples
 - ▶ Kolmogorov-Smirnov for large samples (>50)
- ▶ I have not covered these with you as they will usually return a result to indicate non-normality
 - ▶ THIS DOES NOT MEAN YOU CAN'T PROCEED WITH PARAMETRIC TESTS
- ▶ I expect you to complete a normality assessment in your CA as I have outlined during the module.
 - ▶ If you rely solely on a normality test then you will lose quite a few marks.

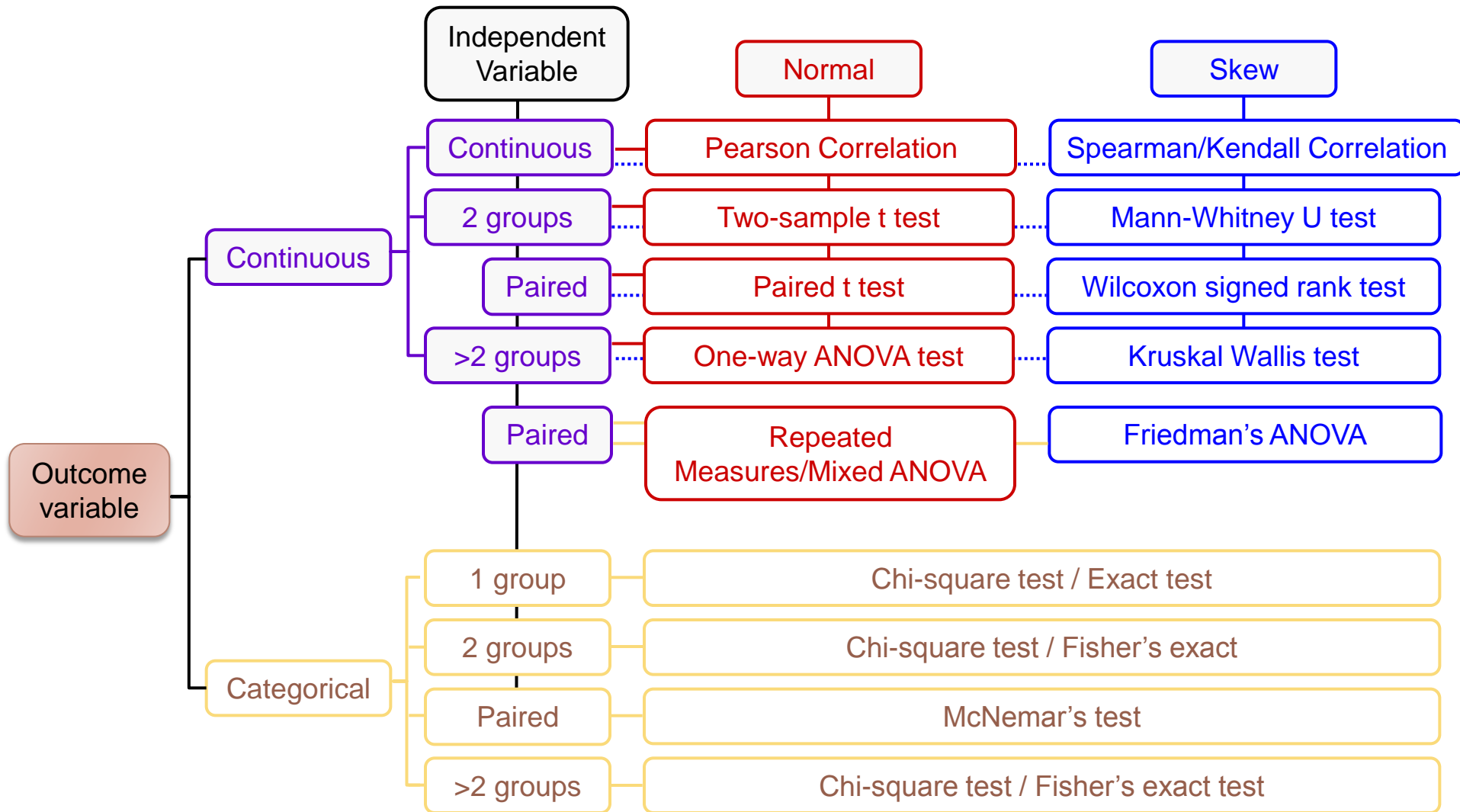


Which test?

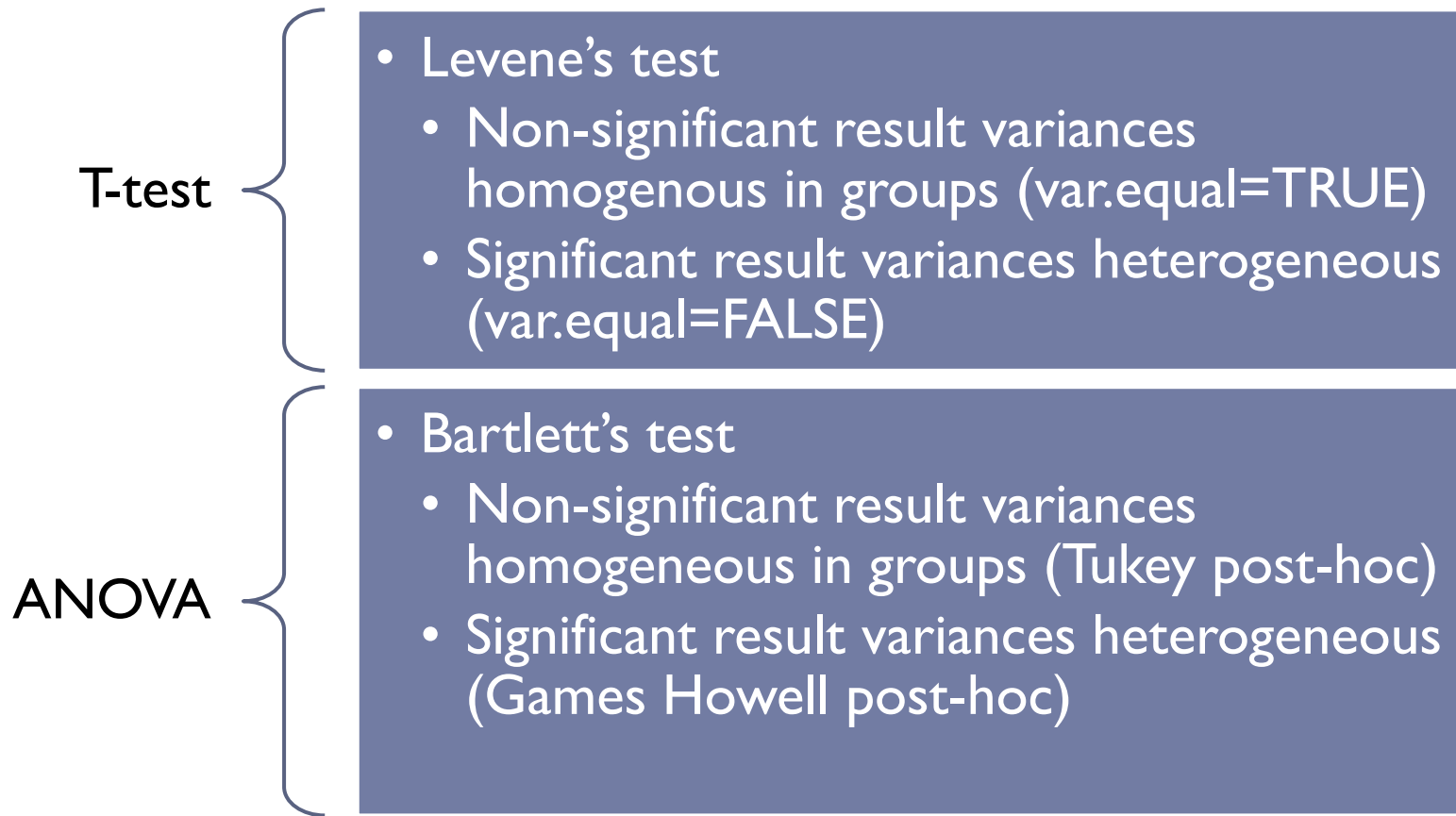
- ▶ What is your measurement type?
 - ▶ For the outcome variable?
 - ▶ Continuous (Normal, Skew) or Categorical?
 - ▶ If more than one outcomes, are they paired or related?
 - ▶ For your independent variable?
 - ▶ Continuous or Categorical (1 group, 2 groups, more than 2 groups)
 - ▶ For 2 or more than 2 groups: Independent (Unrelated) / Paired (Related)



How to choose your test?



Parametric Difference Tests – Pre-Check



Independent variable/ Number of groups	Outcome(Dependent) variable		
	Continuous and Normally distributed (Parametric)	Continuous and skewed / Ordinal (Non-parametric)	Binary (2 categories)
Continuous	Pearson correlation <code>cor.test method='Pearson'</code>	Spearman/Kendall correlation <code>cor.test method='Spearman' / method='Kendall'</code>	
2 independent groups	T test <code>t.test var.equal=TRUE/FALSE</code>	Mann-Whitney U test <code>coin::wilcox.test</code>	Chi-square test / Fisher's Exact <code>gmodels::Crosstable fisher=TRUE chisq=TRUE</code>
Paired (related) sample (2 time points)	Paired t test <code>t.test paired=TRUE/FALSE var.equal=TRUE/FALSE</code>	Wilcoxon signed rank test <code>coin::wilcox.test Paired=TRUE</code>	McNemar's test <code>mcnemar.test</code>
>2 independent groups	One-way ANOVA test <code>aov posthoc: Tukey/Games Howell posthoc Userfriendlyscience::onewaypost hoc=tukey/games-howell</code>	Kruskal-Wallis test <code>kruskal.test</code>	Chi-square test / Fisher's Exact Test <code>gmodels::Crosstable fisher=TRUE chisq=TRUE</code>
>2 related samples (>2 time points)	Repeated measures ANOVA <code>Aov</code>	Friedman's Test <code>Friedman.test</code>	