Correlation Analysis

5th - 9th December 2011, Rome

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Now what if we would like to measure how well two variables are associated with one another?

Correlations

What is a correlation?

- A statistical correlation is a dependent relationship between two variables
- Examples include the relationship between:
  - Height and weight
  - Level of education and income
  - Price and demand of rice
  - Humidity and precipitation
- However, a correlation is ***not*** the same as causality

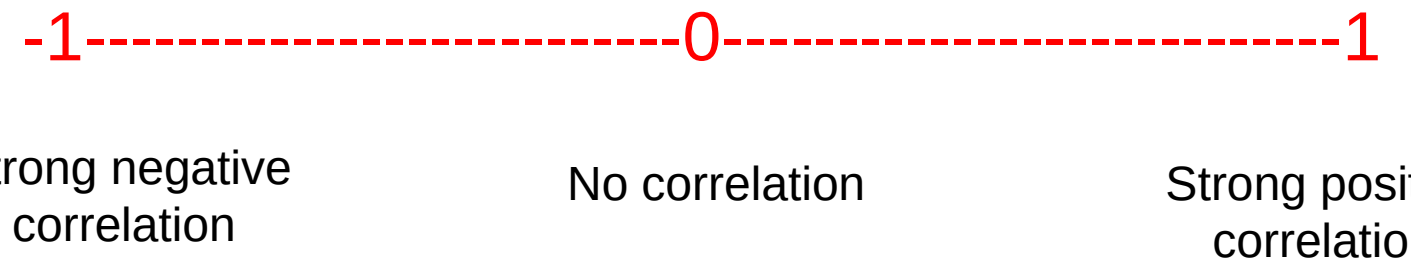
Tests

- Pearson correlation coefficients (r) are the test statistics used to measure strength of the linear** relationship between two variables

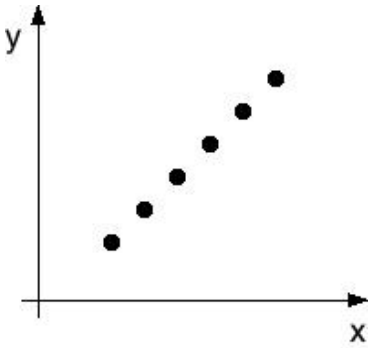
- A correlation also does not have to be a linear relationship in this case we use a different test (Spearman's rho)

Types of correlations

- **Positive correlations**: Two variables are positively correlated if increases (or decreases) in one variable results in increases (or decreases) in the other variable.
- **Negative correlations**: Two variables are negatively correlated if one increases (or decreases) and the other decreases (on increases).
- **No correlations**: Two variables are not correlated if there is no linear relationship between them.

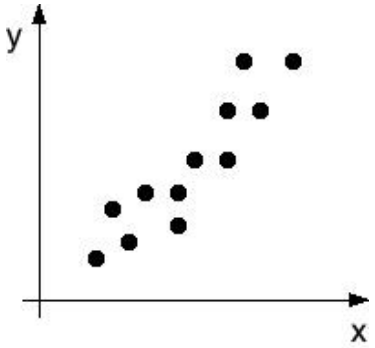


Illustrating types of correlations



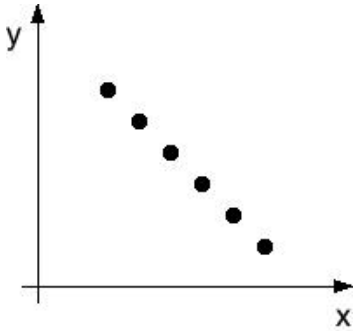
Perfect positive correlation

Test statistic= 1



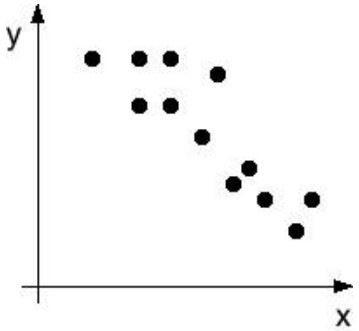
Positive correlation

Test statistics>0 and <1



Perfect negative correlation

Test statistic= -1



Negative correlation

Test statistic<0 and >-1

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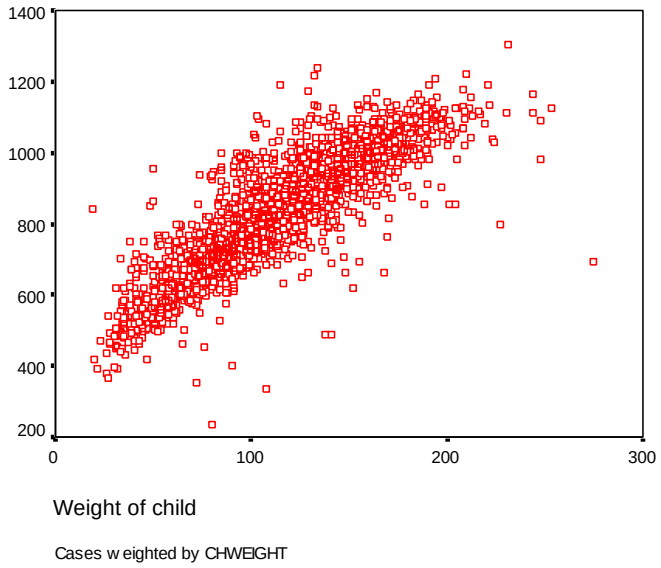
Example for the Kenya Data

Correlation between children's weight and height…



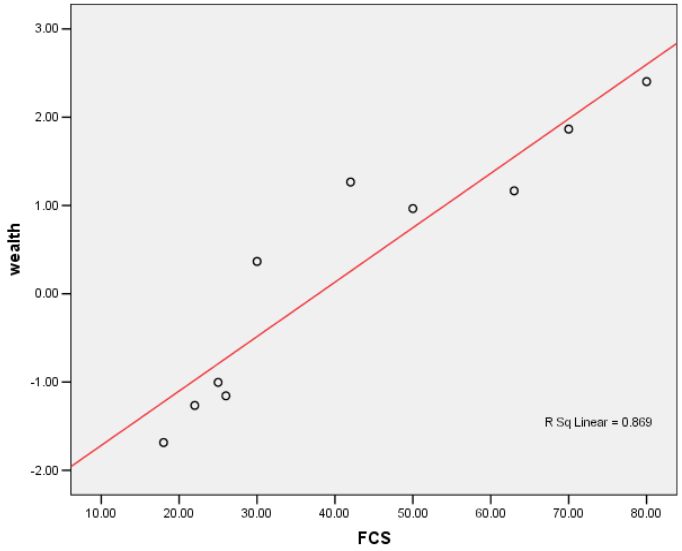
Is this a positive or negative correlation??

To calculate a Pearson's correlation coefficient in SPSS

In SPSS, correlations are run using the following steps:

1. Click on "Analyze" drop down menu
2. Click on "Correlate"
3. Click on "Bivariate…"
4. Move the variables that you are interested in assessing the correlation between into the box on the right
5. Click "OK"

example in SPSS…



Correlations

		wealth	FCS
wealth	Pearson Correlation	1	.932**
	Sig. (2-tailed)		.000
	N	10	10
FCS	Pearson Correlation	.932**	1
	Sig. (2-tailed)	.000	
	N	10	10

**. Correlation is significant at the 0.01 level

Using SPSS we get Pearson's correlation (0.932)

1. *Lets refresh briefly, what does a correlation of 0.932 mean??*

2. What does *** mean?

Summary

Independent T-test	Continuous	Categorical binomial	To compare differences in the means of two groups (identified by the categories of the binomial variable) To see if the difference is statistically significant ($p<0.05$)	Compare the mean z-scores of male and female children	Run the independent samples T-test; Report the two means; Check if the T value is statistically significant ($p<0.05$)
One-way ANOVA: Post-hoc Multiple Comparisons	Continuous	Categorical	To compare differences in the means of three or more groups (identified by the categories of the categorical variable)	Compare the mean z-score by residence status (IDP, refugee, or resident HHs)	Run the One-Way ANOVA post-hoc procedure Check if the categorical variable explains in a significant way some of the observed variation through the F-test. Check which differences are statistically significant ($p<0.05$) through the post-hoc tests (e.g., REGWQ, Tukey HSD, Games-Howell, etc.)
Chi-square	Categorical	Categorical	To detect whether there is a statistically significant association between two categorical variables	Explore the association between food consumption groups and ethnic groups	Compute the Chi-square and report the value Check if the value is statistically significant ($p<0.05$) (The Chi-square helps determine whether the association is statistically significant)
Bivariate Correlation	Continuous	Continuous	To assess the general association between two variables (i.e.,one variable increases/decreases when another	Correlation between children's height and weight	Compute the Pearson Correlation Coefficient and report the value Check if the correlation is statistically significant (two

Check out pg 171 of CFSVA manual for an overview of the test

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