The Reviewer’s Guide to Quantitative Methods in the Social Sciences

The Reviewer’s Guide to Quantitative Methods in the Social Sciences is designed for evaluators of research manuscripts and proposals in the social and behavioral sciences, and beyond. Its 31 uniquely structured chapters cover both traditional and emerging methods of quantitative data analysis, which neither junior nor veteran reviewers can be expected to know in detail. The book updates readers on each technique’s key principles, appropriate usage, underlying assumptions, and limitations. It thereby assists reviewers to offer constructive commentary on works they evaluate, and also serves as an indispensable author’s reference for preparing sound research manuscripts and proposals. Key features include:

**Comprehensive Coverage**—Thirty-one chapters cover virtually all of the classic and emerging quantitative techniques, thus helping reviewers to evaluate a manuscript’s methodological approach to data analysis. In addition, the volume serves as an indispensable reference tool for those designing their own research.

**Unique Chapter Format**—For ease of use, all chapters follow the same structure.

- The opening page of each chapter defines and explains the purpose of that statistical method.
- The next one or two pages provide a table listing various criteria that should be considered when evaluating and applying that methodological approach to data analysis.
- The remainder of each chapter contains numbered sections corresponding to the criteria listed in the opening table. Each section explains the role and importance of that particular criterion.

**Expert Chapter Authors**—Chapters are written by methodological and applied scholars who are expert in the particular quantitative method being reviewed.

**Gregory R. Hancock** is Professor and Chair of the Department of Measurement, Statistics, and Evaluation at the University of Maryland and is Director of their Center for Integrated Latent Variable Research.

**Ralph O. Mueller** is Professor and Dean of the College of Education, Nursing, and Health Professions at the University of Hartford, Connecticut.
The Reviewer’s Guide to Quantitative Methods in the Social Sciences

Editors
Gregory R. Hancock
Ralph O. Mueller
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Preface

Volume Background

A cornerstone of research institutions and agencies around the world is the creation of new knowledge that often is generated through utilizing quantitative research methods. The dissemination of such knowledge through specialized journals, application-oriented outlets, and technical reports is typically filtered through a rigorous peer review process to ensure work of the highest possible quality. Reviewers, and the editors they serve, thus operate in the critical role of gatekeeper and must, collectively, be held accountable for the integrity of the research enterprise.

The quantitative skills that reviewers bring to this role tend to fall into two categories—expertise in methods they use fairly regularly and competently in their own research, and knowledge from academic or professional training that has largely laid dormant since that initial exposure. This limiting state of affairs, which is exacerbated as cohorts of new researchers are trained in increasingly advanced data analysis techniques, can force quantitatively uninitiated reviewers to confine their critical commentary primarily to the content-area portions of a manuscript. In the end, these reviewers are operating by assuming that someone else is tending the methodological gate, and editors are left in the difficult position of burdening those few reviewers who are quantitatively current while constantly having to update their stable of adjunct reviewers with highly specific areas of methodological expertise.

In all fairness, reviewers, whether novice or veteran, should not be expected to have a command of all data analysis methods used in modern research. We believe that they should, however, maintain some broad and evolving awareness of methodological developments, and make an honest attempt to evaluate the analytical methods that are at the core of a manuscript’s intellectual contribution. The current volume, *The Reviewer’s Guide to Quantitative Methods in the Social Sciences*, was born out of a desire to assist reviewers in meeting this professional responsibility. In particular, this volume is designed as a reference tool specifically for reviewers of manuscripts and proposals in the social sciences and beyond, addressing a broad range of traditional and emerging quantitative techniques and providing easy access to critical information that authors should have considered and addressed in their submissions. How this volume’s structure is specifically geared toward reviewers is explained in the next section.

Volume and Chapter Structure

This volume has 31 chapters arranged alphabetically by title, with each chapter addressing a particular quantitative method or area. These include the sound practice of research (e.g., research design, survey sampling, power analysis), the general linear model (e.g., analysis of variance, multiple regression, hierarchical linear modeling, discriminant analysis), the generalized linear model (e.g., logistic regression, log-linear analysis), measurement (e.g., item response theory, generalizability theory, multidimensional scaling), and latent structure methods (e.g., latent class analysis, latent growth curve models, structural equation modeling). The structure within each chapter is the same, consisting of the following three sections:

- Method overview
- Table of desiderata
- Explications of desiderata.
Method overview. Each chapter starts with a brief introduction and overview of the method(s) being addressed in the chapter. This is not meant to teach the reader the topic area per se, but rather to provide an orientation and possible refresher. This section concludes with useful references for the reader who wants more introductory and/or advanced information on that chapter’s topic.

Table of desiderata. On the second page of each chapter begins a numbered list of key elements (desiderata) that should be addressed in any study using that chapter’s method(s). This table serves to provide essential evaluation criteria that a reviewer should consider when judging a manuscript’s methodological approach to data analysis, including the technique’s key principles, appropriate usage, underlying assumptions, and limitations. For each desideratum the section(s) of a manuscript in which the specific issue should most likely be addressed is denoted with (I) Introduction, (M) Methods, (R) Results, and (D) Discussion.

Typically the desiderata appear in a single table; in some cases this table is partitioned by special applications of a certain method (e.g., Chapter 20, Multidimensional Scaling). In a couple of cases the desiderata are presented in two separate tables due to the bifurcated nature of the topic (e.g., Chapter 8, Factor Analysis, with tables for exploratory and confirmatory methods). The user of this volume will also note that there are many desiderata in common across chapters, including such elements as making connections between research questions and the analytic method at hand, explicitly addressing how missing data and outliers were handled, reporting the software and version used, and so forth. Although these could have been culled for a separate table at the beginning of the volume, we believe that having them contained within each chapter as they pertain to the specific method is in keeping with the reference nature of this guide. In this manner, a chapter’s table(s) of desiderata may be used by a reviewer as a checklist to evaluate a manuscript’s methodological soundness. Explications of each desideratum then follow.

Explications of desiderata. Following each chapter’s table(s) of desiderata are corresponding explications for each numbered desideratum. For a reader already thoroughly familiar with a particular desideratum, a given explication may be unnecessary; we expect, however, that most readers will benefit from the supporting explanation, elaboration, and any additional references specific to that desideratum. For example, if a desideratum calls for a manuscript to explicitly examine the assumptions underlying a particular analytical technique, the explication might provide a treatment of the inferential consequences of failing to examine those assumptions as well as the preferred methods for conducting and presenting the results of such an examination. The explications of the desiderata constitute the main body of each chapter, justifying each desideratum in light of accepted practice and the supporting methodological literature.

The Future of This Volume

Any time someone offers recommendations as to proper practice or conduct, reasonable people will disagree. The current volume, methods, and desiderata are no different. In fact, we are quite certain that some knowledgeable readers will take issue with particular chapter authors’ portrayal of a given method’s best practice. That said, in the preparation of this volume we have encouraged chapter authors to try to convey what each technique’s methodological literature considers to be the most accepted practices associated with a given method. Further, we understand that even if there is currently agreement on a technique’s best practices, the methodological literature might determine otherwise in the future.

We therefore view this volume as a living resource. As quantitative methodologies evolve, not just in preferred practice of existing techniques but also in the development of new techniques, we expect each subsequent edition of this guide to adapt as well. Toward this end we welcome readers’ correspondence with chapter authors and editors in an on-going dialog about specific methods and their
desiderata, thus helping to keep this volume continually responsive to changes in appropriate prac-
tice. Our hope is that this will create a dynamic resource for reviewers of manuscripts and proposals, as well as for the authors themselves (e.g., applied researchers, university faculty, and graduate stu-
dents) when designing their own research projects.

Gregory R. Hancock and Ralph O. Mueller
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