

1.4: Types of Statistics

Statistical procedures were each developed to address specific kinds of data, questions, and/or hypotheses. Because there are so many things researchers and statisticians want to know about the world, there are many different techniques, procedures, and formulas that have been developed. Despite the complexity and diversity of options, however, there are two main categories that statistics for behavioral and social sciences can be divided into: Descriptive Statistics and Inferential Statistics.

Descriptive statistics are procedures and results that organize or summarize data for individual variables which are not generalized to populations on their own. Descriptive statistics focus on data univariately. They are named for the fact that they are used to simply describe the raw data through summaries. Thus, when descriptive statistics are used, data from variables are summarized in ways that are too limited to draw conclusions about their possible connections to each other or the likelihood that they represent truths about the populations from which their samples were drawn. Some example of descriptive statistics include means, medians, modes (which we will cover in detail in Chapter 3), ranges, standard deviations, and variances (which we will cover in detail in Chapter 4).

Inferential statistics are procedures and results that allow generalizations to be made about what is likely true of the populations from which the sample data were drawn. To **generalize** in statistics means to apply findings from sample data to the populations from which they were drawn. Another way to say this is that generalizing means inferring something about a population from sample data. When doing so, observations are being used to estimate all that existed to be observed. These are just technical ways of saying that generalizing means using sample data to estimate population data. In keeping, the term “inferential” is used to reflect the fact that truths about populations are being inferred from sample data.

Inferential techniques can be used to make inferences about individual variables for the population or the connections between or among variables in the population. Inferential techniques do this by building on various descriptive statistics (such as the mean and standard deviation) to compute probabilities about which summaries or patterns from variables measured in the samples may apply to those of the population. Essentially, inferential statistics are procedures used to estimate the likelihood that summaries and patterns in data from samples represent truths about their populations. These techniques can be univariate or multivariate. Most of the inferential statistics we will cover in this book will be bivariate in nature.

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