

J. Scott Long, 1997. *Regression Models for Categorical and Limited Dependent Variables. Advanced Quantitative Techniques in the Social Sciences Number 7.* Sage Publications: Thousand Oaks, CA.

List of Figures	xi
List of Tables	xv
Series Editor's Introduction	xix
Preface	xxiii
Acknowledgments	xxv
Abbreviations and Notation	xxvii1
1. Introduction	1
1.1. Linear and Nonlinear Models	3
1.2. Organization	6
1.3. Orientation	9
1.4. Bibliographic Notes	10
2. Continuous Outcomes: The Linear Regression Model	11
2.1. The Linear Regression Model	11
2.2. Interpreting Regression Coefficients	14
2.3. Estimation by Ordinary Least Squares	18
2.4. Nonlinear Linear Regression Models	20
2.5. Violations of the Assumptions	22
2.6. Maximum Likelihood Estimation	25
2.7. Conclusions	33
2.8. Bibliographic Notes	33
3. Binary Outcomes: The Linear Probability, Probit, and Logit Models	34
3.1. The Linear Probability Model	35
3.2. A Latent Variable Model for Binary Variables	40
3.3. Identification	47
3.4. A Nonlinear Probability Model	50
3.5. ML Estimation	52
3.6. Numerical Methods for ML Estimation	54
3.7. Interpretation	61
3.8. Interpretation Using Odds Ratios	79
3.9. Conclusions	83
3.10. Bibliographic Notes	83
4. Hypothesis Testing and Goodness of Fit	85
4.1. Hypothesis Testing	85
4.2. Residuals and Influence	98
4.3. Scalar Measures of Fit	102
4.4. Conclusions	112
4.5. Bibliographic Notes	113

5. Ordinal Outcomes: Ordered Logit and Ordered Probit Analysis	114
5.1. A Latent Variable Model for Ordinal Variables	116
5.2. Identification	122
5.3. Estimation	123
5.4. Interpretation	127
5.5. The Parallel Regression Assumption	140
5.6. Related Models for Ordinal Data	145
5.7. Conclusions	146
5.8. Bibliographic Notes	147
6. Nominal Outcomes: Multinomial Logit and Related Models	148
6.1. Introduction to the Multinomial Logit Model	149
6.2. The Multinomial Logit Model	151
6.3. ML Estimation	156
6.4. Computing and Testing Other Contrasts	158
6.5. Two Useful Tests	160
6.6. Interpretation	164
6.7. The Conditional Logit Model	178
6.8. Independence of Irrelevant Alternatives	182
6.9. Related Models	184
6.10. Conclusions	185
6.11. Bibliographic Notes	186
7. Limited Outcomes: The Tobit Model	187
7.1. The Problem of Censoring	188
7.2. Truncated and Censored Distributions	192
7.3. The Tobit Model for Censored Outcomes	196
7.4. Estimation	204
7.5. Interpretation	206
7.6. Extensions	211
7.7. Conclusions	216
7.8. Bibliographic Notes	216
8. Count Outcomes: Regression Models for Counts	217
8.1. The Poisson Distribution	218
8.2. The Poisson Regression Model	221
8.3. The Negative Binomial Regression Model	230
8.4. Models for Truncated Counts	239
8.5. Zero Modified Count Models	242
8.6. Comparisons Among Count Models	247
8.7. Conclusions	249
8.8. Bibliographic Notes	249
9. Conclusions	251
9.1. Links Using Latent Variable Models	252
9.2. The Generalized Linear Model	257

9.3. Similarities Among Probability Models	258
9.4. Event History Analysis	258
9.5. Log-Linear Models	259
A. Answers to Exercises	264
References	274
Author Index	283
Subject Index	287
About the Author	297