5-1 Review and Preview

Figure 5-2 provides a visual illustration of what this chapter accomplishes. When investigating the numbers of girls in families with exactly two children, we can use the following two different approaches:

- **Use real sample data:** The approach of Chapters 2 and 3 is to collect sample data from actual families, then summarize the results in a table representing the frequency distribution, and then find statistics, such as the sample mean $\bar{x}$ and the sample standard deviation s.
- **Use probabilities to find the results that are expected:** Using principles of probability from Chapter 4, we can find the probability for each possible number of girls. Then we could summarize the results in a table representing a probability distribution.

In this chapter we merge the above two approaches as we create a table describing what we expect to happen, then proceed to find parameters such as the population mean μ and population standard deviation σ. (These values are population parameters because they describe the behavior of the population of all families with two children, not an actual sample of a limited number of such families.) The table at the extreme right in Figure 5-2 represents a *probability distribution,* because it describes the distribution using probabilities instead of frequency counts from actual families. The remainder of this book and the very core of inferential statistics are based on some knowledge of probability distributions. In this chapter we focus on *discrete* probability distributions. *Continuous* probability distributions are discussed in Chapter 6.

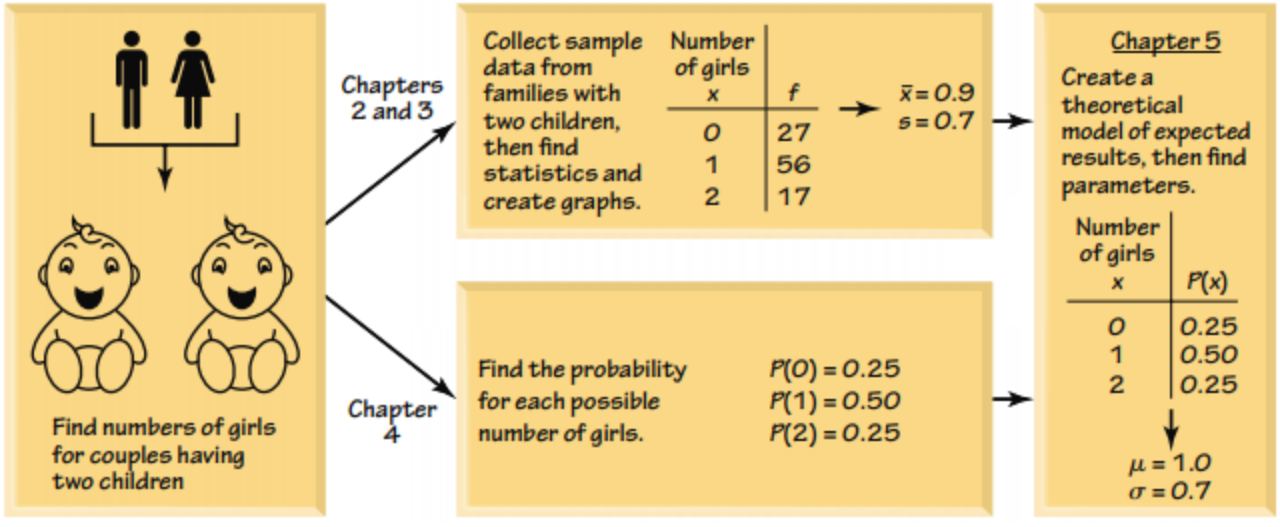

Figure 5-2

5-2 Probability Distributions

Key Concept In this section we introduce the concept of a *random variable* and the concept of a *probability distribution.* We illustrate how a *probability histogram* is a graph that visually depicts a probability distribution. We show how to find the