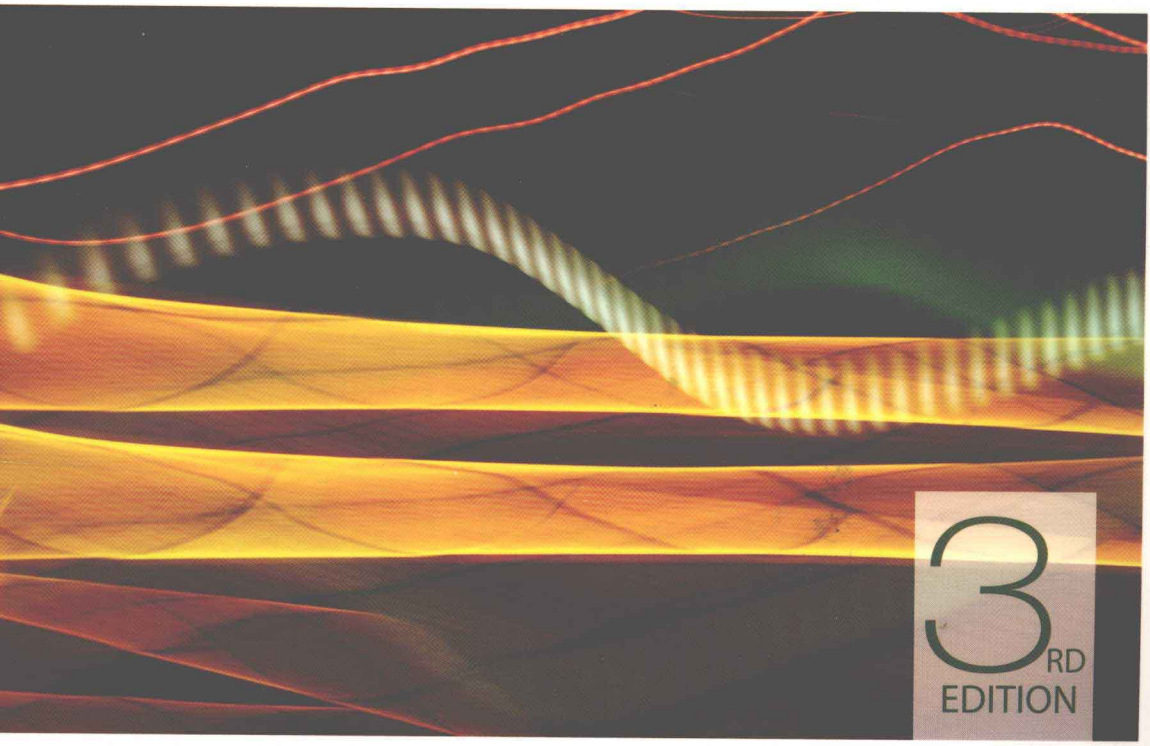
STATISTICS for People Who (*Think They*) HATE STATISTICS



NEIL J. SALKIND

SAGE

STATISTICS for People Who (*Think They*) HATE STATISTICS

3RD EDITION

NEIL J. SALKIND

University of Kansas

SAGE Publications
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For information:

Sage Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

Sage Publications India Pvt. Ltd.
B 1/I 1 Mohan Cooperative Industrial Area
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"I have loved statistics ever since my second undergraduate course. Your book **Statistics for People Who (Think They) Hate Statistics** has cleared up confusion and partial understandings that I have had for years. It is a must for anyone beginning or continuing their journey in this science. I love it, and will use it for all of the foreseeable future."

—Ronald A. Straube
Mission Texas Regional Medical Center

"Salkind's examples assist with the application of key concepts and tests. The book is easy to read due to the way information is presented—such as the Tech Talk, Things to Remember, the Key to Difficulty Index, the various 10 lists, the icons, and the illustrations—including the cartoons. Even the title brings laughter to students—and humor can be a great antidote to stress!"

—Mary Beth Zeni
Florida State School of Nursing

"I am a doctoral student and we simply love your book."

—Marisol Miller
Ph.D. candidate

"I just wanted to thank you for writing such a great book and for allowing people like me who are flung in at the deep end to stand a chance of understanding the basics and allowing us to get over the great fear of statistics! Thanks very much."

—Joanna Paolinelli
MS Student in Developmental Psychology

"I liked its humorous approach, which indeed helps to reduce statistical anxiety. The design of the book is inviting and relaxing, which is a plus. The writing style is great and the presentation is appropriate for my students. A fun and well-written book, it is easy to read and use, and presents statistics in a user-friendly way. . . . I would recommend it for sure."

—Minjuan Wang
San Diego State University

"Let me thank you for a wonderful textbook. Of all the texts I have used over the years, I would have to rate yours #1 for presenting material that can be followed and understood."

—Carolyn Letsche
MA Student in School Counseling

"I just wanted to take a moment of your time to inform you that I have selected your book, **Statistics for People Who (Think They) Hate Statistics**, to use in my course. I truly agree with the direction you have taken with your book and I know that our students will appreciate it just the same."

—Karl R. Krawitz
Baker University

"**Statistics for People Who (Think They) Hate Statistics** really makes students learn and enjoy statistics and research in general. Students especially like the Ten Commandments and Internet sites."

—Valerie Janesick
University of South Florida

"Salkind's book is in a class by itself. It is easily the best book of its kind that I have come across. I enthusiastically recommend it for anyone interested in the subject, and even (and especially) for those who aren't!"

—Russ Shafer-Landau
University of Wisconsin

"**Statistics for People Who (Think They) Hate Statistics** is definitely the right book for people who have to overcome that familiar anxious feeling when opening a standard statistics book and who having finally managed to do so are still not able to make much sense of it all. The book by Salkind is easy and pleasant to read and one that hardly needs any pre-knowledge of the field to be able to follow the author's train of thoughts. Salkind has managed to bring statistics home to people who hate statistics or thought they did."

—From a review in *Statistical Methods in Medical Research*
(Arnold Publications)
—Dr. Andrea Winkler
Maudsley and Bethlem Hospital
London, U.K.

STATISTICS for People Who (*Think They*) HATE STATISTICS

3RD EDITION

This book is dedicated with love and admiration to Sara and Micah—simply the best—and to all the Sharks in Lane 5.

Outside of a book, a dog is man's best friend.
Inside of a dog, it's too dark to read.

—Groucho Marx

"Two Tails Up"

A NOTE TO THE STUDENT: WHY I WROTE THIS BOOK

This is a new edition and a new time in my teaching career. And I continue to be fortunate enough to teach the basics of statistics to many different types of students at many different levels and have profited far more from teaching them than ever before.

What many of them (*still* after all these years) have in common (at least at the beginning of the course) is a relatively high level of anxiety, the origin of which is, more often than not, what they've *heard* from their fellow students. Often, a small part of what they have heard is true—learning statistics takes an investment of time and effort (and there's the occasional monster for a teacher). But most of what they've heard (and where most of the anxiety comes from)—that statistics is unbearably difficult and confusing—is just not true. Thousands of fear-struck students have succeeded where they thought they would fail. They did it by taking one thing at a time, pacing themselves, seeing illustrations of basic principles as they are applied to real-life settings, and even having some fun along the way. That's what I tried to do in writing the first two editions of *Statistics for People Who (Think They) Hate Statistics*, and I tried even harder in completing this revision.

After a great deal of trial and error, and some successful and many unsuccessful attempts, I have learned to teach statistics in away that I (and many of my students) think is unintimidating and informative. I have tried my absolute best to incorporate all of that experience into this book.

What you will learn from this book is the information you need to understand what the field and study of basic statistics is all about. You'll learn about the fundamental ideas and the most commonly used techniques to organize and make sense out of data. There's very little theory (but some), and there are few mathematical proofs or discussion of the rationale for certain mathematical routines.

Why isn't this theory stuff and more in *Statistics for People Who (Think They) Hate Statistics?* Simple. Right now, you don't need it.

It's not that I don't think it is important. Rather, at this point and time in your studies, I want to offer you material at a level I think you can understand and learn with some reasonable amount of effort, while at the same time not be scared off from taking additional courses in the future. I (and your professor) want you to succeed.

So, if you are looking for a detailed unraveling of the derivation of the analysis of variance *F* ratio, go find another good book from Sage Publications (I'll be glad to refer you to one). But if you want to learn why and how statistics can work for you, you're in the right place. This book will help you understand the material you read in journal articles, explain what the results of many statistical analyses mean, and teach you how to perform basic statistical work.

And, if you want to talk about any aspect of teaching or learning statistics, feel free to contact me. You can do this through my e-mail address at school (njs@ku.edu). Good luck, and let me know how I can improve this book to even better meet the needs of the beginning statistics student.

ACKNOWLEDGMENTS

Everybody, and I mean everybody (including Steve in shipping and Sharon in contracts), at Sage deserves a great deal of thanks for providing me with the support, guidance, and professionalism that takes only an idea (way back before the first edition) and makes it into a book like the one you are now reading—and then makes it successful.

However, there are some people who have to be thanked individually for their special care and hard work. Lisa Cuevas Shaw is an author's dream editor—an advocate for the author and his work, listener of ideas both good and bad, and always available to offer feedback and support. She has guided two editions of this work (and other *for People* titles by me) through to any success it has seen. Margo Crouppen, associate editor, was another everyday contact who saw that important things got done as needed and kept the project on track and moving toward publication. I am in her debt. Others who deserve a special note are Karen Greene, editorial assistant; Stephanie Adams, marketing manager; and Veronica Stapleton, production editor. Special, special thanks goes to Liann Lech for her sharp eye and sound copy editing, which make this material read as well as it does.

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AND NOW, ABOUT THE THIRD EDITION . . .

What you read above about this book reflects my thoughts about why I wrote this book in the first place. But it tells you little about this new edition.

Any book is always a work in progress, and *Statistics for People Who (Think They) Hate Statistics* is no exception. Over the past 6 years or so, many people have told me how helpful this book is, and others have told me how they would like it to change and why. In revising this book, I am trying to meet the needs of all audiences. Some things remain the same, and some have changed.

There are always new things worth consideration and different ways to present old themes and ideas. Here's a list of what you'll find that's new in the third edition of *Statistics for People Who (Think They) Hate Statistics.*

- There is a bunch of new exercises at the end of each chapter. Not only more, but also ones that vary greater in their level of application and (I hope) interest. These exercises use data sets that are available at http://www.sagepub.com/salkindstudy and at the author's Web site at http://soe.ku.edu/faculty/Salkind/stats_fpwhs3e/. You can download them as needed.

- These data sets continue to come in two flavors—SPSS (that popular statistical analysis program) and Excel (the spreadsheet that many people use for data analysis). These data sets are available in Appendix C and online at http://www.sagepub.com/salkindstudy and at the author's Web site at http://soe.ku.edu/faculty/Salkind/stats_fpwhs3e/.

- The answers to the *Time to Practice* questions are now at the end of the book rather than at the end of the chapter. This makes them easier to locate as a group (and makes it harder to peek!).

- The information on reliability and validity has been moved to the first part of the book, rather than appearing later. This was done

in reaction to several suggestions by users that the material would be better understood if placed earlier in the book. This is the only major change in organization of the material.

- The third edition features SPSS 15, the latest version that SPSS offers. For the most part, you can use a version of SPSS that is as early as 11 to do most of the work, and even these earlier versions can read the data files created with the later versions.

Any typos and such that appear in this edition of the book are entirely my fault, and I apologize to the professors and students who are inconvenienced by their appearance. And I so appreciate any letters, calls, and e-mails pointing out these errors. We have all made every effort in this edition to correct any previous errors and hope we did a reasonably good job. Let me hear from you with suggestions, criticisms, nice notes, and so on. Good luck.

Neil J. Salkind
University of Kansas
njs@ku.edu

BRIEF CONTENTS

DETAILED CONTENTS