What is the definition of concomitant variable and what are some examples?

Authored by

stats writer

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A concomitant variable, also known as a confounding variable, is a variable that is related to both the independent and dependent variables in a study. It can potentially influence the results and therefore needs to be controlled for in order to accurately determine the relationship between the independent and dependent variables.

Examples of concomitant variables include age, gender, socioeconomic status, and education level. For example, in a study investigating the relationship between coffee consumption and heart disease, age could be a concomitant variable as older individuals tend to drink more coffee and are also more likely to have heart disease. Therefore, age would need to be controlled for in order to accurately determine the true relationship between coffee consumption and heart disease.

Concomitant Variable: Definition & Examples

A concomitant variable (sometimes called a "covariate") is a variable that is not of primary interest in a study, but nonetheless may have some interaction with the variable(s) of interest being studied.

Not accounting for these types of variables can lead to biased or misleading results in an analysis, so it's important to deal with them when possible.

In observational studies, it's important to be aware of the fact that concomitant variables could cause unusual interpretations of data and the relationships between variables. In experimental studies, it's important to design the experiment in such a way that eliminates or reduces the risk of concomitant variables.

The following examples illustrate several cases in which concomitant variables could be present in a study:

Example 1

Researchers want to understand the relationship between population density and ice cream sales. However, a concomitant variable that likely affects ice cream sales is weather.

Thus, if researchers want to perform a linear regression to quantify the relationship between population density and ice cream sales, they should also attempt to collect data about weather so that they can control for that variable in the regression and be able to obtain an accurate estimate of the effect that population density has on ice cream sales.

Example 2

Researchers want to understand the relationship between hours spent practicing and average points scored per game by basketball players. However, a concomitant variable that likely affects average points scored is minutes played per game.

Thus, researchers should also track how many minutes a player plays per game so that they can include it as a variable in regression analysis and isolate the effect that hours spent practicing has on average points scored per game.

How to Interpret Regression Coefficients

Example 3

Researchers want to know whether or not a certain fertilizer leads to increased plant growth. However, sunlight exposure and watering frequency are both potential concomitant variables that likely affect plant growth.

Thus, researchers should also collect data on sunlight exposure and watering frequency so that they can include them as variables in regression analysis and be able to understand the effect that the fertilizer has on plant growth, *after accounting for sunlight exposure and watering frequency.*

How to Identify & Eliminate Concomitant Variables

To discover concomitant variables, it helps to have domain expertise in the area under study. By knowing

what potential variables could be affecting the relationship between the variables in the study that aren't included explicitly in the study, you may be able to uncover potential concomitant variables.

In observational studies, it can be very difficult to eliminate the risk of concomitant variables. In most cases, the best you can do is simply identify, rather then prevent, potential concomitant variables that may be impacting the study.

For example, suppose we want to know whether two pills have a different impact on blood pressure. We know that concomitant variables such as *diet* and *smoking habits* also impact blood pressure, so we can attempt to control for these concomitant variables by using a randomized design. This means we randomly assign patients to take either the first or second pill.

Since we randomly assign patients to groups, we can assume that the concomitant variables will affect both groups roughly equally. This means any differences in blood pressure can be attributed to the pill, rather than the effect of a concomitant variable.