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# Applied Longitudinal Data Analysis: Modeling Change And Event Occurrence



## Synopsis

Change is constant in everyday life. Infants crawl and then walk, children learn to read and write, teenagers mature in myriad ways, the elderly become frail and forgetful. Beyond these natural processes and events, external forces and interventions instigate and disrupt change: test scores may rise after a coaching course, drug abusers may remain abstinent after residential treatment. By charting changes over time and investigating whether and when events occur, researchers reveal the temporal rhythms of our lives. *Applied Longitudinal Data Analysis* is a much-needed professional book for empirical researchers and graduate students in the behavioral, social, and biomedical sciences. It offers the first accessible in-depth presentation of two of today's most popular statistical methods: multilevel models for individual change and hazard/survival models for event occurrence (in both discrete- and continuous-time). Using clear, concise prose and real data sets from published studies, the authors take you step by step through complete analyses, from simple exploratory displays that reveal underlying patterns through sophisticated specifications of complex statistical models. *Applied Longitudinal Data Analysis* offers readers a private consultation session with internationally recognized experts and represents a unique contribution to the literature on quantitative empirical methods. Visit <http://www.ats.ucla.edu/stat/examples/alda.htm> for: • Downloadable data sets • Library of computer programs in SAS, SPSS, Stata, HLM, MLwiN, and more • Additional material for data analysis

## Book Information

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## Customer Reviews

"The book begins with an excellent introduction to the types of questions that might be answered by a longitudinal study...After a chapter with sensible suggestions for exploratory analysis... --Statistics in Medicine Review" It will come as no surprise to those familiar with Judith Singer and John Willett's didactic journal articles to learn that they have written a terrific textbook on longitudinal data analysis." --Social Methods and Research "Anyone teaching courses on the analysis of repeated measures data or on the analysis of survival data in the social sciences will find this book extremely helpful. It is thorough, well written and the associated web site ([www.oup-usa.org/alda](http://www.oup-usa.org/alda)) provides useful back-up material in the form of datasets used in the book..." --Centre for Multilevel Modelling "This book...will certainly have a substantial impact on the analyses of longitudinal data carried out in many fields." --International Epidemiological Association "Longitudinal data are often essential for understanding the dynamics of social and other systems. Recent methodological developments in multilevel and event history data modeling have made it possible to handle such data efficiently and informatively. This book provides a valuable exploration of the application of this methodology, within a likelihood framework, to real data using careful and clear descriptions of procedures. Particularly important is the attention given by the authors to the assumptions built into their statistical models. This book will provide a useful resource for the applied researcher who wishes to gain insight into the analysis of longitudinal data and to be guided through the various stages of an analysis." --Harvey Goldstein, Professor of Statistical Methods, University of London, Institute of Education "This book will be of great use to many behavioral and social researchers who use quantitative methods to analyze longitudinal data. Its defining contribution is that it teaches researchers to analyze data wisely. Through many examples, it helps people look at their data using a variety of graphical and tabular techniques. It encourages people to formulate sensible models in light of their research questions. It teaches people to view such models as tentative representations, subject to criticism and revision based on data. It wages a much-needed struggle against overly formulaic thinking that is all too common in the every day practice of statistical analysis in social science." --Stephen W. Raudenbush, Professor of Education and Statistics, Senior Research Scientist, Survey Research Center, School of Education, University of Michigan "This is a clearly written book on longitudinal analysis, multilevel models, and survival analysis by two outstanding classroom teachers. Building systematically from elementary ideas to advanced data analysis, it will be a great resource for students and investigators in the social and biomedical sciences." --James H. Ware, Frederick Mosteller Professor of Biostatistics, Harvard School of Public Health "...provides readers with a solid, thorough, and accurate understanding of concepts and procedures. [S]ubstantive researchers may have been introduced to multilevel models or methods

for categorical data analysis but they have difficulty seeing how these methods can be applied to longitudinal data. The authors make this connection, and also comprehensively introduce the methods to those completely unfamiliar with either multilevel models or survival analysis."--Journal of the American Statistical Association, March 2005, vol. 100, No. 469, 352-353

John B. Willett is at Harvard University.

Others have already said that this book is superb and I completely agree. If you have had a class that covers applied statistics (basic correlation and regression) you should be able to pick this up and read it with no trouble. There is math here but it is *well* explained and the algebra is always presented with a worked example. The code at UCLA (sorry they will not let me post the link here) makes the incredibly good writing even more valuable because, not only will you understand the concepts behind Mixed Effects/Hierarchical Linear Models, you will be able to implement the ideas. If you already have some experience with Mixed Effects/HLM browse the code and you will quickly see this book covers a wide scope. I have worked with the SAS code a lot and even though the book is a bit old (by a programmer's standards) the code still works just fine. While the book is written to be clear for non-mathematicians, there are many "intermediate to advanced" statistical topics covered here. These are important areas which are typically unintelligible to non-statisticians or are glossed over or ignored by other authors. Here are some noteworthy examples. This book could/should be used as a text on data exploration and visualization. There are many case-studies throughout the book and they all begin with great visualizations (with the all important code supplements showing the novice how to make the plots in the book). Topics like fitting lines, splines, curves are covered clearly and are shown beautifully. The discussion on choosing between sets of models using deviance ( $-2\log$  likelihood) and AIC has the best coverage of any book. The general discussion of likelihood estimation (maximum likelihood and restricted maximum likelihood) is superb. The coverage of data transformation for model fitting is explained well and is presented with wonderful plots. These "bonus" topics are interwoven into the great explanations of longitudinal data analysis. There is so much to like in this book and nothing to criticize (except perhaps the price). It makes the rest of the books in the field look bad.

This is a very nicely written book. A good balance between technical work (formulas) and conceptual narrative (conceptually explaining the theories behind the analysis). I would recommend this book for people who are interested in LDA.

A very approachable introduction to multilevel modeling and survival analysis. My only complaint is that the authors don't explicitly make the link between the hazard function to different choices of survival distribution (e.g. exponential, Weibull), which I would have appreciated.

So far the book has been informative and not too dry especially for a book on stats.

This is a great reference book for anyone doing longitudinal data analysis. The authors include some great real world example to illustrate the different analysis. Additionally, they provide some examples of the syntax for some of the more widely use statistical packages you are likely to use.

Excellent book. Highly recommend it.

This book is very complex, which may scare some people off. However, the information is incredible and very in-depth. I think the strength of this book lies in its concrete examples of different sets of longitudinal data. The authors slowly take you through each step and you eventually come to anticipate which step they are going to take next. The in-depth discussion of the multilevel model of longitudinal data is a necessity for anyone who wants to fully grasp the nature of their data. For anyone interested in conducting longitudinal data, this book is worthwhile.

Singer and Willett is an absolutely wonderful book on longitudinal data analysis. It is divided into two main sections -- one on longitudinal analysis per se, and another on time-to-event, or survival analysis, models. The former is especially good on the basic setup and interpretation of multi-level statistical models. This is a book for beginners in the sense that it emphasizes data analysis, rather than theory. But every statistician, and every user of statistics, can find something of value. When I was only halfway through reading this book, I recommended it to my friends. Several of them have purchased a copy and are glad they did. This is probably the most well-written statistics text I have ever read.

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