

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?

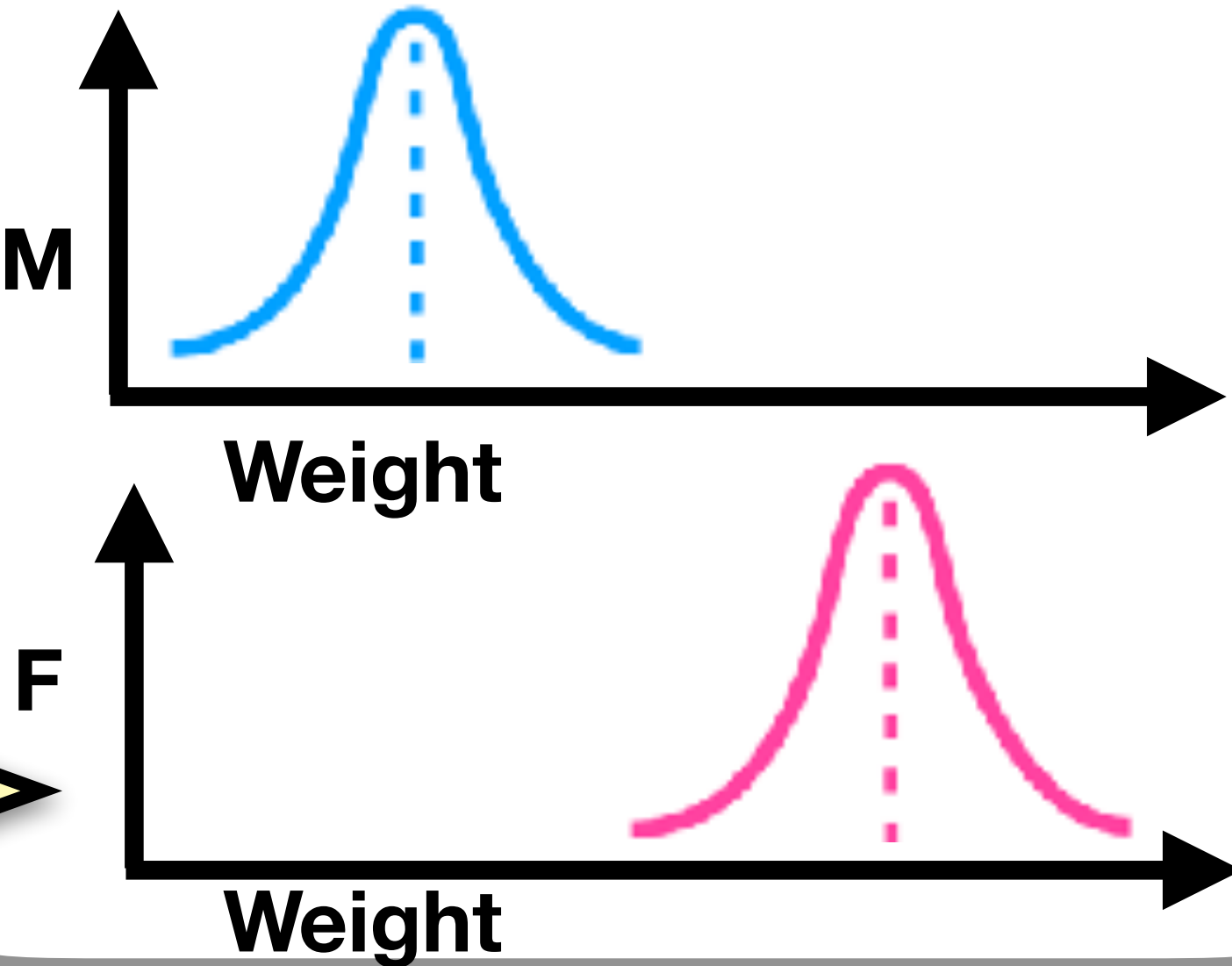
Start with a null hypothesis:

- The average weight in each group is the same

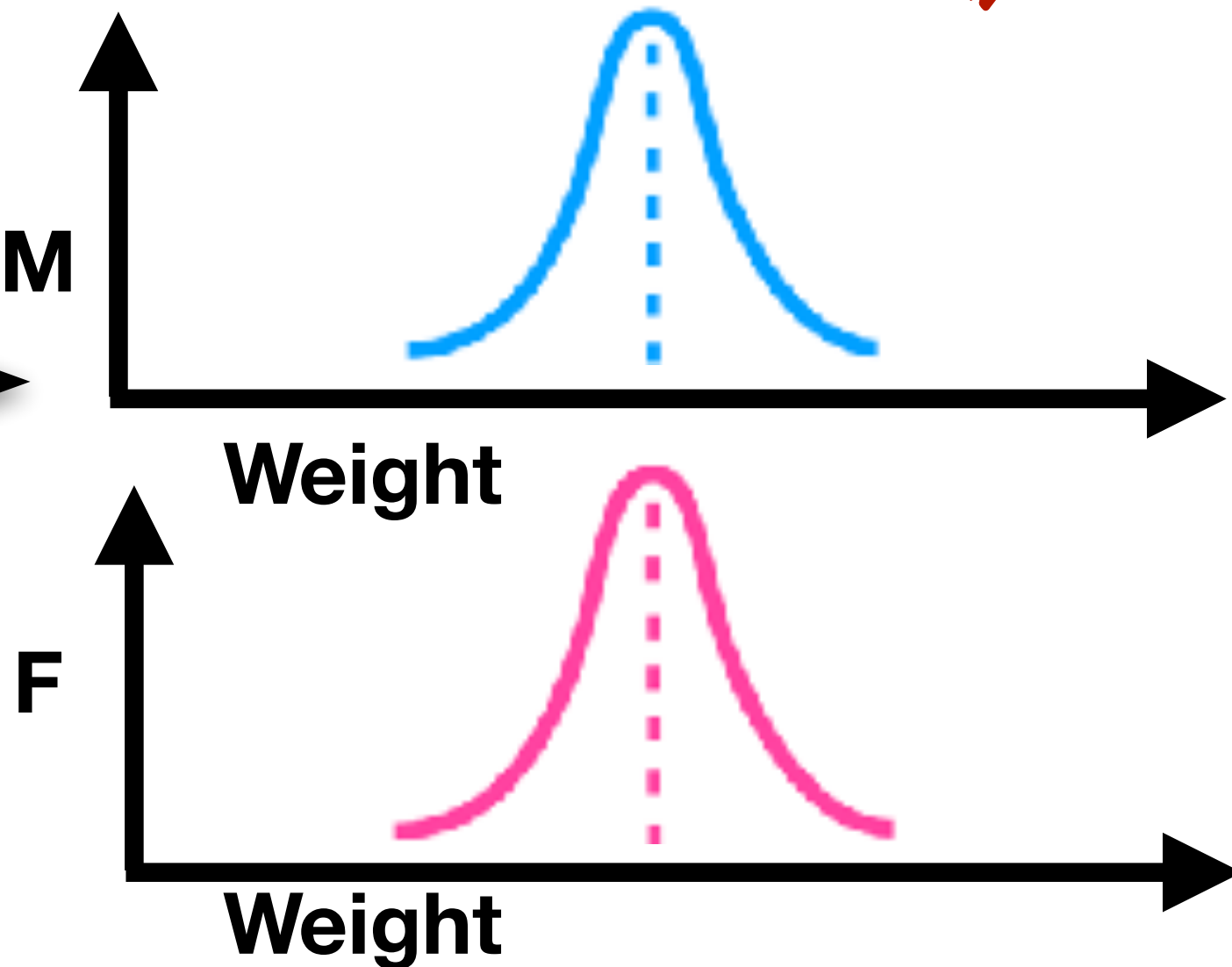
Perform a Student's T test

- 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

Observed difference ✓



Null hypothesis ✗



ANOVA

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?

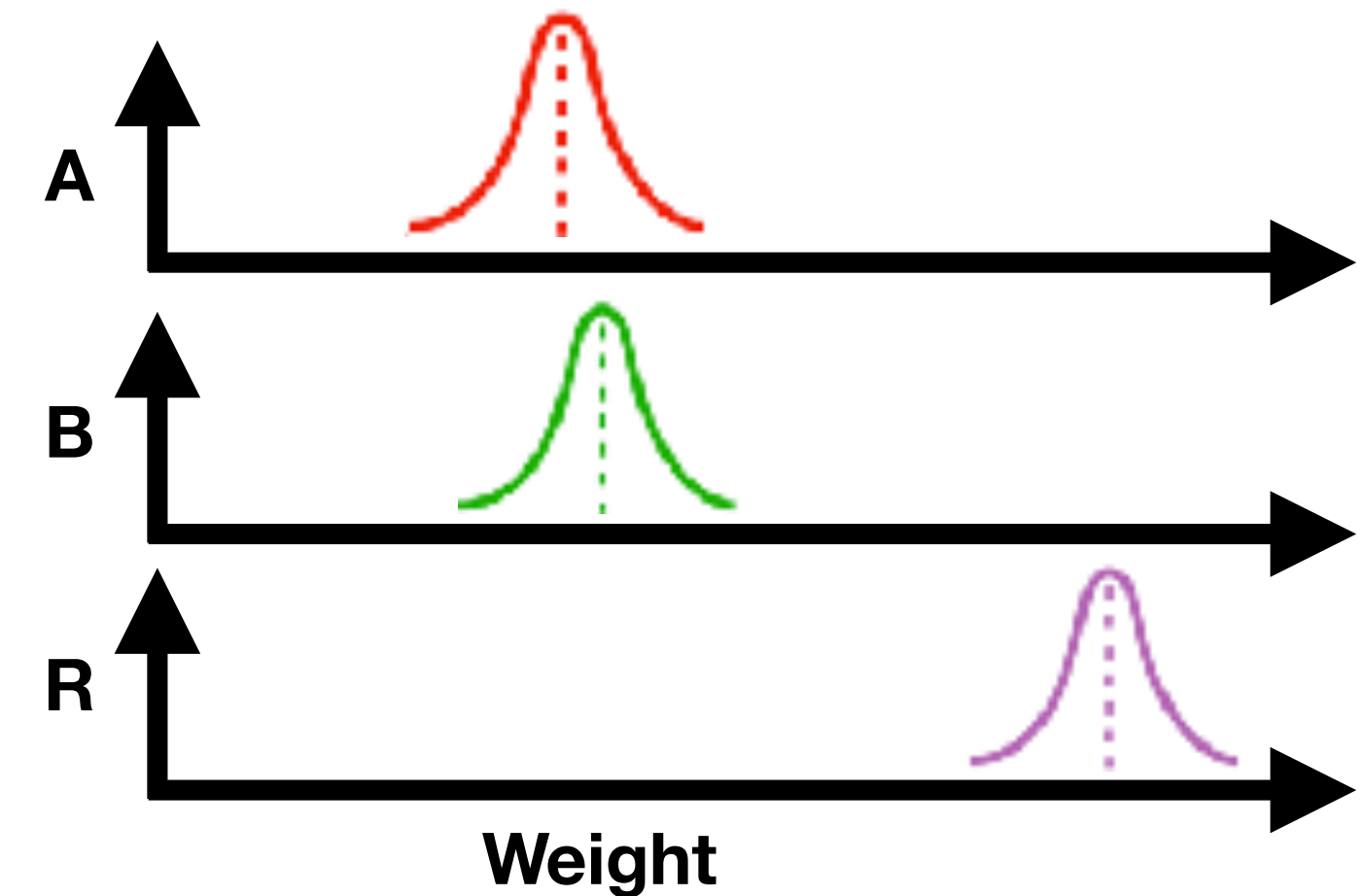
Start with a null hypothesis:

- The average weight in each group is the same

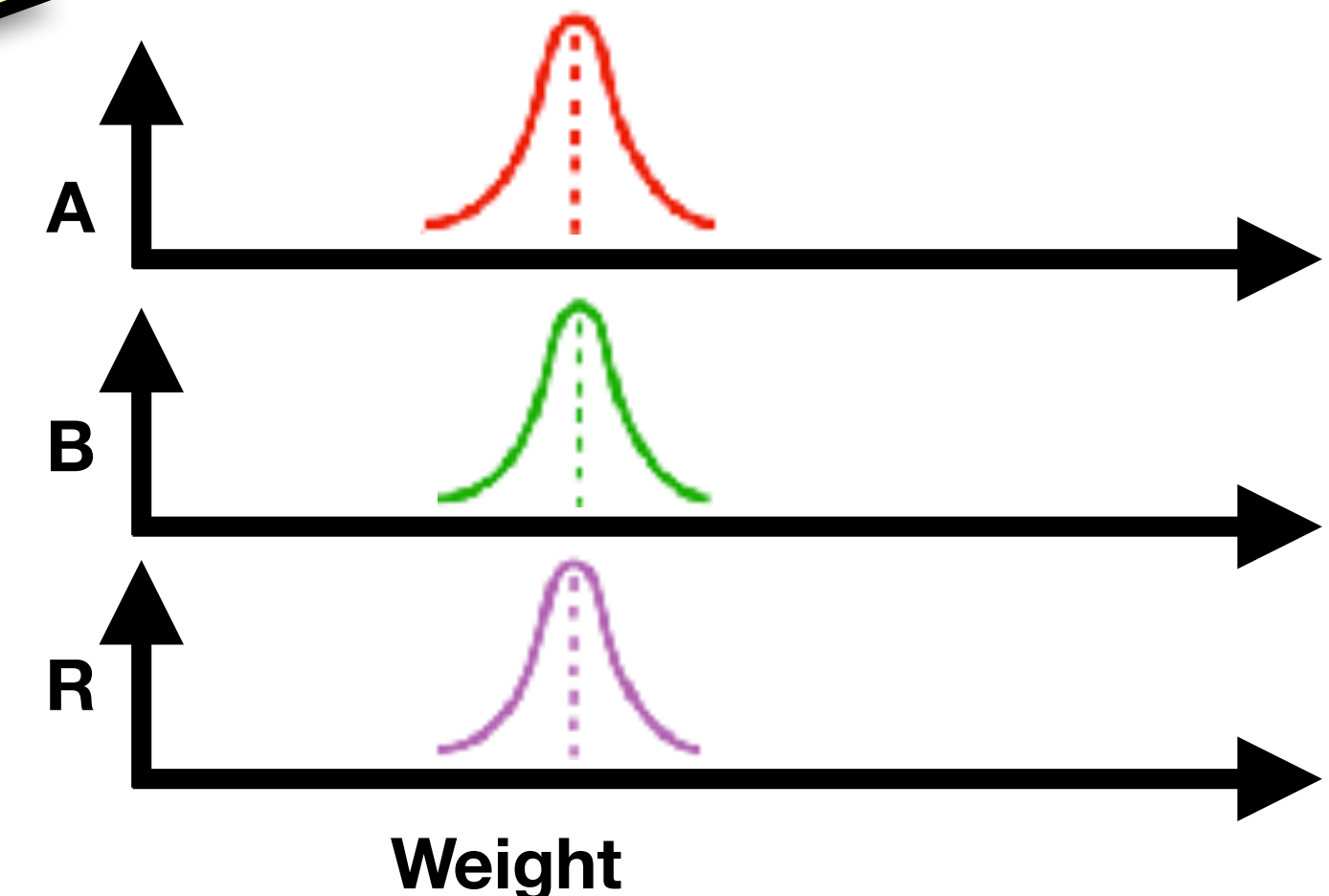
Perform an ANOVA

- 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.

Observed difference ✓



Null hypothesis ✗



Correlation test

Data:

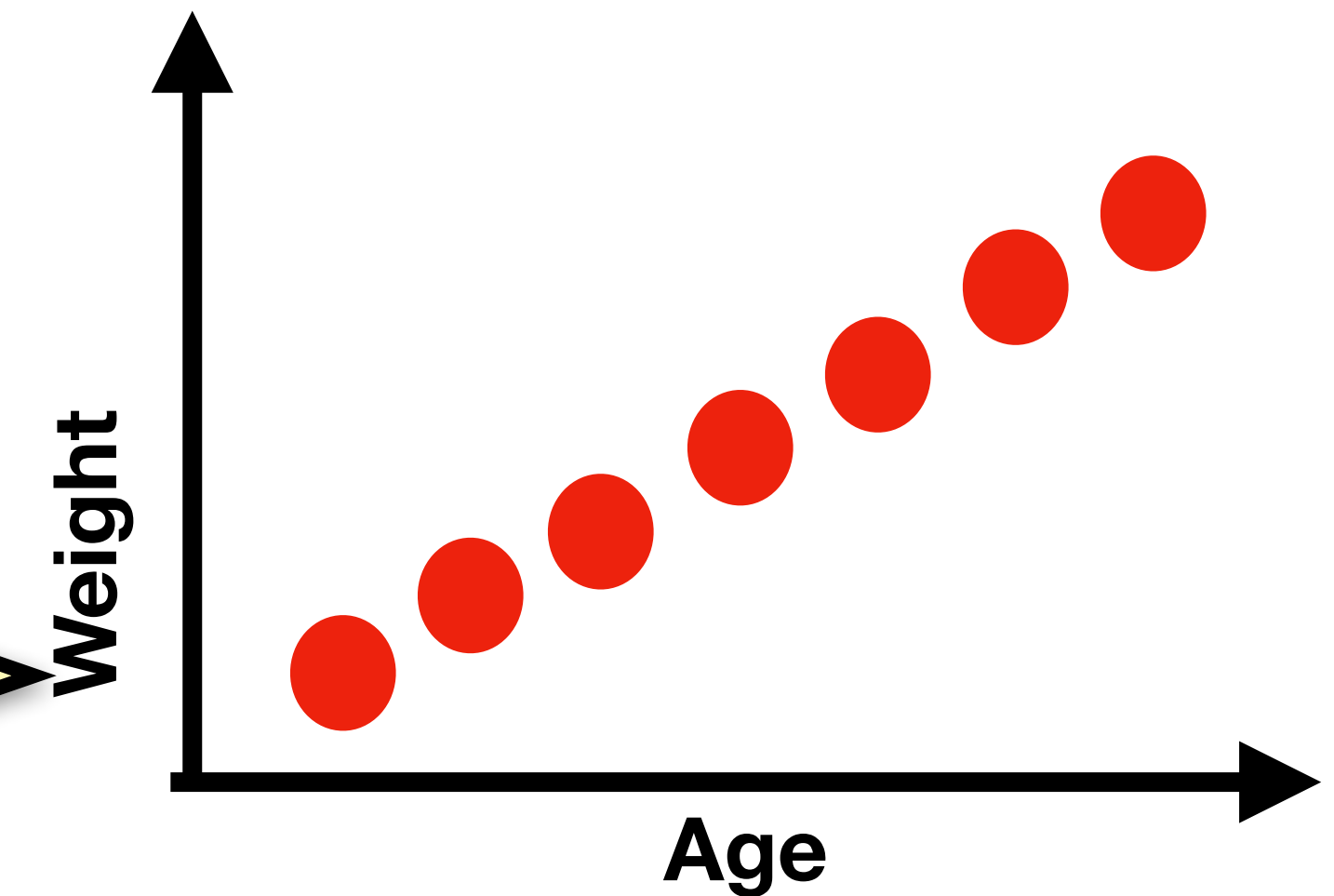
- Two numeric variables like Weight and Age

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).



Observed relationship



Research question:

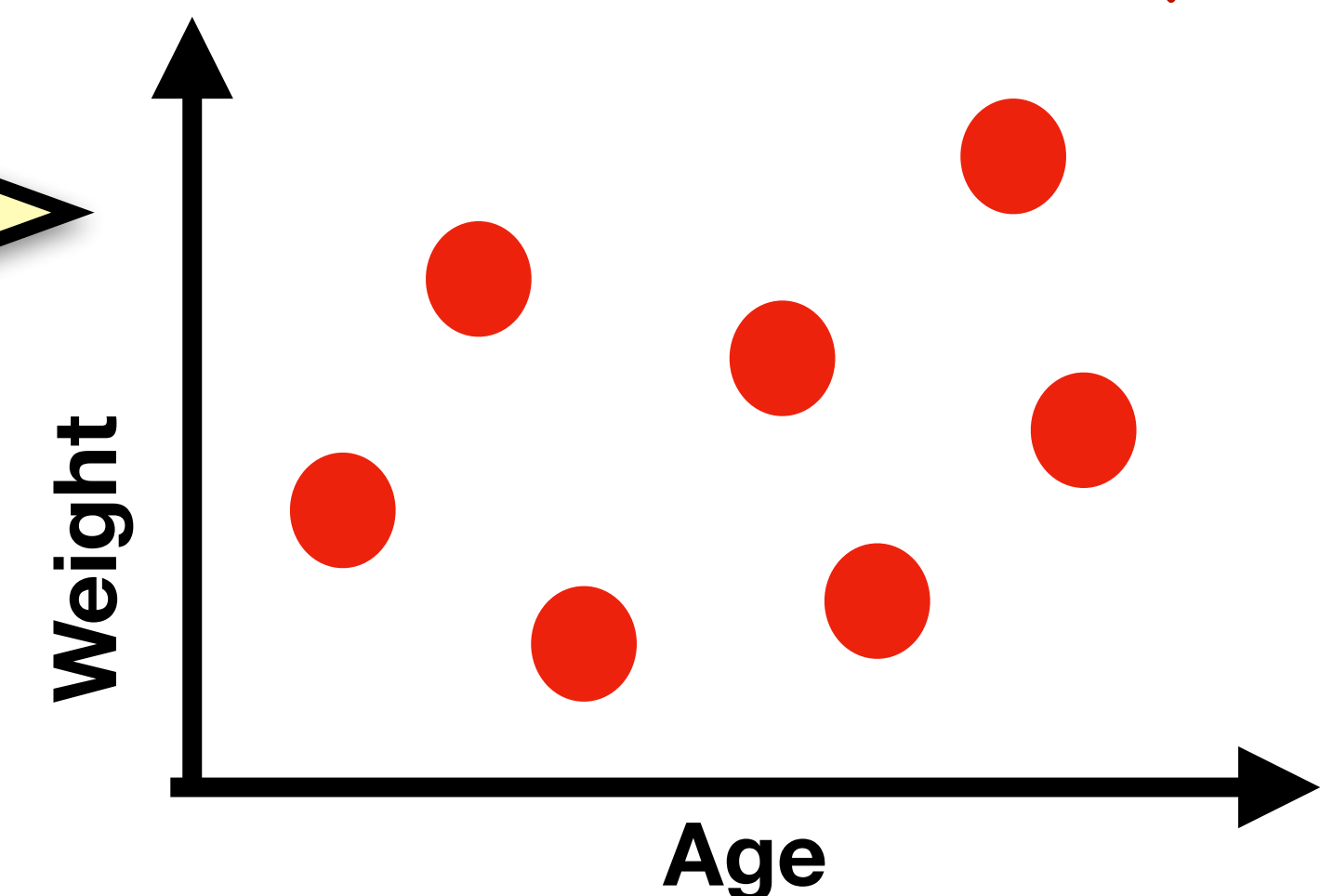
- Is the association / correlation between the two variables a chance finding or is it statistically significant?

Start with a null hypothesis:

- There is no association between the two variables



Null hypothesis



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)