

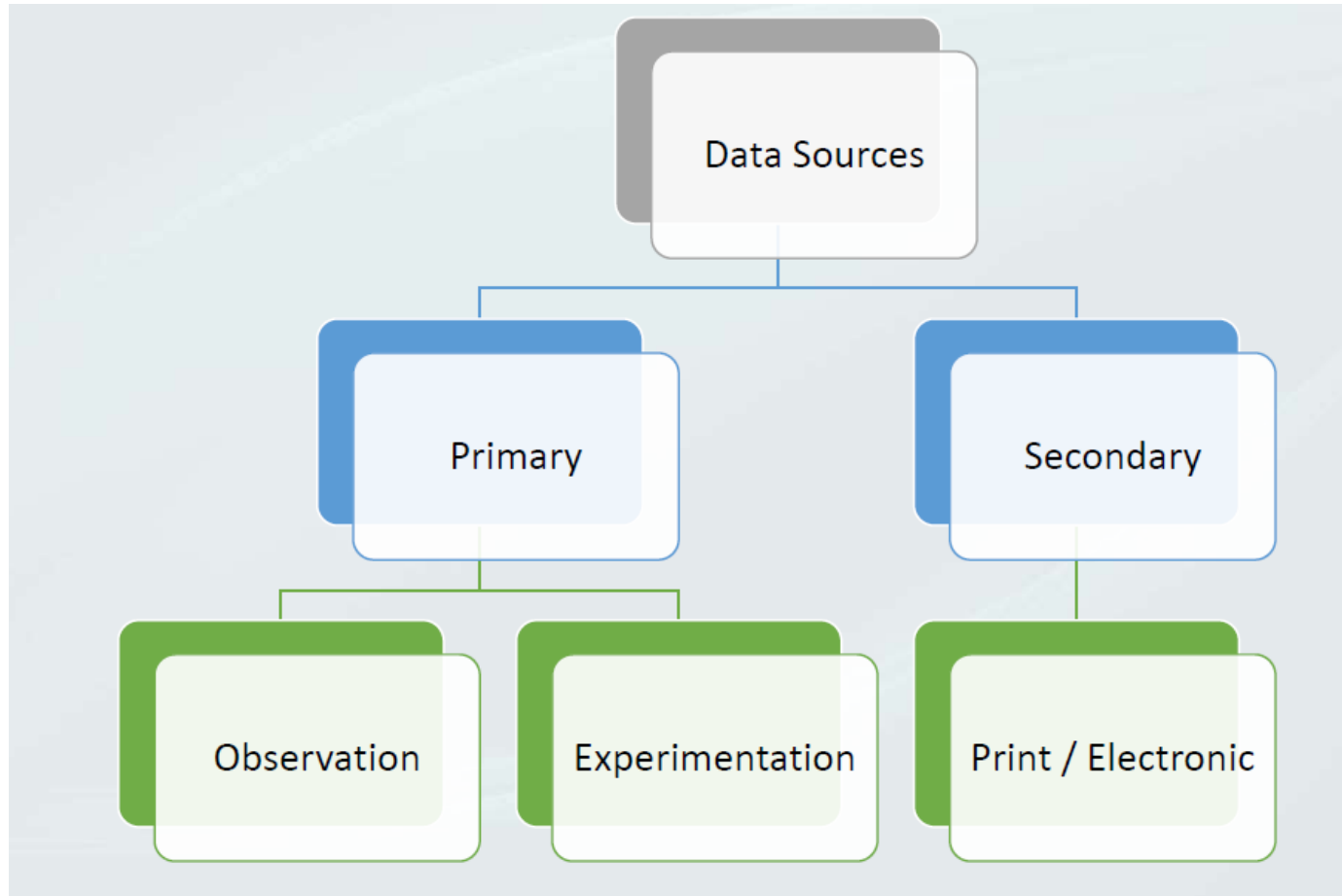
Sampling Methods

By SLIIT Mathematics Unit
Faculty of Humanities and
Sciences

1.

Introduction to Sampling

Data Sources



Introduction to Sampling

- Data should be collected before describing.
- Recap:
 - Population vs. Sample.
 - Census vs. Sampling survey.
- If a sampling survey is done, should plan how to select the sample.
- **Two types of sampling:**
 - Probability sampling.
 - Non-probability sampling.
- Why should a proper sample be selected?

2.

Probability Sampling

Probability Sampling

- Based on the principle of randomization or chance.
- More complex, time consuming and usually more costly.
- More reliable.
- Requires a sampling/survey frame.
- Can use computers or other methods to select elements randomly (e.g.: random number tables).

Probability Sampling (cont'd.)

- Commonly used probability sampling methods:
 - Simple Random Sampling (SRS).
 - Systematic Sampling (SYS).
 - Probability-Proportional-to-Size (PPS) Sampling.
 - Cluster Sampling.
 - Stratified Sampling (STR).
 - Multi-Stage Sampling.
 - Multi-Phase Sampling.
 - Replicated Sampling.

3.

Non-Probability Sampling

Non-Probability Sampling

- Uses a subjective (i.e., non-random) method.
- Does not require a sampling/survey frame.
- Fast, easy and inexpensive.
- Sample might not be representative of the population.
- Chance of each element being selected (i.e., probability), cannot be calculated.
- Can be applied to studies that are used as:
 - an idea generating tool.
 - a preliminary step.
 - a follow-up step.

Non-Probability Sampling

■ **Haphazard Sampling**

- Units are selected in an aimless.
- Assumes that the population is homogeneous.
E.g.: Interviewing whoever walks by.

■ **Volunteer Sampling**

- Respondents are volunteers.
- Generally, volunteers must be screened.
E.g.: Interviewing people who call a radio/TV show.
- Often used to select individuals for focus groups or in depth interviews.

Non-Probability Sampling (cont'd.)

■ **Judgement Sampling**

- Based on previous ideas about the population.
- Subject to the researcher's biases.
- Can be more biased than haphazard sampling.

■ **Quota Sampling**

- One of the most common forms of non-probability sampling.
- Sampling is done until a specific number of units (quotas) for various subpopulations has been selected.
- Market researchers often use quota sampling (particularly for telephone surveys).

Simple Random Sampling (SRS)

- Starting point for all probability sampling designs.
- Each unit in the sample has the same inclusion probability (n – Sample Size, N – Population Size).
- Sampling may be done with or without replacement (SRSWR or SRSWOR).
- Generally, SRSWOR yields more precise results and is operationally more convenient.

SRS (cont'd.)

- Advantages of SRS
 - Simplest sampling technique.
 - Requires no additional (auxiliary) information on the frame in order to draw the sample.
 - Needs no technical development.
- Disadvantages of SRS
 - Makes no use of auxiliary information even if such information exists on the survey frame.
 - Can be expensive.
 - It is possible to draw a 'bad' SRS sample.

Systematic Sampling (SYS)

- Units are selected from the population at regular intervals.
- A sampling interval ($k = N/n$) and a random start are required.
- Every k th individual thereafter.
- **Advantages**
 - Can result in a sample that is better dispersed than SRS.
 - Simpler than SRS.
- **Disadvantages**
 - Can result in a 'bad' sample if the sampling interval matches some periodicity in the population.

Stratified Sampling



- Divide population into two or more subgroups (called strata) according to some common characteristic.
- A simple random sample is selected from each subgroup, with sample sizes proportional to strata sizes.

Cluster Sampling




- Population is divided into several “clusters,” each representative of the population.
- A simple random sample of clusters is selected.
- All items in the selected clusters can be used, or items can be chosen from a cluster using another probability sampling technique.


Multistage Sampling

- With multistage sampling, we select a sample by using combinations of different sampling methods.
- **Example:-** In Stage 1, we might use cluster sampling to choose clusters from a population. Then, in Stage 2, we might use simple random sampling to select a subset of elements from each chosen cluster for the final sample.

4.

Survey Errors

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- I. Coverage error or selection bias:** Coverage error occurs if certain groups or subjects are excluded from the sampling frame. So that they have no chance of being selected in the sample. Coverage error results in a selection bias.
 - II. Non-response bias:** Not everyone is willing to respond to a survey. Nonresponse error arises from the failure to collect data on all subjects in the sample and results in a Nonresponse bias.

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- I. Sampling error:** Sampling error reflects the heterogeneity or “chance differences” from sample to sample based on the probability of particular individuals being selected in the particular samples. Sampling error can be reduced by taking large samples.
 - II. Measurement error:** This refers to inaccuracies in the recorded responses that occur because of a weakness in question wording, an interviewer’s effect on the respond, or the effort made by the respondent (respondent error).

PROBLEM

- An auto analyst is conducting a satisfaction survey, sampling from a list of 10,000 new car buyers. The list includes 2,500 Ford buyers, 2,500 GM buyers, 2,500 Honda buyers, and 2,500 Toyota buyers. The analyst selects a sample of 400 car buyers, by randomly sampling 100 buyers of each brand. Is this an example of a simple random sample?
 - a) Yes, because each buyer in the sample was randomly sampled.
 - b) Yes, because each buyer in the sample had an equal chance of being sampled.
 - c) Yes, because car buyers of every brand were equally represented in the sample.
 - d) No, because every possible 400-buyer sample did not have an equal chance of being chosen.
 - e) No, because the population consisted of purchasers of four different brands of car

Thank You

Questions?

