Spearman’s Rank Method - calculating the coefficient

Null hypothesis – There is no significant correlation between the amount of hours studied and exam result

* Create a table from your data.
* Rank the two data sets. Ranking is achieved by giving the ranking '1' to the biggest number in a column, '2' to the second biggest value and so on. The smallest value in the column will get the lowest ranking. This should be done for both sets of measurements.
* Tied scores are given the mean (average) rank. For example, the two tied scores of 16 hours are both ranked third, but occupy two positions (third and fourth) in a ranking hierarchy of ten. The mean rank in this case is calculated as (3+4) ÷ 2 =3.5
* Find the difference in the ranks (d): This is the difference between the ranks of the two values on each row of the table. The rank of the second value (price) is subtracted from the rank of the first (distance from the museum).
* Square the differences (d²) To remove negative values and then sum them (d²).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Hours studied | Rank of hours studied | % exam result | Rank of % exam result | Difference between ranks (d) | Difference between ranks squared (d²) |
| Tom  |  |  |  |  |  |  |
| Mary  |  |  |  |  |  |  |
| Alice |  |  |  |  |  |  |
| Albert |  |  |  |  |  |  |
| Stuart |  |  |  |  |  |  |
| Victor |  |  |  |  |  |  |
| Leonard |  |  |  |  |  |  |
| Fiona |  |  |  |  |  |  |
| Chris  |  |  |  |  |  |  |
| Fred |  |  |  |  |  |  |
|  |  |  |  |  | Ʃd² |  |

 

Complete the calculation above to find the coefficient (rs)

n is the number of samples. In this example there were 10 students and so n=10

The coefficient rs will be between a value of -1 and +1, where -1 indicates a perfect negative

correlation and +1 indicates a perfect positive correlation. A value of between -0.7 to +0.7 is

generally seen as being too weak to be thought of as a significant result.

Significance levels – These are used to quantify how significant a correlation is.

0.05 is the same as 95% confidence

0.01 is the same as 99% confidence

Use the significance table below to find out the critical value at the 95% confidence level.



What is the critical value at 95%?

Can we accept or reject the null hypothesis that there is no significant correlation between hours studied and % exam result? Why?

The 95% (0.05) significance level means that we can be 95% confident that the result we have is not by chance. The 99% (0.01) significance level means that we can be 99% confident that the result we have is not by chance.

If rs is greater than or equal to the critical value you can reject the null hypothesis that there is no significant correlation between the amount of hours studied and exam result and accept an alternative hypothesis that there is a significant correlation. If it is less, then you would accept the null hypothesis.