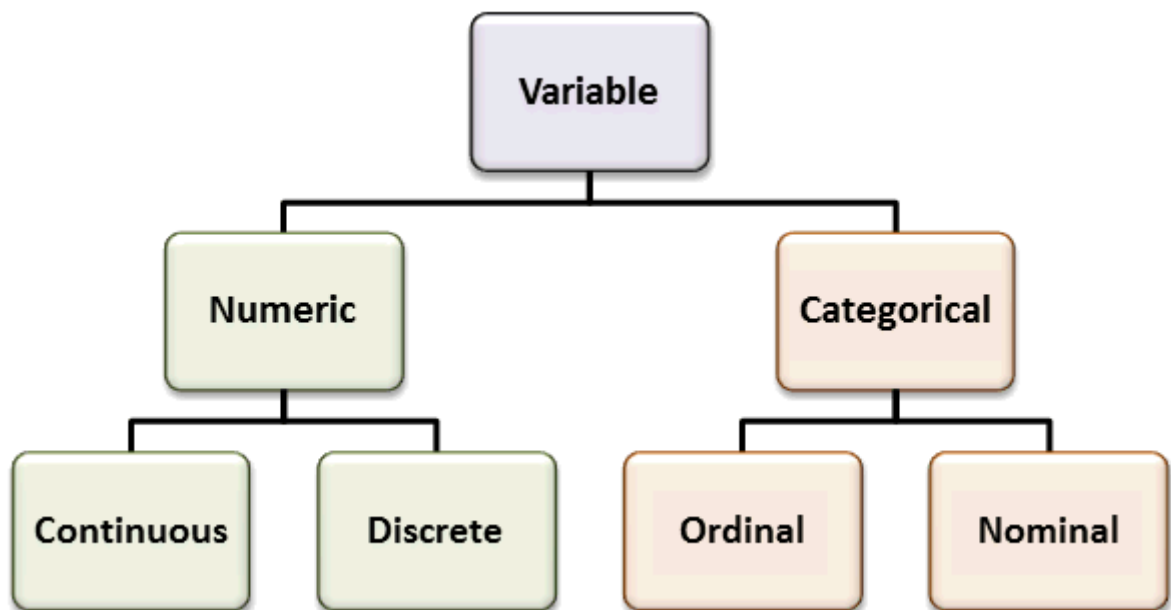


VARIABLES

CLASSIFICATION AND USES



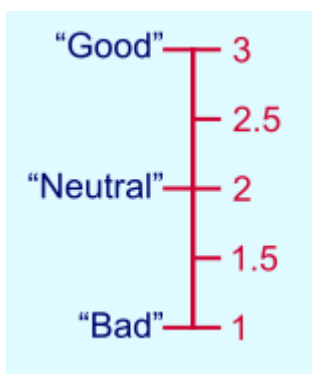
VARIABLE :

- A variable is any characteristics, number, or quantity that can be measured or counted.
- While a “variable” in algebra really just means one thing—an unknown value—you’ll come across dozens of types of variables in statistics.
- It is called a variable because the value may vary between data units in a population, and may change in value over time.
- For example; 'income' is a variable that can vary between data units in a population and can also vary over time for each data unit.

QUALITATIVE (CATEGORICAL)

Qualitative variables take on values that are names or labels. The color of a ball (e.g., red, green, blue) or the breed of a dog (e.g., collie, shepherd, terrier) would be examples of qualitative or categorical variables.

- Ordinal variable: It is a categorical variable. Observations can take a value that can be logically ordered or ranked but do not necessarily establish a numeric difference between each category. Example of ordinal categorical variables include academic grades (i.e. A, B, C),



QUANTITATIVE (NUMERIC)

Quantitative variables are numeric. They represent a measurable quantity. For example, when we speak of the population of a city, we are talking about the number of people in the city - a measurable attribute of the city. Therefore, population would be a quantitative variable.

- Continuous variable: It is a numeric variable. Observations can take any value between a certain set of real numbers. The value given to an observation for a continuous variable can include values as small as the instrument of measurement allows. Examples of continuous variables include height, time, age, and temperature.

Continuous Variable
A variable which can take any value in a particular limit.
Its value increases in fractions but not in jumps.
Examples: Height, weight and age of family members; in weight, say 50.5 kg, 30 kg, 42.8 kg and 18.6 kg

- **Nominal variable:** It is a categorical variable. Observations can take a value that is not able to be organised in a logical sequence. Examples of nominal categorical variables include sex, business type, eye color, religion and brand.

What is your hair color?

- 1 - Brown
- 2 - Black
- 3 - Blonde
- 4 - Gray
- 5 - Other

- **Discrete variable:** It is a numeric variable. Observations can take a value based on a count from a set of distinct whole values. A discrete variable cannot take the value of a fraction between one value and the next closest value. Examples of discrete variables include the number of registered cars, number of business locations, and number of children in a family, all of which measured as whole units (i.e. 1, 2, 3 cars).

Discrete Variable
A variable which can take only certain values.
It jumps from one value to another value, but it will not consider the intermediate value between two values. Thus, the value of the variables can increase in complete numbers.
Example: Number of students who opt for Commerce in Class 11, say 30, 35, 40, 45 and 50

Apart from these some of the other variables which can be either Qualitative or Quantitative and posses some additional properties are :

- **Confounding variable:** extra variables that have a hidden effect on your experimental results.
Random variables are associated with random processes and give numbers to outcomes of random events.
- **Binary variable (or) Dichotomous variable:** a variable that can only take on two values, usually 0/1. Could also be yes/no, tall/short or some other two-variable combination. Ex: Yes/No, Off/On, 0/1, etc.,
- **Criterion variable:** another name for a dependent variable, when the variable is used in non-experimental situations.

- **Dummy Variables:** Dummy variables (sometimes called indicator variables) are used in regression analysis and Latent Class Analysis. As implied by the name, these variables are artificial attributes, and they are used with two or more categories or levels. It's used when you want to work with categorical variables which have no quantifiable relationship with each other.

Original Variable Race-Ethnicity	Black	Hispanic	Asian	Other
White/European-American (1)	0	0	0	0
Black/African-American (2)	1	0	0	0
Hispanic/Latino (3)	0	1	0	0
Asian-American (4)	0	0	1	0
Other (5)	0	0	0	1

- **Dependent variable:** The dependent variable (DV) is just like the name sounds; it depends upon some factor that you, the researcher, control. For example:
 - How well you perform in a race depends on your training.
 - How much you weigh depends on your diet.
 - How much you earn depends upon the number of hours you work.
- **Independent variable:** Independent variables are variables that stand on their own and aren't affected by anything that you, as a researcher, do. You have complete control over which independent variables you choose. During an experiment, you usually choose independent variables that you think will affect dependent variables. Those are variables that can be changed by outside factors. If a variable is classified as a control variable, it may be thought to alter either the independent variable or dependent variable but it isn't the focus of the experiment.

$$y = b_0 + b_1x$$

x = independent variable

y = dependent variable

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SUBJECT Variables-types and uses.

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