

A little statistical theory regarding measures of association.

Pearson's product-moment correlation coefficient (r) is appropriate when variables are continuous and reach an interval or ratio level of measurement. It is a measure of the strength of linear relationship only. When the data are not continuous (dichotomous or ordinal), alternatives are available.

As a simplification, dichotomous variables can be thought of in two ways: (1) truly dichotomous and (2) artificially dichotomous. A truly dichotomous variable has only two values (e.g., yes, no; on, off; pass, fail). An artificially dichotomous variable is one that has a continuous underlying scale, but has been dichotomized (e.g., tall, short; high scorer, low scorer; stressed, relaxed).

Phi Coefficient (Φ)

An index of the strength of association between two dichotomous variables;
This is equivalent to the Pearson correlation coefficient.

Polychoric Coefficient (r_{poly})

An index of strength of association between two artificially ordinal variables.

Tetrachoric Coefficient (r_{tet})

An index of strength of association between two artificially dichotomized variables

Point-biserial Coefficient (r_{pbis})

An index of strength of association between a dichotomous variable and a continuous variable

Biserial Coefficient (r_{bis})

An index of strength of association between an artificially dichotomized variable and a continuous variable

Spearman Rank-Order Coefficient (r_s)

An index of strength of association between two variables where at least one is measured at the ordinal level of measurement

Kendall's tau (τ)

An alternative to Spearman's rank-order correlation coefficient (more tedious to compute)