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Exercises Quantitative Methods

Worksheet: Measures of association

Example 2.1 (*Human_Resources.sav*)
A Human Resources Department has listed for two years the values of the four variables:

X_1= number of the vacant positions (monthly)

X_2= times absent (days per month)

X_3= labor turnover per month

X_4= long hours per month

Is there a relationship between two of these variables? Interpretation?

Correlations

		Vacant_Positions	Times_Absent	Labour_Turnover	Long_Hours
Vacant_Positions	Pearson Correlation	1	,857**	,008	,839**
	Sig. (2-tailed)		,000	,971	,000
	N	24	24	24	24
Times_Absent	Pearson Correlation	,857**	1	-,059	,968**
	Sig. (2-tailed)	,000		,785	,000
	N	24	24	24	24
Labour_Turnover	Pearson Correlation	,008	-,059	1	,011
	Sig. (2-tailed)	,971	,785		,961
	N	24	24	24	24
Long_Hours	Pearson Correlation	,839**	,968**	,011	1
	Sig. (2-tailed)	,000	,000	,961	
	N	24	24	24	24

**. Correlation is significant at the 0.01 level (2-tailed).

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Example 2.2 (Fiona Mathews, Paul J. Johnson, Andrew Neil)
You are what your mother eats: evidence for maternal preconception diet influencing foetal sex in humans (see Proceedings of the Royal Society, Series B, April 2008)

A total of 721 women with normal singleton pregnancies kept a prospective food diary of their diet in early pregnancy and gave a retrospective food diary of their usual diet in the year prior conception:

Went to test whether particular foods were associated with infant sex.

cereal	female	male	
low	123	93	216
moderate	113	92	205
high	126	174	300
	362	359	721

Müsli_Geschlecht.sav

Results: p-value of Pearson's Chi-Square Test $= 0{,}000\,918\,5$
this means that the infant sex depends on the particular food.
$\gamma = 0{,}215$; a weak trend that women producing male infants consumed more breakfast cereal than those who ate less than or equal to one bowlful per week.

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Example 2.3 (*Module exam in Quantitative Methods, January* 23^{rd}*, 2006)*
An observational study on gender bias in admissions was done by the Graduate Division at the University of California, Berkeley. Assuming that men and women are on the whole equally well qualified, the difference in admission rates looks like a strong piece of evidence to show that men and women are treated differently in the admission procedure. Does the university seem to prefer men?

Admissions data for the graduate programs in the two largest majors at the University of California, Berkeley:

Major A

	Applicants not admitted	Applicants admitted	$\sum$
female	21	87	108
male	313	512	825
	334	559	933

Major B

	Applicants not admitted	Applicants admitted	$\sum$
female	8	17	25
male	207	353	560
	215	370	585

The university policy does not allow these majors to be identified by name.

Open the file *Applicants_UC.sav*

1. Does the university seem to prefer women? Check it for
   a) major A
   b) major B
   c) major A and B together
2. Find the direction of the association between the gender and the major(s):
   a) major A
   b) major B
   c) major A and B together

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Exercises Quantitative Methods

Worksheet: Correlation

Example 2.4 (*revenue_profits_2012.sav*)
The following table is a list of the world-wide twenty leading public companies in the year 2012 (see: Forbes Global 2000). The ranking is based on a mix of four metrics: sales, profit, assets and market value. The revenue in billion US \$ (auf Deutsch: Milliarden US \$) and the profit in billion US \$ are listed:

Rank	Corporation	Revenue	Profits
1.	Royal Dutch Shell	470.2	30.9
2.	Wal-Mart	447.0	15.7
3.	ExxonMobil	433.5	41.1
4.	BP	375.5	25.7
5.	Petro China	310.1	20.6
6.	Chevron	236.3	26.9
7.	Volkswagen Group	221.9	21.5
8.	Total	216.2	15.9
9.	General Electric	147.3	14.2
10.	Petrobas	145.9	20.1
11.	Berkshire Hathaway	143.7	10.3
12.	BNP Paribas	119.0	7.9
13.	Gazprom	117.6	31.7
14.	J.P. Morgan Chase & Co.	110.8	19.0
15.	Citigroup	102.6	11.1
16.	HSBC	102.0	16.2
17.	Wells Fargo	87.6	15.9
18.	ICBC	82.6	25.1
19.	Construction Bank	68.7	20.5
20.	Agricultural Bank of China	62.4	14.4

a) Construct a scatter plot with revenue as the x-axis and profits as the y-axis. The points in the scatter plot should have the case name of the corporation.

b) Compute and comment the correlation between the revenue and the profits of the twenty corporations.