

Contents

PART I ORIENTATION

| | | |
|-----------|--|----|
| Chapter 1 | Behavior Genetic Approaches in Behavioral Medicine: An Introduction | 3 |
| | <i>John K. Hewitt and J. Rick Turner</i> | |
| | Introduction | 3 |
| | Heritability and Genetic Analysis | 4 |
| | Caveats about Heritability | 5 |
| | Twin, Family, and Adoption Studies | 7 |
| | The Physical Basis of Genetic Inheritance | 10 |
| | The Search for Individual Genes | 11 |
| | Conclusions | 12 |
| | References | 12 |

PART II ADDICTIVE BEHAVIORS

| | | |
|-----------|---|----|
| Chapter 2 | Mediators and Moderators of Alcoholism Inheritance ... | 17 |
| | <i>Matt McGue</i> | |
| | Introduction | 17 |
| | Behavior Genetic Methodology | 18 |
| | Sources of Phenotypic Variance | 18 |
| | Adoption Study Design | 19 |
| | Classic Twin Study Design | 19 |
| | Genetic Marker Studies | 20 |
| | Inherited Basis of Alcoholism | 21 |
| | Adoption Studies | 21 |
| | Twin Studies | 23 |
| | Genetic Marker Studies | 25 |
| | Summary of Genetic Evidence | 27 |
| | Mechanisms of Inherited Influence | 27 |
| | Mediators of Alcoholism Inheritance | 28 |
| | Moderators of Alcoholism Inheritance | 33 |

Summary 38
 References 39

Chapter 3 Genetic Influences on Smoking Behavior 45

Andrew C. Heath and Pamela A. F. Madden

Introduction 45
 Why Are People Still Smoking? 46
 How Generalizable Are These Findings? 49
 Who Becomes a Smoker? 52
 How Generalizable Are the Findings for Smoking Initiation? 53
 Can We Exclude Nongenetic Explanations? 54
 How Do We Explain the Genetic Influence? 55
 Why Do Smokers Keep Smoking? 56
 How Generalizable Are the Findings for Smoking Persistence? 58
 How Do We Explain the Genetic Influence on Smoking Persistence? 58
 Discussion 60
 References 63

Chapter 4 Smoking and Addictive Behaviors: Epidemiological, Individual, and Family Factors 67

David C. Rowe and Miriam R. Linver

Introduction 67
 Psychological Functions of Smoking 69
 Personality Traits and Smoking 73
 Intergenerational Transmission of Smoking 74
 Vertical Transmission 74
 Horizontal Transmission 76
 Summary and Conclusions 81
 References 83

PART III STRESS AND REACTIVITY

Chapter 5 Behavior Genetic Studies of Cardiovascular Responses to Stress 87

John K. Hewitt and J. Rick Turner

Introduction 87
 Laboratory Investigation of Stress Responses 88
 Twin Studies of Stress Responses 88
 Discussion and Conclusions 90

| | |
|--|------------|
| Future Directions | 92 |
| Laboratory Studies | 92 |
| Laboratory–Field Generalization Studies | 93 |
| Ambulatory Monitoring Studies | 96 |
| Summary | 99 |
| References | 99 |
| | |
| Chapter 6 Developmental Genetic Trends in Blood Pressure Levels and Blood Pressure Reactivity to Stress | 105 |
| <i>Harold Snieder, Lorenz J. P. van Doornen, and Dorret I. Boomsma</i> | |
| Introduction | 105 |
| Blood Pressure Levels | 106 |
| Blood Pressure Reactivity | 107 |
| Twin Studies | 108 |
| Blood Pressure Levels | 108 |
| Blood Pressure Reactivity | 111 |
| Parent–Offspring Studies | 111 |
| Blood Pressure Levels | 111 |
| Blood Pressure Reactivity | 114 |
| Longitudinal Studies: Blood Pressure Levels | 114 |
| A Compromise: Estimation of Age-Dependent Genetic and Environmental Effects without a Longitudinal Design | 115 |
| Blood Pressure Levels | 117 |
| Blood Pressure Reactivity | 121 |
| Discussion | 123 |
| References | 126 |

PART IV BODY WEIGHT, ADIPOSITY, AND EATING BEHAVIORS

| | |
|---|------------|
| Chapter 7 Genetic Influences on Body Mass Index in Early Childhood | 133 |
| <i>Lon R. Cardon</i> | |
| Introduction | 133 |
| Colorado Adoption Project | 134 |
| Models of Development | 135 |
| Parent–Offspring Models | 136 |
| Continuity of Body Mass Index in the Colorado Adoption Project | 138 |
| Adiposity Rebound | 140 |
| Conclusions | 142 |
| References | 142 |

| | |
|---|---------|
| Chapter 8 Genetic Studies of Obesity across the Life Span | 145 |
| <i>Joanne M. Meyer</i> | |
| Introduction | 145 |
| Genetic Designs: Questions They Can Answer about Individual Differences in Obesity | 146 |
| Cross-Sectional Twin Studies | 148 |
| Overview | 148 |
| Twin Studies of the Body Mass Index | 148 |
| Twin Studies of Fat Deposition and Patterning | 152 |
| Summary | 153 |
| Studies of Biological Parents and Their Offspring | 154 |
| Overview | 154 |
| Parent–Offspring Similarity for Indices of Fat Distribution | 154 |
| Early-Onset Obesity and Familial Risk | 156 |
| Summary | 156 |
| Adoption Studies | 157 |
| Overview | 157 |
| Danish Adoption Studies | 157 |
| Iowa Adoption Study | 158 |
| Summary | 159 |
| Longitudinal Studies | 159 |
| Overview | 159 |
| Empirical Evidence of Tracking | 160 |
| Genetically Informative Designs | 162 |
| Summary | 163 |
| Conclusions, Limitations, and Future Directions | 163 |
| References | 164 |
| Chapter 9 Genetics and Eating Disorders | 167 |
| <i>Jeanine R. Spelt and Joanne M. Meyer</i> | |
| Introduction | 167 |
| Case Definition | 168 |
| Epidemiology | 170 |
| Developmental Models for the Eating Disorders | 171 |
| Vulnerability Factors | 171 |
| Stressors | 174 |
| Synthesis | 174 |
| Familial Transmission of the Eating Disorders | 175 |
| Overview | 175 |
| Family Studies | 176 |
| Twin Studies | 177 |
| Familial Nature of Comorbidity | 179 |

| | |
|---|-----|
| Genetic Studies of Psychological Domains Related to Eating Disorders | 181 |
| Future Directions | 182 |
| References | 182 |

PART V GENDER AND ETHNICITY

| | |
|---|-----|
| Chapter 10 Issues in the Behavior Genetic Investigation of Gender Differences | 189 |
| <i>Chandra A. Reynolds and John K. Hewitt</i> | |
| Introduction | 189 |
| Importance of Gender Differences in Prevalence Rates | 190 |
| Mean Gender Differences | 194 |
| Gender Differences in Individual Variation | 194 |
| Final Considerations and Conclusions | 198 |
| References | 199 |
| Chapter 11 Studying Ethnicity and Behavioral Medicine: A Quantitative Genetic Approach | 201 |
| <i>Keith E. Whitfield and Toni P. Miles</i> | |
| Introduction | 201 |
| Behavior Genetics and the Study of Ethnicity | 202 |
| Regionality and Chronic Diseases among Minorities | 204 |
| Applications in the Study of Behavioral Medicine | 205 |
| Alcohol Use | 205 |
| Smoking | 207 |
| Cardiovascular Reactivity to Stress | 208 |
| Differential Heritability | 209 |
| Conclusions | 210 |
| References | 210 |

PART VI BEYOND HERITABILITY

| | |
|---|-----|
| Chapter 12 Genetics, Environmental Risks, and Protective Factors | 217 |
| <i>Robert Plomin</i> | |
| Introduction | 217 |
| Beyond Heritability | 217 |
| Multivariate Analysis | 217 |
| Developmental Analysis | 218 |

| | |
|---|-----|
| Extremes Analysis | 218 |
| Molecular Genetic Analysis | 219 |
| Genetic Research and Identification of Environmental Influences | 221 |
| Nurture as Well as Nature | 221 |
| Nonshared Environment | 222 |
| The Nature of Nurture | 222 |
| Life Events | 224 |
| Social Support | 226 |
| Causes and Consequences of Genetic Influence on Environmental | |
| Measures | 226 |
| Genotype–Environment Correlation | 227 |
| Multivariate Genetic Analysis of Genotype–Environment | |
| Correlation | 228 |
| Conclusions and Implications | 229 |
| References | 231 |

**Chapter 13 Quantitative Trait Loci: Mapping Genes
for Complex Traits** 237

Lon R. Cardon

| | |
|---|-----|
| Introduction | 237 |
| Genotype Measurement and Linkage | 238 |
| Complex Phenotypes | 239 |
| Sib-Pair Methods for Quantitative Trait Locus Linkage | 240 |
| Analysis of Discrete Traits in Sib-Pairs | 244 |
| Some Examples of Quantitative Trait Locus Linkage Studies | 245 |
| Conclusions | 247 |
| References | 248 |

PART VII EPILOGUE

**Chapter 14 Implications of a Behavior Genetic Perspective
in Behavioral Medicine** 253

John K. Hewitt and J. Rick Turner

| | |
|---------------------------|------------|
| Author Index | 257 |
|---------------------------|------------|

| | |
|----------------------------|------------|
| Subject Index | 265 |
|----------------------------|------------|