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# *Journal of Statistical Software*

June 2011, Volume 42, Issue 1.

<http://www.jstatsoft.org/>

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## An Introduction to the Special Volume on “Political Methodology”

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### Abstract

This special volume of the *Journal of Statistical Software* on political methodology includes 14 papers, with wide-ranging software contributions of political scientists to their own field, and more generally to statistical data analysis in the the social sciences and beyond. Special emphasis is given to software that is written in or can cooperate with the R system for statistical computing.

*Keywords:* political science, statistical software, R.

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## 1. Introduction

This special volume on political methodology demonstrates the progressive sophistication of empirical analysis in political science, a trend that motivates the development both of specialized software of interest primarily to researchers in that discipline, or some subfield of it, and of statistical software of more general interest in the social sciences and beyond. It is also noteworthy how many of the 14 papers in this volume—all but three—describe packages developed for the R statistical computing environment (Ihaka and Gentleman 1996; R Development Core Team 2011). As is evident in the content of this journal from its inception, and in books on statistical computing published recently by and for statisticians, R has come to dominate the development of statistical software by statisticians. The use of R among political scientists and others in the social sciences is apparently also on an upwards trajectory.

The content of the current volume is also testimony to the diverse interests of political scientists. Nevertheless a few themes emerge:

Several of the papers describe software that directly analyzes political behavior and systems—these will be of interest almost exclusively to political scientists, although some of this software may have imaginative uses in other disciplines.

- The **BARD** package for R (Altman and McDonald 2011) implements methods for legislative redistricting and for analyzing redistricting plans.
- The **wnominate** R package (Poole, Lewis, Lo, and Carroll 2011) scales votes and legislators based on roll-call voting data. The package may have applications in other similar item-response settings, where a number of individuals make repeated binary choices.
- **IndElec** (Ocaña and Oñate 2011) is a stand-alone program that processes voting data from complex electoral systems, where, for example, different parties may field candidates in different electoral districts. **IndElec** outputs indices computed from the data in a variety of formats for analysis by standard statistical software.

Two papers describe software that simplifies the application of advanced methods used in social science—these will be of interest to social scientists more generally, and possibly to some researchers in other fields of application.

- The **eco** package for R (Imai, Lu, and Strauss 2011) includes Bayesian and likelihood-based methods, along with the method of bounds, for ecological inference in  $2 \times 2$  tables, where the marginal distributions of the two variables in a series of tables are known, but the cell counts are not.
- The R package **anchors** (Wand, King, and Lau 2011) uses supplemental data from “vignettes”—situations described to survey respondents and rated by them in relation to Likert-type ordinal response categories—to scale the items and respondents.

A number of the papers in this special volume introduce software for statistical methods that are widely useful beyond the social sciences.

- Three papers describe R packages that are related to the counter-factual approach to causal inference from observational data, introduced by Rubin (1974). The **Synth** package (Abadie, Diamond, and Hainmueller 2011) constructs a synthetic control group to evaluate the effect of an intervention in cross-sectional/time-series data. As their names suggest, the **MatchIt** (Ho, Imai, King, and Stuart 2011) and **Matching** (Sekhon 2011) packages implement methods for estimating causal effects by matching “treated” cases to controls.
- The **psce** package for R (Bailey and Katz 2011) computes panel-corrected standard errors for least-squares regression estimates in cross-sectional/time-series data, correcting both for contemporaneous correlation across units of observation and for unit-level heteroscedasticity.
- The **poLCA** package for R (Linzer and Lewis 2011) implements latent-class analysis and latent-class regression models for polytomous outcome variables.
- The **MCMCpack** package for R (Martin, Quinn, and Park 2011) efficiently implements Markov chain Monte Carlo methods for Bayesian estimation of a variety of commonly used statistical models.

Finally, three papers make technical contributions to statistical computing, and are consequently primarily of interest to writers of statistical software, including, of course, many of the readers of this journal.

- Altman and Jackman (2011) offer a variety of advice for writing sound statistical software.
- Mebane, Jr. and Sekhon (2011) introduce the **rgenoud** package for R, which implements general genetic optimization methods; **rgenoud** is used, for example, in the **Matching** package (Sekhon 2011), described in this special volume.
- Pemstein, Quinn, and Martin (2011) describe the **Scythe** library for C++, which facilitates writing computationally efficient statistical software, including in R. For example, **Scythe** is employed in the **Matching** (Sekhon 2011) and **MCMCpack** (Martin *et al.* 2011) R packages discussed in this volume.

## Acknowledgments

The editors are grateful for the valuable and outstandingly constructive work of the reviewers of papers for this special volume of the *Journal of Statistical Software*, including Ferdinand Alimadhi, Gia Barboza, Josh Clinton, Skyler Cranmer, Jos Elkink, Ben Hansen, Jennifer Hill, Andrew Gelman, Eduardo Leoni, William McCausland, Bruce D. McCullough, Mihai Oltean, Steven Scott, Martyn Plummer, Peter Rossi, Jon Wakefield, and Langche Zeng.

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