

15-3 Procedures

Key Concept This section describes a general approach for the statistical analysis of data.

Prepare Instead of mindlessly plugging data into a statistical procedure, we should begin with a preparation that includes basic considerations, such as those included in Figure 1-2 from Section 1-2:

- Consider the *context* of the data
- Consider the *source* of the data
- Consider the *sampling method*

Analyze After completing the preliminary preparations, we should proceed with the following:

- Exploring the data by constructing appropriate graphs, visualizing the distribution of the data, identifying outliers, and computing values of relevant statistics
- Using technology to apply a suitable statistical method

Conclude Based on the results, consider the conclusions to be formed.

- Determine whether the results have *statistical significance*.
- Determine whether the results have *practical significance*.

Inferences: Estimating Parameters and Hypothesis Testing When trying to use sample data for making inferences about a population, it is often difficult to determine which particular procedure is best. Figure 15-1 on the following page includes the major methods included in this book, along with a scheme for determining which of those methods should be used. Figure 15-1 applies to a fixed population. If the data are from a process that may change over time, construct a control chart (see Chapter 14) to determine whether the process is statistically stable. Figure 15-1 applies to process data only if the process is statistically stable. In addition to the procedures identified in Figure 15-1, there are many other methods that might be more suitable for a particular statistical analysis. Consult your friendly professional statistician for help with other methods.

15-4 Perspectives

Key Concept It probably comes as no big surprise that successful completion of an introductory statistics course does not make anyone an expert statistician. But one of the great things about statistics is that the limited topics covered in the introductory course can enable you to understand the statistics presented in the media, professional journals, and your classes. And you will have improved job marketability.

Throughout this text we have emphasized the importance of good sampling methods. We should all know that a bad sample may be beyond repair by even the most expert statisticians using the most sophisticated techniques and the most expensive and extensive technology. There is a plethora of mail, magazine, Internet, and telephone call-in surveys that give respondents the option of whether to participate. The results of such voluntary response surveys are generally worthless when judged according to the criteria of sound statistical methodology. Conversely, we should all know that many surveys and polls obtain very good results, even though the sample