

Statistics in Criminal Justice

Statistics in Criminal Justice

Fourth Edition

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For Bryan, who made the desert bloom, used
sun to brighten the night, and brought such joy
to family and friends

D. W.

For my parents, Chester and Lila, who have been
a constant source of support

C. B.

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Preface

Oliver Wendell Holmes, the distinguished associate justice of the Supreme Court, was noted for his forgetfulness. On a train leaving Washington, D.C., he is said to have been approached by a conductor who requested his ticket. Holmes, searching through his case and his pockets, could not locate his pass. After a few awkward moments, the conductor recognized the distinctive-looking and well-known jurist and suggested that he just send the rail company the ticket when he found it. Justice Holmes, however, is said to have looked sternly at the conductor and responded, “Young man, the problem is not where is my ticket; the problem is where am I going.”

For the student of statistics, a textbook is like a train ticket. Not only does it provide a pass the student can use for entering a new and useful area of study; it also defines the route that will be taken and the goals that are important to achieve. Different textbooks take different approaches and emphasize different types of material. *Statistics in Criminal Justice* emphasizes the uses of statistics in research in crime and justice. This text is meant for students and professionals who want to gain a basic understanding of statistics in this field. In the first chapter, the main themes of the text are outlined and discussed. This preface describes how the text is organized.

The text takes a building-block approach. This means that each chapter helps prepare you for the chapters that follow. It also means that the level of sophistication of the text increases as the text progresses. Basic concepts discussed in early chapters provide a foundation for the introduction of more complex statistical issues later. One advantage to this approach is that it is easy to see, as time goes on, how much you have learned about statistics. Concepts that would have seemed impossible to understand, had they been introduced at the outset, are surprisingly simple when you encounter them later on. If you turn to the final chapters of the book now, you will see equations that are quite forbidding. However, when you come to these equations after covering the material in earlier chapters, you will be surprised at how easy they are to understand.

Throughout the text, there is an emphasis on *comprehension* and not *computation*. This approach is meant to provide readers with an accessible but sophisticated understanding of statistics that can be used to examine real-life criminal justice problems. In the opening chapters of the

book, basic themes and materials are presented. Chapter 1 provides an introduction to how we use statistics in criminal justice and the problems we face in applying statistics to real-life research problems. Chapters 2 through 5 introduce basic concepts of measurement and basic methods for graphically representing data and using statistics to describe data. Many of the statistics provided here will be familiar to you; however, remember that the more advanced statistics presented in later chapters build on the themes covered in these early chapters.

One of the fundamental problems researchers face is that they seek to make statements about large populations (such as all U.S. citizens) but are generally able to collect information or data on only a sample, or smaller group, drawn from such populations. In Chapters 6 through 12, the focus is on how researchers use statistics to overcome this problem. What is the logic that underlies the statistics we use for making statements about populations based on samples? What are the different types of statistical procedures or tests that can be used? What special problems are encountered in criminal justice research, and how should the researcher approach them? Some texts skip over the basics, moving students from test to test before they understand the logic behind the tests. The approach here is to focus in greater detail on relatively simple statistical decisions before moving on to more complex ones.

Having examined how we can make statements about populations from information gained from samples, we turn to how we describe the strength of association between variables. In the social sciences, it is often essential not only to determine whether factors are related but also to define the strength and character of those relationships. Accordingly, in Chapters 13 and 14, we look at measures of association, and in Chapters 15 through 20, we examine bivariate and different types of multivariate regression. These are likely to be new topics for you, though they are statistics commonly used in criminal justice.

In the concluding chapters, we look at three special topics. Chapter 21 focuses on the design of randomized experiments. Randomized experiments allow criminal justice researchers to be confident about the causal relationships between variables, and are often used in the evaluation of criminal justice interventions. Chapter 22 describes confidence intervals, a method for assessing how much trust you can place in the specific estimates that you obtain from a sample. Because our emphasis is on research in criminal justice, we conclude the text with a chapter that examines methods for evaluating and improving the design of a research project. The statistical concept that is central to Chapter 23—statistical power—follows directly from the concepts developed in prior chapters. Statistical power is often ignored in introductory statistics texts. However, it has become a central concern in criminal justice research and accordingly is given emphasis in this text.

While it is always difficult in statistics to decide where an introductory text should stop, with an understanding of these techniques you

will have the basic tools to comprehend and conduct criminal justice research. Of course, these tools constitute a building block for more advanced methods. The goal of the text is not only to bring you to this point in learning statistics, but also to leave you with the confidence and tools to tackle more complex problems on your own. Each chapter starts with a statement of the basic concepts and problems addressed and ends with a full chapter summary. There is also a list of equations, when relevant, at the end of the chapter. These materials should help you to review what you have learned and to identify the basic knowledge you need to move on to subsequent chapters.

All of the chapters contain a list of key terms with short definitions. The key terms appear in boldface the first time they are mentioned in the chapter. Sometimes a term may have been briefly explained in an earlier chapter, but is designated as a key term in the chapter where the concept is more central. A general glossary of key terms appears at the end of the book. Chapters 2 through 23 each have a set of questions at the end. The questions are designed to make you think about the subjects covered in the chapter. Sometimes they are straightforward, following directly from the text. Sometimes they ask you to develop ideas in slightly different ways than in the text. In constructing the questions, we sought to make working on statistical issues as much fun as possible. In statistics, it is crucial to go over material more than once. The questions are meant to reinforce the knowledge you have gained.

A working knowledge of computers is not required to understand the statistical concepts or procedures presented in the text. However, computers have become a very important part of research in statistics, and thus we provide computer exercises for relevant chapters and a web site where you can access the data needed for those exercises (see the Computer Exercises at the end of Chapter 2 for details). You are encouraged to use the web site. It will help you to see the connection between the topics discussed in the chapters and statistical computing.

Statistics in Criminal Justice will allow you to approach statistics in a familiar context. It emphasizes the statistics and the problems that are commonly encountered in criminal justice research. It focuses on understanding rather than computation. However, it takes a serious approach to statistics, which is relevant to the real world of research in crime and justice. The text is meant not only as an introduction for students but also as a reference for researchers. The approach taken will help both students who want an introduction to statistics and professionals who seek a straightforward explanation for statistics that have become a routine tool in contemporary criminal justice systems.

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