Independent and Dependent Variable Examples

Generally speaking, in any given model or equation, there are two types of variables:

- Independent variables – The values that can be changed in a given model or equation. They provide the "input" which is modified by the model to change the "output."
- Dependent variables – The values that result from the independent variables.

If a scientist conducts an experiment to test the theory that a vitamin could extend a person's life-expectancy, then:

- The independent variable is the amount of vitamin that is given to the subjects within the experiment. This is controlled by the experimenting scientist.
- The dependent variable, or the variable being affected by the independent variable, is life span.

The independent variables and dependent variables can vary from person to person, and the variances are what are being tested; that is, whether the people given the vitamin live longer than the people not given the vitamin. The scientist might then conduct further experiments changing other independent variables -- gender, ethnicity, overall health, etc. -- in order to evaluate the resulting dependent variables and to narrow down the effects of the vitamin on life span under difference circumstances.

Here are some other examples of dependent and independent variables in scientific experiments:

- A scientist studies the impact of a drug on cancer. The independent variables are the administration of the drug – the dosage and the timing. The dependent variable is the impact the drug has on cancer.
- A scientist studies the impact of withholding affection on rats. The independent variable is the amount of affection. The dependent variable is the reaction of the rats.
- A scientist studies how many days people can eat soup until they get sick. The independent variable is the number of days of consuming soup. The dependent variable is the onset of illness.

Example of Variables in Mathematics

In mathematics, the "x" and "y" values in an equation or a graph are referred to as "variables."

- If an equation shows a relationship between x and y in which the value of y is dependent upon the value of x, y is known as the dependent variable and is sometimes referred to as 'function(x)' or f(x).
- The final solution of the equation, y, depends on the value of **x, the independent variable** which can be changed.
  - If the **independent variable** is (**increased, decreased, changed**), then the **dependent variable** will (**increase, decrease, change**.)
  - Example Hypothesis:
  - If the **amount of heat** is **decreased** then **germination** will **decrease**.
  - In the example the independent variable is **amount of heat**, it will be **decreased,** and then the dependent variable which is **germination** will **decrease.**
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Variables and Hypothesis

Variables

Scientists use an experiment to search for cause and effect relationships in nature. In other words, they design an experiment so that changes to one item cause something else to vary in a predictable way.

These changing quantities are called variables, and an experiment usually has three kinds: independent, dependent, and controlled.

The **independent variable is the one that is changed** by the scientist. In an experiment there is only one independent variable.

As the scientist changes the independent variable, he or she observes what happens.

The **dependent variable changes in response to the change the scientist makes** to the independent variable. The new value of the dependent variable is caused by and depends on the value of the independent variable. For example, if you open a faucet (the independent variable), the quantity of water flowing (dependent variable) changes in response--the water flow increases.

The number of dependent variables in an experiment varies, but there is often more than one.

Experiments also have controlled variables. Controlled variables are quantities that a scientist wants to remain constant, and he must observe them as carefully as the dependent variables. For example, if we want to measure how much water flow increases when we open a faucet, it is important to make sure that the water pressure (the controlled variable) is held constant. That's because both the water pressure and the opening of a faucet have an impact on how much water flows. If we change both of them at the same time, we can't be sure how much of the change in water flow is because of the faucet opening and how much because of the water pressure. Most experiments have more than one controlled variable. Some people refer to controlled variables as "constant variables."

Independent Variables (IV) & Dependent Variables (DV)

In an experiment, the *independent variable* is the variable that is varied or manipulated by the researcher, and the *dependent variable* is the response that is measured.

An *independent variable* is the presumed cause, whereas the *dependent variable* is the presumed effect.

In experiments, the IV is the variable that is controlled and manipulated by the experimenter; whereas the DV is not manipulated, instead the DV is observed or measured for variation as a presumed result of the variation in the IV.

The DV refers to the status of the 'effect'(or outcome) in which the researcher is interested; the independent variable refers to the status of the presumed 'cause,' changes in which lead to changes in the status of the dependent variable…any event or condition can be conceptualized as either an independent or a dependent variable.

Some Examples of Independent and Dependent Variables

The following is a hypothesis for a study.

1. "There will be a statistically significant difference in graduation rates of at-risk high-school seniors who participate in an intensive study program as opposed to at-risk high-school seniors who do not participate in the intensive study program."

IV: Participation in intensive study program. DV: Graduation rates.

The following is a description of a study.

2. "A director of residential living on a large university campus is concerned about the large turnover rate in resident assistants. In recent years many resident assistants have left their positions before completing even 1 year in their assignments. The director wants to identify the factors that predict commitment as a resident assistant (defined as continuing in the position a minimum of 2 years). The director decides to assess knowledge of the position, attitude toward residential policies, and ability to handle conflicts as predictors for commitment to the position."

IV: knowledge of position, attitude toward policies, and ability to handle conflicts. DV: commitment to position (continuing in position for 2 years or not continuing)