



Sampling Theory in Statistics Explained - SSC CGL Tier II Notes in PDF

The latest SSC Exam Dates Calendar is out. According to the latest update, SSC CGL Tier II Exam will be conducted from 18th to 20th January 2018! The Prelims of SSC CGL was conducted from 5th August to 24th August 2017. You will be competing for a total of 4733 vacancies this year! If you have cleared the SSC CGL Tier I, then you must be preparing for SSC CGL Tier II. This article will help you on **Sampling Theory in Statistics for SSC CGL Tier II**. In the following article, you will know in detail about Sampling & Non-Sampling Errors, Probability & Non-Probability Sampling Techniques, Difference between Clusters & Strata, etc. You can also take our [SSC CGL Tier II](#) Online Mock Tests to boost up your preparation strategy.

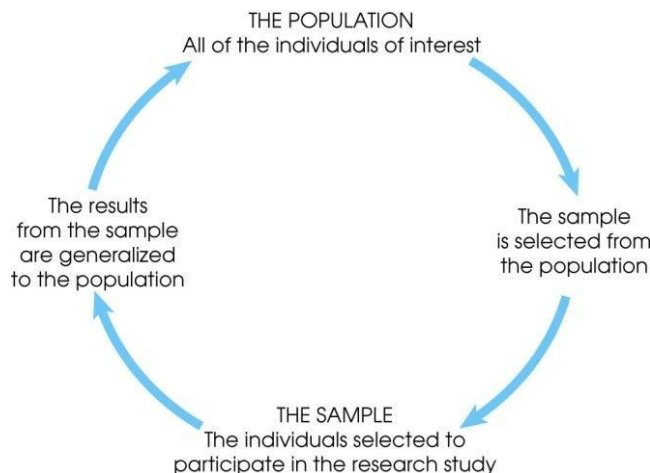
⇒ Sampling Theory in Statistics Explained - Introduction

A common goal of surveys and other data collecting tools is to collect data from a smaller part of a larger group so that we can learn something about the larger group

- **Data:** Data are observations that have been collected
- **Population:** The entire group of individuals is called the **population**. It is a totality of statistical data forming a subject of an investigation or the complete collection of all elements to be studied.
- **Sample:** Usually populations are so large that a researcher cannot examine the entire group. Therefore, a sample is selected to represent the population in a



research study. It is a portion of population or a sub-collection of elements, which is examined with a view to estimating the characteristics of a population



- **Parameter:** It is a characteristic of a population based on all the units of the population or a numerical measurement describing some characteristics of a population. It is also called population values.

population



parameter

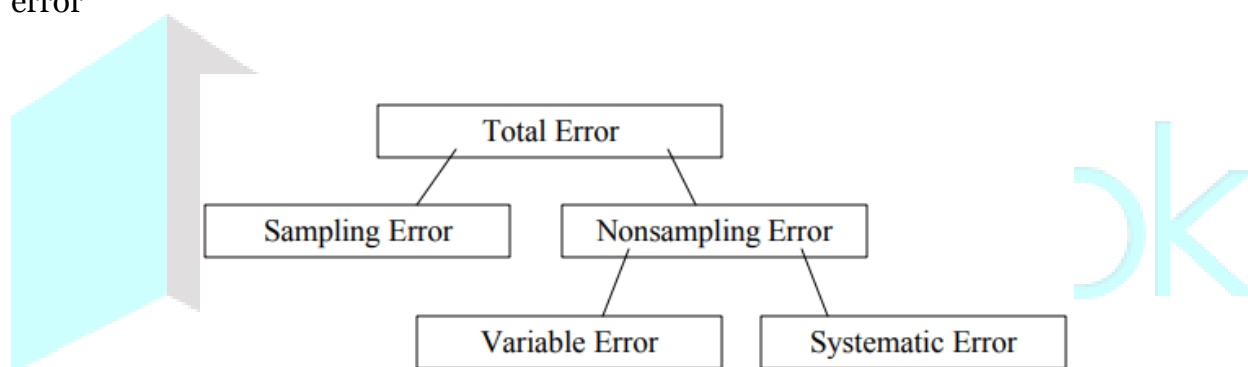
- **Statistics:** It can be defined as a collection of methods for planning experiments, obtaining data, and then organizing, summarizing, presenting, analyzing, interpreting, and drawing conclusions based on the data. It is a numerical measurement describing some characteristics of a sample



sample
↕
statistic

⇒ Sampling Theory - Sampling and Non-Sampling Errors

In sampling theory, **total error** can be defined as the variation between the mean value of population parameter and the observed mean value obtained in the research. The total error can be classified into two categories, i.e. sampling error and non-sampling error



Basis for comparison	Sampling Error	Non - Sampling Error
Meaning	Sampling error is a type of error, occurs due to the sample selected does not perfectly represents the population of interest	An error occurs due to sources other than sampling, while conducting survey activities is known as non-sampling error



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Cause	Deviation between sample mean and population mean	Deficiency and analysis of data
Type	Random	Random or Non – Random
Occurs	Only when sample is selected	Both in sample and census
Sample size	Possibility of error reduced with the increase in sample size.	It has nothing to do with the sample size.

⇒ Sampling Theory - Probability & Non-Probability Sampling Techniques

Probability sampling involves random selection of elements in which each element has a chance of being selected whereas non – probability sampling involves non – random methods in the selection of elements in which not all have equal chances of being selected. Methods of Probability and non-probability sampling techniques are discussed below:

- **Simple random sampling:** It involves selecting anybody from the sample frame entirely at random. In this, each and every unit in the population has an equal chance of being selected.



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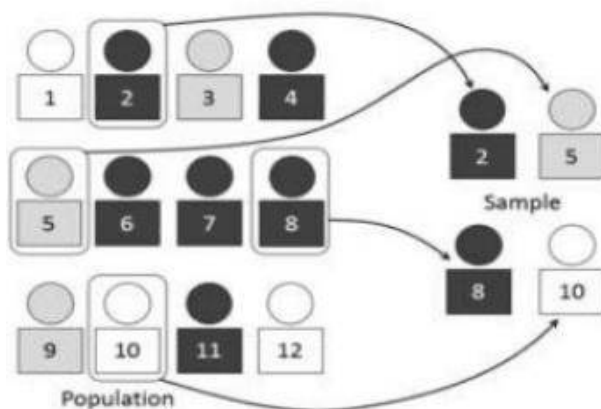


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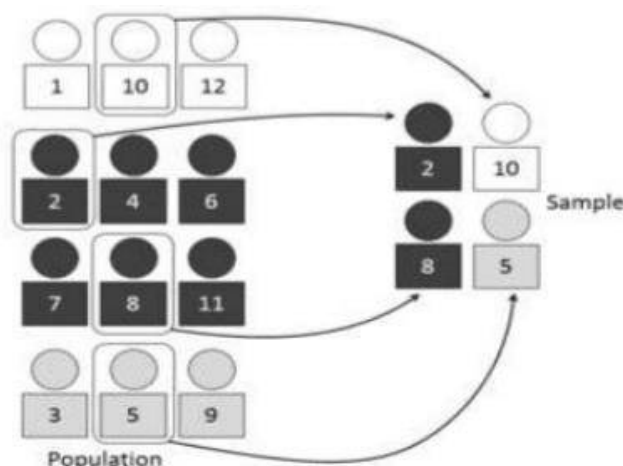
- **Stratified sampling:** Stratified sampling is a way of ensuring that particular strata or categories of individuals are represented in the sampling process. Subdivide the population into at least two different subgroups that share the same characteristics, and then draw a sample from each subgroup (or stratum)





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⇒ Sampling Theory - Difference Between Strata & Clusters

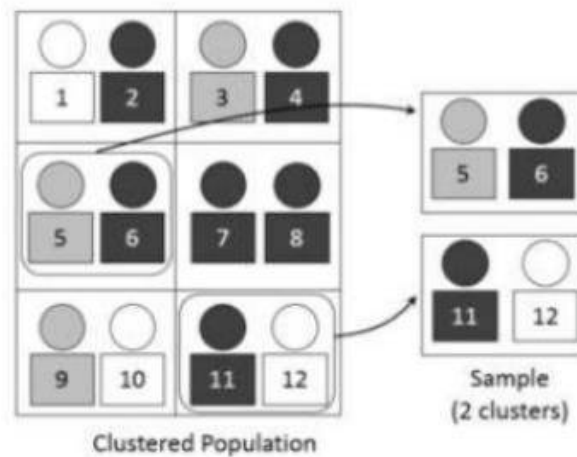
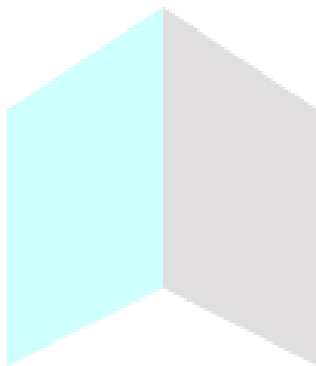
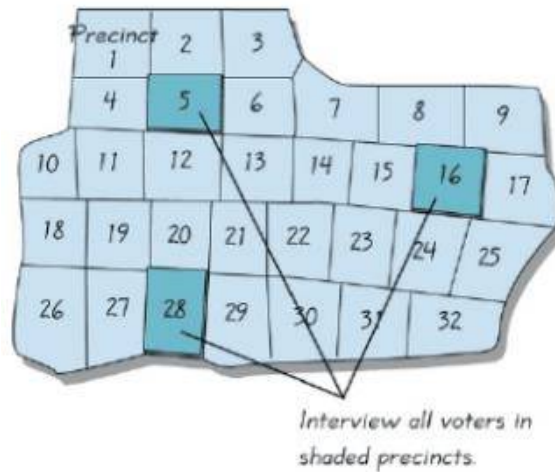
Although strata and clusters are both non-overlapping subsets of the population, they differ in several ways. All strata are represented in the sample, but only subsets of clusters are in the sample. With stratified sampling, the best survey results occur when elements within strata are internally homogeneous. However, with cluster sampling, the best results occur when elements within clusters are internally heterogeneous

- **Cluster sampling:** Divide the population into sections (or clusters); randomly select some of those clusters; choose all members from selected clusters. It is similar to stratified sampling but the groups are selected for their geographical location. Unlike strata, a cluster should be as heterogeneous as the population itself.



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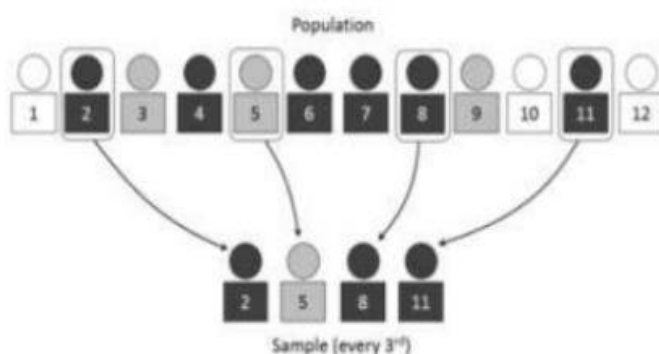


- **Systematic sampling:** Select some starting point and then select every k^{th} element in the population. It is like random sampling but the respondents are selected in a random way. It is also called interval sampling.



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- **Multistage sampling:** It is a combination of random, systematic, stratified, and cluster sampling. If the probability is involved at each stage, then the distribution of sample statistics can be obtained. It is a complex form of cluster sampling in which two or more levels of units are embedded one in the other.
 - First stage, random number of districts chosen in all states
 - Followed by random number of talukas, villages
 - Then third stage units will be houses
 - All ultimate units (houses, for instance) selected at last step are surveyed

This technique is essentially the process of taking random samples of preceding random samples. It is not as effective as true random sampling, but probably solves more of the problems inherent to random sampling. It is an effective strategy because it banks on multiple randomizations.



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- **Multiphase sampling:** In this type of sampling, part of the information is collected from whole sample & part from a subsample.

For example:

- In Tb survey MT in all cases – Phase I
- X-Ray chest in MT positive cases – Phase II
- Sputum examination in X-Ray positive cases - Phase III

Survey by such procedure is less costly, less laborious & more purposeful

- **Purposive sampling or Judgment sampling:** In this type of sampling, the samples are selected based on preconceived purpose or on the judgment of the investigator. This is used primarily when there is a limited number of people that have expertise in the area being researched
- **Convenience sampling:** Use results that are easy to get i.e. use who is available. It is also known as grab or opportunity sampling or accidental or haphazard sampling. It involves the sample being drawn from that part of the population which is close to hand





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- **Quota sampling:** In this sampling, we keep on going until the sample size is reached. In this method, a sample size is determined first and then quota is fixed for various categories of population, which is followed while selecting the sample

⇒ Sampling Theory - Sampling Distribution

The sampling distribution of a statistic is the distribution of all possible values taken by the statistic when all possible samples of a fixed size n are taken from the population.

The sampling distribution of a statistic is the probability distribution of that statistic. It is also defined as the process of selecting a number of observations from all the observations from a particular group or population.

⇒ Sampling Theory Explained - Sample Size

Decisions

It is the mathematical estimation of the number of subjects/units to be included in the study. Sampling and sample size are crucial issues in pieces of quantitative research.

The various steps involved are:

1. Define the population
2. Determine the sampling frame
3. Select sampling technique
4. Determine the sample size
5. Execute the sampling process

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