

Basic Template

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Data Is Collected From Either A Population Or a Sample

Population

All the items or individuals about which you want to draw conclusions.

Sample

A portion of the population of items or individuals.

Collection Data Via Sampling is Used When doing So Is

- Less time consuming than selecting every item in the population
- Less costly than using entire population
- Less cumbersome and more practical than analyzing the entire population
- Statistical theory guarantees that there is almost no need to study the whole population when sample is “good” and “big” enough.

Parameter or Statistic?

- A **population parameter** summarizes the value of a specific variable for a population.
- A **sample statistic** summarizes the value of a specific variable for sample data

Sources of Data Arise From the Following Activities

- business activities
- Distributing data compiled by an organization or individual
- compiling responses from a survey

- Conducting a designed experiment and recording the outcomes
- Conducting an observational study and recording the results

Examples of Data Collected From Ongoing Business Activities

- A bank studies years of financial transactions to help them identify patterns of fraud
- Economists utilize data on searches done via Google to help forecast future economic conditions
- Marketing companies use tracking data to evaluate the effectiveness of a web site

Examples of Data Distributed By an Organization or Individual

- Financial data on a company provided by investment services
- Industry or market data from market research firms and trade associations
- Stock prices, weather conditions, and sports statistics in daily newspapers

Examples of Survey Data

- A survey asking people which laundry detergent has the best stain-removing abilities
- Political polls of registered voters during political campaigns
- People being surveyed to determine their satisfaction with a recent product or service experience

These are “snapshots” of data compiled from surveys

Examples of Data from a Designed Experiment

A Designed experiment entails conditions or “treatment groups”

- Consumer testing of different versions of a product to help determine which product should be pursued further
- Material testing to determine which supplier’s material should be used in a product
- Market testing on alternative product promotions to determine which promotion to use more broadly.

Examples of Data Collected form Observational Studies

- Market researchers utilizing focus groups to elicit unstructured responses to open-ended questions
- Measuring the time it takes for customers to be served in a fast food establishment

- Measuring the volume of traffic through an intersection to determine if some form of advertising at the intersection is justified

Observational Studies & Designed Experiments Have a Common Objective

- Both are attempting to quantify the effect that a **process change** (called a **treatment**) has on a variable of interest.
- In an observational study, there is no direct control over which items receive the treatment.
- In a designed experiment, there is direct control over which items receive the treatment

Sources of Data

- Primary Sources: The data collector is the one using the data for analysis:
 - Data from a political survey
 - Data collected from an experiment
 - Observed data
- Secondary Sources: The person performing the data analysis is not the data collector:
 - Analyzing census data
 - Examining data from print journals or data published on the internet