TOPIC NAME:

Correlation: Definitions, Types and Importance | Statistics

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In this article we will discuss about:- 1. Definitions of Correlation 2. Types of Correlation 3. Importance 4. Methods 5. Uses of the Co-Efficient.

Definitions of Correlation:
According to English & English:
"Correlation is a relationship or dependence. It is the fact that two things or variables are so related that change in one is accompanied by a corresponding or parallel change in the other."

According to Ferguson:
ADVERTISEMENTS:

"Correlation is concerned with describing the degree of relation between two variables."

According to Guilford:
"A coefficient of correlation is a single number that tells us to what extent two things are related, to what extent variation in one go with variations in the other."

According to Lathrop:

"Correlation is a joint relationship between two variables."

Types of Correlation:
1. Positive Correlation:
If the weight of an individual increases in proportion to increase in his height, the relation between this increase of height and weight is called as positive correlation. It ranges from 0 to + 1. If it is 0 then there is no relation at all. When it is + 1, then there is perfect positive correlation.

2. Negative Correlation:
It is just the opposite of positive correlation. If the weight of an individual does not increase in proportion to increase in his height or if the weight of an individual decreases with an increase in height, then it is said to be negative correlation, also ranges from 0 to -1. -1 is perfect negative correlation.

3. Zero Correlation:
Zero correlation is a correlation showing no relationship, or a correlation having a correlation coefficient of zero.

Importance of Correlation:
Correlation is very important in the field of Psychology and Education as a measure of relationship between test scores and other measures of performance. With the help of correlation, it is possible to have a correct idea of the working capacity of a person. With the help of it, it is also possible to have a knowledge of the various qualities of an individual.

After finding the correlation between the two qualities or different qualities of an individual, it is also possible to provide his vocational guidance. In order to provide

educational guidance to a student in selection of his subjects of study, correlation is also helpful and necessary.

Methods of Finding Out the Correlation:
Various persons have suggested various methods for finding out correlation.

Two methods that are prevalent and important are:-
1. Rank order method.

2. Product Moment method.

Rank order Method:
Differences among individuals in many traits can often be expressed by ranking the subjects is 1 -2 – 3 order when such differences cannot be measured directly. For instance, individuals may be ranked in order of merit for obedience, industriousness, punctuality, honesty, salesmanship or social adjustment. Similarly various advertisements colour combinations, jokes and picture which are difficult to evaluate numerically may be put in order of merit for beauty, humour, artistic quality or some other quality.

The formula for calculating the correlation by Rank order method is as under:

$$P(rho) = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$$

P (rho) stands for coefficient of correlation from rank differences.

$\sum D^2$ represents the sum of the squares of differences in rank. N represents number of pairs.
In order to illustrate this formula, we give below an example:

Student	Marks of Eng.	Mark of Math	R_1	R_2	d	d_2
A	22	18	1	2	1	1
B	18	15	3	5	2	4
C	19	17	2	3	1	1
D	15	16	5	4	1	1
E	17	19	4	1	3	9
N=5						$\Sigma D^2 = 16$

$$P(rho) = 1 - \frac{6\Sigma D^2}{N(N^2 - 1)}$$

$$= 1 - \frac{6 \times 16}{5(25 - 1)}$$

$$= 1 - \frac{96}{120}$$

$$= 1 - .8$$

$$= .2$$

INTEPRETATION TABLE:

S.No.	Degree of Correlation	Types of Correlation
1.	$\pm.00$ to $\pm.20$	Neglegible
2.	$\pm.20$ to $\pm.40$	Low
3.	$\pm.40$ to $\pm.70$	Moderate
4.	$\pm.70$ to $\pm.90$	High
5.	$\pm.90$ to ± 1.00	Very high
6.	± 1.00	Perfect.

So we can interpret the present result .2 by saying that there is negligible positive correlation.

Example : 2.

Student	X (Math)	Y (Science)	R_1	R_2	D	D^2
A	43	53	9	8	1	1
B	73	67	2	3	-1	1
C	57	56	6	6	0	0
D	62	64	4	4	0	0
E	44	72	10	2	8	64
F	59	55	5	7	-2	4
G	46	49	8	9	-1	1
G	53	42	7	10	-3	9
I	82	75	1	1	0	0
J	67	61	5	5	-2	4
					+9	84
					-9	
					0	

$$P = 1 - \frac{6 \sum D^2}{N(N^2 - 1)}$$

$$= 1 - \frac{6 \times 84}{10(10^2 - 1)}$$

$$= 1 - \frac{504}{10 \times (100 - 1)}$$

$$= 1 - \frac{504}{10 \times 99}$$

$$= 1 - \frac{504}{990}$$

$$= 1 - .51$$

$$= .49$$

Uses of the Co-Efficient of Correlation:

The use of coefficient of correlation is very wide. In almost all social sciences this is now being increasingly used. It is useful whenever each number of a group of individuals has been measured on two or more traits. It expresses at one figure the average degree of resemblance etc., between the two traits.

Its specific uses may be given as follows:
1. Prognosis (Prediction):

The coefficient of correlation is used quite profitably in Prediction. In a number of studies it is used to predict the success one will achieve in his further educational careers.

2. Reliability:

The co-efficient of correlation has been used very often to test the reliability. Through calculation of this statistics it has been sought to be asserted whether or not a test measures on two successive occasions the same type of thing.

3. Validity:

A test's width value can be obtained through correlation. Whenever a test is constructed the tests, not what it claims to

test. This question is answered by the magnitudes of the coefficient with various criteria.

4. Test Construction:
The coefficient of correlation is also being used in the test construction. Whenever a new test is constructed, there is always the questions of whether each element of the test is related to other elements or to the test as a whole and as to whether each element is related to the criteria chosen. Those relationships are all examined through the technique of correlation.