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Sampling in Sociology: An Analytical Study

المعاينة في العلوم الاجتماعية: دراسة تحليلية

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Abstract:

This article is a contribution to the theoretical literature explaining the concept of sampling and its role in sociological research. It seeks to clarify both the conceptual and the scientific aspect of sampling that constitutes one of the most critical steps in scientific methodologies. Sampling facilitates the research process and significantly contributes to the research success and the accuracy of its results. The research also highlights the role and importance of sampling in sociological research and examines the social theories associated with this aspect. Furthermore, the research seeks to define the relationship between the sample and the research population, clarifying whether this relationship is always characterized by correlation. The selection of the size and type of sample is a crucial step towards of the research success and accuracy

Keywords: Sampling, population, sample, sociological research.

المخلص:

يأتي هذا المقال ضمن المقالات النظرية المفسرة لمفهوم المعاينة و دورها في البحوث الاجتماعية نريد من خلاله تفسير الجانب المفاهيمي والعلمي للمعاينة التي تعد احد اهم خطوات المناهج العلمية على العموم التي من شأنها تسهيل العملية البحثية وتساهم بشكل كبير في احتمالية نجاح البحث ودقة نتائجه ، موضحين دورها وأهميتها في البحوث الاجتماعية ، كما سنتطرق إلى النظريات الاجتماعية المرتبطة بهذا الجانب، ونسعى إلى تحديد علاقة العينة و مجتمع البحث ، وتوضيح ما إذا كانت العلاقة بينهما تتسم دائماً بالتلازم، يعد اختيار حجم ونوع العينة اهم محدد لدقة نتائج البحث و منه نجاح العملية البحثية ككل.

الكلمات المفتاحية: المعاينة، مجتمع البحث ، العينة ، البحث الاجتماعي .

1. INTRODUCTION

This phase in methodology is referred to as sampling¹, which is the statistical process undertaken to select a subset of the target population known as the sample. This process aims to achieve objectives such as making observations and drawing statistical conclusions about this subset of community elements. Thus, sampling is the process of selecting a sufficient number of elements from the population, enabling the researcher to study the characteristics of the chosen sample and, where applicable, to generalize these characteristics to the original population. It is essential to always remember that the outcome of the sampling

process is the desired sample². Sampling also encompasses a series of processes aimed at constructing a representative sample of the target research population³. Social science research, in general, revolves around deriving patterns of behavior present within specific categories of societal groups. It is impractical to study entire communities due to feasibility constraints and cost limitations; thus, it is imperative to select a representative sample of the target population for observation and analysis. Selecting a truly representative sample of the target population is crucial, as it enables

¹ Batchirdj, A. (2015). *Social science research: Principles, methods, and practices* (K. bin Nasser Al-Hayan, Trans.) (2nd ed.). Al-Yazouri Publishing.

² Najjar, F. J. S., et al. (2009). *Scientific research methods: An applied perspective*. Amman. (Original work published in Arabic).

³ Angers, M. (2009). *Scientific research methodology in the humanities* (Sahraoui et al., Trans.; 2nd ed.). Al-Qasba Publishing, Algeria.

the generalization of conclusions drawn from the sample to the broader population under study.

2. The concept of Population

The sample constitutes a segment of the population on which the study is conducted, and it is selected according to specific criteria to accurately represent the population. It comprises a collection of units extracted from the statistical community, ensuring that it faithfully represents that community. Thus, the sample is regarded as a part of the whole, implying that a subset of individuals from the population is chosen to be representative of the research population.

The sample is a specific portion or a relative subset of the individuals from the original population, from which the results of the study are generalized to the entire population. The units of the sample may consist of individuals, neighborhoods, streets, or other entities. Additionally, it can be defined as "the physical and human models drawn from the total community according to general conditions and regulations, ensuring that these models carry the characteristics of the whole and represent it"⁴. Furthermore, it is described as "the subset on which the researcher conducts the study, ensuring that it reflects the characteristics of the overall research population"⁵.

3. Characteristics that must be met in the Sample⁶

First: The sample must represent the original population; ie. it should encompass all the characteristics of the original community. The researcher cannot generalize the findings if the sample is selected arbitrarily. In other words, if the same results are replicated across other samples, the sample under investigation should closely resemble the original

population. This ensures that the means and percentages of the characteristics of the sample members are comparable or similar to those of the original population, allowing the samples to be representative of the entirety to which they belong.

Second: The units of the original population must have equal opportunities for selection. It is important to note that researchers often rely on this second condition, as it provides several assurances for fulfilling the first condition. By ensuring equal chances of selection for all individuals, we generally obtain a sample that accurately represents the original population. Some may assume that the larger the sample size, the better the research; they even consider studying the entire population as a form of strength. This is a misconception. Others believe that as the size of the population increases, the sample size must also increase, which is another common error. In fact, for a homogenous population, a relatively small sample is sufficient to represent it. If it is possible to achieve the same results, then there is no need to utilize a larger sample⁷.

There is an opposing viewpoint, which is the more prevailing perspective that suggests "it is often difficult for the results obtained by the researcher using samples to precisely align with the actual results obtained from a complete study of the original population. The results of the samples may be close to the actual results but not identical to them. The more the researcher seeks to achieve more accurate and reliable results, the more it becomes necessary to increase the size of the selected sample"⁸.

The sample serves as a substitute for studying the population or phenomenon as a whole; thus, the researcher resorts to selecting a sample to derive results that can subsequently be generalized to encompass the entire phenomenon or the total

⁴ Sama'a, S. (2002). *Scientific research: Methodologies and statistical methods*. Jordan.

⁵ Slatnia, B., & Hassan, A. (2008). *Fundamentals of scientific research*. Algeria.

⁶ Zrouati, R. (n.d.). *Methods and tools of scientific research in social sciences* (1st ed.). Dar Al-Huda Ain M'lila, Algeria. pp. 207, 334.

⁷ Bouhafs, A. K. (n.d.). *Foundations of research methodologies in psychology*. University Publications Office, Algeria.

⁸ Zrouati, R. Op. Cit.

population intended for study. The sample must meet the following conditions:

1. The units of the studied community must be homogeneous.
2. The sample should be large enough to fulfill the objectives of the study.
3. The method of selecting the sample must be predetermined.

The reasons for choosing a sampling method can be summarized as follows:

1. The inability to study all elements of the original population.
2. The high cost of studying the entire population.
3. The inability to enumerate all elements of the original population.

4. Types of Samples

Samples can be divided into probabilistic samples and non-probabilistic samples, which include:

4.1. Probabilistic or random samples

They can either be simple random samples, selected through a lottery method, or stratified random samples where the studied community is divided into sections and categories based on specific characteristics. These categories form the basis of the division, and a random number is taken from each category. We will focus on the most common and widely used types, including:

4.1.1. Stratified sampling

In stratified sampling, the sampling frame is divided into homogeneous and non-overlapping subgroups called strata. Furthermore, a simple random sample is taken from within each subgroup. If we select 200 companies from a list that includes 100, we can begin by classifying the companies based on their size. For instance, there could be large companies (with more than 500 employees), medium-sized companies (with between 50 and 500 employees), and small companies (with fewer than 50 employees). Then, we can randomly select 67 companies from each subgroup so that our final sample consists of 200 companies. However, although there are many small companies within the sample, which outnumber large companies,

obtaining an equal number of large, medium-sized, and small companies will make the sample less representative of the target population. This means it will be biased in favor of the larger companies, which are fewer in number within the target population under study. This phenomenon is known as disproportional stratified sampling because the proportion of the sample within each subgroup does not reflect the proportions present in the sampling frame or the target population for the study. Furthermore, the smaller subgroups, which particularly encompass large companies, are known as over-represented sampling groups. One of the alternative techniques that will be utilized is selecting sub-samples in proportion to their size in the target population. For example, if there are 100 large companies, 300 medium-sized companies, and 600 small companies, we can take a sample consisting of 60 companies from the large companies group, 60 companies from the medium-sized companies group, and 120 companies from the small companies group. In this case, the proportional distribution of companies in the sample is maintained; thus, this technique is referred to as proportional stratified sampling. It is noteworthy that the disproportional method is particularly effective in representing small subgroups, such as large companies, and does not necessarily represent the target population less effectively compared to the proportional method, as long as the results derived from the disproportional method are weighted according to the proportion of the subgroup in the entire population⁹.

4.1.2. Cluster sampling

Also known as group sampling, it is used when selecting a large sample size. In this method, groups are relied upon instead of individuals as the sampling unit. It can be

⁹ Gharib, S. M. (1997). *Design and implementation of social research*. Dar Al-Ma'arifa Al-Jami'iya, Alexandria, Egypt. (Original work published in Arabic)

envisioned as a bunch of grapes, where a group is chosen rather than individuals. Any intact or healthy group that shares the same characteristics and features is referred to as a cluster. The steps to select a cluster sample are similar to those for random sampling, except that in this type, random selection is made for the clusters instead of individuals.

For example, let's consider a study of graduates from our university in 2015. The study population consists of graduates from all the university's various colleges for the 2015 season. When using cluster sampling, with the assistance of the graduate lists that serve as the sampling frame, some colleges are randomly selected, and then some disciplines are also chosen randomly¹⁰. For instance: Let's consider a study of graduates from our university from 2015. The study population consists of graduates from all the university's different colleges for the 2015 academic year. When using cluster sampling, with the assistance of the graduate lists that constitute the sampling frame, some colleges are randomly selected, followed by the random selection of some disciplines as well.

4.1.3. Simple random sampling

In this technique, all possible subgroups of the target population, more accurately referred to as the subgroups of the sampling frame, are granted an equal probability of selection for the units n . The probability of selecting any group consisting of a number of units n out of N present in the sampling frame is represented in the formula $\frac{n!}{N!}$ from the total number. Therefore, the sample statistics are considered unbiased estimates of the population parameters without any weighting.

The process of simple random sampling involves selecting participants randomly from the sampling frame. For large sampling frames, a table of random numbers or a random number generator is typically used. For example, if we want to

select 200 companies for a research study from a list containing 1,000 companies, we can input this list into a spreadsheet program like Excel. We can then use the RAND function available in Excel to generate random numbers for all 1,000 entries on that list. We would then sort the list in ascending order based on the corresponding random numbers and select the first 200 entries from this sorted list. This method is considered one of the easiest and simplest techniques among all the technical methods related to the probability sampling process¹¹.

4.1.4. Systematic sampling

In this technique, the sampling frame is arranged according to certain criteria and factors, and samples are selected at regular intervals from this ordered list. Systematic sampling begins with a random starting point, and then a specified number of elements K is selected from that point onward, where K equals the total number of units (N) divided by the sample size (number of desired units n), which is formally referred to as the sampling fraction. It is essential to note that the starting point is not necessarily the first point in the list; instead, it is chosen randomly from among the initial elements corresponding to the sampling frame size in the list.

In the previous example of selecting 200 companies from a list containing 1,000 companies, we could sort the 1,000 companies in ascending or descending order based on a specific metric, such as the number of employees or annual revenue, in addition to randomly selecting one company from the top five on the sorted list. After that, we would select every fifth company listed in the ordered list. This process ensures that there is no disproportionate representation of large or small companies in the selected sample. Instead, companies of all sizes are generally represented uniformly, as is the case in our sampling frame. In other words, the sample serves as a representation of the target population, at

¹⁰ Khatib, A. (2008). *Scientific research and higher education*. Dar Al-Masirah for Publishing, Distribution, and Printing, Jordan, p. 44.

¹¹ Batchirdj, A. (2015). Op. Cit. P. 193.

least based on the sorting criterion¹².

4.2. Non-probability samples

These are technical sampling methods where many units in the target population have a zero chance of selection, or where the probability of selection cannot be accurately determined. Typically, units are selected based on specified non-random criteria such as quota sampling or convenience sampling. Since the selection process is not random, non-probability samples do not allow for the estimation of sampling errors and may be subject to sampling bias. Therefore, information obtained from the sample cannot be generalized back to the target population. The types of non-probability sampling methods include the following:

4.2.1. Convenience sampling

Also known as accidental sampling or opportunistic sampling, this technique involves drawing a sample from that part of the target population that is readily available or easily accessible. For example, if we are standing outside a shopping center conducting a survey for a research study about people as they enter the shopping center, the sample of participants we obtain is a convenience sample. This type of sample is considered non-probability because we have systematically excluded all individuals who are shopping at other commercial centers. Furthermore, the opinions gathered from the selected sample may reflect the unique characteristics of that particular shopping center, such as the nature of the stores within it. For instance, high-end retail shops may attract wealthier customers, or the demographic characteristics of those shops may influence the opinions collected. Additionally, a shopping center located near a university may primarily attract university students with specific purchasing needs, which means this sample may not represent the broader shopping public. Consequently, the scientific generalization of such observations is extremely limited. Other examples of convenience sampling include

surveying students enrolled in a specific class or sampling patients who have entered a particular medical clinic. This type of sampling is most useful in experimental testing contexts, where the purpose of this sampling is to test the instrument or measurement validity rather than to draw generalizable conclusions¹³.

4.2.2. Quota sampling

This type is a less restrictive technique that doesn't necessarily achieve proportional representation but rather aims to meet a minimum size for each subgroup. For instance, if the U.S. population consists of 50% Caucasians, 15% Hispanic Americans, and 13% African Americans, and we want to understand their voting preferences in a sample of 98 people, we might stand outside a shopping center and ask people about their voting preferences. However, in this case, we would stop questioning people who appear to be of Hispanic origin once we've obtained 15 responses from this subgroup, or African Americans once we've obtained 13 responses. Even if we continue sampling other ethnic groups, the ethnic structure of our sample will roughly correspond to the overall ethnic structure of the U.S. population. In essence, we're setting "quotas" for each group to ensure a minimum representation.

In this case, we could decide to select 50 participants from each of the three ethnic subgroups (Caucasians, Hispanic Americans, and African Americans) and stop when we reach the allocated quota for each subgroup. No type of quota sampling is truly representative of the U.S. population. Depending on whether our study is conducted in a shopping center in New York City or in Texas, the results could be very different. While non-proportional quota sampling may be less representative of the target population, it can be useful in providing insights into the opinions of smaller or underrepresented groups by oversampling them¹⁴.

¹² Ibid., P. 194.

¹³ Batchirdji, A. (2015). Op. Cit. P. 200.

¹⁴ Ibid.p.201.

4.2.3. Snowball sampling

In this sampling method, we begin by identifying a small group of participants who meet the inclusion criteria for our study. Then, we ask these participants to recommend other people they know who also meet your selection criteria. For example, if we want to conduct a research study on computer network administrators and we know one or two of these administrators, we can start with these individuals and ask them to recommend other people who also work in network administration. Although this method rarely leads to representative samples, it can sometimes be the only way to reach populations that are difficult to access or when a sampling frame is not available¹⁵.

4. CONCLUSION

A researcher conducting a study on a phenomenon or problem must define the study population that aligns with the phenomenon being investigated and select a representative sample to obtain relatively accurate results, which can then be generalized to the original population. The study manifested that the use of samples in social research requires attention to several aspects related to the frameworks, units, types, and sizes of samples. The design of the sample depends on the research topic that the researcher intends to undertake and on the accuracy of the information that the researcher aims to achieve in their study. Thus, it can be said that samples come with several advantages and disadvantages. Nevertheless, samples remain an effective tool in scientific research, particularly in social research, in order to obtain results that can analyze the findings and interpret the phenomena.

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¹⁵ Ibid.p.201.