



Preface and Introductory Comments

This project came about because of my desire to encourage mediation and moderation analyses in program evaluations and to increase applications of structural equation modeling (SEM) to such analyses. Over the many years I have conducted program evaluations, I have seen what I believe is a significant gap linking program evaluation on the one hand and the very powerful analytic tool of SEM, broadly defined, on the other. I decided to write a book that would educate researchers and evaluators about the many SEM-based statistical tools that can be brought to bear for purposes of program evaluation *and* that would get down into the weeds and give readers the details they need to actually apply those methods to their data. Achieving this goal is a non-trivial task and it quickly became apparent to me that my only feasible outlet for such a book would be a webbook. For cost reasons, print publishers place constraints on page limits that I needed to be free of. Print media limit the design features I can include relative to a webbook and I wanted the freedom to add videos, links, and a variety of tools that simply can't be done in purely print formats. The marketplace for academically oriented books has changed so radically in recent years that older publishing models have become obsolete, especially for books that target more advanced students and colleagues. Hence, the current webbook.

This is not a book on mediation and moderation more generally although it certainly has a good deal of material that bears on such matters. Rather, I focus on the case where the goal is to evaluate the efficacy and effectiveness of interventions and to bring mediation and moderation perspectives to that enterprise. I decided to restrict myself to the case of experimental designs that take the form of randomized trials because these are critical to rigorous program evaluation and are commonplace. Much of the literature on mediation and moderation ignores application of SEM to experimental designs. The current project addresses this gap.

One frustration I have had with structural equation modeling (SEM) oriented books on mediation and moderation is their failure to provide the practical details

that researchers need to apply SEM methods to randomized trials and to do so in ways that are accessible to everyday researchers. Again, I understand how print and cost constraints limit authors' abilities to do this. My intent is otherwise.

Some of my chapters are short but others are quite long. The length is in part due to my inclusion of computer code and output in addition to more traditional explanatory material. However, this is not the only reason for the length of many of my chapters. Rather, my goal is to both (a) broaden your analytic toolbox by introducing you to a wide range of statistical tools you can potentially access for purposes of program evaluation, and (b) get into the analytic specifics so that you can actually apply these tools when you need to. A given chapter might cover half a dozen or so topic areas that span one hundred or even two hundred pages. In most cases, the different sections stand independent of one another so that you can jump from one section to another as your interests so dictate. The chapters are not written with the idea they can be processed in a single sitting. Rather, the longer chapters are probably best conceptualized as a collection of short how-to monographs that you can access on demand. Ultimately, I think you will appreciate the level of detail for programming and application that I provide if you ever decide to actually execute one or more of the analyses.

Another frustration I have had is that many of the methodological or statistical books I read refer me elsewhere to obtain or learn about software that I need to get my analyses done. I rectified this in the current project by providing on my website almost all of the software you will need to analyze the topics I cover. To be sure, I feature the SEM-based Mplus software in my book because I believe it is the most state-of-the-art SEM package available. You will need to purchase Mplus to take full advantage of my book. In my opinion, the investment is worth its weight in gold. The R SEM software called lavaan is growing in popularity and it also has much to offer. I admire those who have contributed to its development and I make use of it at times in my own work. However, I would argue that it is not nearly as flexible and option-rich as Mplus. If you are serious about SEM analytic frameworks, Mplus is the way to go.

Having said that, I also provide an extensive library of supplementary programs that are written in R that are available on my website and that have a point-and-click inspired, user-friendly interface. Most of the more complex programs are accompanied by instructional videos on how to use the program. You do not even have to know how to program R to use these programs. My website will query you about key facets of your analytic method and then write the R syntax for you. You

do not even have to understand the syntax. All you need to do is to copy and paste it into R and the rest will take care of itself.

Another advantage of a webbook is that I can make use of additional tools that the web offers that are difficult to access easily in passive print books. I include links to other sites for purposes of getting immediate access to these resources. I also include pop-up videos. To be sure, my ability to use the vast array of internet-based media tools is limited by my limited programming skills, but as you will see as you explore my website, I have made use of a wide range of pedagogical devices.

I have written my book at what I consider to be a more introductory, reader friendly level – not too introductory but not too advanced for doctoral students who have had an introductory statistic course and perhaps a course in linear regression. I tried not to get too wrapped up in equations but it is inevitable that I do so in some places. I am certain that some readers will object to the more informal and introductory approach I have taken, but my goal is to make the material relatively accessible to typical researchers as a first step. Bear with me in this regard.

In working through relevant literatures, I have been impressed by how diverse and demanding these literatures are. In ways, I view my book as a way of encouraging people to begin a conceptual and methodological journey that I believe is worthwhile but that ultimately will not be an easy one. I cover considerable ground in this book but there is much left untouched. A frustrating feature of existing literature is that sometimes the same term is used to refer to different concepts, sometimes different symbols are used to refer to the same concepts, and sometimes the same symbol is used to refer to different concepts. I tried to bring some consistency to my book along these lines but ultimately concluded it is impossible to do so if I want to put the reader in a position to read journal articles and books on the concepts. Instead, I tried to use notation that was typical of most literature in a given topic area.

Mediation and moderation are controversial topics and the relevant literatures about them are filled with conflicting advice. This also is true of SEM more generally. I have tried to make the reader aware of these controversies. I provide my own perspectives on them but realize not everyone will agree with my arguments. All I can say is that reasonable people can disagree about the best way to do things.

This book covers conceptual, design, measurement, and analysis issues in the formulation of randomized trials that include mediation and/or moderation. In my view, it provides an overview of critical issues in such matters. I am an applied

researcher at heart and that spirit comes through in this project. I try to keep matters practical and focused toward real world applications sometimes at the cost of elaborating statistical theory. Chapters 2 through 8 provide material that lays the conceptual, measurement, methodological and analytic foundations for the remainder of the book on mediation and moderation analyses in randomized trials. I felt it important to make this foundational material accessible to readers.

The book is a continual work in progress. I refine and update it frequently. The advantage of a web book is that I do not have to keep notes on changes I want to make for a second edition. I just make the changes instantly. In this sense, the book is fluid in character. I, of course, tremendously value input and feedback from users and experts alike. Please do not hesitate to contact me at jjaccard@gmail.com to provide constructive feedback.

I am still working on an effective Subject Index that will help you navigate your way around the book. I will add to the website soon.

The “cover” of my book is a shout out to the classic and highly influential monograph by Donald Campbell and Julian Stanley on experimental and quasi-experimental design. Their book was a staple of my methodological training as a doctoral student and has retained its value over the many years since its publication. It is well worth a read.

[TO BE COMPLETED]

James Jaccard
Professor Emeritus
New York University