

Exercise walk-through

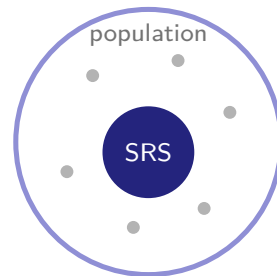
3.5

Introduction to Experimental Design

AP Statistics

What we will cover

- 1 Trusting the data
- 2 Observational vs experiment
- 3 Random sampling
- 4 When sampling goes wrong
- 5 Designing experiments
- 6 Scope of inference

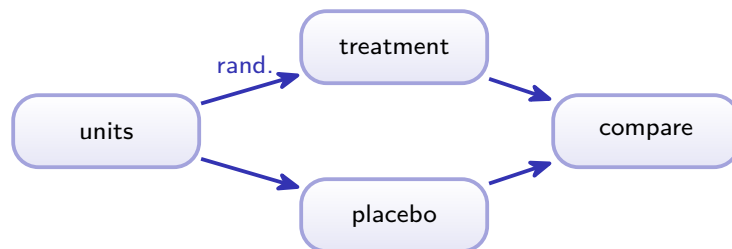


Designing experiments

Three principles:

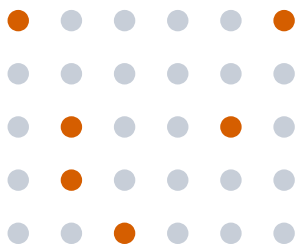
- **control** : hold other variables equal
- **randomization** : balances unknowns
- **replication** : many units per treatment

A **placebo** + **double-blind** design separate the real effect from belief.

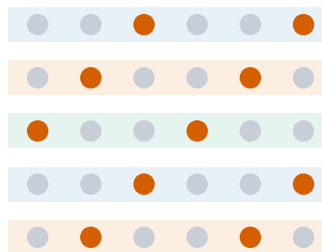


Random Sampling, continued

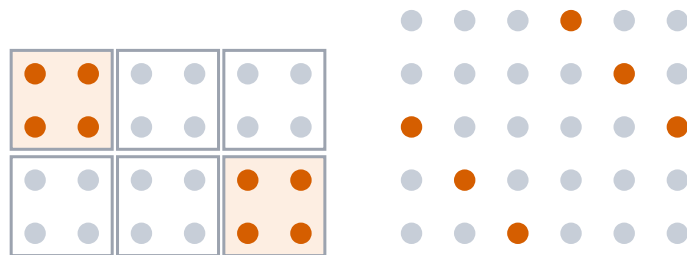
simple random



stratified



clustersystematic (every 5th)



SRS: equal chance · stratified: sample within groups ·
cluster: take whole clusters · systematic: every k th

Four random sampling designs: who gets selected, and how

Exercises 2.1-2.3

2.1 Name the three principles of experimental design.

[2]

2.2 State the purpose of a control group.

[1]

2.3 Define a placebo.

[1]

Exercises 2.1-2.3

2.1 Name the three principles of experimental design. [2]

2.1

- control, randomization, replication
-

2.2 State the purpose of a control group. [1]

2.2

- to provide a baseline for comparison with the treated group(s)
-

2.3 Define a placebo. [1]

2.3

- a fake treatment given for comparison

Exercises 3.1-3.2

3.1 Assigning units to treatments by chance is

[1]

☐

A control

B randomization

C replication

D bias

3.2 A fake treatment used for comparison is a

[1]

☐

A factor

B placebo

C block

D response

Exercises 3.1-3.2

3.1 Assigning units to treatments by chance is

[1]

☐

- A control
- B randomization
- C replication
- D bias

3.1 B

- randomization.

3.2 A fake treatment used for comparison is a

[1]

☐

- A factor
- B placebo
- C block
- D response

3.2 B

- placebo.

Exercise 3.3 (a)

3.3 A trial gives half the patients a real pill and half a sugar pill.

(a) Name the group given the sugar pill.

[1]

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(a) Name the group given the sugar pill.

[1]

(a)

- the control group

Exercise 3.3 (b)

3.3 A trial gives half the patients a real pill and half a sugar pill.

(b) Name the sugar pill itself.

[1]

Exercise 3.3 (b)

3.3 A trial gives half the patients a real pill and half a sugar pill.

(b) Name the sugar pill itself.

[1]

(b)

- a placebo

Exercise 3.3 (c)

3.3 A trial gives half the patients a real pill and half a sugar pill.

(c) Name the principle of using enough patients.

[1]

Exercise 3.3 (c)

3.3 A trial gives half the patients a real pill and half a sugar pill.

(c) Name the principle of using enough patients.

[1]

(c)

- replication