Correlation Encyclopedia Article

Correlation

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Correlation

Correlation refers to the degree of **correspondence** or relationship between two variables. Correlated variables tend to change together. If one **variable** gets larger, the other one systematically becomes either larger or smaller. For example, we would expect to find such a relationship between scores on an **arithmetic** test taken three months apart. We could expect high scores on the first test to predict high scores on the second test, and low scores on the first test to predict low scores on the second test.

In the above example the scores on the first test are known as the independent or predictor variable (designated as "X") while the scores on the second test are known as the dependent or response variable (designated as "Y"). The relationship between the two variables X and Y is a positive relationship or positive correlation when high measures of X correspond with high measures of Y and low measures of X with low measures of Y. It is also possible for the relationship between variables X and Y to be an inverse relationship or negative correlation. This occurs when high measures of variable X are associated with low measures of variable Y and low measures on variable X are associated with high measures of variable Y. For example, if variable X is school attendance and variable Y is the score on an achievement test we could expect a negative correlation between X and Y. High measures of X (absence) would be associated with low measures of Y (achievement) and low measures of X with high measures of Y.

The correlation coefficient tells us that a relationship exists. The + or - sign indicates the direction of the relationship while the number indicates the magnitude of the relationship. This relationship should not be interpreted as a causal relationship. Variable X is related to variable Y, and may indeed be a good predictor of variable Y, but variable X does not cause variable Y although this is sometimes assumed. For example, there may be a positive correlation between head size and IQ or shoe size and IQ. Yet no one would say that the size of one's head or shoe size causes variations in intelligence. However, when two more likely variables show a positive or negative correlation, many interpret the change in the second variable to have been caused by the first.