

## BOOK REVIEW

R. Plomin, J. C. Defreiss, I. P. W. Craig, & P. McGuffin (Ed.S.) (2003)

### BEHAVIORAL GENETICS IN THE POSTGENOMIC ERA

Washington, D.C.: American Psychological Association, pp. 608/hardcover \$59.95

When we flip through the pages of the history of science and get to the 21<sup>st</sup> Century, the completion of the human genome sequence certainly qualifies as one of the great moments. Mendel's serendipitous experiments with peas and the discovery of genetics in 1903 paved the way for the double helix and the discovery of DNA in 1953, as well as the cracking of the genetic code in 1966. At this point, we know that the human genome consists of three billion letters of DNA with 20 amino acids as building blocks of protein. The genes that control the body's development, growth, function, and aging are made of a specific sequence of these chemical pairs. A small change in the sequence can be enough to cause disease. By identifying the correct and healthy sequence of base pairs, researchers may one day be able to extrapolate appropriate treatment for both physical and mental disorders.

Scientists are still uncertain as to exactly how many genes there are in the genome, but they believe that it is in the range of 30,000. This pioneering work has spawned many conferences on the advances of genetics, including one in March of 2001 that took place in Cambridge, United Kingdom. Funded by the Wellcome Trust, the conference invited 45 of the top scientists in the field to lecture on the theme of behavioral genetics in the postgenomic era.

Fortunately, the proceedings from this conference have been gathered into a new book, which is entitled *Behavioral Genetics and the Postgenomic Era*.

This rather non-traditional text opens with three forewords, each written by a prominent behavioral scientist. Irving I. Gottesman of the University of Minnesota offers a piece that reflects a behavioral genetics perspective, Jerome Kagan of Harvard University discusses a behavior science perspective, and James D. Watson of the Cold Spring Harbor Laboratory has written an essay on molecular genetics. The forewords set a perfect tone for the major volume that follows, which consists of more than 600 pages devoted to various aspects of behavioral genetics.

The main text is divided into nine sections. Editors Plomin, Defreiss, Craig, and McGuffin offer thoughtful and thought-provoking introductory material. They celebrate the postgenomic era and focus on the behavioral dimensions and disorders that are, no doubt, the most complex traits in DNA analysis in some of the chapters they have authored themselves. The authors further highlight the identification of genes associated with behavior and the exploration of mechanisms by which genes have their affect, otherwise known as functional genomics. Quantitative and molecular genetic issues are also featured as they relate to the genetics of behavior.

Researchers in quantitative genetics have taught us that genetic factors contribute to the nearly all complex traits, including behavior. In fact, most of what is known today about the genetics of human behavior stems from quantitative genetic research. In the 1980s, a new generation of DNA markers gave way to the identification of genetics for complex quantitative traits influenced by multiple genes as well as multiple environmental factors.

The central topics covered by the book are the well-studied domains of cognitive abilities and disabilities, psychopharmacology, personality, and psychopathology. The contributors stress that genetic factors influence the way humans experience their environment. Additional sections include

molecular genomics, which looks at the three million DNA variations and three billion base pairs that constitute our genetic structure. The DNA sequences that identify the physical differences from one person to another are outlined. Contributions on behavioral genomics are also included. Finding the genes connected with behavior, locating specific genes associated to complex traits, and the implications of such discoveries for the future are detailed. Throughout the book, the field of genomics, which involves the location of genes, is emphasized. This perspective is differentiated from functional genomics, which determines how specific genes work.

The last section of the book considers personality and how genetic structures relate to each other in order to form individual personalities. There is a very timely chapter, given the explosion of developments with serotonergic compounds and anxiety disorders, on neuroticism and serotonin. This discussion also highlights serotonin's role in anxiety, and there is a subsequent chapter on animal models of anxiety.

A section on psychopathology addresses Attention Deficit Hyperactivity Disorder, schizophrenia, genetic affective disorders, and dementia, all of which are important topics where there is great promise of improvement provided by the ongoing developments in genetic restructuring.

Finally, the editors close the book with further attention on the efforts to locate specific genes associated with behavior and how behavioral genomics in the future will be at the cutting edge of behavioral genetics in the postgenomic era. A detailed glossary proves very handy for identifying specific terms.

Although the weighty nature of the topic makes the presentation somewhat dry at times, overall, the text is extremely well done and highly informative. I highly recommend the book as among the best resources on the subject for anyone working with genetic aspects of emotional and behavioral disorders, for medical and psychiatric residents interested in genetics, and for behavioral scientists in the field.

**Frank M. Dattilio, Ph.D., ABPP**  
Harvard Medical School