

## Mechanism to conduct random assignment

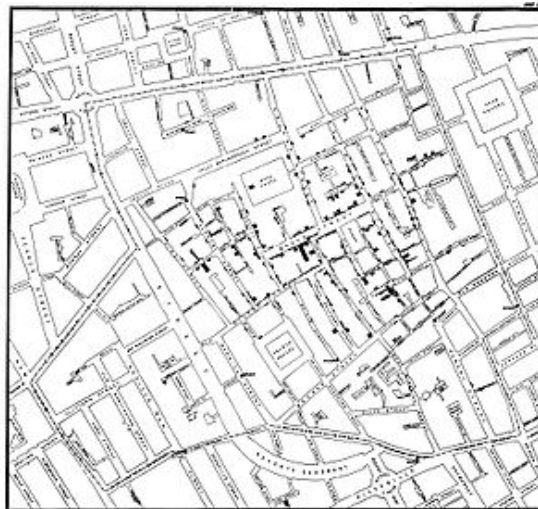
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- When  $N$  is small, simple random assignment can create a treatment group larger or smaller than intended.
- For field experiments, and some lab experiments, you could randomize the order of participants, selecting the first  $M$  (out of  $N$ ) to be in the treatment group
  - E.g. you can use Stata setting a seed, so randomness can be replicated
- You should be aware of any confounding factor that can affect random assignment
- Important: Random assignment has to ensure that groups are statistically independent of all observables and unobservables
  - Check balance between treatment and control at pre-treatment

## Natural experiments

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- Example: Dr. John Snow and Cholera (London, 1854)
- 500 deaths in one month
- Preconception: Transmission was caused by pollution
- The dots show clusters of cholera cases
  - Cases of cholera were near by the pump
- He realized that the outbreak was spreading because of contaminated water



## Natural experiments

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- Another example:
  - Effect of daylight saving on traffic accidents (Sood & Ghosh, 2007)
    - Data: 1976-2003, natural experiment: 1986 law changed the time when states switched to DST
    - Result: no short-term effect, positive long-term effect
- Experimenter has no control over an external alteration
- Advantage
  - Behavior is by definition “natural”
- Disadvantage
  - Many times there is no random “assignment,” and researchers have to “demonstrate” causality

## Lab experiments

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- We can consider a “lab” in a broad sense



- Lab experiments will not be covered in this course, but in case you are interested, you can read: “Lab experiments are a major source of knowledge in the social sciences” (Falk & Heckman, 2009)

## Field study experiments (example)

- Question: Are people averse to overhead in charity donations (Gneezy, Keenan & Gneezy, 2014):
- Program cost was \$20,000
- Random assignment (N = 40,000)
  - Control
  - Seed (private donor: \$10,000)
  - Match (up to \$10,000)
  - Overhead (donor: \$10,000 for overhead)

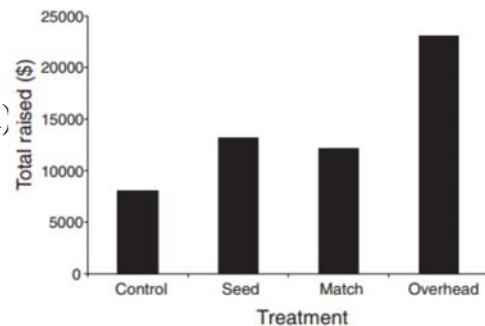


Fig. 2. Total amount raised by treatment.

- Question: Why?

## Field experiments (example)

- Question: Can descriptive norms (what other people do) increase towel reuse (Shultz et al., 2008):
- Condo units (each stay = 1 week)
- Random assignment
  - Treatment: “75% of hotel guests choose to reuse their towel each day”
  - Control: Standard message
- They found: large reduction in the number of towels used



Many of our guests have expressed to us their approval of conserving energy. When given the opportunity, nearly 75% of hotel guests choose to reuse their towels each day. Because so many guests value conservation and are in the habit of conserving, this hotel has initiated a conservation program.

Washing towels every day uses a lot of energy, so reusing towels is one way you can conserve.

If you would like your towels replaced, please leave your used towels in the basket on the bathroom floor. Towels left hanging \* on the towel rack tell us that you want to reuse them.

PLEASE REUSE YOUR TOWELS

\* If you have questions, please call the front desk \*



- Question: Why?

## Field experiments

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- Advantages
  - Real-world behaviors
  - It allows to examine measures hard to test in the lab (e.g. energy usage or voter turnout in an election)
  - “Gold standard” in social sciences
- Disadvantages
  - Costly
  - No controlled setting (greater chance of noise)
    - Need for larger samples
  - It may be hard to answer the “why”
  - Difficulty to replicate
    - E.g. get permissions

## Experimental design

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- The experimental design is a process, in which measurement, procedure, and way of sampling is determined.
  - Some terminology: participants, experimental conditions, and confounding.
  - We will talk about the N of participants when we talk about statistical power.
- Experiments using random assignment
  - Maximize internal validity. Why?
    - Control, especially in laboratory settings
  - This may compromise construct and external validity (in the lab). Why?
  - Variables are the construct what a research wants to study. Example: what if you want to study political campaigns on voting?