

Key	Descriptive Statistics	Inferential Statistics
Purpose	Describes and summarizes data to provide meaningful information about its features, such as central tendency (mean, median, mode), variability (range, variance, standard deviation), and distribution (skewness, kurtosis).	Draws conclusions or inferences about a population based on sample data, often using probability theory and hypothesis testing.
Scope	Focuses on analyzing and summarizing the characteristics of the data itself without making any generalizations beyond the sample.	Extends findings from a sample to make generalizations or predictions about a larger population
Data Requirement	Requires only the data at hand to compute measures and visualizations.	Requires both sample data and assumptions about the population to draw conclusions about the population.
Example Measures	Mean, median, mode, range, variance, standard deviation, histograms, box plots.	Confidence intervals, hypothesis tests (t-tests, ANOVA, chi-square tests), regression analysis, correlation analysis.
Goal	To summarize and present data in a meaningful and concise manner for easier interpretation and understanding.	To generalize findings from a sample to a larger population and to test hypotheses or predictions.
Assumptions	Assumes the data accurately represents the sample without errors or bias.	Requires assumptions about the population distribution, randomness of sampling, and often assumes data follows specific statistical distributions.
Techniques Used	Summarization (mean, median, etc.), visualization (histograms, box plots), and exploratory data analysis techniques.	Probability theory, hypothesis testing, regression modeling, and advanced statistical techniques to make predictions or draw conclusions.
Generalizability	Describes characteristics of the sample data but does not make predictions or generalizations beyond the sample.	Uses sample data to make predictions or inferences about the population, assuming the sample is representative and the study design is appropriate.

Usage	Reporting summary statistics in research papers, creating visualizations for data exploration, summarizing survey responses.	Testing hypotheses in clinical trials, predicting election outcomes based on polls, analyzing effects of a new drug on a population.
Risk of Error	Less risk of error since it deals with summarizing known data.	Higher risk of error due to assumptions made about the population and sampling variability.