**SAMPLING & SAMPLING TECHNIQUES**

Degree Course (Three Years)

Psychology Honours

B. A. Part– III Honours Paper VI: Group A (Research Methodology)

Unit 5

By

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Sampling is a process used in statistical analysis in which a predetermined number of observations are taken from a larger population. The methodology used to sample from a larger population depends on the type of analysis being performed, but it may include simple random sampling or systematic sampling.

Sampling is the statistical process of selecting a subset (called a “sample”) of a population of interest for purposes of making observations and statistical inferences about that population. Social science research is generally about inferring patterns of behaviors within specific populations. We cannot study entire populations because of feasibility and cost constraints, and hence, we must select a representative sample from the population of interest for observation and analysis. It is extremely important to choose a sample that is truly representative of the population so that the inferences derived from the sample can be generalized back to the population of interest. Improper and biased sampling is the primary reason for often divergent and erroneous inferences reported in opinion polls and exit polls conducted by different polling groups

Sampling should be such that error of estimation is minimum. “In the social sciences, it is not possible to collect data from every respondent relevant to our study but only from some fractional part of the respondents. The process of selecting the fractional part is called sampling.” – David S. Fox Sampling is fundamental to all statistical methodology of behavioural and social research. Bad sampling vitiates the data at the source and no amount of subsequent statistical findings will improve its quality. In fact sampling is the part of the strategy of research and has by now acquired the status of technical job.

**TYPES OF SAMPLING DESIGNS**

Several methods have been devised to select representative samples. In general two types of techniques of sampling are as follows:

1. **Probability Sampling**
2. **Non-probability Sampling**

A brief mention of the important sample designs is as follows:

**PROBABILITY SAMPLING**

Types or Techniques Probability Sampling: There are a number of techniques of taking probability sample. But here only six important techniques have been discussed as follows:

**1. Simple Random Sampling**

Simple random sampling: This type of sampling is also known as chance sampling or probability sampling where each and every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in case of finite universe, has the same probability of being selected. For example, if we have to select a sample of 300 items from a universe of 15,000 items, then we can put the names or numbers of all the 15,000 items on slips of paper and conduct a lottery. Using the random number tables is another method of random sampling. To select the sample, each item is assigned a number from 1 to 15,000. Then, 300 five digit random numbers are selected from the table. To do this we select some random starting point and then a systematic pattern is used in proceeding through the table. We might start in the 4th row, second column and proceed down the column to the bottom of the table and then move to the top of the next column to the right. When a number exceeds the limit of the numbers in the frame, in our case over 15,000, it is simply passed over and the next number selected that does fall within the relevant range. Since the numbers were placed in the table in a completely random fashion, the resulting sample is random. This procedure gives each item an equal probability of being selected. In case of infinite population, the selection of each item in a random sample is controlled by the same probability and that successive selections are independent of one another. Aandomization is a method and is done by using a number of techniques as :

 (a) Tossing a coin.

(b) Throwing a dice.

(c) Lottery method.

(d) Blind folded method.

(e) By using random table of ‘Tippett’s Table’.

***Advantages***

(a) It requires a minimum knowledge of population.

(b) It is free from subjectivity and free from personal error. (

c) It provides appropriate data for our purpose.

 (d) The observations of the sample can be used for inferential purpose***.***

***Disadvantages***

(a) The representativeness of a sample cannot be ensured by this method.

 (b) This method does not use the knowledge about the population.

(c) The inferential accuracy of the finding depends upon the size of the sample.

**2. Systematic Sampling**

Systematic sampling: In some instances the most practical way of sampling is to select every 15th name on a list, every 10th house on one side of a street and so on. Sampling of this type is known as systematic sampling. An element of randomness is usually introduced into this kind of sampling by using random numbers to pick up the unit with which to start. This procedure is useful when sampling frame is available in the form of a list. In such a design the selection process starts by picking some random point in the list and then every nth element is selected until the desired number is secured. There should be a list of informations of all the individuals of the population in any systematic way. Now we decide the size of the sample.

Let sample size = n and population size = N

Now we select each N/nth individual from the list and thus we have the desired size of sample which is known as systematic sample. Thus for this technique of sampling population should be arranged in any systematic way.

***Advantages***

(a) This is a simple method of selecting a sample.

 (b) It reduces the field cost.

(c) Inferential statistics may be used.

(d) Sample may be comprehensive and representative of population.

(e) Observations of the sample may be used for drawing conclusions and generalizations.

***Disadvantages***

(a) This is not free from error, since there is subjectivity due to different ways of systematic list by different individuals. Knowledge of population is essential.

(b) Information of each individual is essential.

(c) This method can’t ensure the representativeness.

(d) There is a risk in drawing conclusions from the observations of the sample.

**3. Stratified Sampling**

If the population from which a sample is to be drawn does not constitute a homogeneous group, then stratified sampling technique is applied so as to obtain a representative sample. In this technique, the population is stratified into a number of nonoverlapping subpopulations or strata and sample items are selected from each stratum. If the items selected from each stratum is based on simple random sampling the entire procedure, first stratification and then simple random sampling, is known as stratified random sampling. Researcher should choose that characteristic or criterion which seems to be more relevant in his research work. Stratified sampling may be of three types:

1. Disproportionate stratified sampling.

2. Proportionate stratified sampling.

3. Optimum allocation stratified sampling.

***Advantages***

(a) It is (more precisely third way) a good representative of the population.

 (b) It is an improvement over the earlier.

(c) It is an objective method of sampling.

(d) Observations can be used for inferential purpose.

***Disadvantages***

(a) Serious disadvantage of this method is that it is difficult for the researcher to decide the relevant criterion for stratification.

 (b) Only one criterion can be used for stratification, but it generally seems more than one criterion relevant for stratification.

(c) It is costly and time consuming method.

(d) Selected sample may be representative with reference to the used criterion but not for the other. (e) There is a risk in generalization.

**4. Multiple or Double or Repetitive Sampling**

Generally this is not a new method but only a new application of the samplings we discussed above. This is most frequently used for establishing the reliability of a sample. When employing a mailed

questionnaire, double sampling is sometimes used to obtain a ‘more representative sample. This is done because some randomly selected subjects who are sent questionnaires may not return them. Obviously, the missing data will bias the result of the study, if the people who fail to reply the’ query differ in some fundamental way from the others in respect to the phenomena being studied. To eliminate this bias, a second sample may be drawn at random from the non-respondents and the people interviewed to obtain the desired information. Thus this technique is also known as repeated or multiple sampling. This double sampling technique enables one to check on the reliability of the information obtained from the first sample. Thus, double sampling, wherein one sample is analysed, and information obtained is used to draw the next sample to examine the problem further.

***Advantages***

(a) This sampling procedure leads to the inferences of free determine precision based on a number of observations.

(b) This technique of sampling reduces the error.

(c) This method maintains the procedure of the finding evaluate the reliability of the sample.

***Disadvantages***

(a) This technique of sampling cannot be used for a large sample. It is applicable only for small sample. (b) This technique is time consuming, costly, and requires more competition.

(c) Its planning and administration is more complicated.

**5. Multi-Stage Sampling**

This is a further development of the idea of cluster sampling. This technique is meant for big inquiries extending to a considerably large geographical area like an entire country. Under multi-stage sampling the first stage may be to select large primary sampling units such as states, then districts, then towns and finally certain families within towns. If the technique of random-sampling is applied at all stages, the sampling procedure is described as multi-stage random sampling. The Individuals are selected from different stages for constituting the multi-stage sampling.

***Advantages***

(a) It is a good representative of the population.

(b) Multi-stage sampling is an improvement over the earlier methods.

(c) It is an objective procedure of sampling.

(d) The observations from multi-stage sample may be used for inferential purpose.

***Disadvantages***

(a) It is a difficult and complex method of samplings.

(b) It involves errors when we consider the primary and secondary stages.

(c) It is again a subjective phenomenon.

**6. Cluster Sampling**

Cluster sampling involves grouping the population and then selecting the groups or the clusters rather than individual elements for inclusion in the sample. Suppose some departmental store wishes to sample its credit card holders. It has issued its cards to 15,000 customers. The sample size is to be kept say 450. For cluster sampling this list of 15,000 card holders could be formed into 100 clusters of 150 card holders each. Three clusters might then be selected for the sample randomly. The sample size must often be larger than the simple random sample to ensure the same level of accuracy because is cluster sampling procedural potential for order bias and other sources of error is usually accentuated. The clustering approach can, however, make the sampling procedure relatively easier and increase the efficiency of field work, specially in the case of personal interviews. Area sampling is quite close to cluster sampling and is often talked about when the total geographical area of interest happens to be big one. Under area sampling we first divide the total area into a number of smaller non-overlapping areas, generally called geographical clusters, then a number of these smaller areas are randomly selected, and all units in these small areas are included in the sample. Area sampling is specially helpful where we do not have the list of the population concerned. It also makes the field interviewing more efficient since interviewer can do many interviews at each location. ***Advantages***

(a) It may be a good representative of the population.

(b) It is an easy method.

(c) It is an economical method.

(d) It is practicable and highly applicable in education.

(e) Observations can be used for inferential purpose.

***Disadvantages***

(a) Cluster sampling is not free from error.

(b) It is not comprehensive.

All these above are techniques of probability sampling.

**7. Non-probability Sampling Techniques**

Non-probability is also known as non-parametric sampling which ate used for certain purpose.

**1. Incidental or Accidental Assignment**

The term incidental or accidental applied to those samples that are taken because they are most frequently available, i.e. this refers to groups which are used as samples of a population because they are readily available or because the researcher is unable to employ more acceptable sampling methods.

***Advantages***

(a) It is very easy method of sampling.

(b) It is frequently used in behavioural sciences.

(c) It reduces the time, money and energy i.e. it is an economical method.

***Disadvantages***

(a) It is not a representative of the population.

(b) It is not free from error.

(c) Parametric statistics cannot be used.

**2. Judgement Sampling**

This involves the selection of a group from the population on the basis of available information thought. It is to be representative of the total population. Or the selection of a group by intuition on the basis of criterion deemed to be self-evident. Generally investigator should take the judgement sample so this sampling is highly risky.

***Advantages***

(a) Knowledge of the investigator can be best used in this technique of sampling.

(b) This technique of sampling is also economical.

***Disadvantages***

(a) This technique is objective.

(b) It is not free from error.

(c) It includes uncontrolled variation.

(d) Inferential statistics cannot be used for the observations of this sampling, so generalization is not possible.

**3. Purposive Sampling**

The purposive sampling is selected by some arbitrary method because it is known to be representative of the total population, or it is known that it will produce well matched groups. The Idea is to pick out the sample in relation to some criterion, which are considered important for the particular study. This method is appropriate when the study places special emphasis upon the control of certain specific variables.

***Advantages***

(a) Use of the best available knowledge concerning the sample subjects.

(b) Better control of significant variables.

(c) Sample groups data can be easily matched.

(d) Homogeneity of subjects used in the sample.

***Disadvantages***

(a) Reliability of the criterion is questionable.

 (b) Knowledge of population is essential.

(c) Errors in classifying sampling subjects.

(d) Inability to utilise the inferential parametric statistics.

(e) Inability to make generalization concerning total population.

**4. Quota Sampling**

Quota sampling: In stratified sampling the cost of taking random samples from individual strata is often so expensive that interviewers are simply given quota to be filled from different strata, the actual selection of items for sample being left to the interviewer’s judgement. This is called quota sampling. The size of the quota for each stratum is generally proportionate to the size of that stratum in the population. Quota sampling is thus an important form of non-probability sampling. Quota samples generally happen to be judgement samples rather than random samples. This combined both judgement sampling and probability sampling. The population is classified into several categories: on the basis of judgement or assumption or the previous knowledge, the proportion of population falling into each category is decided. Thereafter a quota of cases to be drawn is fixed and the observer is allowed to sample as he likes. Quota sampling is very arbitrary and likely to figure in Municipal surveys.

***Advantages***

(a) It is an improvement over the judgement sampling.

 (b) It is an easy sampling technique.

(c) It is most frequently used in social surveys.

***Disadvantages***

 (a) It is not a representative sample.

(b) It is not free from error.

(c) It has the influence of regional geographical and social factors.

**CHARACTERISTICS OF A GOOD SAMPLE**

The following are the main characteristics of a good sample:

1. A good sample is the true representative of the population corresponding to its properties. The population is known as aggregate of certain properties and sample is called sub-aggregate of the universe.

2. A good sample is free from bias, the sample does not permit prejudices the learning and preconception, imaginations of the investigator to influence its choice.

3. A good sample is an objective one, it refers objectivity in selecting procedure or absence of subjective elements from the situation.

4. A good sample maintains accuracy. It yields an accurate estimates or statistics and does not involve errors.

 5. A good sample is comprehensive in nature. This feature of a sample is closely linked with true-representativeness. Comprehensiveness is a quality of a sample which is controlled by specific purpose of the investigation. A sample may be comprehensive in traits but may not be a good representative of the population.

6. A good sample is also economical from energy, time and money point of view.

7. The subjects of good sample are easily approachable. The research tools can be administered on them and data can be collected easily.

8. The size of good sample is such that it yields an accurate result. The probability of error can be estimated.

9. A good sample makes the research work more feasible.

10. A good sample has the practicability for research situation