



Taking Statistics Again for the First Time

A Review of

Quantitative Models in Psychology

by Robert E. McGrath

Washington, DC: American Psychological Association, 2011. 241 pp. ISBN

978-1-4338-0959-0. \$59.95

doi: 10.1037/a0027334

Reviewed by

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There are two basic problems with taking a statistics course. The first is that you almost never have good mental schema for taking the material in. Thus, while you are trying to develop an organizational structure for understanding the basic ideas of the course, you miss all the nuances and refinements that are critical to developing in-depth knowledge and a real appreciation for the material.

The second problem is that statistics courses are almost always taught by people with a great facility for statistics. And, as we all know, the ability to understand statistics and the ability to speak English coherently are not (?) located in the same cells of the brain. In order for one to go in, the other has to leave. Thus, we are left with the fundamental conundrum of statistics instruction: You should never take statistics for the first time; you should only ever retake it. In that way, you will be ready to digest the content, allocate ideas to well-conceived and tested mental structures, pick up on the subtleties and shades of meaning, and perhaps even get the jokes, feeble as they may be.

But you are saying, "That ship has sailed, and, Lord knows, it was a rocky voyage." This is where Robert McGrath comes in. McGrath is going to let you take statistics again: And not just introductory statistics; probably every statistics course you ever took (hard to imagine you've gotten this far in this review if you only ever took one statistics course).

In *Quantitative Models in Psychology*, McGrath has written a book that explains all those things you really didn't understand when you took statistics the first time. This is the book of "statistical do-overs." And the beauty of it is that McGrath is a clinical psychologist. He feels your quantitative pain. What McGrath has done in *Quantitative Models* is to very clearly imagine his reader and write a book directly geared to that reader. It is an exceptional accomplishment.

So, who is the reader that McGrath is speaking to, and what is this book about? The reader, I think, is a practicing psychologist—either a researcher or a clinician—who took quantitative methods and understood a fair amount of it, and maybe even enjoyed it a bit, but who didn't get it all down and who from time to time wonders, "Why do we do this?" This is a person who has a vague sense of following the rules for quantitative undertakings but does not really understand the rationale behind those undertakings. Indeed, in the preface of the book, McGrath states that he wants to look at the question of "why" instead of "how" in quantitative methods.

Basically, what McGrath is doing is letting you take statistics a second time. And since he never starts a sentence with “Let x be defined over a range . . . , ” chances are you will understand what he is talking about. That’s good for a start. But what truly makes this work pretty close to unique is the range of topics that are covered, and covered well.

So if you never really understood the difference between Fisher’s approach to hypothesis testing and the Neyman-Pearson approach, it’s in there. Can’t really follow the underlying conceptual model of Bayesian statistics? It’s in there. There’s also a great section in the book on why hypothesis testing is analogous to a criminal trial (a metaphor I have been using for decades). McGrath also explains multicollinearity, suppressor variables, and spurious correlations. He walks you through the rudiments of factor analysis, structural equation modeling, classical and modern test (item response theory; IRT) theories, validity studies, meta-analysis, and hierarchical linear modeling.

So, is this book several thousand pages long? Nope. It’s 241 pages, including “About the Author.” How does McGrath do this? He makes two critical and highly useful assumptions (that I could induce). First, he assumes that you have a decent background in most of these topics at the outset. Second, he assumes you are interested in these topics and willing to put in a bit of a contribution to the joint effort necessary to enhance your quantitative background. It is a powerful combination.

Is *Quantitative Models in Psychology* perfect? I would say, no, but that might be nothing more than me saying I didn’t write it (I wish I had!). I’ve got my nits to pick: I like directional hypotheses more than McGrath does; I might have spent a bit more time looking at issues in reliability and the relationships among types of reliabilities than he did; and Bayesian statistics still comes off looking a bit like a Three-Card Monte game. But those are nits, and I had to go back and dig them out! *Quantitative Models in Psychology* is an exceptional piece of scholarship, highly readable, and, in all likelihood, will make you a better psychologist!