

# T test

**Data:**

- A numeric variable (like weight)
- A categorical variable (like sex)

**Observation from the data:**

- The average weight for males is more than that for females

**Research question:**

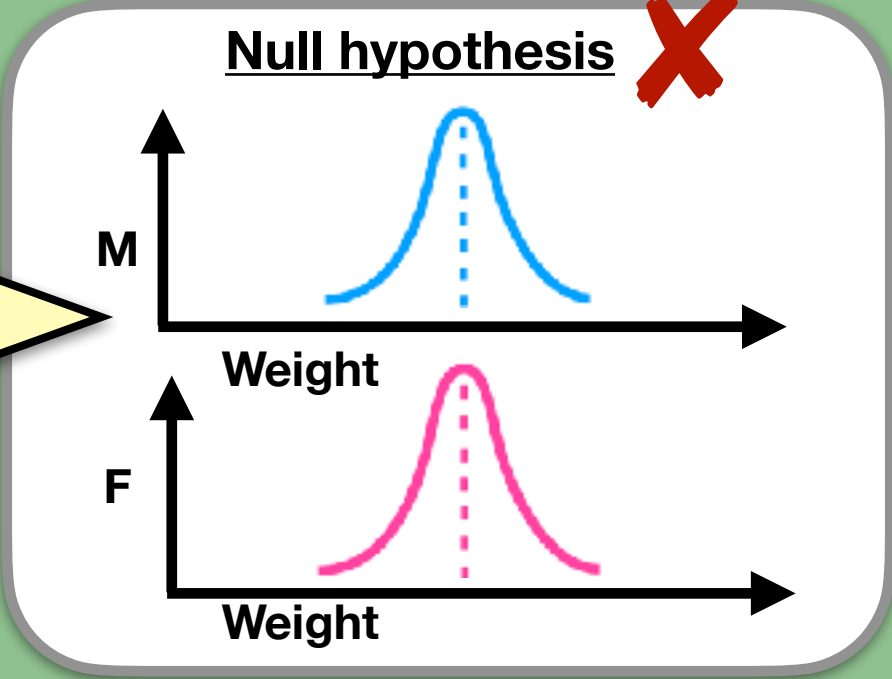
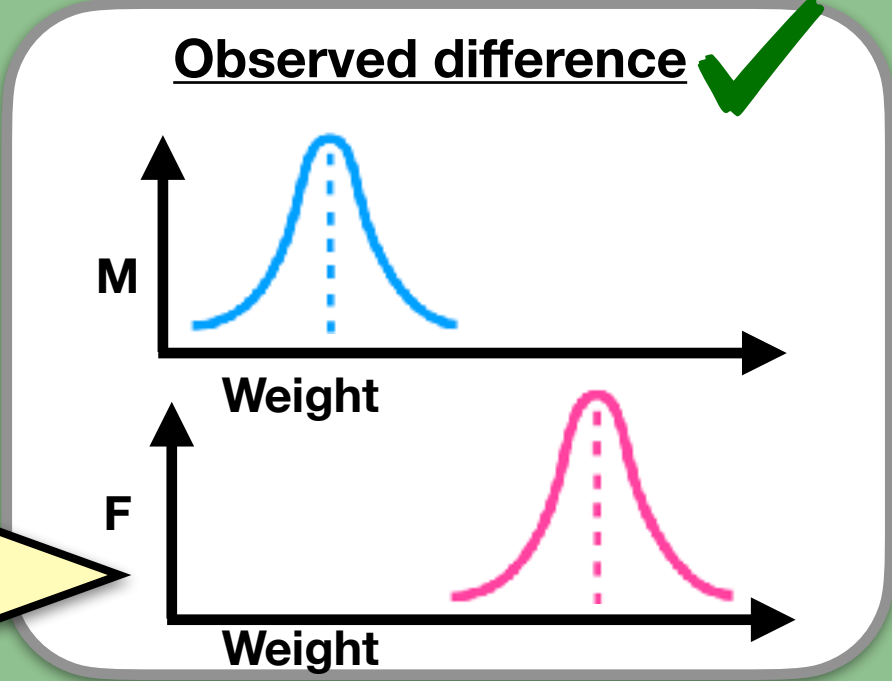
- Is this difference due to chance or is it a statistically significant difference?

**Start with a null hypothesis:**

- The average weight in each group is the same

**Perform a Student's T test**

- If the p value is less than 0.05 then you can reject the null hypothesis and conclude that the difference between means (averages) in the two categories is statistically significant



# Chi test

**Data:**

- Two categorical variables e.g.
  - Sex (male / female)
  - Height category (short, medium height, and tall)

**Observation from the data:**

- As we look at the observations in the different height categories, we see different proportions of men and women. We would also see the association if we looked at the sex groups separately: the proportion of people who were short, medium and tall would be different in the two groups.

**Research question:**

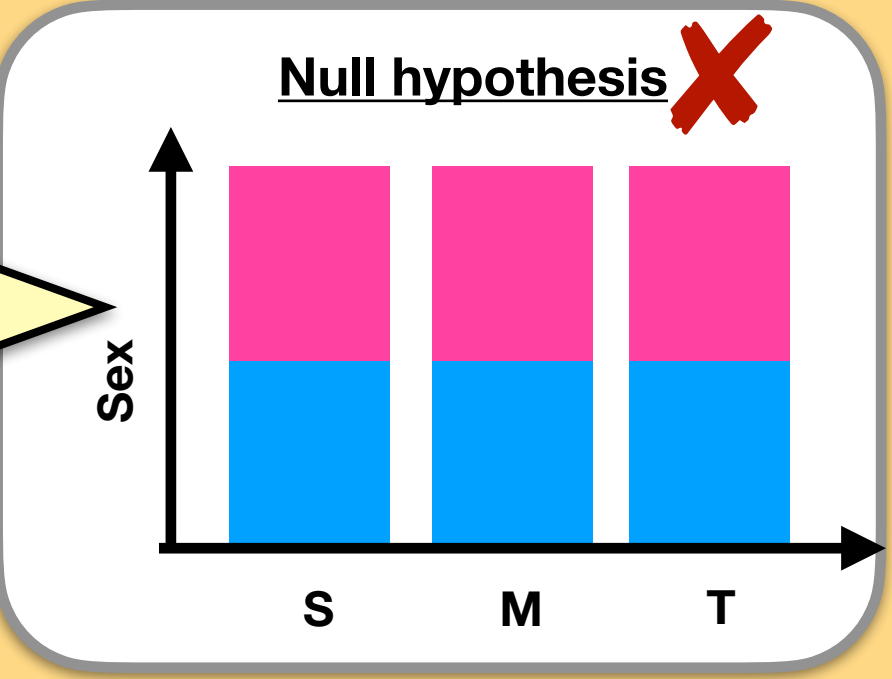
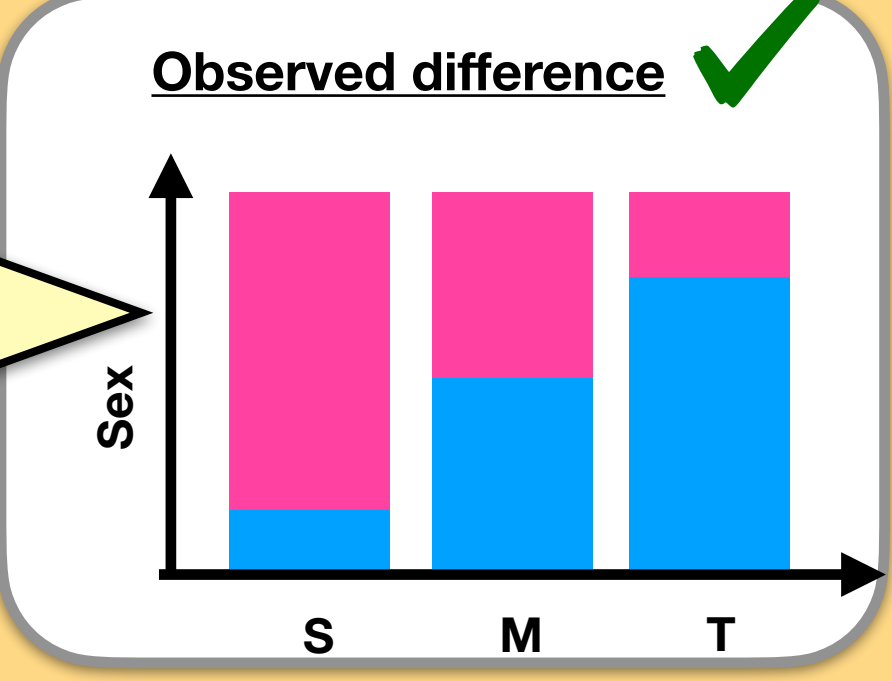
- Is this association due to chance or is it statistically significant?

**Start with a null hypothesis:**

- There is no association between Sex and Height Category

**Perform a Chi test**

- If the p value is less than 0.05 then you can reject the null hypothesis and conclude that the association between Sex and Height Category is statistically significant



**Data:**

- A numeric variable (like weight)
- A categorical variable with 3 or more categories (like nationality: American; British; Russian)

**Observation from the data:**

- The average weight is not the same for each nationality

**Research question:**

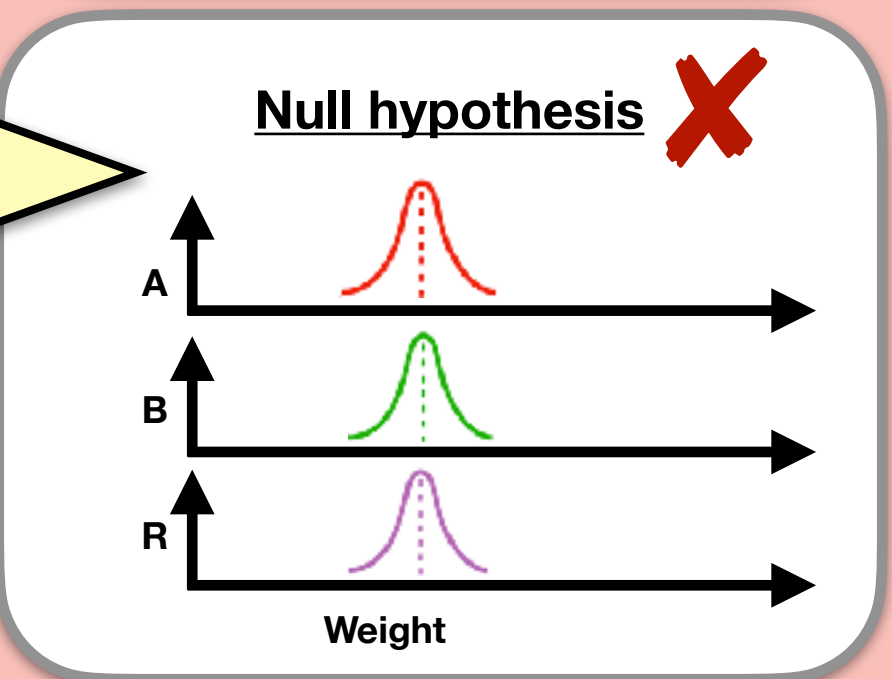
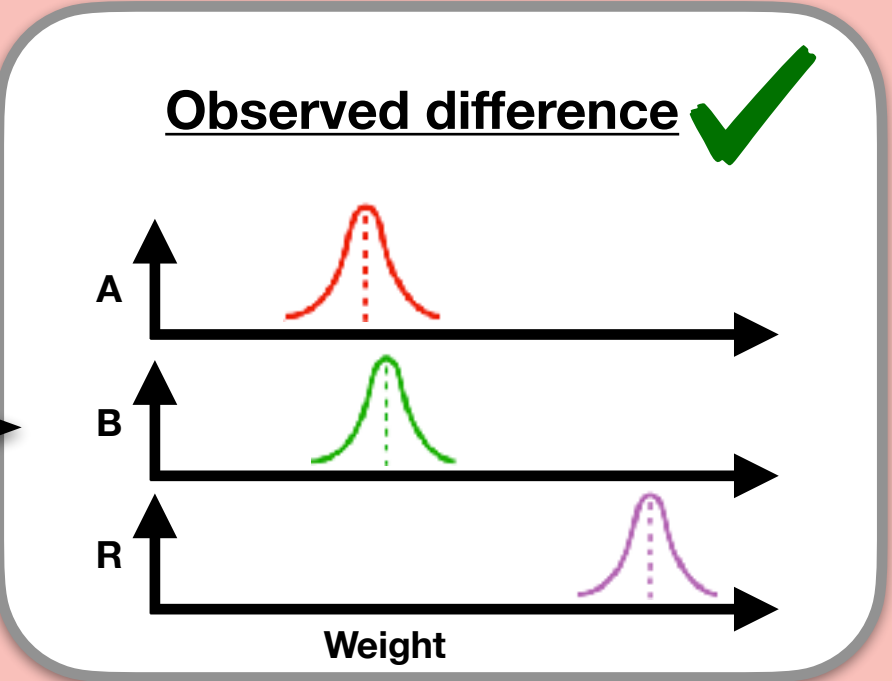
- Is this difference due to chance or is it a statistically significant difference?

**Start with a null hypothesis:**

- The average weight in each group is the same

**Perform an ANOVA**

- If the p value is less than 0.05 then you can reject the null hypothesis and conclude that the difference between means (averages) in the three categories is statistically significant. Note that this test doesn't tell you which of the three is different. It just tells you that they are not all the same.



# Correlation test

**Data:**

- Two numeric variables like Weight and Age

**Observation from the data:**

- There is an association (correlation) between the two variables: as the value of one changes, the value of the other seems to change with it (either up or down).

**Research question:**

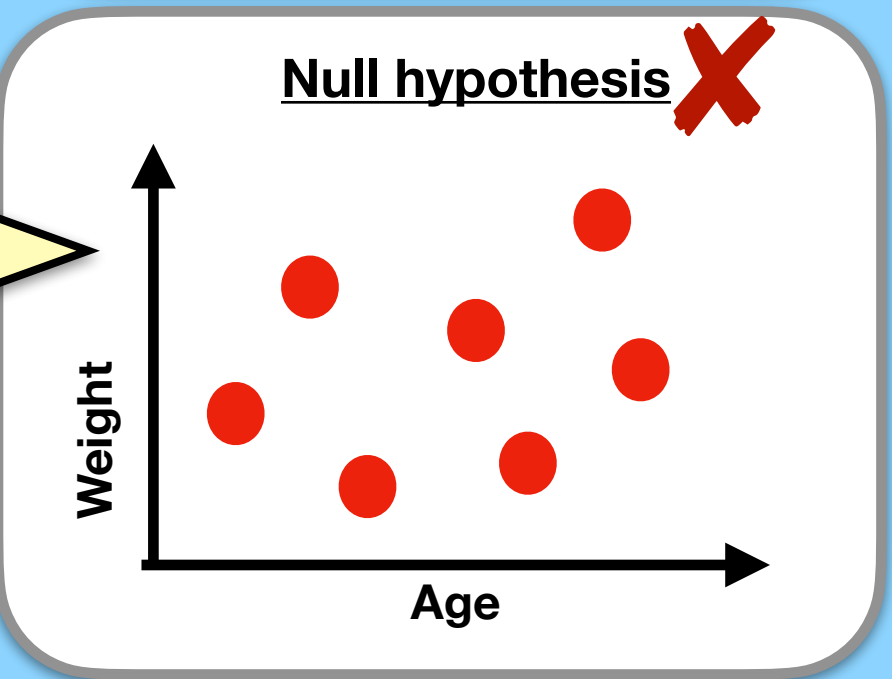
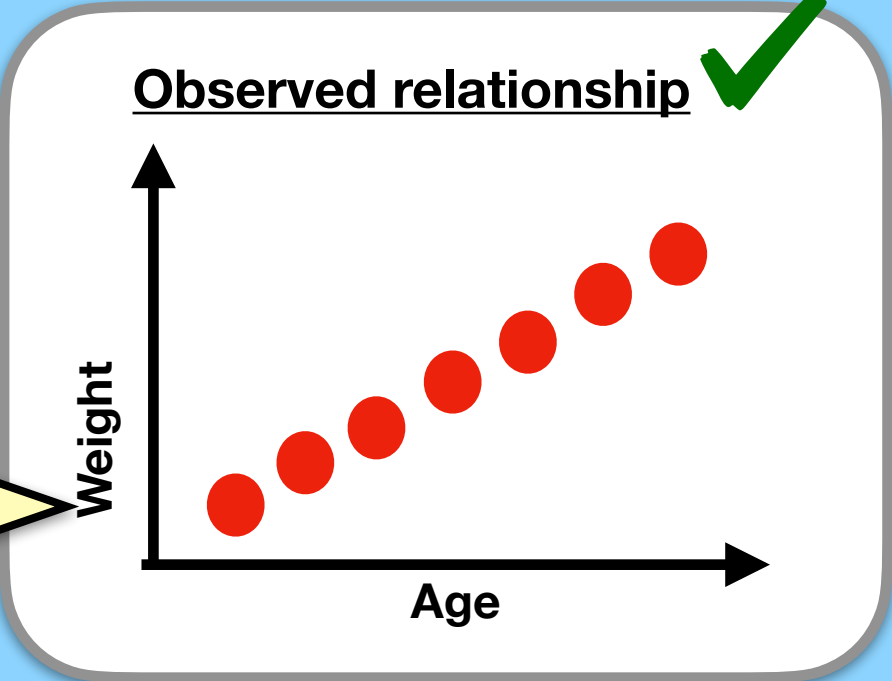
- Is the association / correlation between the two variables a chance finding or is it statistically significant?

**Start with a null hypothesis:**

- There is no association between the two variables

**Perform a Correlation test**

- If the p value is less than 0.05 then you can reject the null hypothesis and conclude that the correlation between the two variables is statistically significant. This test will also give you the correlation coefficient (that tells you about the strength of the association)



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