concepts, and a presentation of statistical *tools* used throughout the remainder of the book. The reader is encouraged to review the introductory chapters *after* reading subsequent chapters.

This book emphasizes those experimental designs that are most useful in the behavioral sciences. Many of the chapters conclude with a selected bibliography of contemporary research, which indicates diverse applications of the designs discussed in the chapter. The reader should consult the bibliographies to gain an over-all view of the way experimental designs are used in research.

The validity of inductive inferences that an experimenter draws from research rests on the fulfillment of certain assumptions. These assumptions are explicitly stated for each design as it is presented. Procedures for determining whether or not the assumptions are tenable in the light of sample data are also described.

A list of advantages and disadvantages for each design is provided to aid an experimenter in the selection of an appropriate design. Subsequent sections of this chapter treat general concepts basic to the selection of the best design for a particular research application.

1.2 DEFINITION OF BASIC TERMS

A number of terms must be defined before concepts basic to the selection of an experimental design can be discussed. It is assumed that the reader already has some familiarity with most of the terms that follow. Therefore, the material in this section is intended only to ensure a common vocabulary for the subsequent discussion. The definitions of some terms are oversimplified, but the assumed mathematical background does not permit rigorous definitions for all terms. Additional definitions are listed in the glossary.

Population. A collection of all observations identifiable by a set of rules.

Sample. A subset of observations from a population.

Random Sample. A sample drawn from a population in such a way that all possible samples of size n have the same probability of being selected.

Parameter. A measure computed from all observations in a population. Parameters are designated by Greek letters. For example, the symbols for a population mean and standard deviation are μ and σ, respectively.

Statistic. A measure computed from observations in a sample. Statistics are designated by Latin letters. For example, the symbols for a sample mean and standard deviation are $\bar{X}$ and S, respectively.

Random Variable. A quantity, say X, which may assume a range of possible values, each having an associated probability, say $p(X)$.

Estimator. The particular function of observations in a sample that is chosen to estimate a population parameter. For example, the sample mean is used to estimate the population mean. The numerical value obtained is called an estimate.