CORRELATION & REGRESSION

KEY WORDS & DEFINITIONS

1. **Correlation** A description of the linear relationship between two variables.
2. **Bivariate data** Pairs of values for two variables
3. **Causal relationship** Where a change in a variable causes a change in another. Not always true.
4. **Least squares regression line**
A type of line of best fit which is a straight line in the form $y = a + bx$
5. **'b' of a regression line**
The gradient of the line; indicating positive correlation if it is positive and negative correlation if it is negative..
6. **Independent or Explanatory variable**
The variable which occurs regardless of the other variable (e.g. time passing). Plotted on the x axis.
7. **Dependent or Response variable**
The variable whose value depends on the independent variable's data points.
8. **Interpolation** Estimating a value within the range of the data. Reliable.
9. **Extrapolation** Estimating a value outside of the range of the data. NOT reliable.
10. **Product Moment Correlation Coefficient**
A measure of the strength and type of correlation.

WHAT DO I NEED TO KNOW

Interpreting 'b' of a regression line:
Refer to the change in the variable y for each unit change of the variable x IN CONTEXT

PMCC, r is the PMCC for a population sample

PMCC, ρ is the PMCC for the entire population

Range of PMCC, r: $-1 \leq r \leq 1$

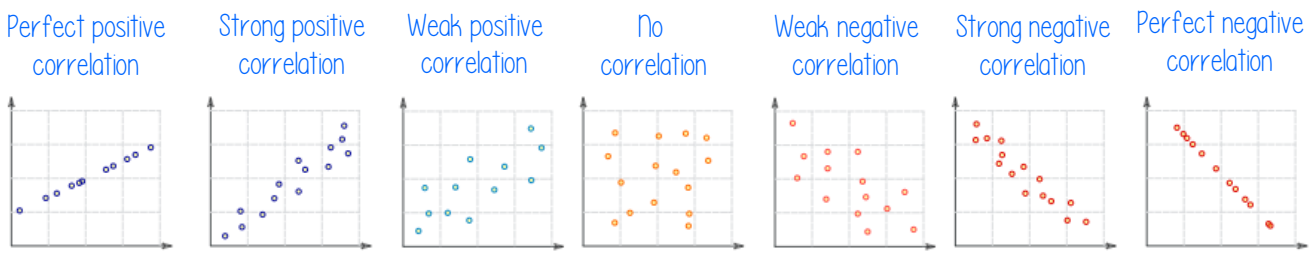
Hypotheses for one tailed test on PMCC:
H_0: $\rho = 0$
H_1: $\rho > 0$ or H_1: $\rho < 0$

Hypotheses for two tailed test on PMCC:
H_0: $\rho = 0$
H_1: $\rho \neq 0$

Check sample size is big enough to draw a valid conclusion and comment on it if not.

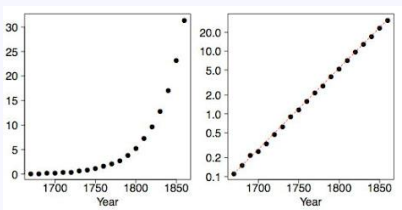
A regression line is only a valid model when the data shows linear correlation.

Only make predictions for the dependent variable using the regression line of y on x within the range of the original data



EXPONENTIAL MODELS

You can use logarithms and coding to transform graphs and examine trends in non-linear data



If $y = ax^n$ then $\log y = \log a + n \log x$

If $y = kb^x$ then $\log y = \log k + x \log b$

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