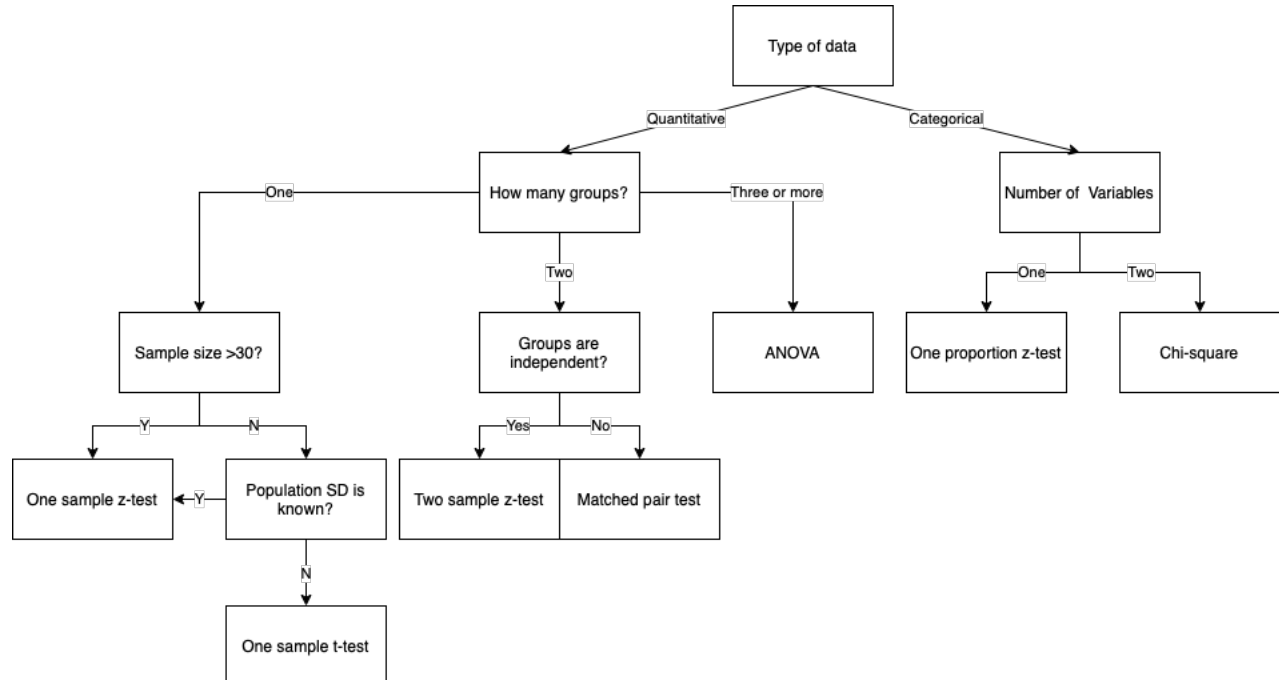


Final Sheet

December 2021

- 1 Data
- 2 Normal distribution
- 3 Binomial distribution
- 4 Regression Analysis
- 5 Experiments and Observational studies
- 6 Types of sampling
- 7 Hypothesis Testing



7.a One sample z-test

Algorithm

- Identify parameter of interest. Find the null and alternative hypotheses.
- s - The standard deviation of the sample.
- n - The sample size.
- μ - Hypothesised population mean.
- $\mathbf{SE}(\bar{y}) = \frac{s}{\sqrt{n}}$ - Standard error of the statistic.
- Construct the null-model: $\mathbf{N}(\mu, \frac{s}{\sqrt{n}})$
- Find the test-statistic(t): $\mathbf{Z} = \frac{x-\mu}{\mathbf{SE}(\bar{y})}$
- Using R compute the p-value:
 - One-sided hypothesis : `pnorm(t)`
 - Two-sided hypothesis : `2 * pnorm(t)`
- If the p-value is less than α - reject the null-hypothesis. Otherwise, you fail to reject the null-hypothesis.

7.b One proportion z-test

Algorithm

- Identify parameter of interest. Find the null and alternative hypotheses.
- n - The sample size.
- p_0 - Hypothesised proportion.
- $\mathbf{SD} = \sqrt{\frac{p_0(1-p_0)}{n}}$ - Standard error of the statistic.
- Construct the null-model: $\mathbf{N}(\mu, \sqrt{\frac{p_0(1-p_0)}{n}})$
- Find the test-statistic(t): $\mathbf{Z} = \frac{x-p_0}{\mathbf{SD}}$
- Using R compute the p-value:
 - One-sided hypothesis : `pnorm(t)`
 - Two-sided hypothesis : `2 * pnorm(t)`
- If the p-value is less than α - reject the null-hypothesis. Otherwise, you fail to reject the null-hypothesis.

7.c Two sample z-test

Algorithm

- Identify parameter of interest. Find the null and alternative hypotheses.
- s - The standard deviation of the sample.
- n - The sample size.
- μ - Hypothesised population mean.
- $\mathbf{SE}(\bar{y}) = \frac{s}{\sqrt{n}}$ - Standard error of the statistic.
- Construct the null-model: $\mathbf{N}(\mu, \frac{s}{\sqrt{n}})$
- Find the test-statistic(t): $\mathbf{Z} = \frac{x-p_0}{\mathbf{SE}(\bar{y})}$
- Using R compute the p-value:
 - One-sided hypothesis : `pnorm(t)`
 - Two-sided hypothesis : `2 * pnorm(t)`
- If the p-value is less than α - reject the null-hypothesis. Otherwise, you fail to reject the null-hypothesis.

7.d Matched pair

7.e One sample t-test

7.f ANOVA