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Nota di contenuto	Introduction -- Part I Continuous, Count, and Dichotomous Outcomes -- 2. Standard GEE Modeling of Correlated Univariate Outcomes -- 3. Partially Modified GEE Modeling of Correlated Univariate Outcomes -- 4. Fully Modified GEE Modeling of Correlated Univariate Outcomes -- 5. Extended Linear Mixed Modeling of Correlated Univariate Outcomes -- 6. Example Analyses of the Dental Measurement Data -- 7. Example Analyses of the Epilepsy Seizure Rate Data -- 8. Example Analyses of the Dichotomous Respiratory Status Data -- 9. Example Analyses of the Blood Lead Level Data -- Part II Polytomous Outcomes -- 10. Multinomial Regression -- 11. Ordinal Regression -- 12. Discrete Regression -- 13. Example Multinomial and Ordinal Regression Analyses -- 14. Example Discrete Regression Analyses -- Part III Adaptive Analysis Strategies -- 15. Alternative Analyses -- 16. Additional Example Analyses.
Sommario/riassunto	This book formulates methods for modeling continuous and categorical correlated outcomes extending the commonly used methods: generalized estimating equations (GEE) and linear mixed modeling. Partially modified GEE adds estimating equations for

variance/dispersion parameters to the standard GEE estimating equations for the mean parameters. Fully modified GEE uses alternate estimating equations for the mean parameters. The new estimating equations in these two cases are generated by maximizing a "likelihood" function related to the multivariate normal density function. Partially modified GEE and fully modified GEE use the standard GEE approach to estimate correlation parameters based on the residuals. Extended linear mixed modeling (ELMM) uses the likelihood function to estimate not only mean and variance/dispersion parameters, but also correlation parameters. Formulations are provided for gradient vectors and Hessian matrices, for a multi-step algorithm for solving estimating equations, and model-based and robust empirical tests for assessing theory-based models. Directly specified correlation structures are considered as well as covariance structures based on random effect/coefficients. Standard GEE, partially modified GEE, fully modified GEE, and ELMM are demonstrated and compared using a variety of regression analyses of different types of correlated outcomes. Example analyses of correlated outcomes include linear regression for continuous outcomes, Poisson regression for count/rate outcomes, logistic regression for dichotomous outcomes, exponential regression for positive-valued continuous outcome, multinomial regression for general polytomous outcomes, ordinal regression for ordinal polytomous outcomes, and discrete regression for discrete numeric outcomes. These analyses also address nonlinearity in predictors based on adaptive search through alternative fractional polynomial models controlled by likelihood cross-validation (LCV) scores. Larger LCV scores indicate better models but not necessarily distinctly better models. LCV ratio tests are used to identify distinctly better models. A SAS® macro has been developed for analyzing correlated outcomes using standard GEE, partially modified GEE, fully modified GEE, and ELMM within alternative regression contexts. This macro and code for conducting the analyses addressed in the book are available as supplementary materials upon request from the author. Detailed descriptions of how to use this macro and interpret its output are provided in the book.