positive relationship
(linear)

negative relationship
(linear)

quadratic relationship

Scatterplot

Scatterplot
SPSS - Graphs/Legacy/
Scatter

**Both at least
INTERVAL leveled**

**Both are at least
ordinal**

a relationship
between
variables

$$r_{pb} = \frac{(\overline{Y_1} - \overline{Y_0})S_X}{S_Y}$$

Y1 and Y0 are the means of the groups
designated by the dichotomous variable
Sx and Sy are standard deviations of X and Y
rpb = 0, groups are the same

**Point Biserial
Correlation Coefficient**

Point Biserial...
one dichotomous the other
interval - the degree to
which the means of the two
groups on the continuous
measure are different

**At least one
is dichotomous**

At least one...
ant the other is at least
interval leveled

$$\phi = \frac{AD - BC}{\sqrt{(A+B)(C+D)(A+C)(B+D)}}$$

Phi Coefficient

Phi Coefficient
Both dichotomous using of
clustered bar graph etc...

**Guidelines
(Recomended only)**

-1 perfect negative
relationship

0 no relationship

+1 perfect positive
relationship

$$r = \frac{\sum z_x z_y}{N - 1}$$

**Pearson Product Moment
Correlation Coefficient**

Pearson Prod...
when both variables are at
least interval leveled!

r≈+-.5 strong

r≈+-30 moderate

r+- 10 weak

**Cohen's Criteria
for social
sciences**

$$r_s = 1 - \frac{6\sum d_i^2}{N^3 - N}$$

where di is the difference between
ranks in each case

**Spearman Rank
Correlation Coefficient**

Spear...
When both
variables are
at least ordinal

must have ranked data set

Scale itself is ORDINAL!

Scale itself is...
increase in strength from .1
to .3 is less than +.3 to +.5

Restrictions of Range

Restrictions of R...
E.g. elimination of the middle
scores leads to less
homogenous group and
correlations are twisted

Shape of Distributions

Shape of Distr...

reliability of data

reliability of data
the less reliability the more
error in values

Level of measurement	Nominal with two categories (dichotomous)	Non-dichotomous nominal or ordinal with more than two categories but not more than 5 cat.	Ordinal with more than 5 cat.	Interval or ratio
Nominal with two categories (dichotomous)	Pearson Correlation; percentages from cross-tabulation;clustered bar graph	Percentages from cross-tabulation; clustered bar graph	Spearman Correlation; interactive scatterplot; boxplot	Pearson correlation; interactive scatterplot; boxplot
Non-dichotomous nominal or ordinal with more than two categories but not more than 5 cat.	Percentages from cross-tabulation; clustered bar graph	Percentages from cross-tabulation; clustered bar graph	Medians; Spearman Correlation; interactive scatterplot; boxplot	Means or Medians (depending on the shape of the scale variable); interactive scatterplot; boxplot
Ordinal with more than 5 cat.	Spearman Correlation; interactive scatterplot; boxplot	Median;, Spearman Correlation; interactive scatterplot; boxplot	Spearman Correlation; scatterplot	Spearman Correlation; scatterplot
Interval or ratio	Pearson correlation; interactive scatterplot; boxplot	Means or Medians (depending on the shape of the scale variable); interactive scatterplot; boxplot	Spearman Correlation; scatterplot	Pearson Correlation; scatterplot. Correlation should not be used unless scatterplot is well represented by a line.