Def: Experiments are studies where researchers assign treatments to cases.

Def: When an experiment utilizes randomly assigned treatments, we say it is a randomized experiment.

Def: Cases, subjects, and experimental units are the individuals or items on which an experiment is performed.

Def: Treatments are the experimental conditions.

Key Principles

- Control: two or more treatments should be compared.

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- Randomization: experimental units are randomized into treatment groups.
- Replication: enough experimental units are used in order to ensure that randomization creates groups that are similar to each other.

Example

Does folic acid supplementation decrease the rate of birth defects?

- Control: compare supplementation using a multivitamin with folic acid to one without folic acid.

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- Control: compare supplementation using a multivitamin with folic acid to one without folic acid.
- Randomization: randomly assign people to take either folic acid or not.
- Replication: recruit a large number of participants.

Other Important Terms:

Def: Response variable: the characteristic of the experimental outcome that is measured or observed.

Def: Factor: a variable whose effect on the response variable is of interest in the experiment.

Def: Levels: the possible values of a factor.

Def: Treatment: each experimental condition. These are based on the combinations of the levels of the factors.

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
- Response variable:
- Factors:
- Levels:
- Treatments:

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
  - female lions.
- Response variable:
- Factors:
- Levels:
- Treatments:

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
  - female lions.
- Response variable:
  - dummy preference.
- Factors:
- Levels:
- Treatments:

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
  - female lions.
- Response variable:
  - dummy preference.
- Factors:
  - mane length, mane color.
- Levels:
- Treatments:

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
  - female lions.
- Response variable:
  - dummy preference.
- Factors:
  - mane length, mane color.
- Levels:
  - mane length: long and short
  - mane color: light and dark
- Treatments:

Example

Four life-sized dummies of male lions were set up to see how female lions reacted to mane length (long or short) and color (light or dark).

- Experimental units:
  - female lions.
- Response variable:
  - dummy preference.
- Factors:
  - mane length, mane color.
- Levels:
  - mane length: long and short
  - mane color: light and dark
- Treatments:
  - long, light mane
  - long, dark mane
  - short, light mane
  - short, dark mane