Probability sampling is an essential concept in research, statistics, and data analysis. It ensures that every member of a population has a known chance of being selected in a sample, reducing biases and increasing the reliability of findings. In this guide, I will explain probability sampling in simple terms, breaking down different techniques, their applications, and mathematical foundations. Probability sampling is a sampling method where each unit in a population has a specific probability of being selected. This approach ensures representativeness, making it ideal for statistical analysis and inferential studies. Random Selection: Every individual has an equal or known chance of selection. Elimination of Bias: Since selection is random, researcher bias is minimized. Generalizability: Results can be extrapolated to the larger population. Example: Suppose a company has 1,000 employees, and I need to select 100 randomly. I assign each employee a number from 1 to 1,000 and use a random number generator to pick 100 numbers. Mathematical Representation: If a population has size N and I need a sample of size n, the probability of selecting any specific individual is: P = \frac{n}{N} Systematic sampling selects every kth individual from a population after a random starting point. Formula for Sampling Interval: k = \frac{N}{n} Example: If I need to select 100 employees from 1,000, the sampling interval is: k = \frac{1000}{100} = 10 So, I randomly select a starting point and pick every 10th employee. Stratified sampling divides the population into homogeneous subgroups (strata) and selects samples from each group. Formula for Proportional Allocation: n_h = \frac{N_h}{N} \times n where N_h is the size of stratum h, and n_h is the sample size from that stratum. Example: A company has 600 male and 400 female employees. If I need a sample of 100, I allocate: Males: \frac{600}{1000} \times 100 = 60 Females: \frac{400}{1000} \times 100 = 40 Cluster sampling divides the population into clusters and randomly selects entire clusters. Example: A university has 50 departments, each with 200 students. If I randomly select 10 departments and survey all their students, this is cluster sampling. This involves multiple sampling techniques at different stages. Example: I first divide a country into regions (clusters), then select cities using stratified sampling, and finally use simple random sampling to pick respondents. TypeAdvantagesDisadvantagesSimple Random SamplingEasy to implement, unbiasedMay be impractical for large populationsSystematic SamplingSimpler than SRS, evenly spread selectionPeriodic patterns can introduce biasStratified SamplingMore representative, ensures subgroup inclusionRequires knowledge of population characteristicsCluster SamplingCost-effective, practical for large populationsHigher variance compared to SRSMultistage SamplingFlexible, suitable for large-scale studiesComplex to administer Market Research: Ensures consumer surveys reflect diverse demographics. Epidemiology: Helps track disease prevalence. Election Polling: Estimates voter preferences accurately. Academic Research: Ensures unbiased data collection. A census studies every unit in a population, while probability sampling studies a subset. FeatureProbability SamplingCensusCostLowHighTimeShortLongAccuracyHigh if done correctlyHigh but requires more effort To determine the required sample size, I use the following formula: n = \frac{Z^2 p (1-p)}{e^2} where: Z = Z-score based on confidence level p = Estimated proportion of population with a characteristic e = Margin of error Example Calculation: If I want 95% confidence (Z = 1.96), expect 50% (p = 0.5) of respondents to have a trait, and allow a 5% error: n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384 Thus, I need a sample of 384 respondents. Probability sampling is crucial for making valid inferences from data. By understanding different sampling techniques, I can select the most suitable method for any study, ensuring accuracy and reliability. Whether for business, healthcare, or social research, probability sampling provides a strong foundation for decision-making and analysis. Probability sampling is a foundational method in statistics used to create accurate, representative samples from larger populations. By providing each member of a population with a known chance of selection, probability sampling reduces bias and increases the reliability of research outcomes. This guide explores the different types, methods, and practical uses of probability sampling and offers clear examples to help you understand how it works. What is Probability Sampling? Probability sampling is a sampling technique where each member of a population has a calculable chance of being selected for a study. This method ensures that the sample represents the population accurately, reducing sampling bias and making statistical conclusions more reliable. In research and surveys, probability sampling is crucial for making valid inferences about large populations based on the responses from a smaller, manageable sample. Why is Probability Sampling Important? Probability sampling is essential because it ensures: Representativeness: Provides a sample that mirrors the entire population, making study outcomes more applicable. Reduced Bias: With calculated selection, each member has an equal opportunity of being chosen, minimizing bias. Accurate Predictions: Results obtained from probability samples can be more confidently generalized to the broader population. Types of Probability Sampling In simple random sampling, every individual in the population has an equal chance of being selected. This type is often chosen when the population is small and homogenous, as it ensures representation across demographic groups like age, race, and location, predicting election outcomes with higher accuracy. Market Research: Companies might use cluster sampling to gauge product preferences by region, obtaining insights on consumer preferences without sampling the entire country. Public Health Surveys: For national health surveys, researchers use multistage sampling, often beginning with regional clusters, then selecting individuals within those areas to estimate nationwide health trends. Advantages of Probability Sampling Reduces Bias: Every member has an equal or known chance of selection. High Representativeness: Provides accurate representation, especially valuable in large populations. Reliability and Validity: Enhances the trustworthiness of study conclusions, as probability sampling supports reliable generalization to the broader population. Versatility: With different types and methods, probability sampling is adaptable for diverse research needs, from small local studies to large-scale national surveys. Disadvantages of Probability Sampling Time-Consuming: Gathering a complete sampling frame and implementing randomization can require significant time and resources. Complexity in Large Populations: Applying methods like stratified or cluster sampling in large, diverse populations can be complicated. Cost: The meticulous processes required for probability sampling often result in higher costs compared to non-probability sampling methods. When to Use Probability Sampling? Probability sampling is most suitable when: Accuracy is Crucial: Studies that aim to make generalizable predictions about the population. Large Populations: Ideal for large or geographically spread populations. Diversity of Responses is Needed: When subgroups in a population must be represented to understand different perspectives, as in public policy surveys. Probability Sampling vs. Non-Probability Sampling Probability SamplingNon-Probability SamplingEach member has a known chance of selectionNot all members have a known chance of being selectedReduces sampling biasHigher risk of sampling biasHigh reliability for statistical analysisLimited generalizabilityCostly and time-intensiveMore cost-effective and quicker Conclusion Probability sampling is a powerful tool in research, offering methods to accurately represent populations, reduce bias, and increase reliability. Understanding the types—simple random, systematic, stratified, cluster, and multistage—and their applications helps researchers design effective studies and draw meaningful, generalizable conclusions. By choosing the right probability sampling technique, researchers can confidently rely on their data to reflect true population characteristics. Q1: What is the primary benefit of probability sampling?A: Probability sampling provides a representative sample of the population, ensuring reliable and unbiased study results. Q2: Can probability sampling be used for small populations?A: Yes, probability sampling can be used for small populations, although it is often more valuable for larger populations where representativeness is critical. Q3: How does probability sampling differ from non-probability sampling?A: Probability sampling allows every member a known chance of selection, reducing bias, while non-probability sampling does not guarantee equal chances, increasing the risk of bias. Q4: What is the most common type of probability sampling?A: Simple random sampling is one of the most common types, as it is straightforward and ensures equal selection chances. Q5: Why is stratified sampling used?A: Stratified sampling ensures all key subgroups within a population are represented, making it valuable when different segments must be studied individually. Explore More: A Comprehensive Overview of Sampling What Is Trend Analysis in Research? Types, Methods, and Examples The Basics of Quantitative Data Collection: An Introduction Effective Survey Programming Techniques for Accurate Data Collection Sampling is a fundamental concept in statistics that helps us understand large populations without having to study every single individual. In this article, we'll break down the idea of a sample, explain the different types, show how to calculate it, and provide easy-to-understand examples. Whether you're a student, data analyst, or researcher, this guide will give you a strong foundation.A sample is a subset of individuals selected from a larger population. The goal is to use the sample to make inferences or draw conclusions about the whole population.Key Terms:Population: The entire group you want to study.Sample: A smaller group taken from the population.Example: The process of selecting a sample.Why Use Samples?Studying an entire population is often expensive and time-consuming.Samples save time and resources.If selected properly, a sample can provide accurate insights.Example: Suppose a company wants to know what employees think about a new policy. Instead of surveying all 10,000 employees, they can survey 1,000 randomly selected employees.Types of Sampling MethodsThere are two major categories: Probability Sampling and Non-Probability Sampling.1. Probability SamplingIn this method, every member of the population has a known and equal chance of being selected.Probability Sampling. Simple Random SamplingEvery individual has an equal chance of being included. Example: Picking 50 names out of a hat from a list of 500.b. Stratified Sampling: The population is divided into groups (strata), and random samples are taken from each group.Example: Dividing students by grade level and selecting random students from each grade.c. Systematic Sampling: Select every kth individual from a list.Example: Every 10th person on an attendance sheet.d. Cluster Sampling: The population is divided into clusters, some clusters are randomly selected, and all members in those clusters are studied.Example: Randomly picking 5 schools and surveying all students in those schools.2. Non-Probability SamplingIn this method, not every individual has a chance of being selected.a. Convenience Sampling: Select individuals who are easiest to reach.Example: Surveying people at a nearby coffee shop.b. Purposive Sampling: The researcher selects individuals based on their judgment.Example: Interviewing only senior managers for insights about company policy.c. Snowball Sampling: Existing subjects help recruit more subjects.Example: Asking participants to refer others in a study about a rare disease.d. Quota Sampling: Like stratified sampling but not random: select a fixed number from each group.Example: Choosing 20 males and 20 females from a group, regardless of randomness.Characteristics of a Good SampleRepresentative: Should reflect the population accurately.Unbiased: Free from systematic errors.Adequate Size: Large enough to draw meaningful conclusions.Randomness: Ensures each member of the population has a fair chance.How to Apply the Sample Size FormulaTo calculate the sample size accurately, follow these key steps:Step-1: Determine Key InputsStart by identifying your population size, which is the total group you're studying. For small groups (like employees in a small company), precise numbers matter. For large populations (like a country), estimates are usually acceptable.Step-2: Choose a Margin of Error (e)This is the amount of error you're willing to tolerate, expressed as a percentage. A smaller margin (e.g., ±3%) means more accuracy but requires a larger sample.Step-3: Set a Confidence Level (Z-score)Common confidence levels are 90%, 95%, or 99%, which correspond to Z-scores like 1.645, 1.96, and 2.576, respectively. A 95% confidence level means you're 95% sure the real value lies within your margin of error.Step-4: Estimate the Standard Deviation (p)If you're unsure, use 0.5 (50%), which gives the most conservative sample size.Step-5: Apply the FormulaUse this formula for infinite populations:n = \frac{Z^2 \cdot p \cdot (1-p)}{e^2}For finite populations, adjust it as:\text{Adjusted } n = \frac{n}{1 + \frac{(n-1)}{N}}Example: Estimate the proportion of people who prefer tea over coffee. You want 95% confidence, with a margin of error of 5%, and no prior estimate, so use p = 0.5.Example of sample size formulaSo, you need at least 385 people in your sample.Sampling ErrorThis is the difference between the result from the sample and the actual result from the entire population.Types of ErrorsSampling Error: Occurs by chance when a sample doesn't represent the population well.Non-Sampling Error: Mistakes in data collection, recording, or processing.Real-Life ApplicationsHealthcare: Clinical trials test new drugs on a sample of patients.Politics: Polls predict election results using samples.Marketing: Companies survey customers to learn about satisfaction.Education: Researchers study the performance of a sample of students. Probability sampling is a method where every member of a population has a known, non-zero chance of being selected for a research study. What Is Probability Sampling? In social science research, probability sampling is a technique used to select participants or cases so that each has a measurable chance of being included in the study. This method ensures that the sample represents the larger population as accurately as possible. Researchers use it when they want to make valid generalizations from their sample to the broader group. Probability sampling is rooted in the concept of randomness and fairness. It uses random selection techniques to avoid bias and allow every unit in the population an equal or known chance of selection. Because of this, probability sampling supports reliable, data-driven conclusions and is often used in quantitative research. Why Is Probability Sampling Important? Promotes Representativeness The goal of most social science research is to make statements about a population by studying a sample. If the sample is not representative of the population, the results might be misleading. Probability sampling reduces that risk by giving each individual or unit a fair chance of selection. Allows Generalization Since the selection process is based on known probabilities, researchers can use statistical methods to generalize findings from the sample to the population. This is one of the biggest strengths of probability sampling—it helps produce results that are not only valid for the sample but for the broader group as well. Reduces Sampling Bias Sampling bias occurs when certain groups are overrepresented or underrepresented in a sample. Because probability sampling uses randomization, it helps minimize this kind of bias and improves the accuracy of the results. Key Features of Probability Sampling Known probability of selection: Every member of the population has a known and non-zero chance of being included. Random selection: Choices are made randomly rather than by researcher preference or convenience. Supports inferential statistics: Because of its structure, researchers can apply mathematical techniques to draw conclusions about the entire population. Types of Probability Sampling There are several main types of probability sampling. Each has its own strengths, and researchers choose based on their goals, resources, and the nature of the population. Simple Random Sampling In simple random sampling, each member of the population has an equal chance of being selected. Researchers use random methods or lottery methods to choose who will be in the sample. Example: A political scientist studying voting behavior might randomly select 500 registered voters from a national database, giving each voter an equal chance of being picked. Systematic Sampling Systematic sampling involves selecting every kth individual from a list, starting at a random point. The value of k is based on the population and desired sample size. Example: A sociologist with a list of 10,000 residents might select every 100th person after randomly selecting a starting point between 1 and 100. Stratified Sampling Stratified sampling divides the population into subgroups (called strata) based on a characteristic such as age, gender, income, or race. Then, researchers randomly sample from each subgroup to ensure all groups are represented. Example: An education researcher might divide a school population into grade levels and randomly sample students from each grade to study habits across age groups. Cluster Sampling In cluster sampling, the population is broken into clusters, usually based on location or organization. Researchers then randomly select whole clusters and either survey all members within them or select a sample from each. Example: A public health researcher might randomly select several hospitals and then survey all the nurses working at those hospitals about their job satisfaction. Multi-Stage Sampling Multi-stage sampling is a more complex form of cluster sampling. It involves several rounds of sampling, often combining different types of probability sampling at different stages. Example: A criminologist might first randomly select cities, then randomly select neighborhoods within those cities, and finally randomly select households within those neighborhoods. Examples of Probability Sampling in Social Science Fields Sociology A sociologist interested in family structures might use stratified sampling to ensure that all types of households (single-parent, nuclear, extended) are included in the study. Psychology A psychologist studying stress levels among college students might use simple random sampling to select participants from a university's enrollment list. Political Science Election polling often uses probability sampling to predict outcomes. Random digit dialing or voter registry lists allow researchers to draw samples representative of the voting population. Anthropology An anthropologist studying dietary patterns across regions might use cluster sampling to select different villages and survey every household within each one. Education An education researcher might use multi-stage sampling to select schools, then classes within those schools, and finally students within those classes to study reading achievement. Criminal Justice A criminologist might use stratified sampling to study prison populations by dividing inmates into strata based on sentence length, then randomly selecting from each stratum. Strengths of Probability Sampling Enhances Credibility By giving each individual a known chance of selection, researchers reduce the possibility of bias and increase the trustworthiness of their findings. Supports Statistical Inference Because the sample is randomly selected, researchers can calculate sampling error and confidence intervals. This helps determine how likely it is that the findings from the sample apply to the whole population. Works with Large Populations Probability sampling is especially useful when studying large, diverse populations. It helps ensure that different segments of the population are included fairly. Limitations of Probability Sampling While probability sampling is powerful, it is not always easy to use. Several challenges can arise: Requires a Sampling Frame Researchers need a complete and accurate list of the population to conduct probability sampling. This can be hard to obtain, especially for large or mobile populations. Can Be Time-Consuming and Expensive Creating a sampling frame, conducting random selection, and following up with selected individuals may require significant time and resources. Nonresponse Can Affect Validity If selected participants choose not to participate, this can introduce bias. Researchers must take steps to minimize nonresponse and understand how it might affect their results. Probability Sampling vs. Non-Probability Sampling Non-probability sampling includes methods like convenience sampling or snowball sampling, where participants are not randomly selected. While easier to use, non-probability sampling often lacks the ability to generalize findings to the wider population. In contrast, probability sampling offers: Higher accuracy Reduced bias Stronger ability to generalize But it also requires: More planning Greater resources A full population list Researchers often choose the method that best fits their goals, resources, and research design. Best Practices for Using Probability Sampling Define the Population ClearlyBe specific about who is being studied. Develop a Good Sampling FrameEnsure that your list of potential participants is complete and up to date. Choose the Right Sampling MethodMatch the method to the research question, population size, and available resources. Minimize NonresponseFollow up with participants, offer incentives, and make participation easy. Document the ProcessClearly describe how the sample was selected, including the sampling method, sample size, and any challenges faced. Conclusion Probability sampling is a foundational method in social science research. By ensuring every unit in a population has a known chance of selection, it supports fairness, accuracy, and the ability to generalize findings. Though it may require more time and effort, the benefits in terms of quality and credibility are significant. Whether studying political opinions, educational outcomes, or public health, researchers rely on probability sampling to build a strong foundation for their work. By understanding and applying these techniques, social scientists can draw conclusions that are not only statistically sound but meaningful to society as a whole. Glossary Return to Doc's Research Glossary Last Modified: 03/22/2025 Probability sampling is a statistical technique used in research to select a representative sample from a larger population, allowing researchers to make accurate, generalizable inferences. It relies on random selection, which ensures that every individual in the population has an equal chance of being chosen. Probability sampling is widely used in fields like sociology, psychology, and health sciences to obtain reliable and unbiased data. This guide covers probability sampling methods, types, and examples to help you understand how and when to use this approach. Probability sampling is a technique in which participants are randomly selected from a population, giving each individual an equal opportunity to be included. This random selection process reduces sampling bias and increases the likelihood that the sample represents the population accurately. The results obtained from probability sampling are statistically significant, making it ideal for quantitative research. Key Characteristics of Probability Sampling: Random Selection: Each member of the population has an equal chance of being selected. Representative Sample: Ensures the sample reflects the broader population, allowing for generalization of results. Reduces Bias: By using random methods, probability sampling minimizes selection bias. Simple Random Sampling In simple random sampling, each individual has an equal chance of being chosen. Researchers typically use random number generators or lottery software to select participants. Example: A researcher wants to study the dietary habits of students at a university with 10,000 students. They randomly select 200 students by assigning each a number and using a random number generator to pick participants. Systematic Sampling Systematic sampling involves selecting every nth individual from a population list. For this method to be effective, the population list should be random and without hidden patterns. Example: A company has a list of 1,000 employees and wants to survey 100 of them. They select every 10th person on the list to create the sample. Stratified Sampling Stratified sampling divides the population into subgroups (strata) based on shared characteristics (e.g., age, gender, income) and randomly selects participants from each subgroup. This ensures each subgroup is proportionally represented. Example: A researcher studying consumer preferences wants to ensure their sample reflects the population's age groups (18-30, 31-50, 51+) and randomly select participants from each group proportionally. Cluster Sampling In cluster sampling, the population is split into groups, or clusters, typically based on geographical location or another natural grouping. Researchers randomly select entire clusters, then either study all members within those clusters or take a random sample from each cluster. Example: A researcher wants to study educational outcomes in a large city. They divide the city into school districts (clusters), randomly select several districts, and survey all or a random sample of students within those districts. Multi-Stage Sampling Multi-stage sampling is a complex form of cluster sampling that involves multiple stages of random selection. It is especially useful for large and geographically dispersed populations. Example: In a national health survey, researchers first divide the country into regions (stage one), then randomly select cities within each region (stage two), then select households within each city (stage three), and finally survey individuals within each household. The choice of probability sampling method depends on several factors: Population Size: For large populations, multi-stage sampling or cluster sampling may be more practical. Available Resources: Systematic sampling or simple random sampling is often chosen for smaller studies with limited resources. Study Goals: Stratified sampling is ideal when specific subgroups need to be represented proportionally. Geographical Constraints: Cluster sampling is helpful when the population is spread across various locations. Define the Population: Identify who or what you are studying (e.g., college students, employees at a company). Select a Sampling Frame: List all individuals or units within the population. This could be a database of customer records or a list of enrolled students. Choose a Sampling Method: Select the most suitable probability sampling method based on the research question and resources. Determine Sample Size: Calculate how many participants are needed to obtain reliable results (often done through statistical power analysis). Implement Random Selection: Use randomization tools or software to select participants from the population. Increases Accuracy: Minimizes sampling error and provides statistically reliable results. Supports Statistical Testing: Probability sampling methods allow for various statistical analyses that require a representative sample. Time-Consuming: Random selection and large sample sizes may require more time. Resource-Intensive: Some probability sampling methods can be expensive, especially for large-scale studies. Complex Implementation: Methods like multi-stage of stratified sampling require careful planning and knowledge of statistical principles. Healthcare: A hospital wants to study patient satisfaction among all patients who visited in the past year. Using simple random sampling, they select a sample of patients from their database and send a survey to assess satisfaction levels. Education: A researcher studying student performance in a school district uses stratified sampling to divide the population by grade level (e.g., elementary, middle, high school) and randomly selects a small group of students at a university with 10,000 students. While probability sampling may require careful planning and resources, its ability to provide generalizable results makes it essential for data-driven decision-making and scientific discovery. John Wiley & Sons. Lohr, S. L. (2019). Sampling: Design and Analysis (3rd ed.). Chapman & Hall. Thompson, S. K. (2012). Sampling. John Wiley & Sons. Salant, P., & Dillman, D. A. (1994). How to Conduct Your Own Survey. John Wiley & Sons. Levy, P. S., & Lemeshow, S. (2013). Sampling of Populations: Methods and Applications. John Wiley & Sons. Cochran, W. G. (1977). Sampling Techniques (3rd ed.). John Wiley & Sons. Imagine you have a population of 100 people. In this scenario, every person would have odds of 1 in 100 for getting selected. Probability sampling gives you the best chance to create a sample representative of the population. From the responses received, management will now know whether employees in that organization are happy about the amendment. This sampling allows for unbiased and representative conclusions to be drawn about the population based on the sample. Let's talk about probability sampling. Probability sampling is a technique in which the researcher chooses samples from a larger population using a method based on probability theory. For a participant to be considered as a probability sample, he/she must be selected using a random selection. This statistical method used to select a sample from a population in such a way that each member of the population has a known, non-zero chance of being selected. LEARN ABOUT: Theoretical Research Selecting the right sample is crucial for obtaining accurate and reliable results. One of the most popular and effective methods for selecting a sample is probability sampling. Let's explore the different types of probability sampling. From simple random sampling to stratified random sampling, we'll break down each method to help you determine which one is best for your research project. Here are some of the most effective types of probability sampling: Simple Random Sampling: This method involves randomly selecting a sample from the population without any bias. It's the most basic and straightforward form of probability sampling. Stratified random Sampling: This method involves dividing the population into subgroups or strata and selecting a random sample from each subgroup. This technique is useful when the population is heterogeneous and you want to ensure that the sample is representative of different subgroups. Cluster Sampling: This method involves dividing the population into groups or clusters and then randomly selecting some of those clusters. This technique is useful when the population is spread out over a large geographical area. But it is not possible or practical to survey everyone. Systematic Sampling: This method involves selecting every nth member of the population after a random starting point is chosen. Probability sampling is widely used in research. It ensures that the sample is representative of the population, allows researchers to estimate the level of uncertainty in the results, and makes it possible to generalize the findings to the population. As the name suggests, simple random sampling is an entirely random method of selecting the sample. This sampling method is as easy as assigning numbers to the individuals (sample) and then randomly choosing from those numbers through an automated process. Finally, the numbers that are chosen are the members that are included in the sample. There are two ways in which researchers choose the samples in this method of sampling: The lottery system and using number-generating software/ random number table. This sampling technique usually works around a large population and has its fair share of advantages and disadvantages. Stratified random sampling involves a method where the researcher divides a more extensive population into smaller groups that usually don't overlap but represent the entire population. While sampling, organize these groups and then draw a sample from each group separately. Members of these groups should be distinct so that every member of all groups get equal opportunity to be selected using simple probability. This sampling method is also called "random quota sampling." Cluster sampling is a way to select participants randomly that are spread out geographically. For example, if you wanted to choose 100 participants from the entire population of the U.S., it is likely impossible to get a complete list of everyone. Instead, the researcher randomly selects areas (i.e., cities or counties) and randomly selects from within those boundaries. Cluster sampling usually analyzes a particular population in which the sample consists of more than a few elements, for example, city, family, university, etc. Researchers then select the clusters by dividing the population into various smaller sections. Systematic sampling is when you choose every "nth" individual to be a part of the sample. For example, you can select every 5th person to be in the sample. Systematic sampling is an extended implementation of the same old technique in which each person is selected at regular periods to form a sample. There's an equal opportunity for every member of a population to be selected using this sampling technique. When you're conducting a survey, a poll, or a study, understanding the different types of probability sampling can help you make informed decisions and achieve your research goals. LEARN MORE: Population vs Sample Let us take an example to understand this sampling technique. The population of the US alone is 330 million. It is practically impossible to send a survey to every individual to gather information. Use probability sampling to collect data, even if you collect it from a smaller population. For example, an organization has 500,000 employees sitting at different geographic locations. The organization wishes to make certain amendments in its human resource policy, but before they roll out the change, they want to know if the employees will be happy with the change or not. However, reaching out to all 500,000 employees is a tedious task. This is where probability sampling comes in handy. A sample from a larger population i.e., from 500,000 employees, is chosen. This sample will represent the population. Deploy a survey now to the sample. LEARN ABOUT: Survey Sampling From the responses received, management will now be know whether employees in that organization are happy about the amendment. This sampling allows for unbiased and representative conclusions to be drawn about the population based on the sample. Probability sampling is a technique in which the researcher chooses samples from a larger population using a method based on probability theory. For a participant to be considered as a probability sample, he/she must be selected using a random selection. The most important requirement of probability sampling is that everyone in your population has a known and equal chance of getting selected. For example, if you have a population of 100 people, every person would have odds of 1 in 100 for getting selected. Probability sampling gives you the best chance to create a sample that is truly representative of the population. Probability sampling uses statistical theory to randomly select a small group of people (sample) from an existing large population and then predict that all their responses will match the overall population. LEARN ABOUT: Survey Sampling Methods Co-create with your online communities and collect qualitative and quantitative insights for your continuous discovery process. Choose from over 22 million+ ready-made-ready respondents to conduct ongoing market research studies. Access more than 10 specialty audiences, including veterinarians, app developers, building contractors, gamers, small-biz owners, and more. Sampling is the procedure or process of selecting a sample from a larger population. Sampling is often used in our day-to-day practical life. Basic concepts of samplingPopulationThe group of individuals considered under study is called as population. The word population here refers not only to people but to all items that have been chosen for the study. Thus in statistics, population can be number of bikes manufactured in a day or week or month, number of cars manufactured in a day or week or month, number of fans, TVs, chalk pieces, people, students, girls, boys, any manufacturing products, etc...Finite and infinite population:When the number of observations/individuals/products is uncountable in a group, then it is a finite population.When the number of observations/individuals/products is uncountable in a group, then it is an infinite population. Example: number of grains in a sack, number of germs in the body of a sick patient.Sample and sample sizeA selection of a group of individuals from a population in such a way that it represents the population is called as sample and the number of individuals included in a sample is called the sample size.Parameter and statisticParameter: The statistical constants of the population like mean (m), variance s2) are referred as population parameters.Statistic : Any statistical measure computed from sample is known as statistic.Note:In practice, the parameter values are not known and their estimates based on the sample values are generally used.Types of samplingThe technique or method of selecting a sample is of fundamental importance in the theory of sampling and usually depends upon the nature of the data and the type of enquiry. The procedures of selecting a sample may be broadly classified as1. Non-Random sampling or Non-probability sampling.2. Random Sampling or Probability sampling.Random sampling or Probability samplingRandom sampling refers to selection of samples from the population in a random manner. A random sample is one where each and every item in the population has an equal chance of being selected.-Dr. Yates"A random sample is a sample selected in such a way that every item in the population has an equal chance of being included".-HarperThe following are different types of probability sampling.(i) Simple random sampling(ii) Stratified random sampling(iii) Systematic sampling(i) Simple random samplingIn this technique the samples are selected in such a way that each and every unit in the population has an equal chance of being selected as a sample. Simple random sampling may be done, with or without replacement of the samples selected. In a simple random sampling with replacement there is a possibility of selecting the same sample any number of times. Thus, simple random sampling without replacement is followed.Thus in simple random sampling from a population of N units, the probability of drawing any unit at the first draw is 1/N , the probability of drawing any unit in the second draw from among the available (N-1) units is 1/(N-1), and so on. Several methods have been adopted for random selection of the samples from the population. Of those, the following two methods are generally used and which are described below.(A) Lottery methodThis is the most popular and simplest method when the population is finite. In this method, all the items of the population are numbered on separate slips of paper of same size, shape and colour. They are folded and placed in a container and shuffled thoroughly. Then the required numbers of slips are selected for the desired sample size. The selection of items thus depends on chance.For example, if we want to select 10 students, out of 100 students, then we must write the names/roll number of all the 100 students on slips of the same size and mix them, then we make a blindfold selection of 10 students. This method is called unrestricted random sampling, because units are selected from the population without any restriction. This method is mostly used in lottery draws. If the population or universe is infinite, this method is inapplicable.(B)   Table of random numberWhen the population size is large, it is difficult to number all the items on separate slips of paper of same size, shape and colour. The alternative method is that of using the table of random numbers. There are several standard tables of random numbers. But the most practical, easy and inexpensive method of selecting a random sample can be done using "Random Number Table". The random number table has been so constructed that each of the digits 0,1,2,...,9 will appear approximately with the same frequency and independently of each other.The various random number tables available area. L.H.C. Tippett random number seriesb. Fisher and Yates random number seriesc. Kendall and Smith random number seriesd. Rand Corporation random number series.Tippett's table of random numbers is most popularly used in practice. Given below the first forty sets from Tippett's table as an illustration of the general appearance of random numbers:Suppose, if we want to select the required number of samples from a population of size N(