

PREFACE

Some of the most important scientific accomplishments of the twentieth century occurred in the field of genetics, beginning with the rediscovery of Mendel's laws of heredity and ending with the first draft of the complete DNA sequence of the human genome. The pace of discoveries has continued to accelerate in the first part of the twenty-first century. One of the most dramatic developments in the behavioral sciences during the past few decades is the increasing recognition and appreciation of the important contribution of genetic factors to behavior. Genetics is not a neighbor chatting over the fence with some helpful hints—it is central to the behavioral sciences. In fact, genetics is central to all the life sciences and gives the behavioral sciences a place in the biological sciences. Genetic research includes diverse strategies, such as twin and adoption studies (called quantitative genetics), which investigate the influence of genetic and environmental factors, as well as strategies to identify specific genes (called molecular genetics). Behavioral geneticists apply these research strategies to the study of behavior in biopsychology, clinical psychology, cognitive psychology, developmental psychology, educational psychology, neuroscience, psychopharmacology, and social psychology, and increasingly in other areas of the social sciences such as behavioral economics and political science.

The goal of this book is to share with you our excitement about behavioral genetics, a field in which we believe some of the most important discoveries in the behavioral sciences have been made in recent years. This sixth edition continues to emphasize what we know about genetics in the behavioral sciences rather than how we know it. Its goal is not to train students to become behavioral geneticists but rather to introduce students in the behavioral, social, and life sciences to the field of behavioral genetics.

This sixth edition presages a passing of the baton to the next generation. Two new and younger authors (Knopik and Neiderhiser) have joined forces with two authors from the previous editions (Plomin and DeFries), which has brought new energy and ideas that help to capture developments in this fast-moving and highly interdisciplinary field. In addition to updating research with more than 550 new references, this edition represents a substantial reorganization. One feature of this edition is that it highlights the value of behavioral genetics for understanding the environment (Chapter 7) and its interplay with genetics (Chapter 8). At

first, chapters on the environment might seem odd in a textbook on genetics, but in fact the environment is crucial at every step in the pathways between genes, brain, and behavior. One of the oldest controversies in the behavioral sciences, the so-called nature (genetics) versus nurture (environment) controversy, has given way to a view that both nature and nurture are important for complex behavioral traits. Moreover, genetic research has made important discoveries about how the environment affects behavioral development.

We have also expanded our coverage of gene expression and especially epigenetics as pathways between genes and behavior (Chapter 10). Our review of cognitive abilities includes the new area of brain imaging genetics (Chapter 13). Coverage of psychopathology has been expanded (Chapters 14, 15, and 16), a new section on behavioral economics has been included (Chapter 17), and a new chapter on substance use disorders has been added (Chapter 18), reflecting the enormous growth of genetic research in these areas.

We begin with an introductory chapter that will, we hope, whet your appetite for learning about genetics in the behavioral sciences. The next few chapters present the basic rules of heredity, its DNA basis, and the methods used to find genetic influence and to identify specific genes. The rest of the book highlights what is known about genetics in the behavioral sciences. The areas about which the most is known are cognitive disabilities and abilities, psychopathology, personality, and substance abuse. We also consider areas of behavioral sciences that were introduced to genetics more recently, such as health psychology, aging, and evolutionary psychology. Throughout these chapters, quantitative genetics and molecular genetics are interwoven. One of the most exciting developments in behavioral genetics is the ability to begin to identify specific genes that influence behavior. The last chapter, "The Future of Behavioral Genetics," has been reviewed by 30 of the world's top behavioral geneticists and represents a consensus statement about the future of the field.

Because behavioral genetics is an interdisciplinary field that combines genetics and the behavioral sciences, it is complex. We have tried to write about it as simply as possible without sacrificing honesty of presentation. Although our coverage is representative, it is by no means exhaustive or encyclopedic. History and methodology are relegated to boxes and an appendix to keep the focus on what we now know about genetics and behavior. The appendix, by Shaun Purcell, presents an overview of statistics, quantitative genetic theory, and a type of quantitative genetic analysis called model fitting. In this edition we have retained an interactive Web site that brings the appendix to life with demonstrations: <http://pngu.mgh.harvard.edu/purcell/bgim/>. The Web site was designed and written by Shaun Purcell. A list of other useful Web sites, including those of relevant associations, databases, and other resources, is included after the appendix. Following the Web sites list is a glossary; the first time each glossary entry appears in the text it is shown in boldface type.

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