Pearson's Correlation Coefficient

Pearson's correlation coefficient is the test statistics that measures the statistical relationship, or association, between two continuous variables. It is known as the best method of measuring the association between variables of interest because it is based on the method of covariance. It gives information about the magnitude of the association, or correlation, as well as the direction of the relationship.

Questions Answered:

Do test scores and hours spent studying have a statistically significant relationship>

Is there a statistical association between IQ scores and depression?

Assumptions:

1. **Independent of case:** Cases should be independent to each other.
2.
3. **Linear relationship:** Two variables should be linearly related to each other. This can be assessed with a scatterplot: plot the value of variables on a scatter diagram, and check if the plot yields a relatively straight line.
4. **Homoscedasticity:** the residuals scatterplot should be roughly rectangular-shaped.

Properties:

1. **Limit:** Coefficient values can range from +1 to -1, where +1 indicates a perfect positive relationship, -1 indicates a perfect negative relationship, and a 0 indicates no relationship exists..
2. **Pure number:** It is independent of the unit of measurement. For example, if one variable's unit of measurement is in inches and the second variable is in quintals, even then, Pearson's correlation coefficient value does not change.
3. **Symmetric:** Correlation of the coefficient between two variables is symmetric. This means between X and Y or Y and X, the coefficient value of will remain the same.

Degree of correlation:

1. **Perfect:** If the value is near ± 1, then it said to be a perfect correlation: as one variable increases, the other variable tends to also increase (if positive) or decrease (if negative).
2. **High degree:** If the coefficient value lies between ± 0.50 and ± 1, then it is said to be a strong correlation.
3. **Moderate degree:** If the value lies between ± 0.30 and ± 0.49, then it is said to be a medium correlation.

4. **Low degree:** When the value lies below ± .29, then it is said to be a small correlation.
5. **No correlation:** When the value is zero.

Related Pages:

- Conduct and Interpret a Bivariate (Pearson) Correlation
- Correlation (Pearson, Kendall, Spearman)