

Formula for sample Pearson correlation coefficient

The formula for the Pearson correlation coefficient in Urdan's Table 12.3 is the population correlation.

We usually need the formula for the sample correlation, so use this formula instead:

$$r = \frac{1}{n-1} \sum_i z_{xi} z_{yi}$$

with $z_{xi} = (x_i - \bar{x})/s_x$ and $z_{yi} = (y_i - \bar{y})/s_y$.

The only differences are that (1) the sample correlation formula has $n - 1$ in the denominator, and (2) when computing the z scores we use estimates of the standard deviations (s_x, s_y) instead of the true standard deviations (σ_x, σ_y), which are unknown.