Computing Research Project

Selecting Participants

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- One of the most critical issues in planning research is the selection of research participants

- Because these two researchers will have very different participants, it also is likely that they will obtain very different results

- The outcome of the study may depend on the way in which participants are selected

- A population is the entire set of individuals of interest to a researcher
- Although the entire population usually does not participate in a research study, the results from the study are generalized to the entire population
- A sample is a set of individuals selected from a population and usually is intended to represent the population in a research study
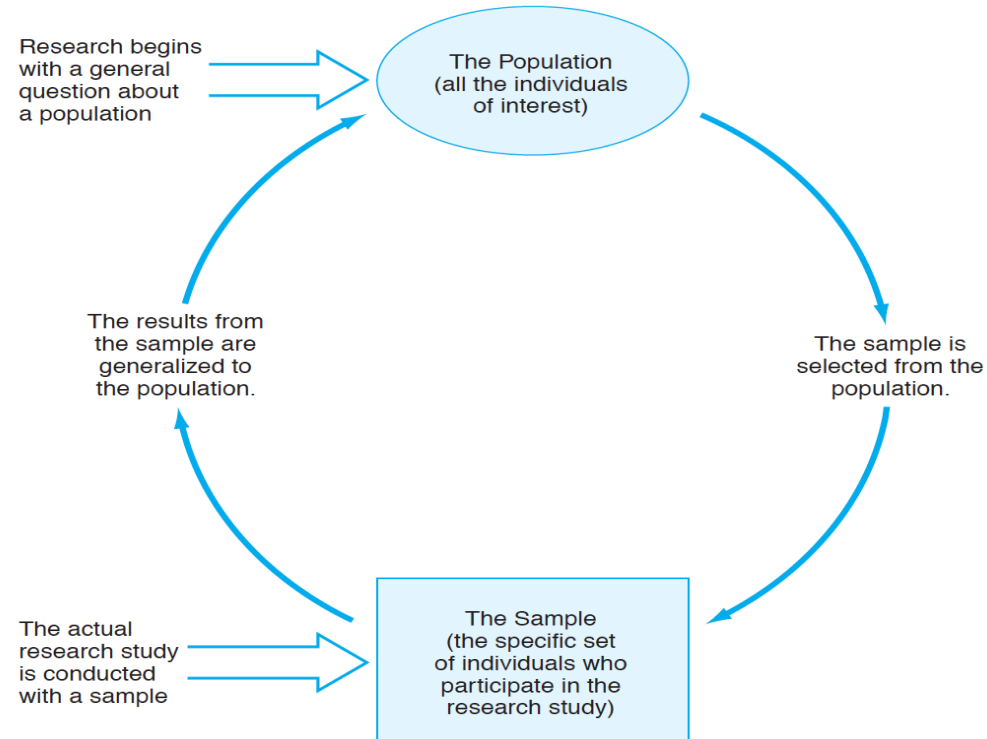
The Relationship Between a Population and a Sample

Research begins with a general question about a population

The Population (all the individuals of interest)

The sample is selected from the population.

The results from the sample are generalized to the population.

The actual research study is conducted with a sample

The Sample (the specific set of individuals who participate in the research study)

FIGURE 5.1 The Relationship Between a Population and a Sample

THE TARGET POPULATION (THE POPULATION)
The entire set of individuals who have the
characteristics required by the researcher

THE ACCESSIBLE POPULATION
A portion of the target population consisting
of individuals who are accessible to be
recruited as participants in the study

THE SAMPLE
The individuals who are
selected to participate
in the research study
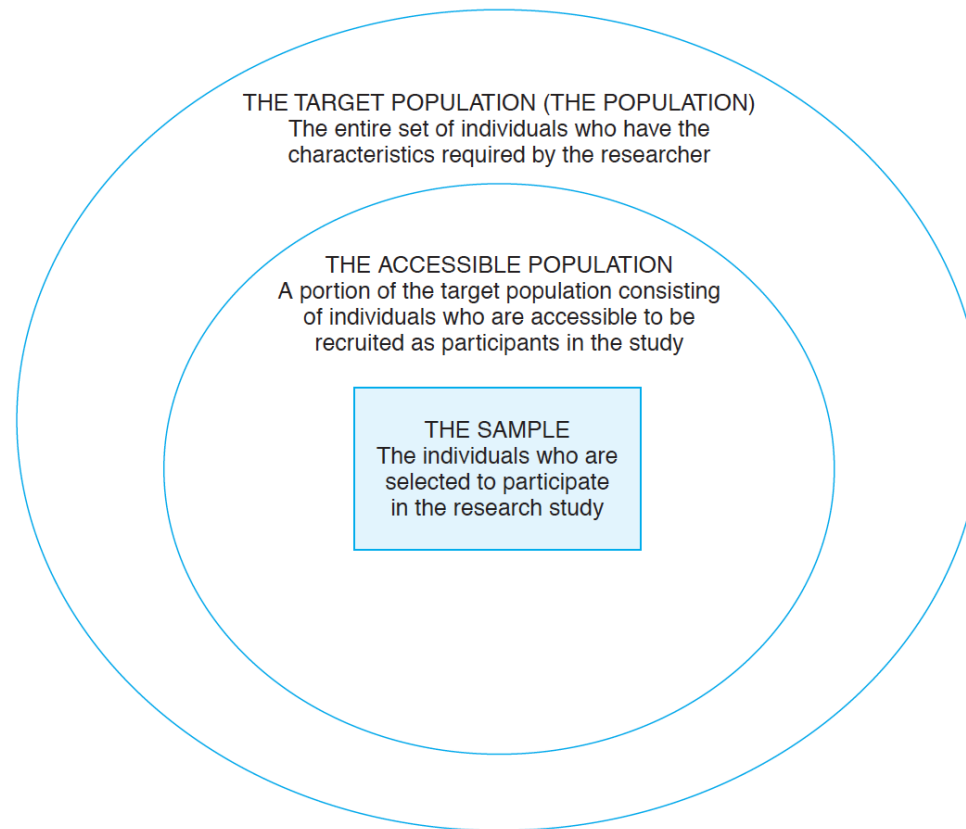
FIGURE **5.2** The Relationship Among the Target Population, the Accessible
Population, and the Sample

- A representative sample is a sample with the same characteristics as the population.

- A biased sample is a sample with different characteristics from those of the population.

- Selection bias or sampling bias occurs when participants or subjects are selected in a manner that increases the probability of obtaining a biased sample.

- One fundamental question in reaching this goal is determining how large the sample should be to be representative
- Unfortunately, there is no simple answer to this question, but there are some general guidelines that can help you choose a sample size.

- In simple terms, the bigger the sample is, the more accurately it represents the population.
- In general, there is no simple solution to determining how many individuals should be in a sample
- One helpful guide is to review published reports of similar research studies to see how many participants they used

- Probability sampling: For example, if each individual in a population of 100 people is equally likely to be selected, then the probability of selection is $1/100$ for each person

- Probability sampling has three important conditions:
  - The exact size of the population must be known
  - Each individual in the population must have a specified probability of selection
  - Individuals are all assigned the same probability; selection must be a random process

- The population is not completely known
- Individual probabilities cannot be known
- Sampling method is based on factors such as common sense or ease with an effort to maintain representativeness and avoid bias.

PROBABILITY SAMPLING METHODS

- Simple Random Sampling
- Systematic Sampling
- Stratified Random Sampling
- Combined-Strategy Sampling

Summary of Sampling Methods

Type of Sampling	Description	Strengths and Weaknesses
Probability Sampling		
Simple Random	A sample is obtained using a random process to select participants from a list containing the total population. The random process ensures that each individual has an equal and independent chance of selection.	The selection process is fair and unbiased, but there is no guarantee that the sample is representative.
Systematic	A sample is obtained by selecting every nth participant from a list containing the total population, after a random start.	An easy method for obtaining an essentially random sample, but the selections are not really random or independent.
Stratified Random	A sample is obtained by dividing the population into subgroups (strata) and then randomly selecting equal numbers from each of the subgroups.	Guarantees that each subgroup will have adequate representation, but the overall sample is usually not representative of the population.
Proportionate Stratified	A sample is obtained by subdividing the population into strata and then randomly selecting from each strata a number of participants so that the proportions in the sample correspond to the proportions in the population.	Guarantees that the composition of the sample (in terms of the identified strata) will be perfectly representative of the composition of the population, but some strata may have limited representation in the sample.

- Convenience Sampling
- Quota Sampling

- In convenience sampling, researchers simply use as participants those individuals who are easy to get.

- People are selected on the basis of their availability and willingness to respond.

- Convenience sampling is considered a weak form of sampling because the researcher makes no attempt to know the population or to use a random process in selection

- There is a strong possibility that the obtained sample is biased
- Despite this major drawback, convenience sampling is probably used more often than any other kind of sampling
- It is an easier, less expensive, more timely technique than the probability sampling techniques

- Most researchers use two strategies to help correct most of the serious problems associated with convenience sampling:
  - First, researchers try to ensure that their samples are reasonably representative and not strongly biased
  - The second strategy that helps minimize potential problems with convenience sampling is simply to provide a clear description of how the sample was obtained and who the participants are

- can ensure that subgroups are equally represented in a convenience sample
- For example, a researcher can guarantee equal groups of boys and girls in a sample of 30 preschool children by establishing quotas for the number of individuals to be selected from each subgroup rather than simply taking the first 30 children, regardless of gender, who agree to participate, you impose a quota of 15 girls and 15 boys

1. Dr. Kim wants to conduct a study on memory in nursing home residents. He contacts local nursing homes and selects 50 residents from their resident lists to participate in his study.
   – a. What is the target population?
   – b. What is the accessible population?
   – c. What is the sample?
2. What is the problem with a biased sample?
3. Explain the difference between probability and nonprobability sampling
4. Describe your sampling strategy in this research project?