SAMPLING

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WHAT IS SAMPLING

It is the process by which a relatively small number of individuals or measures of individuals, objects, or events is selected and analysed in order to find out something about the entire population from which it was selected.

WHY SAMPLING IS NEEDED

- Get information about large populations

- Less costs

- Less field time

- More accuracy i.e. Can Do A Better Job of Data Collection

- When it's impossible to study the whole population

TERMS IN SAMPLING

- **Population-** The well-specified & identifiable group of individuals. E.g. all primary schools, all university students, all housewives etc.

- **Sample**- any number of persons selected to represent the population.

- **Sampling Frame-** the elementary units form the basis of the sampling process and such units are called sampling frame, e.g a telephone directory for an opinion survey in a particular town.

Cont…..

- Parameter- a measure based upon the entire population.
- Statistics- a measure based upon a sample.

STEPS IN SAMPLING

- Defining the population
- Listing the population
- Selecting a representative sample
- Obtaining an adequate sample

Characteristics of a good sample design

- Sample design must result in a truly representative sample.

- Sample design must be such which results in a small sampling error.

- Sample design must be viable in the context of funds available for the research study.

Cont…

- Sample design must be such so that systematic bias can be controlled in a better way.

- Sample should be such that the results of the sample study can be applied, in general, for the universe with a reasonable level of confidence.

Types of sampling

- Non-probability samples

- Probability samples

Non probability samples

- Convenience samples (ease of access),sample is selected from elements of a population that are easily accessible
- Snowball sampling (friend of friend….etc.)
- Quota sampling (when quota is fixed)
- Purposive sampling (judgemental)
  - You chose who you think should be in the study.

Non probability samples
Demerits

- Probability of being chosen is unknown

- Cheaper- but unable to generalise
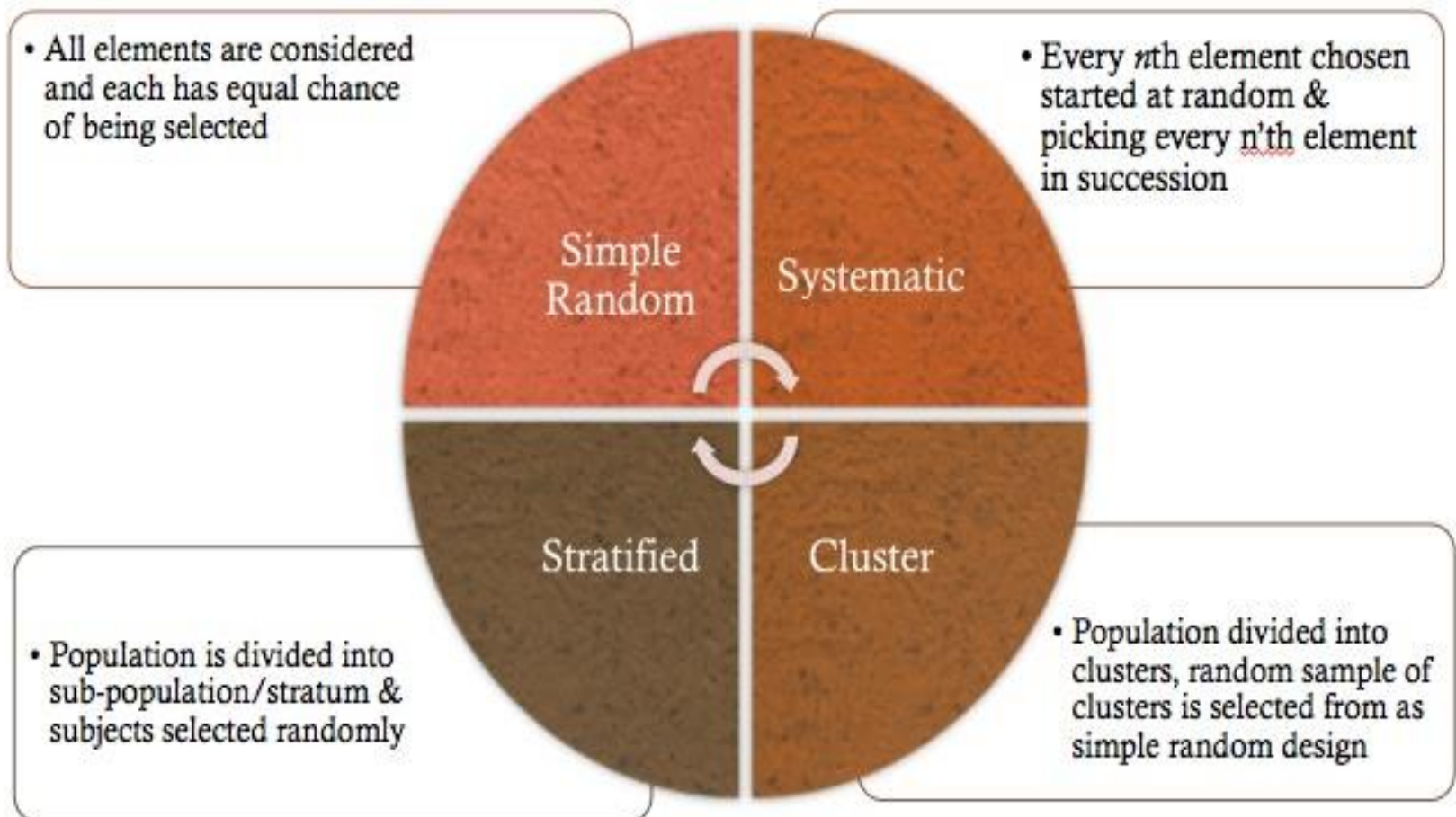
- potential for bias

Probability samples

- Simple random sampling
- Systematic sampling
- Stratified sampling
- Multi-stage sampling
- Cluster sampling

Probability Sampling

- All elements are considered and each has equal chance of being selected

- Every *n*th element chosen started at random & picking every n'th element in succession

Simple Random

Systematic

Stratified

Cluster

- Population is divided into sub-population/stratum & subjects selected randomly

- Population divided into clusters, random sample of clusters is selected from as simple random design

Simple Random Sampling

Random sampling is the purest form of probability sampling.

- Each member of the population has an equal and known chance of being selected.

Eg. Table of Random Numbers, Lottery Method, Tossing of coin etc

Systematic Sampling

- **Systematic sampling** is often used instead of random sampling. It is also called an Nth name selection technique.

- After the required sample size has been calculated, every Nth record is selected from a list of population members.

- Its only advantage over the random sampling technique is simplicity (and possibly cost effectiveness).

Stratified Sampling

- The researcher divides the population into separate groups, called strata. Then, a probability **sample** (often a simple random **sample**) is drawn from each group.
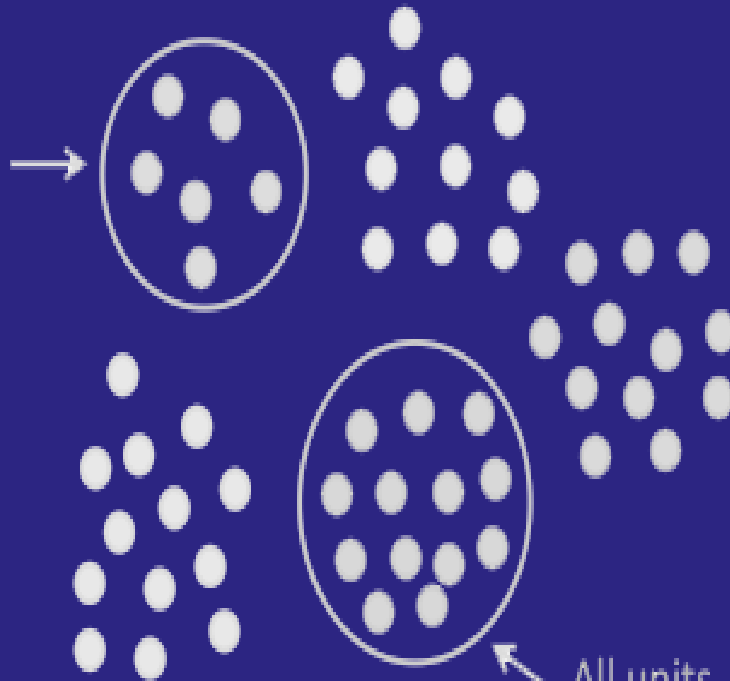
Cluster Sampling

- **Cluster sampling** is a **sampling** technique used when "natural" but relatively homogeneous groupings are evident in a statistical population. In this technique, the total population is divided into these groups (or **clusters**) and a simple random **sample** of the groups is selected.

Cluster Sampling

All units in cluster sampled →

All units in cluster sampled

- Natural grouping within population
- Whole groups sampled

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Multistage Sampling

- Multi-stage sampling represents a more complicated form of cluster sampling in which larger clusters are further subdivided into smaller, a total population of interest is first divided into 'clusters' (for example, a total population into geographic regions, household income levels, etc), and from each cluster individual subjects are selected by random sampling.

Probability samples
Merits

- Random sampling
  - Each subject has a known probability of being selected
- Allows application of statistical sampling theory to results to:
  - Generalise
- Test hypotheses

So…….

- Probability samples are the best
- Ensure
  - Representativeness
  - Precision

Errors in sample

- The difference between the sample estimates (Statistics) and the population value(parameter) is called error.

Classification Of Errors

- Non Sampling error (or bias)
  Inaccurate response   (information bias)

- Sampling error (random error)
  Selection bias

Cont….

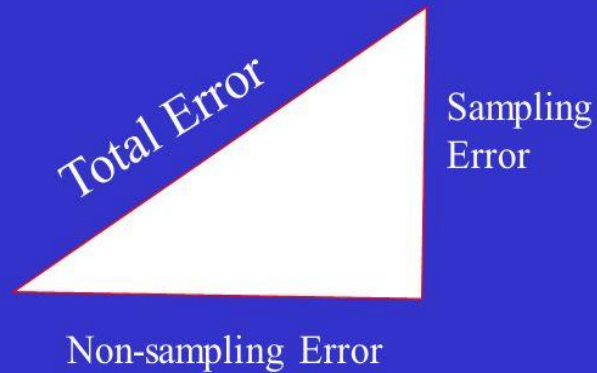|	Random	Systematic
Sampling	A	B
Measurement	C	D

Cont.…

- Cell A & B refer to Sampling error while C & D refer to non sampling error.

(Total error)^2= (Sampling error)^2+(non sampling error)^2

Relationship Between Total Error and Sampling and Non-Sampling Errors

Total Error

Sampling Error

Non-sampling Error

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Thank You