# Chapter Three

Graphic Presentation

**Summary**

* The most basic method for organizing data is to classify the observations into a frequency distribution—a table that reports the number of observations that fall into each category of the variable being analyzed.
* Constructing a frequency distribution is usually the first step in the statistical analysis of data.
* To obtain a frequency distribution for nominal and ordinal variables, count and report the number of cases that fall into each category of the variable along with the total number of cases (N).
* To construct a frequency distribution for interval-ratio variables that have a wide range of values, first combine the scores into a smaller number of groups—known as class intervals—each containing a number of scores.
* Proportions and percentages are relative frequencies. To construct a proportion, divide the frequency (f) in each category by the total number of cases (N). To obtain a percentage, divide the frequency (f) in each category by the total number of cases (N) and multiply by 100.
* Percentage distributions are tables that show the percentage of observations that fall into each category of the variable. Percentage distributions are routinely added to almost any frequency table and are especially important if comparisons between groups are to be considered.
* Cumulative frequency distributions allow us to locate the relative position of a given score in a distribution. They are obtained by adding to the frequency in each category the frequencies of all the categories below it.
* Cumulative percentage distributions have wider applications than cumulative frequency distributions. A cumulative percentage distribution is constructed by adding to the percentages in each category the percentages of all the categories below it.
* One other method of expressing raw frequencies in relative terms is known as a rate. Rates are defined as the number of actual occurrences in a given time period divided by the number of possible occurrences. Rates are often multiplied by some power of 10 to eliminate decimal points and make the number easier to interpret.

**Outline**

* The Pie Chart
  + - A pie chart shows the differences in frequencies or percentages among the categories of a nominal or an ordinal variable
    - The categories are displayed as segments of a circle whose pieces add up to 100% of the total frequencies
    - This is illustrated with an overview of race and ethnicity of the elderly
* The Bar Graph
* The bar graph provides an alternative way to present nominal or ordinal data graphically
* This is illustrated with an overview of the marital status of the elderly
* Bar graphs are often used to compare one or more categories of a variable among different groups
* The Statistical Map
  + - Maps are especially useful for describing geographical variations in variables, such as population distribution, voting patterns, crime rates, or labor force composition
    - Maps can also display geographical variations on the level of cities, counties, city blocks, census tracts, and other units
* The Histogram
* The histogram is used to show the differences in frequencies or percentages among categories of an interval-ratio variable
* A histogram looks very similar to a bar chart except that the bars are contiguous to each other (touching) and may not be of equal width
* Statistics in Practice
  + - Gender and age
* The Line Graph
  + - The line graph is another way to display interval-ratio distributions; it shows the differences in frequencies or percentages among categories of an interval-ratio variable
    - Points representing the frequencies of each category are placed above the midpoint of the category and are joined by a straight line
    - Both the histogram and the line graph can be used to depict distributions and trends of interval-ratio variables
      * Line graphs are generally better suited for comparing how a variable is distributed across two or more groups or across two or more time periods
* Time-Series Charts
  + - A time-series chart displays changes in a variable at different points in time
    - It involves two variables
      * Time, which is labeled across the horizontal axis
      * Another variable of interest whose values (frequencies, percentages, or rates) are labeled along the vertical axis
    - A Closer Look 3.1 A Cautionary Note: Distortions in Graphs
      * Always interpret the graph in the context of the numerical information the graph represents
* Statistics in Practice
  + - The graphic presentation of education
    - Graphics can be used to highlight diversity