Chapter 5

SAMPLING METHODS
LEARNING OBJECTIVES

• Reasons for sampling

• Different sampling methods

• Probability & non probability sampling

• Advantages & disadvantages of each sampling method
A sample is a smaller collection of units from a population.

Used to learn about that population.
SAMPLING

• Why sample?

• Saves Resources
  • Time
  • Money
  • Workload
SAMPLING FRAME

- The list from which the potential respondents are drawn
  - Registrar’s office
  - Class rosters

- Elements = Individual members of population whose characteristics are measured.
Population

- What is your population of interest?
- To whom do you want to generalize your results?
  - All doctors
  - School children
  - Indians
  - Women aged 15-45 years
  - Other
- Can you sample the entire population?
SAMPLING

- 3 factors that influence sample representativeness

  1. Sampling procedure
  2. Sample size
  3. Participation (response)
SAMPLING

- When might you sample the entire population?
  - Population is very small
  - You have extensive resources
  - Don’t expect a very high response
SAMPLING

TARGET POPULATION

STUDY POPULATION

SAMPLE

TARGET POPULATION
**Sampling**

**Population** = Number of humans in whole world (approx. 6 billion)

Parameter of interest = Average food human being consumes in a day.

Representative Sample

100,000 people from all over the world

**Parameter**

Average food human being consumes in the world is 8 pounds.

**Statistics**

Statistics used to estimate parameter

Average weight of food consumed by sampled humans = 8 pounds.
Types of Samples
Probability (Random) Samples

- Simple random sample
- Systematic random sample
- Stratified random sample
- Multistage sample
- Multiphase sample
- Cluster sample
Every unit in the population has a chance (greater than zero) of being selected in the sample.

Probability can be accurately determined.

Every element in the population has same probability of selection = 'Equal Probability of Selection' (EPS) design.

Also referred to as 'self-weighting'.
  - All sampled units are given same weight.
PROBABILITY SAMPLING INCLUDES

- Simple Random Sampling
- Systematic Sampling
- Stratified Random Sampling
- Cluster Sampling
- Multistage Sampling
- Multiphase Sampling

https://www.youtube.com/watch?v=be9e-Q-jC-0
SIMPLE RANDOM SAMPLING

• When population is:
  • Small
  • Homogeneous
  • Readily available

• Each element of the frame has equal probability of selection

• Provides for greatest number of possible samples.
  • Assigning number to each unit in sampling frame

• A table of random numbers or lottery system is used to determine which units are selected
SIMPLE RANDOM SAMPLING

- Disadvantages
- If sampling frame is large, method impractical
- Minority subgroups of interest in population may not be present in sample in sufficient numbers for study
SYSTEMATIC SAMPLING

- The **elements** of the population are put in a list.
- **Then** every $k$th element in the list is chosen (systematically) for inclusion in the sample.
- **For example**, if the population of study contained 2,000 students at a high school and the researcher wanted a sample of 100 students,
SYSTEMATIC SAMPLING

- Students are put in a list
- Then every 20th student is selected for inclusion in the sample.
- To ensure against human bias:
  - The researcher should select the first individual at random.
  - ‘Systematic sample with a Random start'
SYSTEMATIC SAMPLING

EPS method, because all elements have the same probability of selection
(In the example, 1 in 20)
Another Example

- A researcher wants to select a systematic random sample of 10 people from a population of 100. If he or she has a list of all 100 people, he would assign each person a number from 1 to 100.
- The researcher then picks a random number, 6, as the starting number.
- He or she would then select every tenth person for the sample (because the sampling interval = 100/10 = 10).
- The final sample would contain those individuals who were assigned the following numbers: 6, 16, 26, 36, 46, 56, 66, 76, 86, 96.
SYSTEMATIC SAMPLING

• ADVANTAGES:
  - Simple
  - Guaranteed that the population will be evenly sampled

• DISADVANTAGE:
  - Sample may be biased if hidden periodicity in population coincides with that of selection.
STRATIFIED SAMPLING

- Population contains a number of categories
- Sampling frame can be organized into separate "strata"
  - Each stratum is sampled as an independent sub-population
  - Every unit in a stratum has same chance of being selected.
STRATIFIED SAMPLING

Draw a sample from each stratum

Women

Men
STRATIFIED SAMPLING
STRATIFIED SAMPLING

Benefits:
- Using same sampling fraction for all strata ensures proportionate representation in the sample.
- Adequate representation of minority subgroups of interest can be ensured by stratification.

Drawbacks:
- Sampling frame of entire population has to be prepared separately for each stratum.
- In some cases (designs with a large number of strata, or with a specified minimum sample size per group), stratified sampling can potentially require a larger sample than other methods.
Non-Probability Samples

- Convenience sample
- Quota
- Purposive sample
NON PROBABILITY SAMPLING

- Any sampling method where some elements of population have *no chance of selection* or

- Where the probability of selection can't be accurately determined

- It involves the *selection of elements based on assumptions* regarding the population of interest
Example: Visit every household in a given street, and

Interview the first person to answer the door.

In any household with more than one occupant, this is a nonprobability sample,

Some people are more likely to answer the door (e.g. an unemployed person vs employed housemate)
NONPROBABILITY SAMPLING

- Nonprobability Sampling includes: Convenience Sampling, Quota Sampling and Purposive Sampling.

- In addition, non-response effects may turn any probability design into a nonprobability design if the characteristics of nonresponse are not well understood,

- Non-response effectively modifies each element's probability of being sampled.
CONVENIENCE SAMPLING

- Use results that are easy to get

Hey!
Do you believe in the death penalty?
CONVENIENCE SAMPLING

- Sometimes known as grab or opportunity sampling or accidental or haphazard sampling.

- A type of nonprobability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, readily available and convenient.

- The researcher using such a sample cannot scientifically make generalizations about the total population from this sample because it would not be representative enough.
CONVENIENCE SAMPLING

- Example, interviewer conducts a survey at a shopping center early in the morning on a given day,

- People that he/she could interview would be limited to those given there at that given time,
CONVENIENCE SAMPLING

- Which would not represent the views of other members of society in that area.

- If the survey was to be conducted at different times of day and several times per week.

- This type of sampling is most useful for pilot testing.
QUOTA SAMPLING

• The population is **first segmented into mutually exclusive** sub-groups, just as in **stratified sampling**.

• **Then judgment used** to select subjects or units from each segment based on a specified proportion.

• **For example**, an interviewer may be told to sample 200 females and 300 males between the age of 45 and 60.
  • **This step makes** the technique non-probability **sampling**.
QUOTA SAMPLING

• In quota sampling the selection of the sample is **non-random**.

• For example interviewers might be tempted to interview those who **look most helpful**.

• **The problem** is that these samples may be **biased** because not everyone gets a **chance of selection**.

• This **random element** is its **greatest weakness**.
Snowball Sampling

• In social science research, **snowball sampling** is a similar technique.

• Existing study subjects are used to recruit more subjects into the sample.
Purposive Sample

- AKA: Judgmental sample

- Sample is selected based on the knowledge of a population and the purpose of the study.

- Subjects selected because of some characteristic.

- Field researchers often interested in studying extreme or deviant cases
  - Cases that don’t fit into regular patterns of attitudes and behaviors
Purposive Sample

- **Studying the deviant cases**, researchers can often gain a better understanding of the more regular patterns of behavior.

- This is where purposive sampling often takes place.

- **For instance**, if a researcher is interested in learning more about students at the top of their class,

- Sample those students who fall into the "top of the class" category.

- They will be **purposively selected** because they meet a certain characteristic.
Purposive Sample

- Can be very useful for situations where you need to reach a targeted sample quickly and

- Where sampling for proportionality is not the main concern.
Purposive Sample

- **Example:**
- Researchers (typically market researchers) who you might often see at a mall carrying a clipboard and stopping various people to interview.
- Often conducting research using purposive sampling.
- May be looking for and stopping only those people who meet certain characteristics.