

Hypothesis testing

1 Tests of hypotheses

Statistical hypothesis - An assertion or conjecture concerning a population.

To test the validity of a statement a random sample is taken from the population and that data can then be used to provide evidence that either supports or does not support the hypothesis.

Null hypothesis - H_0 - A hypothesis assumed to be true **Alternative hypothesis** - H_1 - The situation if H_0 is false.

If the data leads to rejection of the null hypothesis the alternative hypothesis will be accepted.

The sample data is used to evaluate the **test statistic**, probabilities related to it can be calculated using the null hypothesis.

If the test statistic is found in the **critical region** the null hypothesis will be rejected.

The **boundary values** of the critical region are called the critical values.

2 Method

1. Establish the null and alternative hypothesis (H_0 and H_1)
2. Define distribution under H_0
3. Decide on the significance level
4. Collect data, state the test statistic, $X=$
5. Calculate the probability of obtaining the test statistic or a more extreme result (same direction as H_1)
6. Compare this to the sig level as a decimal
 - If **greater** than the sig level, it is a **non significant** result, it is not in the critical region and we **do not** reject H_0
 - If **less** than sig level, it is a **significant result**, it is in the critical region and we **reject** H_0
7. Interpret the results in terms of the original claim