

# Regression Diagnostics

Thursday & Friday  
May 19<sup>th</sup> & 20<sup>th</sup>, 2022  
11:00am – 5:00pm EDT

Online Workshop

## Professor Emeritus John Fox



**McMaster University**

**Department of Sociology**

**Abstract:** "Regression diagnostics" are methods for determining whether a regression model fit to data adequately represents the data. This workshop will present diagnostics for linear models fit by least squares, for generalized-linear models fit by maximum likelihood, for linear and generalized-linear mixed-effects models, and for linear regression models estimated by instrumental variables.

**The topics below don't precisely correspond to the eight hours of the workshop; in particular, the earlier topics will likely take more time than the later ones.**

- 1) Introduction and review of the normal linear model
- 2) Examining and transforming regression data
- 3) Unusual data: outliers, leverage, and influence
- 4) The response: Non-normality and nonconstant error variance
- 5) Lack-of-fit: Detecting and correcting nonlinearity
- 6) Diagnostics for generalized linear models
- 7) Diagnostics for mixed-effects models and instrumental-variables estimation
- 8) Collinearity diagnostics and wrap-up

Although they will be quickly reviewed, primarily to establish notation and basic results, I assume some familiarity with the various regression models covered in the workshop. Primarily to establish notation and basic results, I prepared a [brief review of these topics](#); **please read the review prior to the workshop.**

I'll use the R statistical computing environment for the presentation, and so I also assume some familiarity with R; you'll find introductory material on R along with a variety of references and links to resources at <http://tinyurl.com/ICPSR-R-course>.

The workshop is largely based on two sources: Fox, *Regression Diagnostics*, Second Edition (Sage, 2020) <https://tinyurl.com/RegDiag>, and Fox and Weisberg, *An R Companion to Applied Regression*, Third Edition (Sage, 2019) <https://tinyurl.com/rcompanion>. You need not have access to these books to follow the workshop, however.

Materials for the workshop will be available in advance at <https://tinyurl.com/SORA-TABA-diagnostics>.

**Speaker Bio:** John Fox is Professor Emeritus of Sociology at McMaster University in Hamilton, Ontario, Canada, where he was previously the Senator William McMaster Professor of Social Statistics. Professor Fox received a PhD in Sociology from the University of Michigan in 1972. He is the author of many articles and books on statistics, including, recently, *Applied Regression Analysis and Generalized Linear Models, Third Edition* (Sage, 2016), *Using the R Commander: A Point-and-Click Interface for R* (Chapman & Hall, 2018), *Regression Diagnostics, Second Edition* (Sage, 2019), *A Mathematical Primer for Social Statistics, Second Edition* (Sage, 2021), and, with Sanford Weisberg, *An R Companion to Applied Regression, Third Edition* (Sage, 2019). He continues to work on the development of statistical methods and their implementation in software. Professor Fox is an elected member of the R Foundation for Statistical Computing and an associate editor of the *Journal of Statistical Software*.

**Please Register @ Eventbrite: [2022 SORA-TABA Annual Workshop & DLSPH Biostatistics Research Day](#)**

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