CONTENTS

| ıa | bles, Figures, Exhibits, and Boxes | XI |
|----|---|-------|
| Pr | reface | xxiii |
| Tł | ne Author | xxvii |
| In | troduction | xxix |
| 1 | CROSS-TABULATIONS | 1 |
| | What This Chapter Is About | 1 |
| | Introduction to the Book via a Concrete Example | 2 |
| | Cross-Tabulations | 8 |
| | What This Chapter Has Shown | 19 |
| 2 | MORE ON TABLES | 21 |
| | What This Chapter Is About | 21 |
| | The Logic of Elaboration | 22 |
| | Suppressor Variables | 25 |
| | Additive and Interaction Effects | 26 |
| | Direct Standardization | 28 |
| | A Final Note on Statistical Controls Versus Experiments | 43 |
| | What This Chapter Has Shown | 45 |
| 3 | STILL MORE ON TABLES | 47 |
| | What This Chapter Is About | 47 |
| | Reorganizing Tables to Extract New Information | 48 |
| | When to Percentage a Table "Backwards" | 50 |
| | Cross-Tabulations in Which the Dependent Variable | |
| | Is Represented by a Mean | 52 |
| | Index of Dissimilarity | 58 |
| | Writing About Cross-Tabulations | 61 |
| | What This Chapter Has Shown | 63 |

Vi Contents

| 4 | ON THE MANIPULATION OF DATA BY COMPUTER | 65 |
|---|--|-----|
| | What This Chapter Is About | 65 |
| | Introduction | 66 |
| | How Data Files Are Organized | 67 |
| | Transforming Data | 72 |
| | What This Chapter Has Shown | 80 |
| | Appendix 4.A Doing Analysis Using Stata | 80 |
| | Tips on Doing Analysis Using Stata | 80 |
| | Some Particularly Useful Stata 10.0 Commands | 84 |
| 5 | INTRODUCTION TO CORRELATION AND REGRESSION | |
| | (ORDINARY LEAST SQUARES) | 87 |
| | What This Chapter Is About | 87 |
| | Introduction | 88 |
| | Quantifying the Size of a Relationship: Regression Analysis | 89 |
| | Assessing the Strength of a Relationship: Correlation Analysis | 91 |
| | The Relationship Between Correlation and Regression Coefficients | 94 |
| | Factors Affecting the Size of Correlation (and Regression) Coefficients | 94 |
| | Correlation Ratios | 99 |
| | What This Chapter Has Shown | 102 |
| 6 | INTRODUCTION TO MULTIPLE CORRELATION AND | |
| | REGRESSION (ORDINARY LEAST SQUARES) | 103 |
| | What This Chapter Is About | 103 |
| | Introduction | 104 |
| | A Worked Example: The Determinants of Literacy in China | 113 |
| | Dummy Variables | 120 |
| | A Strategy for Comparisons Across Groups | 124 |
| | A Bayesian Alternative for Comparing Models | 133 |
| | Independent Validation | 135 |
| | What This Chapter Has Shown | 136 |
| 7 | THE THE PROPERTY OF THE PROPER | |
| | HANDLING SPECIAL ANALYTIC PROBLEMS | 139 |
| | What This Chapter Is About | 139 |
| | Nonlinear Transformations | 140 |

| | | Contents | vii |
|----|---|----------|-----|
| | Testing the Equality of Coefficients | | 147 |
| | Trend Analysis: Testing the Assumption of Linearity | | 149 |
| | Linear Splines | | 152 |
| | Expressing Coefficients as Deviations from the | | |
| | Grand Mean (Multiple Classification Analysis) | | 164 |
| | Other Ways of Representing Dummy Variables | | 166 |
| | Decomposing the Difference Between Two Means | | 172 |
| | What This Chapter Has Shown | | 179 |
| 8 | MULTIPLE IMPUTATION OF MISSING DATA | | 181 |
| | What This Chapter Is About | | 181 |
| | Introduction | | 182 |
| | A Worked Example: The Effect of Cultural Capital on | | |
| | Educational Attainment in Russia | | 187 |
| | What This Chapter Has Shown | | 194 |
| 9 | SAMPLE DESIGN AND SURVEY ESTIMATION | | 195 |
| | What This Chapter Is About | | 195 |
| | Survey Samples | | 196 |
| | Conclusion | | 223 |
| | What This Chapter Has Shown | | 224 |
| 10 | REGRESSION DIAGNOSTICS | | 225 |
| | What This Chapter Is About | | 225 |
| | Introduction | | 226 |
| | A Worked Example: Societal Differences in Status Attainment | | 229 |
| | Robust Regression | | 237 |
| | Bootstrapping and Standard Errors | | 238 |
| | What This Chapter Has Shown | | 240 |
| 11 | SCALE CONSTRUCTION | | 241 |
| | What This Chapter Is About | | 241 |
| | Introduction | | 242 |
| | Validity | | 242 |
| | Reliability | | 243 |

VIII Contents

| | Scale Construction | 246 |
|----|--|-----|
| | Errors-in-Variables Regression | 258 |
| | What This Chapter Has Shown | 261 |
| 12 | LOG-LINEAR ANALYSIS | 263 |
| | What This Chapter Is About | 263 |
| | Introduction | 264 |
| | Choosing a Preferred Model | 265 |
| | Parsimonious Models | 277 |
| | A Bibliographic Note | 294 |
| | What This Chapter Has Shown | 295 |
| | Appendix 12.A Derivation of the Effect Parameters | 295 |
| | Appendix 12.B Introduction to Maximum Likelihood Estimation | 297 |
| | Mean of a Normal Distribution | 298 |
| | Log-Linear Parameters | 299 |
| 13 | BINOMIAL LOGISTIC REGRESSION | 301 |
| | What This Chapter Is About | 301 |
| | Introduction | 302 |
| | Relation to Log-Linear Analysis | 303 |
| | A Worked Logistic Regression Example: | |
| | Predicting Prevalence of Armed Threats | 304 |
| | A Second Worked Example: Schooling Progression Ratios in Japan | 314 |
| | A Third Worked Example (Discrete-Time Hazard-Rate Models): | |
| | Age at First Marriage | 318 |
| | A Fourth Worked Example (Case-Control Models): | |
| | Who Was Appointed to a Nomenklatura Position in Russia? | 327 |
| | What This Chapter Has Shown | 329 |
| | Appendix 13.A Some Algebra for Logs and Exponents | 330 |
| | Appendix 13.B Introduction to Probit Analysis | 330 |
| 14 | MULTINOMIAL AND ORDINAL LOGISTIC REGRESSION AND | |
| | TOBIT REGRESSION | 335 |
| | What This Chapter Is About | 335 |
| | Multinomial Logit Analysis | 336 |

| | | Contents iX |
|------|--|--------------------|
| | Ordinal Logistic Regression | 342 |
| | Tobit Regression (and Allied Procedures) for Censored | |
| | Dependent Variables | 353 |
| | Other Models for the Analysis of Limited Dependent Variables | 360 |
| | What This Chapter Has Shown | 361 |
| 15 | IMPROVING CAUSAL INFERENCE: FIXED EFFECTS AND | |
| | RANDOM EFFECTS MODELING | 363 |
| | What This Chapter Is About | 363 |
| | Introduction | 364 |
| | Fixed Effects Models for Continuous Variables | 365 |
| | Random Effects Models for Continuous Variables | 371 |
| | A Worked Example: The Determinants of Income in China | 372 |
| | Fixed Effects Models for Binary Outcomes | 375 |
| | A Bibliographic Note | 380 |
| | What This Chapter Has Shown | 380 |
| 16 | FINAL THOUGHTS AND FUTURE DIRECTIONS: | |
| | RESEARCH DESIGN AND INTERPRETATION ISSUES | 381 |
| | What this Chapter is About | 381 |
| | Research Design Issues | 382 |
| | The Importance of Probability Sampling | 397 |
| | A Final Note: Good Professional Practice | 400 |
| | What This Chapter Has Shown | 405 |
| | pendix A: Data Descriptions and Download Locations Data Used in This Book | for 407 |
| | | 407 |
| | pendix B: Survey Estimation with the General ial Survey | 411 |
| Ref | erences | 417 |
| Inde | ex | 431 |

TABLES, FIGURES, EXHIBITS, AND BOXES

TABLES

| 1.1. | Joint Frequency Distribution of Militancy by Religiosity Among Urban Negroes in the U.S., 1964. | 8 |
|-------|---|----|
| 1.2. | Percent Militant by Religiosity Among Urban Negroes in the U.S., 1964. | 10 |
| 1.3. | Percentage Distribution of Religiosity by Educational Attainment, Urban Negroes in the U.S., 1964. | 13 |
| 1.4, | Percent Militant by Educational Attainment, Urban Negroes in the U.S., 1964. | 13 |
| 1.5. | Percent Militant by Religiosity and Educational Attainment, Urban Negroes in the U.S., 1964. | 15 |
| 1.6. | Percent Militant by Religiosity and Educational Attainment, Urban Negroes in the U.S., 1964 (Three-Dimensional Format). | 18 |
| 2.1. | Percentage Who Believe Legal Abortions Should Be Possible Under Specified Circumstances, by Religion and Education, U.S. 1965 (N = 1,368; Cell Frequencies in Parentheses). | 27 |
| 2.2. | Percentage Accepting Abortion by Religion and Education (Hypothetical Data). | 28 |
| 2.3. | Percent Militant by Religiosity, and Percent Militant by Religiosity Adjusting (Standardizing) for Religiosity Differences in Educational Attainment, Urban Negroes in the U.S., $1964 (N = 993)$. | 30 |
| 2.4. | Percentage Distribution of Beliefs Regarding the Scientific View of Evolution (U.S. Adults, 1993, 1994, and 2000). | 32 |
| 2.5. | Percentage Accepting the Scientific View of Evolution by Religious Denomination ($N = 3,663$). | 33 |
| 2.6. | Percentage Accepting the Scientific View of Evolution by Level of Education. | 34 |
| 2.7. | Percentage Accepting the Scientific View of Evolution by Age. | 34 |
| 2.8. | Percentage Distribution of Educational Attainment by Religion. | 35 |
| 2.9. | Percentage Distribution of Age by Religion. | 35 |
| 2.10. | Joint Probability Distribution of Education and Age. | 36 |

XII Tables, Figures, Exhibits, and Boxes

| 2.11. | Percentage Accepting the Scientific View of Evolution by Religion, Age, and Sex (Percentage Bases in Parentheses) | 37 |
|-------|--|-----|
| 2.12. | Observed Proportion Accepting the Scientific View of Evolution, and Proportion Standardized for Education and Age. | 39 |
| 2.13. | Percentage Distribution of Occupational Groups by Race, South African Males Age 20–69, Early 1990s (Percentages Shown Without Controls and also Directly Standardized for Racial Differences in Educational Attainment ^a ; $N = 4,004$). | 41 |
| 2.14. | Mean Number of Chinese Characters Known (Out of 10), for Urban and Rural Residents Age 20–69, China 1996 (Means Shown Without Controls and Also Directly Standardized for Urban-Rural Differences in Distribution of Education; N = 6,081). | 42 |
| 3.1. | Frequency Distribution of Acceptance of Abortion by Religion and Education, U.S. Adults, 1965 ($N = 1,368$). | 48 |
| 3.2. | Social Origins of Nobel Prize Winners (1901–1972) and Other U.S. Elites (and, for Comparison, the Occupations of Employed Males 1900–1920). | 51 |
| 3.3. | Mean Annual Income in 1979 Among Those Working Full Time in 1980, by Education and Gender, U.S. Adults (Category Frequencies Shown in Parentheses). | 52 |
| 3.4. | Means and Standard Deviations of Income in 1979 by Education and Gender, U.S. Adults, 1980. | 57 |
| 3.5. | Median Annual Income in 1979 Among Those Working Full Time in 1980, by Education and Gender, U.S. Adults (Category Frequencies Shown in Parentheses). | 58 |
| 3.6. | Percentage Distribution Over Major Occupation Groups by Race and Sex, U.S. Labor Force, 1979 (N = 96,945). | 60 |
| 5.1. | Mean Number of Positive Responses to an Acceptance of Abortion Scale (Range: 0–7), by Religion, U.S. Adults, 2006. | 101 |
| 6.1. | Means, Standard Deviations, and Correlations Among Variables Affecting Knowledge of Chinese Characters, Employed Chinese Adults Age 20–69, 1996 (N = 4,802) | 115 |
| 6.2. | Determinants of the Number of Chinese Characters Correctly Identified on a Ten-Item Test, Employed Chinese Adults Age 20–69, 1996 (Standard Errors in Parentheses). | 116 |
| 6.3. | Coefficients of Models of Acceptance of Abortion, U.S. Adults, 1974 (Standard Errors Shown in Parentheses); $N = 1,481$. | 127 |
| 6.4. | Goodness-of-Fit Statistics for Alternative Models of the Relationship Among Religion, Education, and Acceptance of Abortion, U.S. Adults, 1973 (N = 1,499). | 136 |
| 7.1. | Demonstration That Inclusion of a Linear Term Does Not Affect Predicted Values. | 153 |

| 7.2. | Coefficients for a Linear Spline Model of Trends in Years of School Completed by Year of Birth, U.S. Adults Age 25 and Older, and Comparisons with Other Models (Pooled Data for 1972–2004, N = 39,324). | 157 |
|-------|--|-----|
| 7.3. | Goodness-of-Fit Statistics for Models of Knowledge of Chinese Characters by Year of Birth, Controlling for Years of Schooling, with Various Specifications of the Effect of the Cultural Revolution (Those Affected by the Cultural Revolution Are Defined as People Turning Age 11 During the Period 1966 through 1977), Chinese Adults Age 20 to 69 in 1996 (N = 6,086). | 160 |
| 7.4. | Coefficients for Models 4, 5, and 7 Predicting Knowledge of Chinese Characters by Year of Birth, Controlling for Years of Schooling (p Values in Parentheses). | 161 |
| 7.5. | Coefficients of Models of Tolerance of Atheists, U.S. Adults, $2000 \text{ to } 2004 \text{ (N} = 4,299).$ | 165 |
| 7.6. | Design Matrices for Alternative Ways of Coding Categorical Variables (See Text for Details). | 168 |
| 7.7. | Coefficients for a Model of the Determinants of Vocabulary Knowledge, U.S. Adults, 1994 (N = 1,757; R^2 = .2445; Wald Test That Categorical Variables All Equal Zero: $F_{(3,1752)}$ = 12.48; $p < .0000$). | 169 |
| 7.8. | Means, Standard Deviations, and Correlations for Variables Included in a Model of Educational Attainment for U.S. Adults, 1990 to 2004, by Race (Blacks Above the Diagonal, Non-Blacks Below). | 176 |
| 7.9. | Coefficients of a Model of Educational Attainment, for Blacks and Non-Blacks, U.S. Adults, 1990 to 2004. | 177 |
| 7.10. | Decomposition of the Difference in the Mean Years of School Completed by Non-Blacks and Blacks, U.S. Adults, 1990 to 2004. | 178 |
| 8.1. | Descriptive Statistics for the Variables Used in the Analysis, Russian Adults Age Twenty-Two to Sixty-Nine in 1993 ($N = 4,685$). | 189 |
| 8.2. | Comparison of Coefficients for a Model of Educational Attainment Estimated from a Casewise-Deleted Data Set [C] $(N = 2,661)$ and from a Multiply Imputed Data Set [M] $(N = 4,685)$, Russian Adults Age Twenty-Two to Sixty-Nine in 1993. | 192 |
| 9.1. | Portion of a Table of Random Numbers. | 196 |
| 9.2. | The Population Size, Cumulative Population Size, and Percentage of the Total Population Residing in Each of the Ten Largest Cities in California, 1990. | 201 |
| 9.3. | Design Effects for Selected Statistics, Samples of 3,000 with Clustering (50 Counties as Primary Sampling Units, 2 Villages or | |

XIV Tables, Figures, Exhibits, and Boxes

| | Neighborhoods per County, and 30 Adults Age 20 to 69 per Village or Neighborhood), With and Without Stratification, by Level of Education. | 210 |
|-------|---|-----|
| 9.4. | Determinants of the Number of Chinese Characters Correctly Identified on a 10-Item Test, Employed Chinese Adults Age 20–69, $1996 (N = 4,802)$. | 216 |
| 9.5. | Coefficients for Models of the Determinants of Income, U.S. Adult Women, 1994, Under Various Design Assumptions ($N = 1,015$). | 221 |
| 9.6. | Coefficients of a Model of Educational Attainment, U.S. Adults, 1990 to 2004 ($N = 15,932$). | 223 |
| 10.1. | Coefficients for Models of the Determinants of the Strength of the Occupation-Education Connection in Eighteen Nations. | 236 |
| 11.1. | Values of Cronbach's Alpha for Multiple-Item Scales with Various Combinations of the Number of Items and the Average Correlation Among Items. | 246 |
| 11.2. | Factor Loadings for Abortion Acceptance Items Before Rotation. | 253 |
| 11.3. | Abortion Factor Loadings After Varimax Rotation. | 254 |
| 11.4. | Means, Standard Deviations, and Correlations Among Variables Included in Models of the Acceptance of Legal Abortion, U.S. Adults, $1984 (N = 1,459)$. | 256 |
| 11.5. | Coefficients of Two Models Predicting Acceptance of Abortion, U.S. Adults, 1984. | 256 |
| 11.6. | Mean Score on the ISEI by Level of Education, Chinese Males Age Twenty to Sixty-Nine, 1996. | 259 |
| 11.7. | Coefficients of a Model of the Determinants of Political Conservatism Estimated by Conventional OLS and Errors-in-Variables Regression, U.S. Adults, 1984 ($N = 1,294$). | 260 |
| 12.1. | Frequency Distribution of Program by Sex in a Graduate Course. | 265 |
| 12.2. | Frequency Distribution of Level of Stratification by Level of Political Integration and Level of Technology, in Ninety-Two Societies. | 268 |
| 12.3. | Models of the Relationship Between Technology, Political Integration, and Level of Stratification in Ninety-Two Societies. | 269 |
| 12.4. | Percentage Distribution of Expected Level of Stratification by Level of Political Integration and Level of Technology, in Ninety-Two Societies (Expected Frequencies from | |
| 12.5. | Model 7 Are Percentaged). Frequency Distribution of Whether "A Communist Should Be Allowed to Speak in Your Community" by Schooling, Region, and | 272 |
| | Age, U.S. Adults, $1977 (N = 1,478)$. | 273 |

| Goodness-of-Fit Statistics for Log-Linear Models of the Associations Among Whether a Communist Should Be Allowed to Speak in Your Community, Age, Region, and Education, U.S. Adults, 1977. | 275 |
|---|---|
| Expected Percentage (from Model 8) Agreeing That "A Communist Should Be Allowed to Speak in Your Community" by Education, Age, and Region, U.S. Adults, 1977. | 276 |
| Frequency Distribution of Voting by Race, Education, and Voluntary Association Membership. | 278 |
| Frequency Distribution of Occupation by Father's Occupation, Chinese Adults, 1996. | 280 |
| Interaction Parameters for the Saturated Model Applied to Table 12.9. | 282 |
| Goodness-of-Fit Statistics for Alternative Models of Intergenerational Occupational Mobility in China (Six-by-Six Table). | 284 |
| Frequency Distribution of Educational Attainment by Size of Place of Residence at Age Fourteen, Chinese Adults Not Enrolled in School, 1996. | 289 |
| Percentage Ever Threatened by a Gun, by Selected Variables, U.S. Adults, 1973 to 1994 ($N = 19,260$). | 306 |
| Goodness-of-Fit Statistics for Various Models Predicting the Prevalence of Armed Threat to U.S. Adults, 1973 to 1994. | 308 |
| Effect Parameters for Models 2 and 4 of Table 13.2. | 310 |
| Goodness-of-Fit Statistics for Various Models of the Process of Educational Transition in Japan (Preferred Model Shown in Boldface). | 315 |
| Effect Parameters for Model 3 of Table 13.4. | 316 |
| Odds Ratios for a Model Predicting the Likelihood of Marriage from Age at Risk, Sex, Race, and Mother's Education, with Interactions Between Age at Risk and the Other Variables. | 323 |
| Coefficients for a Model of Determinants of <i>Nomenklatura</i> Membership, Russia, 1988. | 328 |
| Effect Parameters for a Probit Analysis of Gun Threat (Corresponding to Models 2 and 4 of Table 13.3). | 331 |
| Effect Parameters for a Model of the Determinants of English and Russian Language Competence in the Czech Republic, 1993 (N = 3.945) (Standard Errors in Parentheses: p Values in Italic) | 339 |
| Effect Parameters for an Ordered Logit Model of Political Party | 345 |
| Predicted Probability Distributions of Party Identification for Black and non-Black Males Living in Large Central Cities of Non-Southern | 349 |
| | Among Whether a Communist Should Be Allowed to Speak in Your Community, Age, Region, and Education, U.S. Adults, 1977. Expected Percentage (from Model 8) Agreeing That "A Communist Should Be Allowed to Speak in Your Community" by Education, Age, and Region, U.S. Adults, 1977. Frequency Distribution of Voting by Race, Education, and Voluntary Association Membership. Frequency Distribution of Occupation by Father's Occupation, Chinese Adults, 1996. Interaction Parameters for the Saturated Model Applied to Table 12.9. Goodness-of-Fit Statistics for Alternative Models of Intergenerational Occupational Mobility in China (Six-by-Six Table). Frequency Distribution of Educational Attainment by Size of Place of Residence at Age Fourteen, Chinese Adults Not Enrolled in School, 1996. Percentage Ever Threatened by a Gun, by Selected Variables, U.S. Adults, 1973 to 1994 (N = 19,260). Goodness-of-Fit Statistics for Various Models Predicting the Prevalence of Armed Threat to U.S. Adults, 1973 to 1994. Effect Parameters for Models 2 and 4 of Table 13.2. Goodness-of-Fit Statistics for Various Models of the Process of Educational Transition in Japan (Preferred Model Shown in Boldface). Effect Parameters for Model 3 of Table 13.4. Odds Ratios for a Model Predicting the Likelihood of Marriage from Age at Risk, Sex, Race, and Mother's Education, with Interactions Between Age at Risk and the Other Variables. Coefficients for a Model of Determinants of Nomenklatura Membership, Russia, 1988. Effect Parameters for a Probit Analysis of Gun Threat (Corresponding to Models 2 and 4 of Table 13.3). Effect Parameters for a Model of the Determinants of English and Russian Language Competence in the Czech Republic, 1993 (N = 3,945). (Standard Errors in Parentheses; p Values in Italic.) Effect Parameters for an Ordered Logit Model of Political Party Identification, U.S. Adults, 1998 (N = 2,443). Predicted Probability Distributions of Party Identification for Black |

XVI Tables, Figures, Exhibits, and Boxes

| 14.4. | Effect Parameters for a Generalized Ordered Logit Model of Political Party Identification, U.S. Adults, 1998. | 350 |
|-------|--|-----|
| 14.5. | Effect Parameters for an Ordinary Least-Squares Regression Model of Political Party Identification, U.S. Adults, 1998. | 354 |
| 14.6. | Codes for Frequency of Sex in the Past Year, U.S. Adults, 2000. | 356 |
| 14.7. | Alternative Estimates of a Model of Frequency of Sex, U.S. Adults, $2000 (N = 2,258)$. (Standard Errors in Parentheses; All Coefficients Are Significant at .001 or Beyond.) | 357 |
| 15.1. | Socioeconomic Characteristics of Chinese Adults by Size of Place of Residence, 1996. | 373 |
| 15.2. | Comparison of OLS and FE Estimates for a Model of the Determinants of Family Income, Chinese RMB, 1996 ($N = 5,342$). | 374 |
| 15.3. | Comparison of OLS and FE Estimates for a Model of the Effect of Migration and Remittances on South African Black Children's School Enrollment, 2002 to 2003. (N(FE) = 2,408 Children; N(full RE) = 12,043 Children.) | 379 |
| FIGU | RES | |
| 2.1. | The Observed Association Between X and Y Is Entirely Spurious and Goes to Zero When Z Is Controlled. | 23 |
| 2.2. | The Observed Association Between X and Y Is Partly Spurious: the Effect of X on Y Is Reduced When Z Is Controlled (Z Affects X and Both Z and X Affect Y). | 23 |
| 2.3. | The Observed Association Between X and Y Is Entirely Explained by the Intervening Variable Z and Goes to Zero When Z Is Controlled. | 24 |
| 2.4. | The Observed Association Between X and Y Is Partly Explained by the Intervening Variable Z: the Effect of X on Y Is Reduced When Z Is Controlled (X Affects Z, and Both X and Z Affect Y). | 24 |
| 2.5. | Both X and Z Affect Y, but There Is no Assumption Regarding the Causal Ordering of X and Z. | 25 |
| 2.6. | The Size of the Zero-Order Association Between X and Y (and Between Z and Y) Is Suppressed When the Effects of X on Z and Y have Opposite Sign, and the Effects of X and Z on Y have Opposite Sign. | 26 |
| 4.1. | An IBM punch card. | 71 |
| 5.1. | Scatter Plot of Years of Schooling by Father's Years of Schooling (Hypothetical Data, $N = 10$). | 88 |
| 5.2. | Least-Squares Regression Line of the Relation Between Years of Schooling and Father's Years of Schooling | 89 |

| 5.3. | Least-squares Regression Line of the Relation Between Years of Schooling and Father's Years of Schooling, Showing How the "Error of Prediction" or "Residual" Is Defined. | 90 |
|------|---|-----|
| 5.4. | Least-Squares Regression Lines for Three Configurations of Data: (a) Perfect Independence, (b) Perfect Correlation, and (c) Perfect Curvilinear Correlation—a Parabola Symmetrical to the X-Axis. | 92 |
| 5.5. | The Effect of a Single Deviant Case (High Leverage Point). | 95 |
| 5.6. | Truncating Distributions Reduces Correlations. | 97 |
| 5.7. | The Effect of Aggregation on Correlations. | 99 |
| 6.1. | Three-Dimensional Representation of the Relationship Between Number of Siblings, Father's Years of Schooling, and Respondent's Years of Schooling (Hypothetical Data; N = 10). | 105 |
| 6.2. | Expected Number of Chinese Characters Identified (Out of Ten) by Years of Schooling and Gender, Urban Origin Chinese Adults Age 20 to 69 in 1996 with Nonmanual Occupations and with Years of Father's Schooling and Level of Cultural Capital Set at Their Means (N = 4,802). (Note: the female line does not extend beyond 16 because there are no females in the sample with post-graduate education.) | 120 |
| 6.3. | Acceptance of Abortion by Education and Religious Denomination, U.S. Adults, $1974 (N = 1.481)$. | 131 |
| 7.1. | The Relationship Between 2003 Income and Age, U.S. Adults Age Twenty to Sixty-Four in 2004 ($N = 1,573$). | 141 |
| 7.2. | Expected ln(Income) by Years Of School Completed, U.S. Males and Females, 2004, with Hours Worked per Week Fixed at the Mean for Both Sexes Combined $(42.7; N = 1,459)$. | 144 |
| 7.3. | Expected Income by Years of School Completed, U.S. Males and Females, 2004, with Hours Worked per Week Fixed at the Mean for | |
| 7.4 | Both Sexes Combined (42.7). | 145 |
| 7.4. | Trend in Attitudes Regarding Gender Equality, U.S. Adults Surveyed in 1974 Through 1998 (Linear Trend and Annual Means; N = 21,464). | 151 |
| 7.5. | Years of School Completed by Year of Birth, U.S. Adults (Pooled Samples from the 1972 Through 2004 GSS; N = 39,324; Scatter Plot Shown for 5 Percent Sample). | 154 |
| 7.6. | Mean Years of Schooling by Year of Birth, U.S. adults (Same Data as for Figure 7.5). | 155 |
| 7.7. | Three-Year Moving Average of Years of Schooling by Year of Birth, U.S. Adults (Same Data as for Figure 7.5). | 155 |
| 7.8. | Trend in Years of School Completed by Year of Birth, U.S. Adults (Same Data as for Figure 7.5). Predicted Values from a Linear | |
| | Spline with a Knot at 1947. | 158 |

XVIII Tables, Figures, Exhibits, and Boxes

| 7.9. | Graphs of Three Models of the Effect of the Cultural Revolution on Vocabulary Knowledge, Holding Constant Education (at Twelve Years), Chinese Adults, 1996 (N = 6,086). | 163 |
|--------|--|-----|
| 7.10. | Figure 7.9 Rescaled to Show the Entire Range of the Y-Axis. | 163 |
| 10.1. | Four Scatter Plots with Identical Lines. | 226 |
| 10.2. | Scatter Plot of the Relationship Between X and Y and Also the Regression Line from a Model That Incorrectly Assumes a Linear Relationship Between X and Y (Hypothetical Data). | 227 |
| 10.3. | Years of School Completed by Number of Siblings, U.S. Adults, $1994 (N = 2,992)$. | 228 |
| 10.4. | Years of School Completed by Number of Siblings, U.S. Adults, 1994. | 228 |
| 10.5. | A Plot of Leverage Versus Squared Normalized Residuals for Equation 7 in Treiman and Yip (1989). | 232 |
| 10.6. | A Plot of Leverage Versus Studentized Residuals for Treiman and Yip's Equation 7, with Circles Proportional to the Size of Cook's D. | 233 |
| 10.7. | Added-Variable Plots for Treiman and Yip's Equation 7. | 233 |
| 10.8. | Residual-Versus-Fitted Plot for Treiman and Yip's Equation 7. | 234 |
| 10.9. | Augmented Component-Plus-Residual Plots for Treiman and Yip's Equation 7. | 235 |
| 10.10. | Objective Functions for Three M Estimators: (a) OLS Objective Function, (b) Huber Objective Function, and (c) Bi-Square Objective Function. | 238 |
| 10.11. | Sampling Distributions of Bootstrapped Coefficients (2,000 Repetitions) for the Expanded Model, Estimated by Robust Regression on Seventeen Countries. | 240 |
| 11.1. | Loadings of the Seven Abortion-Acceptance Items on the First Two Factors, Unrotated and Rotated 30 Degrees Counterclockwise. | 255 |
| 13.1. | Expected Probability of Marrying for the First Time by Age at Risk, U.S. Adults, 1994 ($N = 1,556$). | 320 |
| 13.2. | Expected Probability of Marrying for the First Time by Age at Risk (Range: Fifteen to Thirty-Six), Discrete-Time Model, U.S. Adults, 1994. | 322 |
| 13.3. | Expected Probability of Marrying for the First Time by Age at Risk (Range: Fifteen to Thirty-Six), Polynomial Model, U.S. Adults, 1994. | 322 |
| 13.4. | Expected Probability of Marrying for the First Time by Age at Risk, Sex, and Mother's Education (Twelve and Sixteen Years of Schooling), Non-Black U.S. Adults, 1994. | 326 |
| 13.5. | Expected Probability of Marrying for the First Time by Age at Risk, Sex, and Mother's Education (Twelve and Sixteen Years of Schooling), Black U.S. Adults, 1994. | 326 |

| 13.B.1. | Probabilities Associated with Values of Probit and Logit Coefficients. | 334 |
|---------|--|-----|
| 14.1. | Three Estimates of the Expected Frequency of Sex per Year, | 337 |
| | U.S. Married Women, 2000 (N = 552). | 358 |
| 14.2. | Expected Frequency of Sex Per Year by Gender and Marital Status, | |
| | U.S. Adults, $2000 (N = 2,258)$. | 359 |
| 16.1. | 1980 Male Disability by Quarter of Birth (Prevented from Work by a Physical Disability). | 386 |
| 16.2. | Blau and Duncan's Basic Model of the Process of Stratification. | 394 |
| EXHIE | BITS | |
| 4.1. | Illistration of How Data Files Are Organized. | 67 |
| 4.2. | A Codebook Corresponding to Exhibit 4.1. | 68 |
| BOXE | S | |
| | Open-Ended Questions | 3 |
| | Samuel A. Stouffer | 6 |
| | Technical Points on Table 1.1 | 9 |
| | Technical Points on Table 1.2 | 10 |
| | Technical Points on Table 1.3 | 14 |
| | Technical Points on Table 1.4 | 15 |
| | Technical Points on Table 1.5 | 16 |
| | Technical Points on Table 1.6 | 18 |
| | Paul Lazarsfeld | 22 |
| | Hans Zeisel | 27 |
| | Stata -do- Files and -log- Files | 30 |
| | Direct Standardization In Earlier Survey Research | 31 |
| | The Weakness of Matching and a Useful Fix | 44 |
| | Technical Points on Table 3.3 | 53 |
| | Substantive Points On Table 3.3 | 54 |
| | A Historical Note on Social Science Computer Packages | 66 |
| | Herman Hollerith | 70 |
| | The Way Things Were | 72 |
| | Treating Missing Values as If They Were Not | 75 |

XX

| People Generally Like to Respond to (Well-Designed and Well-Administered) Surveys | 77 |
|---|------|
| Why Use the "Least Squares" Criterion to Determine | |
| the Best-Fitting Line? | 91 |
| Karl Pearson | 93 |
| A Useful Computational Formula for r | 93 |
| A "Real Data" Example of the Effect of Truncating the Distribution | 97 |
| A Useful Computational Formula for η^2 | 101 |
| Multicollinearity | 108 |
| Reminder Regarding the Variance of Dichotomous Variables | 110 |
| A Formula for Computing R ² from Correlations | 111 |
| Adjusted R ² | 111 |
| Always Present Descriptive Statistics | 114 |
| Technical Point on Table 6.2 | 117 |
| Why You Should Include the Entire Sample in Your Analysis | 122 |
| Getting p-values via Stata | 125 |
| Using Stata to Compare the Goodness-of-fit of Regression Models | 125 |
| R. A. (Ronald Aylmer) Fisher | 126 |
| How to Test the Significance of the Difference | |
| Between Two Coefficients | 129 |
| Alternative Ways to Estimate BIC | 134 |
| Why the Relationship Between Income and Age Is Curvilinear | 140 |
| A Trick to Reduce Collinearity | 145 |
| In Some Years of the GSS, Only a Subset of Respondents | |
| Was Asked Certain Questions | 150 |
| An Alternative Specification of Spline Functions | 156 |
| Why Black versus Non-black Is Better Than White versus | 1776 |
| Non-white for Social Analysis in the United States | 175 |
| A Comment on Credit in Science | 175 |
| Why Pairwise Deletion Should Be Avoided | 183 |
| Technical Details on the Variables | 188 |
| Telephone Surveys | 198 |
| Mail Surveys | 199 |
| Web Surveys | 200 |
| Philip M. Hauser | 202 |
| A Superior Sampling Procedure | 204 |

| Tables Figures | English the table | | | VVI |
|------------------|-------------------|-------|------|-----|
| Tables, Figures, | EXPIDITS. | and B | oxes | AAI |
| | | | | |

| Sources of Nonresponse | 207 |
|---|-----|
| Leslie Kish | 208 |
| How the Chinese Stratified Sample Used in the Design | |
| Experiments was Constructed | 212 |
| Weighting Data in Stata | 213 |
| Limitations of the Stata 10.0 Survey Estimation Procedure | 215 |
| An Alternative to Survey Estimation | 219 |
| How to Downweight Sample Size in Stata | 219 |
| Ways to Assess Reliability | 244 |
| Why the SAT and GRE Tests Include Several Hundred Items | 245 |
| Transforming Variables so That "High" has a Consistent Meaning | 248 |
| Constructing Scales from Incomplete Information | 249 |
| In Log-Linear Analysis "Interaction" Simply Means "Association" | 264 |
| L ² Defined | 267 |
| Other Software for Estimating Log-Linear Models | 294 |
| Maximum Likelihood Estimation | 302 |
| Probit Analysis | 302 |
| Technical Point on Table 13.1 | 305 |
| Limitations of Wald Tests | 309 |
| Smoothing Distributions | 325 |
| Estimating Generalized Order Logit Models With Stata | 349 |
| James Tobin | 354 |
| Panel Surveys in the Public Domain | 369 |
| Otis Dudley Duncan | 395 |
| Sewell Wright | 396 |
| Ask a Foreigner To Do It | 397 |
| George Peter Murdock | 398 |
| In the United States, Publicly Funded Studies Must be Made | |
| Available to the Research Community | 401 |
| An "Available from Author" Archive | 404 |