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心理学专业 SPSS 13.0步步通 (第6版)

SPSS for Windows Step-by-Step

By Darren George Paul Mallery

附赠光盘

内含书中所有数据文件
SPSS 14.0试用版抢先体验

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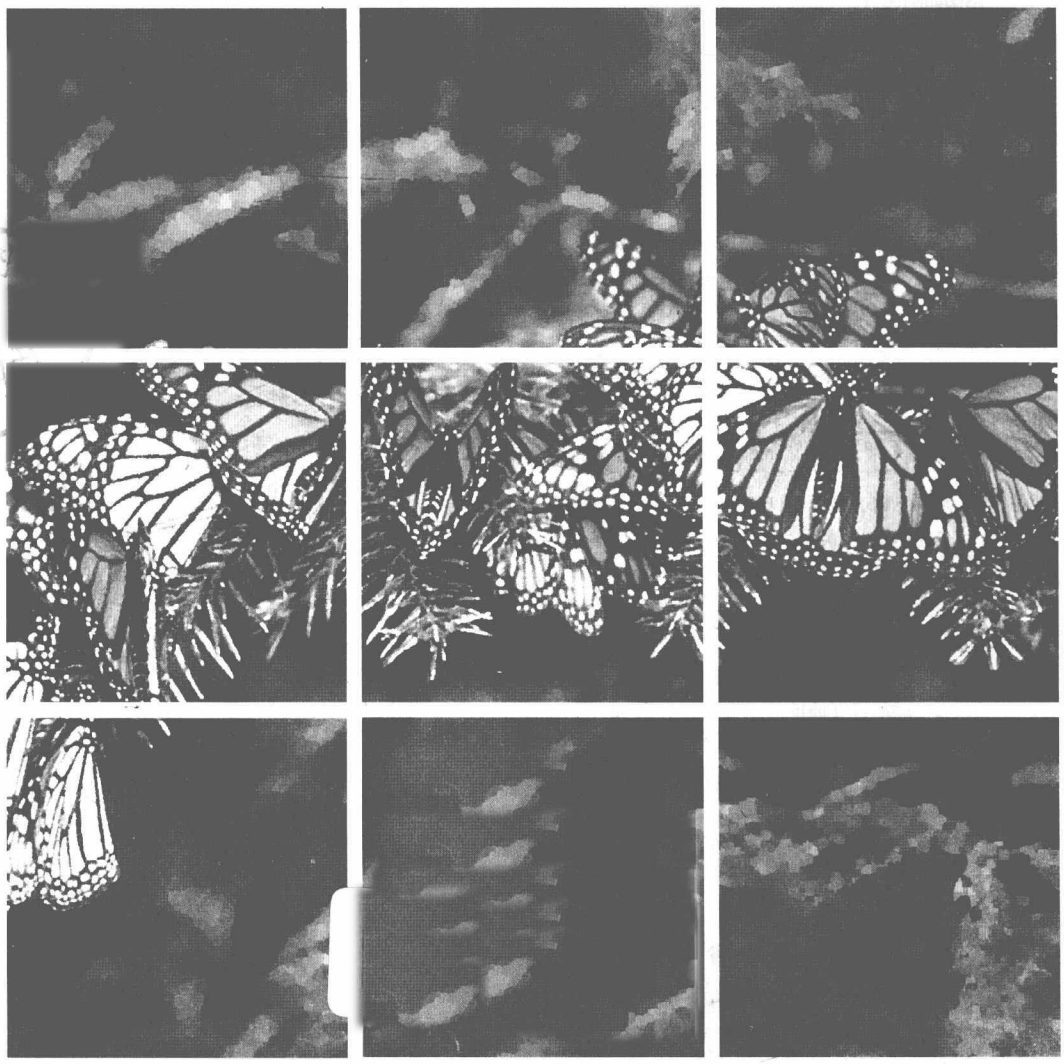

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中文导读

SPSS是社会科学研究的一个有力的工具，它使得数据分析过程变得相对简单而易于了解和掌握。本书对SPSS的程序和步骤都进行了非常清晰和透彻的介绍，跟随着书中的一步步讲解，初学者很容易掌握复杂的SPSS数据分析过程。SPSS的统计过程结果被总结到220张最新版的输出表中，而作者对于这些输出表中关键术语的解释以及相关理论背景的介绍，让读者在掌握具体统计过程的同时，也对统计逻辑的整体框架有所了解，这对初学者来说是非常有益的。本书对已经掌握SPSS的操作方法且需要经常使用SPSS的使用者来说也是一本有效的工具书，可以放在案头随时拿来翻阅。《SPSS步步通》第6版中显著的变化是增加了易读性，让烦杂的数据分析操作变得不再可怕。本书还突出介绍了SPSS13.0版本中的一大新特点，那就是数据编辑器的切分控制功能，通过上下两个对照表使得数据一目了然。

这本书的特点是简洁而全面。每章篇幅短小，而章节众多，覆盖的内容较为广泛。全书共有28章，前16章介绍了SPSS的基本内容，适用于对于统计知识有初步了解的读者，后12章涉及一些高级的统计知识，需要读者具备一定的统计基础。前五章介绍了建立和管理数据文件的知识，第6～28章逐步从基本系统模块介绍到高级统计和回归模块。每章依照下面三个部分叙述：

“Introduction”在一般的概念水平上解释统计程序，避免多余的细节和过多地强调计算；

“Step by Step”通过表和图将统计过程每个步骤分解，使其看到与之前章节的内部联系；

“Output”中解释了刚才运行的结果，将关键的术语给予定义。

主要内容包括：第一部分：概要、SPSS的视窗过程、建立和编辑数据文件、数据文件的管理、

制图。第二部分（基本命令模块）：Frequency 命令、Descriptive 命令、Crosstabulation 和 Chi-Square、Means 过程、相关分析、t 检验、单因素方差分析、二因素方差分析、三因素方差分析、简单线性回归、多元回归、非参数检验、信度分析、多维度度量、因素分析、集群分析、判别分析。第三部分（高级模块）：MANOVA 和 MANCOVA、重复测量的 MANOVA、逻辑回归、分层对数线性模型、一般对数线性模型、残差分析。

在每章的开始，作者都用一段文字来介绍该统计方法的基本原理。像作者在导言中陈述的那样，作者力图将每种统计方法予以言简意赅的介绍。综合以上特点，本书是一本很有价值的 SPSS 教材。

同样需要请读者注意的是，对多元回归或因素分析这样复杂的统计技术，用四五页纸来描述其原理显然是不够的，所以，就像我上课时向学生提醒的那样，希望读者不要将 SPSS 统计书替代心理统计使用。因此，读者在自学 SPSS 时，一定要结合统计书的有关章节，特别是高级统计，弄清概念和统计方法的原理和适用条件。这样才能更好地基于统计原理，得心应手地使用 SPSS 并为数据的统计分析进行服务。

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PREFACE

SPSS is a powerful tool that is capable of conducting just about any type of data analysis used in the social sciences, the natural sciences, or in the business world. While mathematics is generally thought to be the language of science, data analysis is the language of research. Research in many fields is critical for human progress, and as long as there is research, there will be the need to analyze data. The present book is designed to make data analysis more comprehendible and less toxic.

In our teaching, we have frequently encountered students so traumatized by the professor who cheerily says "Analyze these data on SPSS; get the manuals if you don't know how," that they dropped the course rather than continue the struggle. It is in response to this anguish that the present book was conceived. Darren George's background has been teaching high school mathematics, and Paul Mallery worked his way through college training people to use computers and programming computers. Both of us find great pleasure in the challenge of making a process that is intrinsically complex as clear as possible. The ultimate goal in all our efforts with the present book has been to make SPSS procedures, above all else, clear.

As the book started to take shape, a second goal began to emerge. In addition to making SPSS procedures clear to the beginner, we wanted to create a tool that was an effective reference for anyone conducting data analysis. This involved the expansion of the original concept to include essentially all major statistical procedures that SPSS covers in the base module and much of the advanced and regression modules as well. The result of years of effort you now hold in your hands.

The most significant changes in this edition are designed to make the book friendlier. For example, one of the great new features in SPSS version 13 is the splitter control in the data editor, so you can see you ID numbers, names, or demographics along the left column at the same time you see variables far to the right in your file; this is described in Chapter 3. A major visual overhaul has been completed with this edition; nearly all screens and most of the output has been updated to more closely match the SPSS windows and output. In all, 226 screen shots and output tables have been updated.

While the first 16 chapters of the book cover basic topics and would be understandable to many with very limited statistical background, the final 12 chapters involve procedures that progressively require a more secure statistical grounding. Those 12 chapters have provided our greatest challenge. At the beginning of each chapter we spend several pages describing the procedure that follows. But, how can one adequately describe, for instance, factor analysis or discriminant analysis in five or six pages? The answer is simple: The procedures must be described at a common sense, conceptual level that avoids excessive detail and excessive emphasis on computation. However, writing those introductions has not been at all simple. The chapter introductions are the most painstakingly worked sections of the entire book. Although we acknowledge the absence of much detail in our explanation of most procedures, we feel that we have done an adequate job at a project that few would even attempt. How successful have we been at achieving clarity in very limited space? You, the reader, will be our ultimate judge.

SPSS Inc. has produced several manuals to describe everything that their package of programs attempts to accomplish. These volumes, over 3000 pages of fine print documentation, are, if nothing else, comprehensive. Anything that SPSS is able to do is described in the manuals. For the experienced researcher, ownership of the manuals is required. We cannot cover in 380 pages what SPSS does in 3000. However, we are

convinced that 95% of analyses that are *ever* conducted in the sciences or business could be accomplished with the information presented in our book. For the additional 5% we frequently refer the reader to the SPSS manuals when the level of specificity required extends beyond the scope of the present volume.

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As we look over the creative efforts of the past years, we wish to acknowledge several people we have never met. These are individuals who have reviewed our work and offered invaluable insight and suggestions for improvement. Our gratitude is extended to Richard Froman of John Brown University, Michael A. Britt of Marist College, Marc L. Carter of the University of South Florida, and Randolph A. Smith of Ouachita Baptist University. And then there's the standard (but no less appreciated) acknowledgment of our families and friends who endured us while we wrote this. Particular notice goes to Marcus George (son of the first author) who contributed substantially to the design and format of the present volume, to our wives Elizabeth George and Suzanne Mallery for their support and encouragement, and to our children who figure out ways to spend the royalty checks.

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SPSS for Windows Step By Step

A Simple Guide and Reference

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1

An Overview of SPSS for Windows Step by Step

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THIS BOOK is designed to give you the step-by-step instructions necessary to do most major types of data analysis using SPSS for Windows. This software was originally created by three Stanford graduate students in the late 1960's, and SPSS (once "Statistical Package for the Social Sciences," then "Statistical Product and Service Solutions," and now just "SPSS"), a Chicago-based firm, has grown to be one of the world's largest statistical software companies.

NECESSARY SKILLS

For this book to be effective when you conduct data analysis with SPSS, you should have certain limited knowledge of statistics and a general acquaintance with the use of a computer. Each issue is addressed in the next two paragraphs.

Statistics: You should have had at least a basic course in statistics or be in the process of taking such a course. While it is true that this book devotes the first two or three pages of each chapter to a description of the statistical procedure that follows, these descriptions are designed to refresh the reader's memory, *not* to instruct the novice. While it is certainly possible for the novice to follow the steps in each chapter and get SPSS to produce pages of output, a fundamental grounding in statistics is important for an understanding of which procedures to use and what all the output means. In addition, while the first 16 chapters should be understandable by individuals with limited statistical background, the final 12 chapters deal with much more complex and involved types of analyses. These chapters require substantial grounding in the statistical techniques involved.

Computer knowledge: Your knowledge of the computer may be quite limited. The following, however, are necessary. You must:

- Have access to a personal computer that has
  - Windows 98, Windows 2000, ME, NT 4.0, or XP installed
  - SPSS for Windows Release 13 installed
- Know how to turn the computer on
- Have a working knowledge of the keys on the keyboard and how to use a mouse

This book will take you the rest of the way. If you are using SPSS on a network of computers (rather than your own PC) the steps necessary to access SPSS for Windows may vary slightly from the single step shown in the pages that follow.

SCOPE OF COVERAGE

SPSS for Windows is a complex and powerful statistical program by any standards. The software occupies about 200MB of your hard drive, and requires at least 128MB of RAM to operate adequately. If you didn't understand the last sentence, don't worry! Despite its size and complexity, SPSS has created a program that is not only powerful but is very user friendly (you're the user, the program tries to be friendly). By creating the windows version, SPSS has done for data analysis what Henry Ford did for the automobile: made it available to the masses. SPSS is able to perform essentially any type of statistical analysis ever used in the social sciences, in the business world, and in other scientific disciplines.

This book was written for Version 13 of SPSS for Windows. More specifically, the screen shots and output are based on Version 13.0. With some exceptions, what you see here will be similar to SPSS Version 7.0 and higher. Because only a few parts of SPSS are changed with each version, most of this book will apply to previous versions. It's 100% up-to-date with version 13.0, but it will only lead you astray about 3% of the time if you're using version 12.0, and it's still 85% accurate for version 7.0 (if you can find a computer that old).

Our book covers the statistical procedures present in the three *modules* created by SPSS that are most frequently used by researchers. A module (within the SPSS context) is simply a set of different statistical operations. We include the **Base System Module**, the module covering **Advanced Models**, and the module that addresses **Regression Models**—all described in greater detail later in this chapter. To support their program, SPSS has created a set of comprehensive manuals that cover all procedures these three modules are designed to perform. To a person fluent in statistics and data analysis, the manuals are well written and intelligently organized. To anyone less fluent, however, the organization is often undetectable, and the comprehensiveness (about 3,000 pages of fine-print text) is overwhelming. Our book is about 380 pages long. Clearly we cannot cover in 380 pages as much material as the manuals do in 3,000, but herein lies our major advantage.

The purpose of this book is to make the fundamentals of most types of data analysis clear. To create this clarity requires the omission of much (often unnecessary) detail. Despite brevity, we have been keenly selective in what we have included and believe that the material presented here is sufficient to provide simple instructions that cover 95% of analyses ever conducted by social science researchers. Although we cannot substantiate that exact number, our time in the manuals suggests that at least 2,000 of the 3,000 pages involve detail that few researchers ever consider. How often do you really need 7 different methods of extracting and 6 methods of rotating factors in factor analysis, or 18 different methods for post-hoc comparisons after a one-way ANOVA? (By the way, that last sentence should be understood by statistical geeks only.)

We are in no way critical of the manuals; they do well what they are designed to do and we regard them as important adjuncts to the present book. When our space limitations prevent explanation of certain details, we often refer our readers to the SPSS manuals. Within the context of presenting a statistical procedure, we often show a window that includes several options but describe only one or two of them. This is done without apology except for the occasional "description of these options extends beyond the scope of this book" and cheerfully refer you to the appropriate SPSS manual. The ultimate goal of this format is to create clarity without sacrificing necessary detail.

OVERVIEW

This chapter introduces the major concepts discussed in this book and gives a brief overview of the book's organization and the basic tools that are needed in order to use it.

If you want to run a particular statistical procedure, have used SPSS for Windows before, and already know which analysis you wish to conduct, you should read the Typographical and Formatting Conventions section in this chapter (pages 6-8) and then go to the appropriate chapter in the last portion of the book (Chapters 6 through 28). Those chapters will tell you exactly what steps you need to perform to produce the output you desire.

If, however, you are new to SPSS for Windows, then this chapter will give you important background information that will be useful whenever you use this book.

THIS BOOK'S ORGANIZATION, CHAPTER BY CHAPTER

This book was created to describe the crucial concepts of analyzing data. There are three basic tasks associated with data analysis:

A. You must type data into the computer, and organize and format the data so both SPSS and you can identify it easily,
B. You must tell SPSS what type of analysis you wish to conduct, and
C. You must be able to interpret what the SPSS output means.

After this introductory chapter, Chapter 2 deals with basic operations such as types of SPSS windows, the use of the toolbar and menus, saving, viewing and editing the output, printing output, and so forth. While this chapter has been created with the beginner in mind, there is much SPSS-specific information that should be useful to anyone. Chapter 3 addresses the first step mentioned above—creating, editing, and formatting a data file. The SPSS data editor is an instrument that makes the building, organizing, and formatting of data files wonderfully clear and straightforward.

Chapters 4 and 5 deal with two important issues—modification and transformation of data (Chapter 4), and creation of graphs or charts (Chapter 5). Chapter 4 deals specifically with different types of data manipulation, such as creating new variables, reordering, restructuring, merging files, or selecting subsets of data for analysis. Chapter 5 introduces the basic procedures used when making a number of different graphs; some graphs, however, are described more fully in the later chapters.

Chapters 6 through 28 then address Steps B and C—analyzing your data and interpreting the output. It is important to note that each of the analysis chapters is self-contained. If the beginner, for example, were instructed to conduct *t* tests on certain data, Chapter 11 would give complete instructions for accomplishing that procedure. In the Step by Step section, Step 1 is always "start the SPSS program" and refers the reader to Chapter 2 if there are questions about how to do this. The second step is always "create a data file or edit (if necessary) an already existing file," and the reader is then referred to Chapter 3 for instructions if needed. Then the steps that follow explain exactly how to conduct a *t* test.

As mentioned previously, this book covers three basic modules produced by SPSS: **Base System**, **Advanced Models**, and **Regression Models**. Since some computers at colleges or universities may not have all of these modules (the base-system module is always present), we organize the book according to the structure SPSS has imposed: In this book we cover ALL procedures included in the Base System module and then selected procedures from the more complex Advanced Models and Regression Models. Chapters 6-22 deal with processes included in the Base System module. Chapters 23-27 deal with procedures in the Advanced and Regression Models, and Chapter 28, the analysis of residuals, draws from all three modules.

Base System Module: Chapters 6 through 10 describe the most fundamental data analysis methods available, including frequencies, bar charts, histograms, and percentiles (Chapter 6); descriptive statistics such as means, medians, modes, skewness, and ranges (Chapter 7); crosstabulations and chi-square tests of independence (Chapter 8); subpopulation means (Chapter 9); and correlations between variables (Chapter 10).

The next group of chapters (Chapters 11 through 17) explains ways of testing for differences between subgroups within your data or showing the strength of relationships between a dependent variable and one or more independent variables through the use of *t* tests (Chapter 11), ANOVAs (Chapters 12, 13, and 14); linear, curvilinear, and multiple regression analysis (Chapters 15 and 16); and the most common forms of nonparametric tests are discussed in Chapter 17.

Reliability analysis (Chapter 18) is a standard measure used in research that involves multiple response measures, multidimensional scaling is designed to identify and model the structure and dimensions of a set of stimuli from dissimilarity data (Chapter 19), then factor analysis (Chapter 20), cluster analysis (Chapter 21), and discriminant analysis (Chapter 22) all occupy stable and important niches in research conducted by scientists.

Advanced and Regression Models: The next series of chapters deals with analyses that involve multiple *dependent* variables (SPSS calls these procedures General Linear Models; they are also commonly called MANOVAs or MANCOVAs). Included under the heading General Linear Model are simple and general factorial models and multivariate models (Chapter 23), and models with repeated measures or within-subjects factors (Chapter 24).

The next three chapters deal with procedures that are only infrequently performed, but they are described here because when these procedures are needed they are indispensable. Chapter 25 describes logistic regression analysis and Chapters 26 and 27 describe hierarchical and nonhierarchical log-linear models, respectively. As mentioned previously, Chapter 28 on residuals closes out the book.

AN INTRODUCTION TO THE EXAMPLE

A single example is used in 17 of the first 19 chapters of this book. For more complex procedures it has been necessary to select different examples to reflect the particular procedures that are presented. Examples are useful because often, things that appear to be confusing in the SPSS documentation become quite clear when you see an example of how they are done. Although only the most frequently used example is described here, there are a total of twelve data sets that are used to demonstrate procedures throughout the book, in addition to datasets used in the exercises. Data files are available for download at **www.ablongman.com/george6e**. These files can be of substantial benefit to you as you practice some of the processes presented here without the added burden of having to input the data. We suggest that you make generous use of these files by trying different procedures and then comparing your results with those included in the output sections of different chapters.

The example has been designed so that it may be used to demonstrate most of the statistical procedures presented here. It consists of a single data file used by a teacher who teaches three sections of a class with approximately 35 students in each section. For each student, the following information is recorded:

- ID number
- Name
- Gender
- Ethnicity
- Year in school

- Upper- or lower-division classperson
- Previous GPA
- Section
- Whether or not he or she attended review sessions or did the extra credit
- The scores on five 10-point quizzes and one 75-point final exam

In Chapter 4 we describe how to create four new variables. In all presentations that follow (and on the data file available on the website), these four variables are also included:

- The total number of points earned
- The final percent
- The final grade attained
- Whether the student passed or failed the course

The example data file (the entire data set is displayed at the end of Chapter 3) will also be used as the example in the introductory chapters (Chapters 2 through 5). If you enter the data yourself and follow the procedures described in these chapters, you will have a working example data file identical to that used through the first half of this book. Yes, the same material is recorded on the downloadable data files, but it may be useful for you to practice data entry, formatting, and certain data manipulations with this data set. If you have your own set of data to work with, all the better.

One final note: All of the data in the **grades** file are totally fictional, so any findings exist only because we created them when we made the file.

TYPOGRAPHICAL and FORMATTING CONVENTIONS

Chapter organization: Chapters 2 through 5 describe SPSS for Windows formatting and procedures, and the material covered dictates each chapter's organization. Chapters 6 through 28 (the analysis chapters) are, with only occasional exceptions, organized identically. This format includes:

1. The **Introduction** in which the procedure that follows is described briefly but concisely. These introductions vary in length from one to seven pages depending on the complexity of the analysis being described.
2. The **Step by Step** section in which the actual steps necessary to accomplish particular analyses are presented. Most of the typographical and formatting conventions described below refer to the Step by Step sections.
3. The **Output** section, in which the results from analyses described earlier are displayed—often abbreviated. Text clarifies the meaning of the output, and all of the critical output terms are defined.

The screens: Due to the very visual nature of SPSS, every chapter contains pictures of *screens* or *windows* that appear on the computer monitor as you work. The first picture from Chapter 6 (following page) provides an example. These pictures are labeled "Screens" despite the fact that sometimes what is pictured is a screen (everything that appears on the monitor at a given time) and other times is a *portion* of a screen (a window, a dialog box, or something smaller). If the reader sees reference to Screen 13.3, she knows that this is simply the third picture in Chapter 13. The screens are typically positioned within breaks in the text (the screen icon and