

# **SAS for Mixed Models, Second Edition**

## **Book Review**

Mar 7<sup>th</sup>, 2008

**Alina Rivilis**  
[alina.rivilis@cancercare.on.ca](mailto:alina.rivilis@cancercare.on.ca)

## **Authors:**

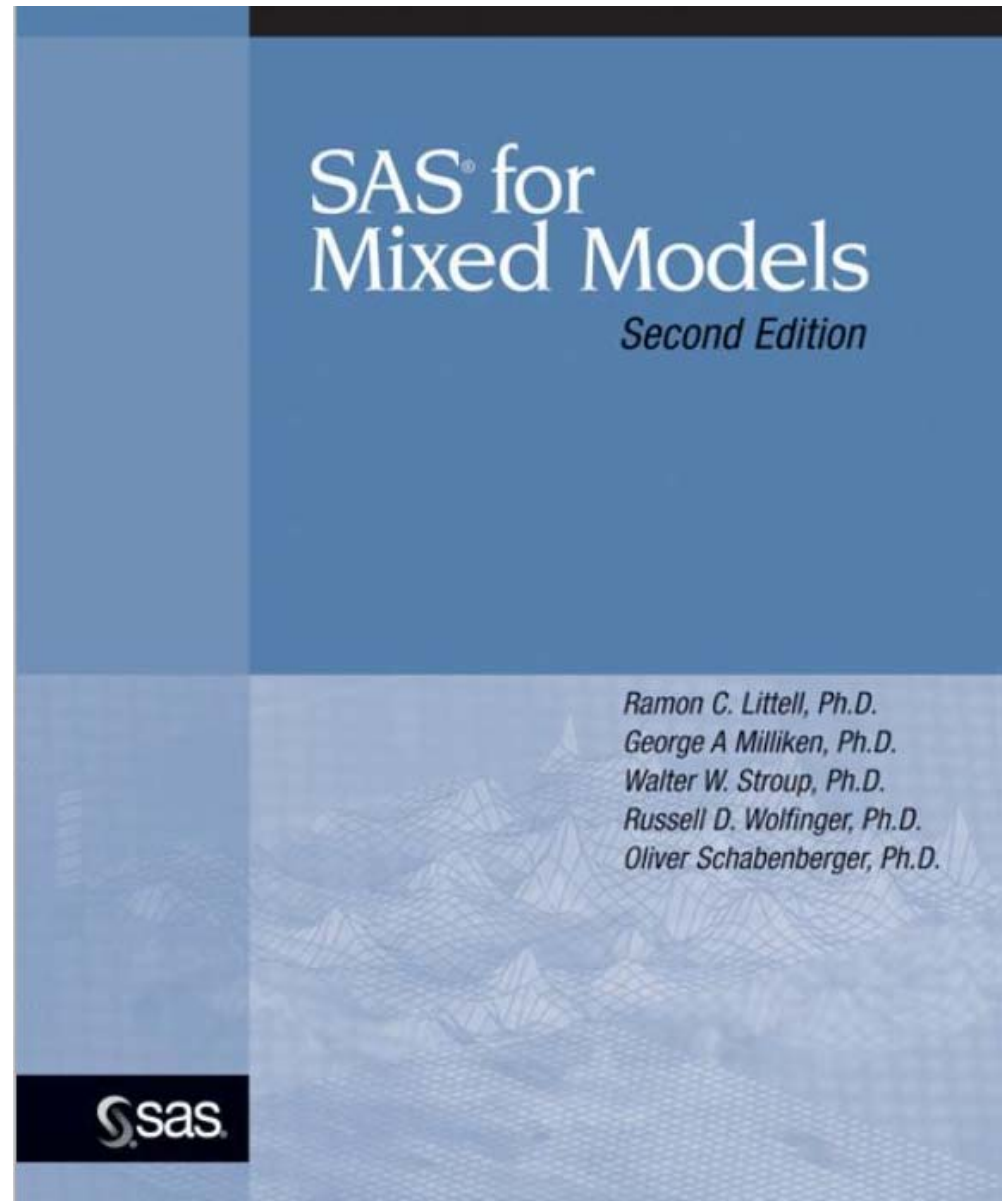
Ramon C. Littell

George A. Milliken

Walter W. Stroup

Russell D. Wolfinger

Oliver, Schabenberber



# About this book...

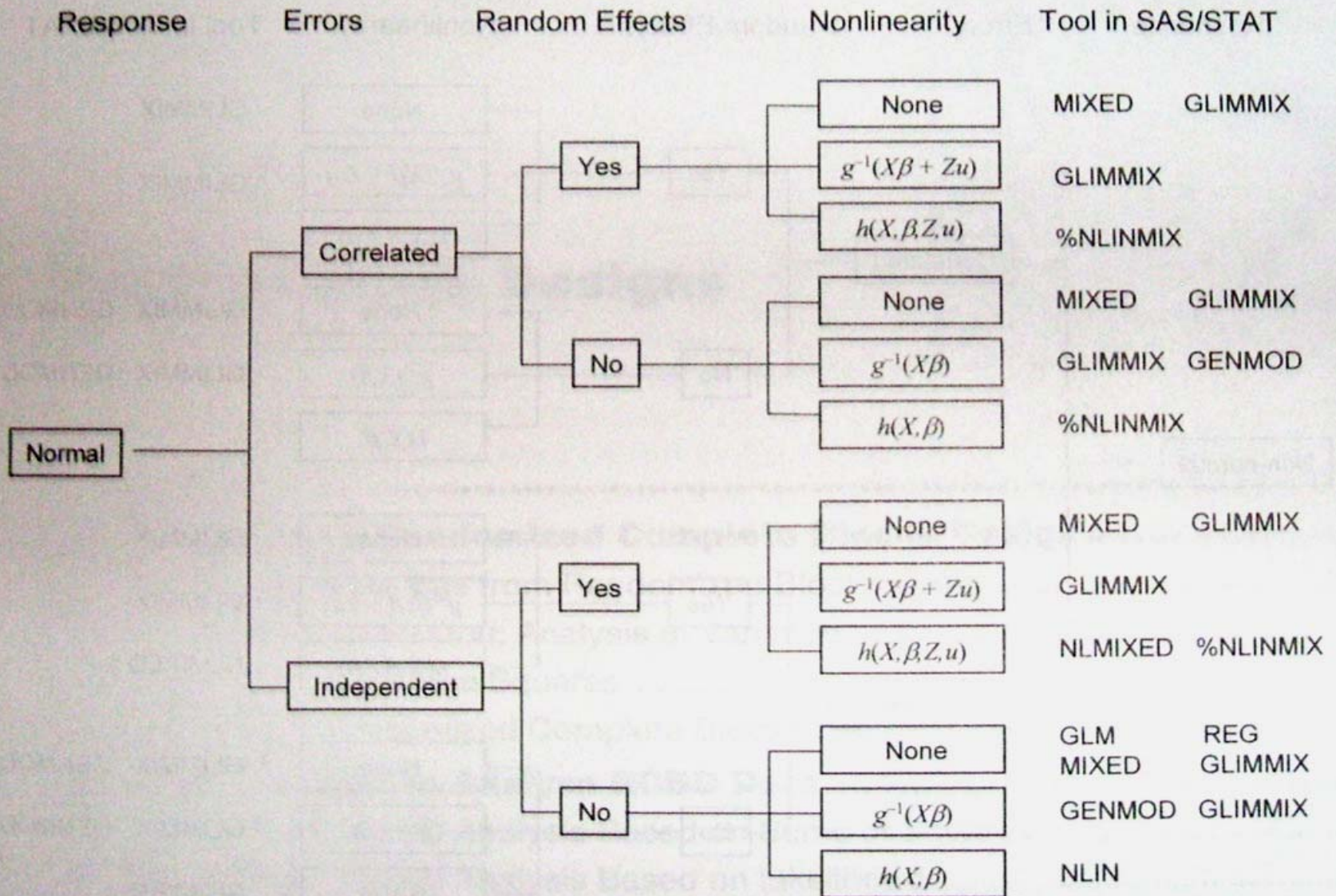
- it is a practical guide to using mixed models with SAS (for those who are strong technically, and aren't scared of SAS code and mathematical notation)
  - PROC MIXED
  - PROC NLMIXED
  - PROC GLIMMIX



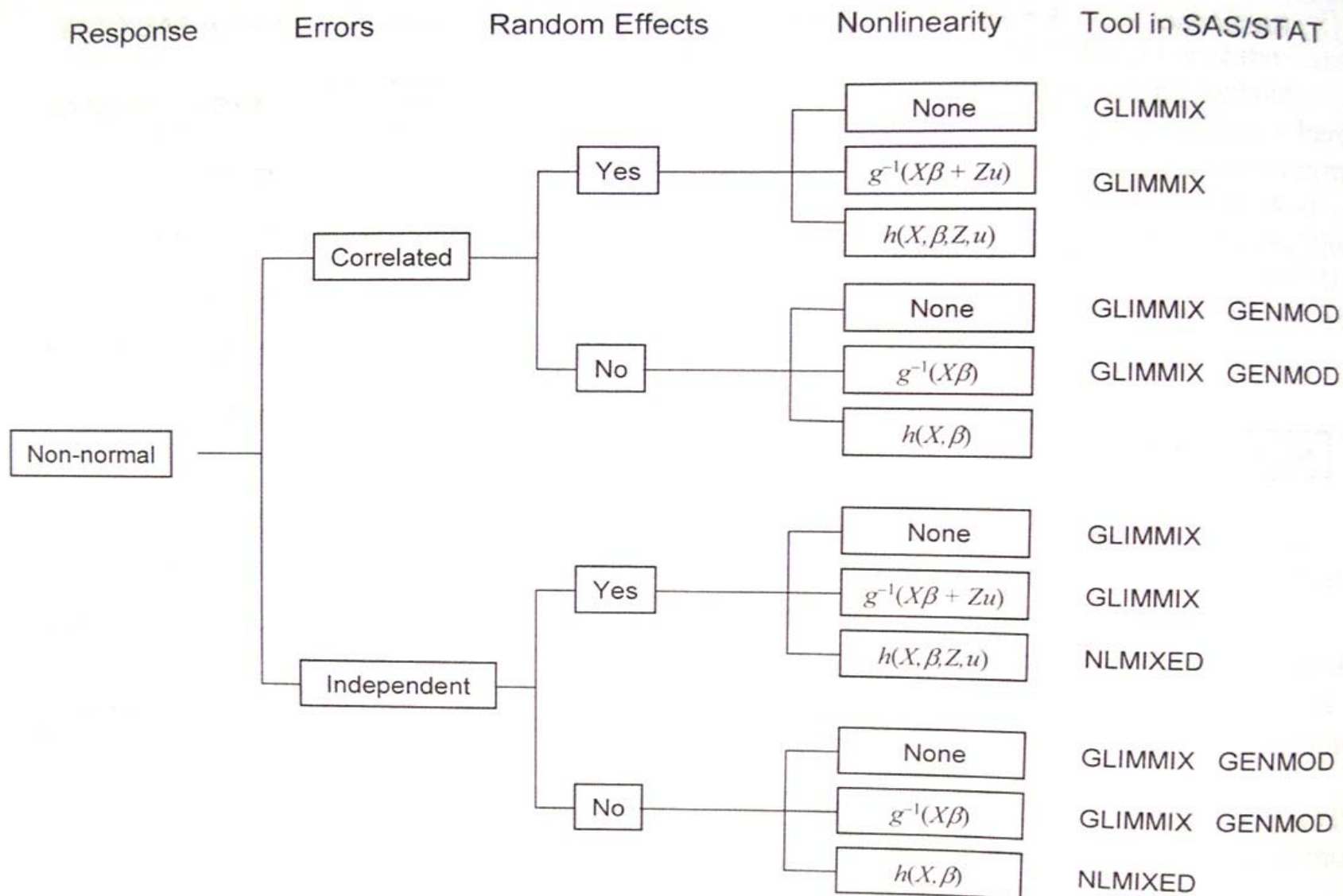
# Why I liked this book?

- Similarly to the first edition of this book, the mixed models are presented via examples and case studies.
- Very applied, and examples range from basic to complex case studies.
- Lots of SAS code, and interpretation of output

**Figure 1.2** Flowchart Indicating Tools in SAS/STAT for Normal Distributed Response



**Figure 1.3** Flowchart Indicating Tools in SAS/STAT for Non-normal Distributed Response



# Before you purchase the book

- This book is for the advanced reader
- Assumes a background in two-way ANOVA and regression and basic knowledge of linear models and matrix algebra
- Requires strong knowledge of probability and statistics theory, regression, matrix algebra and analysis of variance.
- Understanding experimental design would also help.

# Before you purchase the book

- May not be beneficial if your particular problem doesn't match one of the examples in the book
- The mixed model formulation is a bit "scattered" over several chapters, and various mathematical notation is used throughout the book (could be confusing if you haven't been exposed to mixed model formulation)

# Who would the book benefit?

- Graduate students, statisticians, biostatisticians, etc.
- SAS users who work with multilevel data (a background in mixed models wouldn't hurt)
- Those who use PROC GLM, would be able to make the transition to PROC MIXED, PROC NL MIXED, PROC GLIMMIX

# Why would I purchase this book?

- Useful examples along with SAS code and output
- Good interpretation of SAS output
- Presentation of theory
- Lots of detail and options of PROC MIXED (estimate, contrast, model fit, repeated measures, etc.)
- Numerous case studies (very applied)
- Choosing appropriate covariance structure
  - variance components
  - compound symmetry (common covariance plus diagonal)
  - unstructured (general covariance)
  - autoregressive
  - spatial
  - general linear
  - factor analytic



# Why would I purchase this book?

- Mixed Model Diagnostics (Ch 10)
- Power calculation and analysis (Ch 12)
- Some Bayesian approaches to Mixed Models (Ch 13)
- Nonlinear mixed models (Ch 15), PROC NLMIXED
- Model fit, fit criteria, random-effects, simple mixed with a single fixed and random effect, split-plot, multilocation, repeated measures, analysis of covariance, random coefficients, spatial correlation.
- BLUP - Best Linear Unbiased Predictor (Ch 6)

**In conclusion:  
This reviewer gives this book  
2 thumbs up!**

