

P R E F A C E

Genetics was one of the major scientific accomplishments of the twentieth century, 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. 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. Genetics includes diverse research strategies such as twin and adoption studies (called quantitative genetics) that investigate the influence of genetic and environmental factors as well as strategies to identify specific genes (called molecular genetics). Behavioral genetics is a specialty that applies these genetic research strategies to the study of behavior, such as psychiatric genetics (the genetics of mental illness) and psychopharmacogenetics (the genetics of behavioral responses to drugs).

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 is the fifth edition of a textbook (Plomin, DeFries, & McClearn, 1980) that followed an earlier version (McClearn & DeFries, 1973). The earlier editions focused on the methods of behavioral genetics. The third edition (Plomin, DeFries, McClearn, & Rutter, 1997) was entirely rewritten, with a topical rather than a methodological focus. The fourth edition added as a coauthor Peter McGuffin, who is an expert in the quantitative and molecular genetic analysis of psychopathology. The fifth edition continues to emphasize what we know about genetics in psychology and psychiatry 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, biological, and social sciences to the field of behavioral genetics. The fifth edition brings the book up to date in this fast-moving field with more than 800 new references. It also expands one chapter on psychopathology into three chapters, reflecting the enormous growth of genetic research on mental illness. It also adds a new chapter called *Pathways between Genes and Behavior*.

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 psychology and psychiatry. The areas about which most is known are cognitive disabilities and abilities, psychopathology, and personality. We also consider areas of psychology more recently introduced to genetics, such as health psychology and aging. These topics are followed by three chapters, one on pathways between genes and behavior, one on environment, and one on evolution. The future of genetic research lies in what we call behavioral genomics—understanding the pathways between genes and behavior, from the expression of genes to the brain. At first, a chapter 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. The chapter on the environment is followed by a chapter on evolution because evolution can be viewed as environmental change at the macro rather than the individual level of the population. The last chapter looks to the future of behavioral genetics. 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.

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://statgen.iop.kcl.ac.uk/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 reference section.

The text is sprinkled with 24 brief, autobiographical "close-ups" of researchers in the field in order to personalize the research. The close-ups are meant to be representative of researchers in the field rather than an honor roll of the most illustrious researchers. To reinforce this point, many of the close-ups in this edition are different from those in the previous edition. In this edition, we have especially tried to add close-ups about younger scientists. We are grateful to our colleagues for contributing autobiographical statements and photographs.

This edition benefited greatly from the advice of many colleagues, far too many to name. We are grateful to Helena Kiernan, who helped us organize the revision, in a race to see what would come first: the book or her baby. As in the previous edition, Mary Louise Byrd, our project editor, eased the publication process. We also appreciate the effort and support of our editor, Erik E. Gilg, who encouraged us to undertake this revision and accelerated its publication.