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Spearman's rank correlation coefficient is a nonparametric and distribution-free rank statistic that was proposed by Charles Spearman to measure the strength of the association between two variables. This measure is used when the distribution of data makes Pearson's correlation coefficient undesirable or misleading. Unlike Pearson's product-moment correlation coefficient, Spearman's coefficient does not assume a linear relationship between two variables, nor does it require the variables to be measured on interval scales. It can be used for variables measured at the ordinal level. Spearman's coefficient assesses how well an arbitrary monotonic function can describe a relationship between two variables, without making any assumptions about the frequency distribution of the variables. It is not a measure of the linear relationship between two variables, as some statisticians may claim.

Spearman suggested ranking the values of Y and X separately. These ranks are then substituted for the actual values of Y and X in the formula for the sample Pearson correlation coefficient. In addition to applying to non-normally distributed continuous data, the Spearman rank correlation coefficient can also be used with ordinal data.

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$$\rho = 1 - \frac{6\Sigma\, d_i^2}{n(n^2 - 1)}$$

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ρ = Spearman’s rank correlation coefficient

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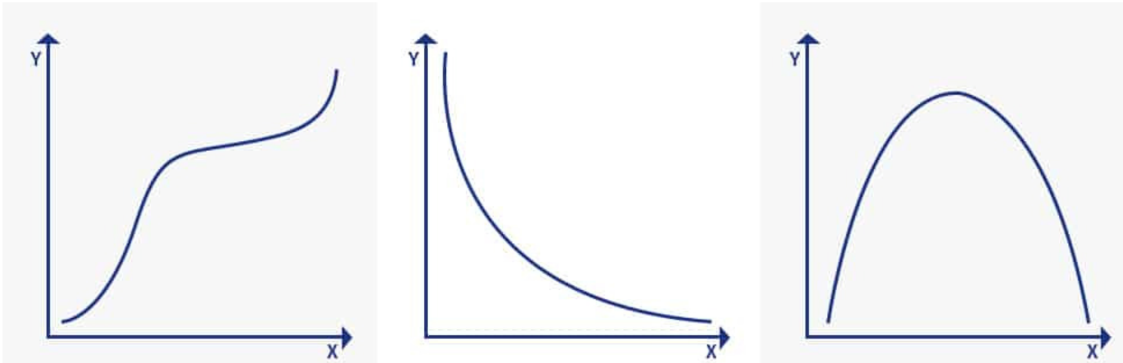
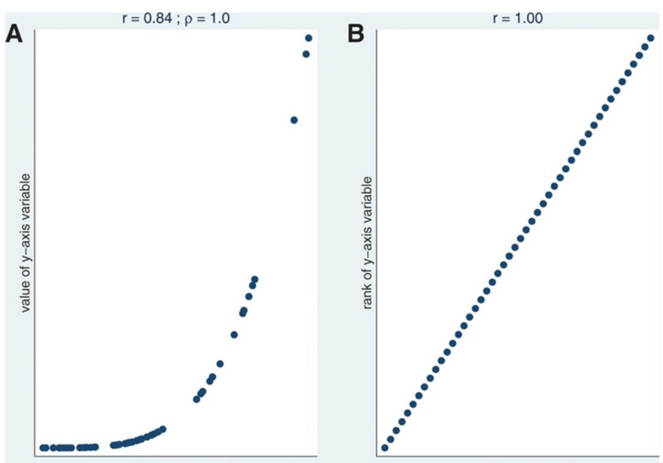
If your data doesn’t meet the above assumptions, then you would need Spearman’s Coefficient. In order



onotonically increasing: When the ‘x’ variable increases and the ‘y’ variable never decreases.
onotonically decreasing: When the ‘x’ variable increases but the ‘y’ variable never increases
ot monotonic: When the ‘x’ variable increases and the ‘y’ variable sometimes increases and

Monotonic relation is less restrictive when compared to a linear relationship that is used in Pearson’s



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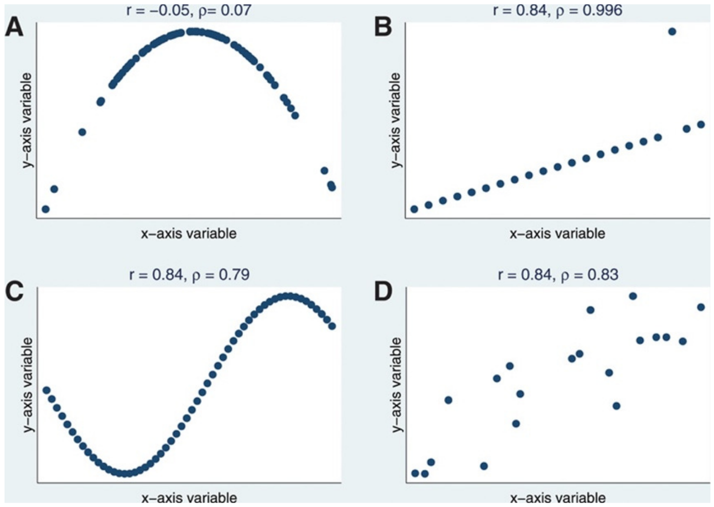
ρ) of +1.0 in A corresponds to the Pearson correlation of +1.0 in B.



quadratic relationship. B–D, Pearson correlation coefficient (*r*) is +0.84, just as in , yet the actual
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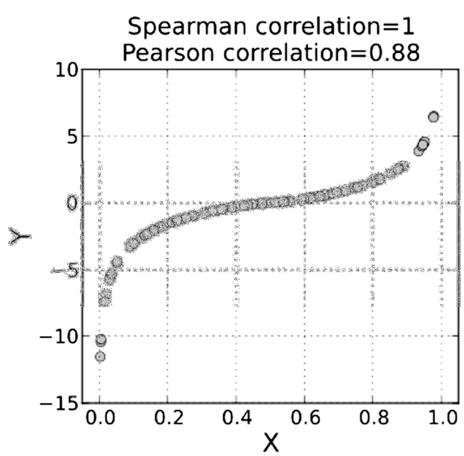

Spearman's correlation is equivalent to calculating the Pearson correlation coefficient on the ranked
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the data before proceeding with Spearman's Rank Coefficient of Correlation. It is important to observe

ranking “1” to the biggest number in the column, “2” to the second biggest number, and so forth. The

ere denotes the difference between ranks. For example, if the first student's physics rank is 3 and the

$$\rho = 1 - \frac{6\Sigma\, \mathrm{d}_i^2}{n(n^2-1)}$$

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Spearman's rank correlations to assess the direction and strength of variables association

by Sylwia Przybylska-Kuć *et*

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$$\rho = 1 - \frac{6\Sigma\, d_i^2}{n(n^2 - 1)}$$

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ρ value might indicate an inverse relationship, although this might be unexpected in

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Aβ 1–40 serum level was positively correlated with AHI, AI, RDT, RDTI, t90, and ODI and

Pair of variables		R Spearman coefficient	p
Aβ 1–40	AHI (h^{-1})	0.45	<0.05
Aβ 1–40	AI (h^{-1})	0.43	<0.05
Aβ 1–40	HI (h^{-1})	0.28	<0.05
Aβ 1–40	RDT (min)	0.48	<0.05
Aβ 1–40	RDTI (min/h)	0.49	<0.05
Aβ 1–40	Mean SpO_2 (%)	-0.28	<0.05
Aβ 1–40	Minimal SpO_2 (%)	-0.47	<0.05
Aβ 1–40	t90 (%)	0.41	<0.05
Aβ 1–40	ODI (h^{-1})	0.46	<0.05

Table 3. Spearman's rank correlation coefficient between amyloid beta 1–40 (Aβ 1–40) and

The assessment of Aβ levels in individuals with obstructive sleep apnea (OSA), a common cause of study, the serum levels of Aβ 1–40 and 1–42 have been tested and correlated with polygraphy results. The findings revealed a significant correlation between Aβ 1–40 serum levels and hypoxia during sleep. hypoxia and Aβ 1–40 serum level. In individuals with the most severe breathing disorders during sleep, Aβ 1–40 level was significantly higher. Additionally, it was positively correlated with the apnea-hypopnea index (r = 0.45; p<0.05) and negatively correlated with oxygen saturation (r = -0.47; p<0.05). No comparable correlations were found for Aβ 1–42. Our results suggest that the assessment of Aβ levels

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