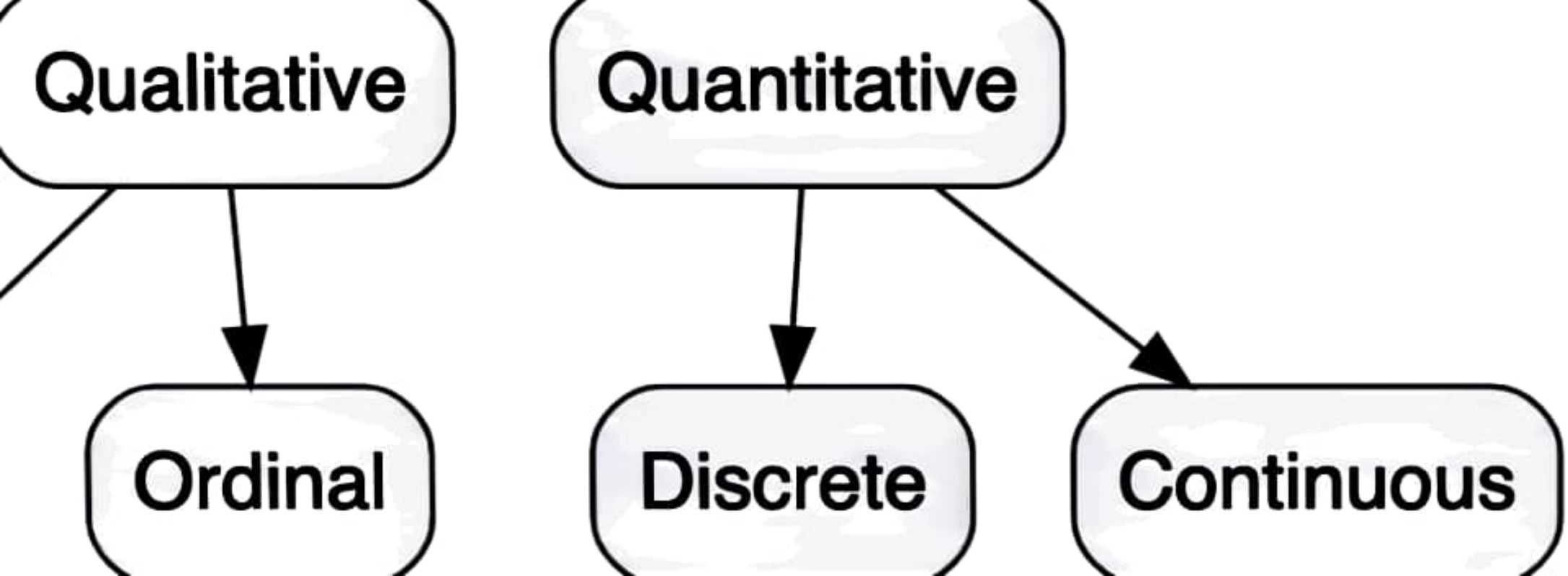
Qualitative
Quantitative
Ordinal
Discrete
Continuous

What about correlational research?

When you do correlational research, the terms “dependent” and “independent” don’t apply, because you are not trying to establish a cause and effect relationship.

However, there might be cases where one variable clearly precedes the other (for example, rainfall leads to mud, rather than the other way around). In these cases you may call the preceding variable (i.e. the rainfall) the **predictor variable** and the following variable (i.e. the mud) the **outcome variable**.

Control variables

Definition: Variables that are held constant throughout the experiment.

Example (salt tolerance experiment):

The temperature and light in the room the plants are kept in, and the volume of water given to each plant.

Dependent variables (aka response variables)

Definition: Variables that represent the outcome of the experiment.

Example (salt tolerance experiment):

Any measurement of plant health and growth: in this case, plant height and wilting.

Independent variables (aka treatment variables)

Definition: Variables you manipulate in order to affect the outcome of an experiment.

Example (salt tolerance experiment):

The amount of salt added to each plant's water.

Parts of the experiment: Independent vs dependent variables

Experiments are usually designed to find out what effect one variable has on another – in our example, the effect of salt addition on plant growth.

You manipulate the **independent variable** (the one you think might be the **cause**) and then measure the **dependent variable** (the one you think might be the **effect**) to find out what this effect might be.

Ordinal variables

What does the data represent?: Groups that are ranked in a specific order.

Examples:

- Finishing place in a race
- Rating scale responses in a survey*

variables)

What does the data represent?: Yes/no outcomes.

Examples:

- Heads/tails in a coin flip
- Win/lose in a football game

Nominal variables

What does the data represent?: Groups with no rank or order between them.

Examples:

- Species names
- Colors
- Brands

Categorical variables represent groupings of some kind. They are sometimes recorded as numbers, but the numbers represent categories rather than actual amounts of things.

There are three types of categorical variables: **binary**, **nominal**, and **ordinal** variables.

Continuous variables (aka ratio variables)

What does the data represent?:

Measurements of continuous or non-finite values.

Examples:

- Distance
- Volume
- Age

When you collect quantitative data, the numbers you record represent real amounts that can be added, subtracted, divided, etc. There are two types of quantitative variables: **discrete** and **continuous**.

Discrete vs continuous variables

Discrete variables (aka integer variables)

What does the data represent?: Counts of individual items or values.

Examples:

- Number of students in a class
- Number of different tree species in a forest

Categorical variables

Data is a specific measurement of a variable – it is the value you record in your data sheet. Data is generally divided into two categories:

- **Quantitative data** represents amounts.
- **Categorical data** represents groupings.

A variable that contains quantitative data is a **quantitative variable**; a variable that contains categorical data is a **categorical variable**. Each of these types of variable can be broken down into further types.