Using SPSS for Windows and Macintosh
This book is dedicated to our parents and to our children.
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Preface

It’s our pleasure to be part of the eighth edition of *Using SPSS for Windows and Macintosh: Analyzing and Understanding Data*. Our objective has been to make each revision of our book more accessible and readable, so that readers can properly conduct statistical analyses with SPSS and make appropriate interpretations of the obtained results.

The development of easy-to-use statistical software like SPSS has changed the way statistics is being taught and learned. No longer do students have to learn a system of elaborate code to conduct simple or complex analyses. Instead, students simply enter their data into the easy-to-use Data Editor. They can then select items from a drop-down menu to make appropriate transformations of variables, click options from another menu to create graphs of distributions of variables, select among various statistical analyses by clicking on appropriate options, and more. With a minimal amount of time and effort, the output is displayed, showing the results.

Researchers also have benefited from applications like SPSS. They do not have to spend time reacquainting themselves with the ins and outs of a statistical software package or learning new programs for conducting analyses that take hours to master. They also do not have to teach assistants how to write code to produce analyses, or examine and reexamine code that has produced error messages that do not really indicate what is wrong. Everyone can just point and click. More sophisticated users can use the syntax features.

In general, programs like SPSS have made life easier for students who are learning statistics, for teachers who are teaching statistics, and for researchers who are applying statistics. Nevertheless, many users of these programs find “doing statistics” an arduous, unenjoyable task. They still are faced with many potential obstacles, and they feel overwhelmed and stressed rather than challenged and excited about the potential for mastering these important skills.

What are some of the obstacles that students, in particular, face when they are trying to conduct statistical analyses with SPSS?

- **Obstacle 1:** Although SPSS is easy to use, many students and first-time users find it very complex. They have to learn how to input data into the Data Editor, save and retrieve data, make transformations to data, conduct analyses, manipulate output, create graphs, edit graphs, and so on.
- **Obstacle 2:** Students can feel helpless. Although they know how to point and click, they are frequently confronted with new dialog boxes with many decisions to make. Their instructor does not have the time to talk about each of the options, so students feel as if they are making uninformed decisions.
- **Obstacle 3:** The amount of output and numbers produced by any statistical procedure is enough to cower most researchers if they are forced to explain their meaning. How can students who are taking statistics for the first time feel confident about interpreting output from an SPSS procedure? In trying to understand output, they are likely to face language problems. For example, “What is a significant F value? Is it the same as the p value that the instructor is talking about? No, it couldn’t be, or she or he would have told us.”

Researchers, graduate students, and more advanced undergraduate students are going to face additional obstacles.

- **Obstacle 4:** Users can think of a number of different ways to analyze their data, but they are unsure about which way would yield the most understanding of their results and not violate the assumptions underlying the analyses.
- **Obstacle 5:** Even if users make all good decisions about statistical approaches and understand the output, they still must write a Results section that conforms to the American Psychological Association (APA) format.

*Using SPSS for Windows and Macintosh: Analyzing and Understanding Data* for Version 23 of SPSS helps readers overcome all of the obstacles discussed earlier. The book is divided into 10 units, which are as follows:

Units 1 to 4 guide students through the most basic of SPSS techniques and use a step-by-step description to master such techniques.

Unit 1, “Getting Started with SPSS,” shows the student how to get started using SPSS, including a survey of the main menus, a description of how to use SPSS Help, and a brief tour of what SPSS can do.

Unit 2, “Creating and Working with Data Files,” goes through the steps of defining variables, showing how data are entered and edited, how to use the Data Editor and the data view screens, how to print SPSS data files, and how to import and export information to and from SPSS.

Unit 3, “Working with Data,” describes how to find and replace data, recode and compute values, sort data, and merge and split files.

Unit 4, “Working with SPSS Graphs and Output for Windows,” teaches the student how to create and enhance SPSS charts as well as how to work with SPSS output including pivot tables. SPSS Windows (version 23)
and Macintosh (version 23) differ in the way that graphics are created and edited, and, thus, there is a separate section covering each—Lesson 16A for Windows and Lesson 16B for the Macintosh. SPSS is becoming increasingly cross-platform, and if you know the Windows version, you can easily adapt to the Macintosh version (and vice versa).

Each unit from 5 through 10 presents a set of statistical techniques and a step-by-step description of how to conduct the statistical analyses. This is not, however, a “cookbook” format. We provide extensive substantive information about each statistical technique, including a brief discussion of the statistical technique under consideration, examples of how the statistic is applied, the assumptions underlying the statistic, a description of the effect size for the statistic, a sample data set that can be analyzed with the statistic, the research question associated with the data set, step-by-step instructions for how to complete the analysis using the sample data set, a discussion of the results of the analysis, a visual display of the results using SPSS graphic options, a Results section describing the results in APA format, alternative analytical techniques (when available), and practice exercises.

Unit 5, “Creating Variables and Computing Descriptive Statistics,” shows how to create new variables from existing ones and discusses the basic procedures for describing qualitative and quantitative variables.

Unit 6, “t Test Procedures,” focuses on comparing means and shows how to use a variety of techniques, including independent and dependent t tests and the one-sample t test.

Unit 7, “Univariate and Multivariate Analysis-of-Variance Techniques,” focuses on the family of analysis-of-variance techniques, including one-way and two-way analyses of variance, analysis of covariance, and multivariate analysis of variance.

Unit 8, “Correlation, Regression, and Discriminant Analysis Procedures,” includes simple techniques such as bivariate correlational analysis and bivariate regression analysis, as well as more complex analyses such as partial correlational analysis, multiple linear regression, and discriminant analysis.

Unit 9, “Scaling Procedures,” focuses on factor analysis, reliability estimation, and item analysis.

Unit 10, “Nonparametric Procedures,” discusses a variety of nonparametric techniques, including such tests as the binomial, one-sample chi-square, Kruskal-Wallis, McNemar, Friedman, and Cochran tests.

New to This Edition

Version 23 of SPSS for Windows and the Macintosh offers additional features of great value. For more details about these features, refer to the SPSS Web site http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype%3DPM%26subtype%3DSP%26htmlfid%3DYSYD03023USEN.

This eighth edition of Using SPSS for Windows and Macintosh includes the following changes:

• Revisions to instructions have been made to ensure they are consistent with the latest version of SPSS.
• New exercises have been added to the end of lessons.
• Revisions to statistical information have been made to make it more accessible to readers.

Also, please note the following:

• While this edition of Using SPSS for Windows and Macintosh focuses on version 23, the material within the chapters is directly applicable to other versions of SPSS as well. In other words, version 23 is backward compatible with most earlier versions of SPSS. While there may be some slight differences, and earlier versions offer fewer features, the user should have no difficulty adapting these materials to the version he or she has available.

Please note that SPSS is developed and owned by IBM and is formally referred to as IBM SPSS Statistics.

Online Data Files

All the data files that you will need to work through the lessons in Using SPSS for Windows and Macintosh are available on the Web through the instructor. You can request your instructors for the same who can download and distribute the data files from the Pearson’s website at http://www.pearsonhighered.com. Several data sets—particularly, Crab Scale Results and Teacher Scale Results—will be introduced as you work through the first 18 lessons. A detailed description of these two files is provided in Appendix A.

There are two more types of data sets used in the later units. The first are data files that may be used when learning particular SPSS procedures, such as paired-samples, t test, or factor analysis. Any of these files can be easily identified since they are named, for example, Lesson 23 Data File 1 or Lesson 36 Data File 1. Also used in the second half of the book are data files for completing exercises at the end of lessons. These are named, for example, Lesson 23 Exercise File 1 or Lesson 36 Exercise File 2.

Please note that the Web site does not contain any executable SPSS data files. You need to have access to SPSS to use these files, as most users of this book will, at the school, company, or other institution. SPSS (at http://www.ibm.com/analytics/us/en/technology/spss/) offers a wide price range packages, including those for students.

Other Features of The Book

LEARNING OBJECTIVES At the beginning of each unit, you will see a list of objectives—skills that you will master when you successfully complete the content of the lesson and work through all of the exercises in the lesson. These advanced objectives indicate what you can expect, and what is expected of you.
TYING CONVENTIONS  There is only one typing convention you must attend to throughout this book. A sequence of actions is represented by what options are selected from what menu, connected by an arrow like this →.

For example, if a certain procedure requires clicking on the File menu and then clicking the New option, it would be represented as follows.

1. Click File → New.

EXAMPLES  Each lesson includes step-by-step procedures, with copious illustrations of screen shots, for successfully completing a technique with sample data. Exercises at the end of each lesson allow you to practice what you have learned.

TIPS  Some of the lessons contain tips (in the margins) that will help you learn SPSS and will teach you shortcuts that make SPSS easier to use.

System Requirements for SPSS 23
for Windows

If you are using SPSS 23 for Windows, then your system must meet the following minimal requirements:

• Microsoft Windows, Windows 7, and Windows 8 and 10 (plus Windows Server)
• Intel or AMD processor running at 1 gigahertz (GHz) or higher.
• 4 gigabytes (GB) of RAM or more.
• 2 gigabytes of available hard-disk space. If you install more than one help language, each additional language requires 60–70 MB of disk space.
• DVD/CD drive (unless downloaded online).
• 1024 x 768 or a higher-resolution monitor.

System Requirements for SPSS 23
for Mac OS X

If you are using SPSS 23 for Macintosh, then your system must meet the following minimal requirements:

• Mac OS® X 10.10 or higher (Yosemite).
• Intel processor.
• 4 gigabytes (GB) of RAM or more.
• 2 gigabytes of available hard-disk space. If you install more than one help language, each additional language requires 60–70 MB of disk space.
• DVD/CD drive.
• 1024 x 768 or a higher-resolution monitor.

Version 23 for both Windows and the Macintosh are virtually identical. The same differences in keystrokes that apply between the operating systems also apply for the use of SPSS. For example, to select all the files listed in a dialog box in the Mac version, use the Command (also known as the Apple key) + A key combination. For Windows, it’s the CTRL+A key combination.
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No book is ever the work of only the authors. Using SPSS for Windows and Macintosh was first contracted with Chris Cardone, whom we would like to thank for giving us the opportunity to undertake the project. Chris remains a good colleague and a better friend.

We would like to thank the many instructors and students who have contacted us about the book. We have very much appreciated your positive comments and your constructive suggestions.

Thank you for using this book. We hope it makes your SPSS activities easy to learn, fun to use, and helpful. Should you have any comments about the book (good, bad, or otherwise), feel free to contact us at the e-mail addresses listed below.

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SAM GREEN is Professor in the T. Denny Sanford School of Social and Family Dynamics at the Arizona State University. He teaches undergraduate and graduate courses in statistics for students in the behavioral sciences. He conducts research primarily in the areas of structural equation modeling, multivariate analyses of means, exploratory factory analysis, measurement invariance, analysis of item data, and reliability. He is currently on the editorial boards of Structural Equation Modeling: A Multidisciplinary Journal, Psychological Methods, Educational and Psychological Measurement, and Journal of Counseling Psychology. He is also a past chair of the Structural Equation Modeling Special Interest Group of the American Educational Research Association.

Sam has a wonderful wife, Marilyn Thompson, and three terrific daughters, Julie, Sarah, and Leah. He enjoys playing with his grandchildren. To relax, he likes to run, read novels, eat good food, travel, and get together with friends.

NEIL J. SALKIND received his Ph.D. from the University of Maryland in Human Development and is Professor Emeritus in the Department of Educational Psychology at the University of Kansas. He was a postdoctoral fellow at the University of North Carolina’s Bush Center for Child and Family Policy. He has published more than 150 professional papers and presentations, has written more than 100 trade and textbooks, including Statistics for People Who Think They Hate Statistics (Sage), Theories of Human Development (Sage), and Exploring Research (Pearson), and has edited several encyclopedias including the Encyclopedia of Human Development and the Encyclopedia of Measurement and Statistics. He was the editor of Child Development Abstracts and Bibliography.

Neil has a wonderful wife, Leni, and three terrific children, Sara, Micah, and Ted. To relax, he likes to letterpress print using equipment dating back to Karl Pearson, read, swim with the River City Sharks, bake brownies (see the recipe at www.statisticsforpeople.com), and poke around old Volvos and old houses.