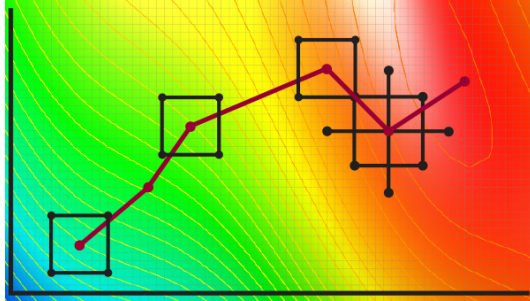


Experimentation for Improvement



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Design and Analysis of Experiments

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Some important terminology we will use all the time

Outcome

- ▶ What we measure after the experiment is finished
- ▶ It is the aspect you are interested in improving.



Factors

- ▶ Things which you actively change to influence the outcome.
- ▶ We typically change 2, 3, 4, or many more factors.
- ▶ Don't fixate on changing 1 factor at a time.



Various outcomes are possible in your experiment:

- ▶ height of the plant
- ▶ average length of leaves
- ▶ the number of flowers

These are examples of numeric measurements (quantitative).



► colour of the flower

This is a qualitative measurement.
(We use qualitative outcomes infrequently)

Outcome = Response

- ▶ What we measure after the experiment is finished
- ▶ It is the aspect you are interested in improving.

Objective

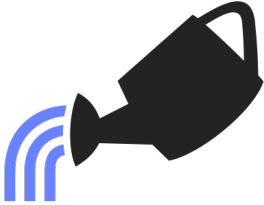
combine the **outcome** with “a desire to *adjust* the outcome”

Various examples of “objectives”

- ▶ maximize (↑) the profit
- ▶ maximize (↑) the height of the plant
- ▶ minimize (↓) pollution
- ▶ minimize (↓) energy used to produce a product

But sometimes the objective is “the same as before” (=)

Factors = Variables



Types of factors

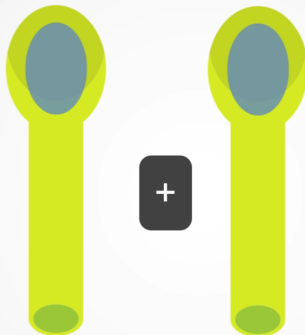
numeric factors (quantitative) can be measured and adjusted to different levels

categorical factors (qualitative) are simply selected for their characteristic



Outcome = taste

Objective = same



Low level: 15mL

High level: 30mL



Low level: 6 drops

High level: 10 drops