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BRIDGING THEORY AND PRACTICE: A REVIEW OF *QUANTITATIVE METHODS FOR THE SOCIAL SCIENCES* BY STOCKEMER & BORDELEAU

Reviewer – Md Naimul Khan¹

Stockemer, D., & Bordeleau, J.-N. (2023). *Quantitative methods for the social sciences: A practical introduction with examples in R*. Cham: Springer.

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Introduction

Quantitative methodology has become an indispensable component of empirical research in the social sciences, facilitating the systematic measurement, analysis, and interpretation of social phenomena (Bryman, 2016). In *Quantitative Methods for the Social Sciences: A Practical Introduction with Examples in R*, Daniel Stockemer and Jean-Nicolas Bordeleau (2023) offer a concise yet methodologically rigorous guide for early-stage researchers and students, integrating statistical theory with the practical application of R. The book is part of Springer's *Texts in Political Science and International Relations* series, reflecting its political science origins while remaining broadly applicable across the social sciences.

At a time when the demand for data-driven decision-making is rapidly increasing in academia, government, and the private sector, the ability to collect, process, and interpret quantitative data has become a critical skill for social scientists (Wooldridge, 2020). This volume situates itself at the intersection of theory and practice, recognizing that statistical methods alone are insufficient without a firm grasp of the research process, from conceptualization to empirical testing. By pairing statistical concepts with executable R code and concrete examples, the authors not only demystify quantitative techniques but also promote reproducibility and transparency—two values that have gained prominence in contemporary research discourse (Stodden et al., 2014). Moreover, the concise length of the book allows for focused learning without overwhelming the novice reader, making it especially suitable for semester-long courses or intensive training workshops.

Scope and Intended Audience

The authors explicitly target undergraduate and early graduate students, especially those with minimal prior exposure to quantitative research methods (Stockemer & Bordeleau, 2023, p. 2). While the examples often draw from political science, the statistical methods—ranging from descriptive measures to multivariate regression—are applicable across a wide spectrum

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of social sciences, including sociology, education, economics, and public health. The consistent integration of R as the analytical platform serves the dual purpose of teaching statistical reasoning and building computational proficiency.

The scope is deliberately balanced between breadth and depth: broad enough to introduce a variety of analytical tools but sufficiently detailed to enable learners to apply them in real-world contexts. The target audience also extends to practitioners and policy analysts seeking to strengthen their quantitative literacy without committing to a highly technical or mathematically dense text. By providing R scripts that can be directly adapted, the book serves as both a teaching aid and a reference manual for applied research projects.

Structure and Content

The text is organized into **nine chapters** grouped around four core stages of empirical research:

1. **The Relevance of Empirical Research** (Chs. 1–2) – introduces the logic of quantitative inquiry, operationalization, and hypothesis formulation (pp. 3–24).
2. **Survey Preparation** (Ch. 3) – covers questionnaire design, sampling strategies, and data collection modes (pp. 25–42).
3. **Survey Implementation** (Ch. 4) – addresses fieldwork considerations, response bias, and ethical concerns (pp. 43–55).
4. **Data Analysis** (Chs. 5–9) – moves from descriptive statistics (pp. 57–72) to inferential tests (t-tests, F-tests, χ^2 tests; pp. 73–98), bivariate correlations (pp. 99–106), and both bivariate and multivariate regression (pp. 107–137). Each chapter concludes with R code examples and output interpretation.

The progression from research design to statistical analysis is deliberate, ensuring that students understand the “why” before the “how” of statistical application. Each method is contextualized with an example rooted in a research question, followed by clear data manipulation and interpretation steps. This alignment between conceptual clarity and procedural demonstration enhances the text’s pedagogical impact, making it easier for learners to transfer skills to their own research projects.

Role of R in the Book

A distinguishing feature of this text is the exclusive use of R as the analytical platform. R is a free, open-source programming language and software environment designed specifically for statistical computing, data analysis, and graphical representation. It is widely used in academia, research organizations, and industry because of its flexibility, cost-free availability, and active global community of developers and users.

What R Can Do

R’s functionality goes far beyond basic number crunching. Its capabilities include:

1. **Statistical Analysis** – R supports a vast array of statistical methods, from descriptive statistics (mean, median, standard deviation) to complex modeling techniques (regression, ANOVA, time-series analysis, survival analysis, generalized linear models).
2. **Data Management** – R can import, clean, transform, and merge datasets from multiple formats such as CSV, Excel, SPSS, Stata, and databases. Functions like `read.csv()`, `merge()`, and `subset()` make it easy to handle large and complex datasets.
3. **Data Visualization** – Both base R and specialized packages like `ggplot2` allow creation of high-quality graphs, charts, and plots, from simple bar charts to sophisticated interactive dashboards.
4. **Reproducible Research** – With tools like R Markdown, analyses can be documented and shared so others can replicate the exact same results.

5. **Extensibility** – Thousands of user-contributed packages in CRAN (Comprehensive R Archive Network) add specialized tools for nearly every research domain, including social sciences, bioinformatics, machine learning, and text analysis.

R's Role in the Book

In *Quantitative Methods for the Social Sciences*, R is not treated as a separate programming course but as an integrated research tool. The authors weave R commands directly into the explanation of statistical concepts. For example:

- When introducing t-tests, the book presents the `t.test()` function, explains each argument, and demonstrates how to interpret the p-value in context (pp. 78–80).
- When explaining chi-square tests, the text uses `chisq.test()` with real survey data, showing how categorical variables can be tested for independence (pp. 90–92).
- Linear regression is introduced alongside the `lm()` function, with a clear breakdown of coefficient interpretation, model fit statistics, and residual diagnostics (pp. 107–137).

The use of **realistic survey datasets** ensures that students also learn essential data preparation steps—such as handling missing values (`na.omit()`), recoding variables (`ifelse()`), and checking assumptions visually (`plot()`, `hist()`).

Why R Matters in Social Science Research

R's open-source nature and transparency make it ideal for reproducible research, a cornerstone of modern science. Because every step—from data import to model estimation—can be written as code, analyses are not only repeatable but also easy to share and adapt. For social scientists, this means more credible findings, easier collaboration, and the ability to update analyses as new data arrive.

In the context of this book, R acts as both the laboratory and the notebook—a space where theory is tested, results are produced, and workflows are documented in one integrated environment. This dual role strengthens students' statistical reasoning while equipping them with a professional-grade analytical skill.

Pedagogical Strengths

One of the text's strongest assets is its accessible language and logical progression. The writing avoids excessive technical jargon while maintaining academic rigor, which is particularly beneficial for students transitioning from qualitative to quantitative research traditions (p. 4). The structure mirrors the natural flow of the research process, reinforcing comprehension through repetition and cumulative skill-building.

Another strength lies in the integration of R examples. Every statistical method is paired with annotated R scripts and sample outputs, enabling immediate hands-on application (pp. 60, 85, 114). This approach aligns with contemporary calls for computational integration in statistics education (Baumer et al., 2014). Additionally, the use of real survey data—rather than artificially simplified datasets—ensures that students confront the complexities and messiness of actual research, fostering both technical and critical thinking skills.

The book's brevity, at approximately 140 pages, is also a pedagogical advantage. Instructors can assign it as a primary text without fear of overwhelming students, and its modular organization allows for selective reading. The combination of conceptual grounding, worked examples, and reproducible code positions the book as an effective bridge between theory-heavy methodology texts and software-centric tutorials.

Limitations

Despite its strengths, the book is not without limitations. The first is its assumption of basic R familiarity. While the authors explain commands and functions in context, complete beginners

to R may find the syntax and occasional troubleshooting challenging (p. 57). A short introductory chapter or appendix on R fundamentals could have increased accessibility for students with no programming background.

The disciplinary focus of the examples, while appropriate for the series, is heavily skewed toward political science. This may limit perceived relevance for readers in sociology, education, or development studies unless instructors provide supplemental discipline-specific datasets. Furthermore, advanced statistical methods such as logistic regression, interaction effects, and model diagnostics receive limited or no coverage (pp. 133–137). This omission means that the text works best as a starting point rather than a comprehensive reference for advanced analysis.

Finally, while the authors discuss ethics and bias in survey research, these sections are relatively brief. A more extended treatment—possibly with case studies—could enhance the critical engagement of students with the social implications of quantitative research.

Contribution to the Literature

Stockemer and Bordeleau’s work occupies a useful niche in the quantitative methods literature. Many existing texts are either too mathematically abstract for beginners or too software-focused to provide conceptual depth. This book manages to balance both elements, ensuring that students not only learn “how” to run statistical tests but also “why” those tests are appropriate in given contexts.

By embedding R within a coherent framework for designing and analyzing surveys, the authors also contribute to the growing body of resources promoting open science and reproducibility (Stodden et al., 2014). In doing so, they encourage a research culture in which transparency and replicability are valued as much as analytical sophistication. This focus is consistent with recent trends in social science education that emphasize computational literacy alongside methodological rigor.

Conclusion and Recommendation

This text is highly recommended as a primary or supplementary textbook for undergraduate quantitative methods courses in political science and related social sciences. Its clarity, concision, and hands-on approach make it ideal for courses emphasizing survey research and applied statistical analysis in R. Instructors may need to supplement the book with additional resources for more advanced statistical modeling or for examples tailored to other disciplines.

Overall, *Quantitative Methods for the Social Sciences: A Practical Introduction with Examples in R* offers a valuable contribution to teaching and learning quantitative research. Its integration of conceptual explanation, real data, and reproducible code embodies best practices in methodological training.

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