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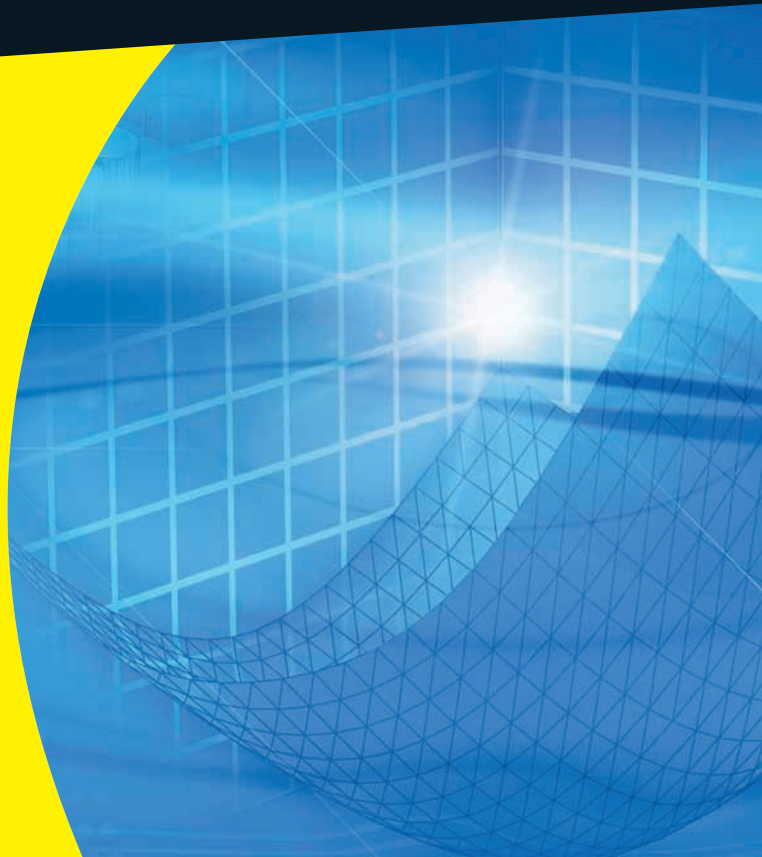
2nd Edition

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Stephen McDaniel
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by Stephen McDaniel and Chris Hemedinger



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Previously, Stephen was the senior manager in charge of the SAS Enterprise Guide development team and the SAS Add-In for Microsoft Office development team at SAS. Stephen has been a SAS user for more than 20 years and has experience with more than 50 organizations as a statistician, statistical programmer, product manager, and manager of data warehousing and business intelligence. You can reach him at www.Freakalytics.com.

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Dedication

I want to thank my wonderful wife and business partner, Eileen, for her patience, support, insights, and encouragement throughout the writing process!—Stephen McDaniel

For my beautiful (and patient) wife, Gail, and our inquisitive three daughters: Maggie, Evelyn, and Gwen. Listen up, girls: Despite what you hear from me, it's usually *not* polite to call somebody a “dummy.”—Chris Hemedinger

Authors' Acknowledgments

The first edition of *SAS For Dummies* took years to assemble, even with the help of dozens of people. It proved popular beyond our wildest expectations. With such momentum, you might think that this second edition would be a piece of cake and practically write itself. Think again.

We, the humble authors, could not have planned and completed this book without the tremendous help of our editors at Wiley and at SAS Press. From Wiley, we relied on Jodi Jensen and Katie Feltman for their coordination and Susan Pink for her thoughtful editing. At SAS Press, Stacey Hamilton served as our acquisitions editor, with help and guidance from Stephenie Joyner and Julie Platt.

Especially for this second edition, we had great technical and content feedback from our panel of reviewers: Marilyn Adams, Marie Dexter, and Jennifer Tamburro at SAS and Eileen McDaniel at Freakalytics.

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We're proud of this book; please send us your comments at <http://dummies.custhelp.com>. For other comments, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

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Introduction

Unless you're a hermit, chances are good that your life is touched by SAS (pronounced "sass") almost every day.

Have you ever received an offer for a credit card in the mail? The bank might have used SAS to select you for the particular offer you received. Remember a recent news article that cited demographic trends in the United States? The Census Bureau uses SAS to crunch its numbers. Were you tempted to buy that new gadget in a big-name retail store? The corporate office might have used SAS to calculate the best price to set for that specific item on that specific week.

The rate you pay for life insurance, the analysis behind pharmaceutical drug trials, the quality of parts used to assemble your automobile — all these are determined by people who use SAS. You don't see SAS directly from day to day — but, like gravity, it's an invisible force that affects your life.

This book offers a prolonged glimpse into the multifaceted world of SAS software. Read on to discover how people use SAS to influence the world around you. Perhaps you'll see how to grab the reins yourself and use SAS to affect your own sphere of influence.

About This Book

Although this book is titled *SAS For Dummies*, 2nd Edition, you absolutely need some smarts to get solid results using SAS. However, the overarching message of this book is that you don't need to be an expert at using software. You just need to know what questions to ask, what data is needed to provide an answer, and how to interpret the results.

This book covers a variety of SAS products. We take a high-level look at some and dive deeply into those that you're most likely to use. The amazing fact is that SAS offers hundreds of software products covering dozens of industries and disciplines. No single person could possibly use them all and still have time for essential activities, such as sleep and personal hygiene. (Hmm, maybe that explains the smell around here.)

Like most software products, SAS products look and work differently from version to version. We describe SAS 9.2 and version 4.2 of the applications that we discuss most, including SAS Enterprise Guide, SAS Add-In for

Microsoft Office, and SAS Web Report Studio. If you have a different version of these SAS applications, many of the instructions and figures in the book will differ from what you see in your installation.

And, hey! Here's something cool about this book: You don't have to read it from stem to stern. Feel free to skip around, reading the sections that cover what you need to know.

This book does *not* address two popular SAS topics:

- ✔ **How to program in SAS:** SAS software has been around for more than 30 years, and you can find plenty of books about SAS programming. Indeed, one goal of this book is to show you how much you can do with SAS without having to become a SAS programmer. However, we provide several examples of SAS programs throughout the book, especially in Chapter 16, so you can at least recognize a SAS program if you meet one on the street.
- ✔ **Life at SAS Institute Inc., the makers of SAS software:** SAS, the company (along with its founder, Jim Goodnight), has had more than its 15 minutes of fame on TV shows (such as *60 Minutes* and *Oprah*) plus a big dose of coverage in business magazines (such as *Fortune* and *Forbes*). The stories are overwhelmingly positive (not featuring anyone trying to blot out the camera view with his palm). SAS is famous for being a great place to work. One of the authors holds a day job at SAS — and he really likes that job. That's all we'll say about that.

Conventions Used in This Book

This book contains lots of descriptive information about SAS software. Because a picture is worth — well, you know — this book has lots of figures of the software in action. (*Action* is a relative term; after all, this *is* business and analytical software, not *World of Warcraft*.)

- ✔ You'll find plenty of step-by-step instructions to accomplish specific tasks. You can follow along with these if you have the software handy; otherwise, you can use your imagination and pretend how much fun it is.
- ✔ When we show a URL, filename, path, data set, or code within regular text, we set it off in a monospace type, like `this`.
- ✔ When we want you to type something, we bold the characters you type (such as, **type this**).
- ✔ If you get the munchies while reading this book, it's because most of the examples refer to data with a candy theme.

- ✓ The data files discussed in the book actually ship with *SAS Enterprise Guide*, which is a SAS application that features prominently in this book.

What You're Not to Read

Occasionally, you'll see some sidebar topics or Technical Stuff icons in the margin that indicate an historical or a technical side point. You can skip those if you want, but reading them will give you that extra edge when SAS comes up in the discussion at the next cocktail party you attend. Study up and impress your friends!

Foolish Assumptions

To better manage the task of writing this book, we had to begin with some assumptions about you, the reader. Here they are:

- ✓ SAS software runs on many types of computer systems, but the majority of people experience it under Microsoft Windows. So, the examples are presented as if you're using a PC. We assume that you know your way around a PC, clicking the mouse, selecting menus, and so on.
- ✓ As we stated, we don't assume that you are a SAS programmer or that you even aspire to be one. However, if you are or if you do, you'll still find this book useful to round off your SAS knowledge.

How This Book Is Organized

Yes, this book *is* organized; the chapters don't simply appear in random order. There are six major parts, each of which includes some self-contained chapters. Don't feel as though you need to read them in order, though. Please, make yourself at home and read whichever chapters interest you the most. (Really, it's okay; we won't be offended.)

Part I: Welcome to SAS!

SAS, meet reader. Reader, meet SAS. In Part I, you get to know each other in this overview of what SAS software is about and what it can do for you. You'll

find an introduction to SAS Enterprise Guide and some examples for getting quick results without having to be an expert.

Part II: Gathering Data and Presenting Information

Data is everywhere, but information is scarce. Part II shows how you can use SAS to take data and turn it into information you can use. And even better, you can see how to turn it into information that others will use and thank you for. You'll find out how to build basic reports and graphs that actually convey useful information.

Part III: Impressing Your Boss with Your SAS Business Intelligence

Part III is a whirlwind tour through the concepts of statistics and analytics. You get an overview of the basics, as well as some examples of how you can apply analytics to understand and predict behavior, as represented in data. Correlations, causality, forecasting — those topics and others are discussed here.

Part IV: Enhancing and Sharing Your SAS Masterpieces

Part IV could be titled “SAS: It’s Everywhere You Want to Be” or “SAS: It’s Not Just for Programmers Anymore.” You’ll see how you can use SAS from your desktop, on the Web, in Microsoft Excel, and even in Microsoft PowerPoint!

Part V: Getting SAS Ready to Rock and Roll

Part V provides a high-level view of how to install and configure SAS software. You might come away with an enhanced appreciation for the person who performs that task for you. You’ll find a gentle introduction to the concepts and structure of SAS programs. And for the experienced SAS programmers in the audience, you can find a candid overview of SAS Enterprise Guide, your new friend.

Part VI: The Part of Tens

Part VI is where we stored the nuggets of knowledge that you can count on both hands (or feet!). Even if you already consider yourself a SAS expert, we promise that you will discover something new here. Check out Part VI for ten productivity tips for SAS Enterprise Guide users, ten must-know items for SAS administrators, and links to more resources.

Icons Used in This Book

All the information in this book is special; we wouldn't have included it otherwise. But some information that we provide is more special than the rest. To draw attention to its "specialness," we tagged it with some eye-catching little icons.



The Tip icon calls out a sentence or two that might prove to be a timesaver in your work. (You're welcome.)



Got a mind like a steel sieve? Well, you might want to reserve some space in your memory bank for the content next to the Remember icon. We use this icon as a way to emphasize an important point or concept.



Hear the voice in your head yelling "Danger Will Robinson! Danger!?" Is your "spidey sense" tingling? Well, there is little danger, really, as long as you heed the advice shown near the Warning icon.



This book contains many little gems of technical information. You can still use SAS if you don't read and understand this stuff, just like you can still enjoy watching hockey if you don't know what *icing* means. But, as any fan will tell you, it's more fun knowing what it all means.

Where to Go from Here

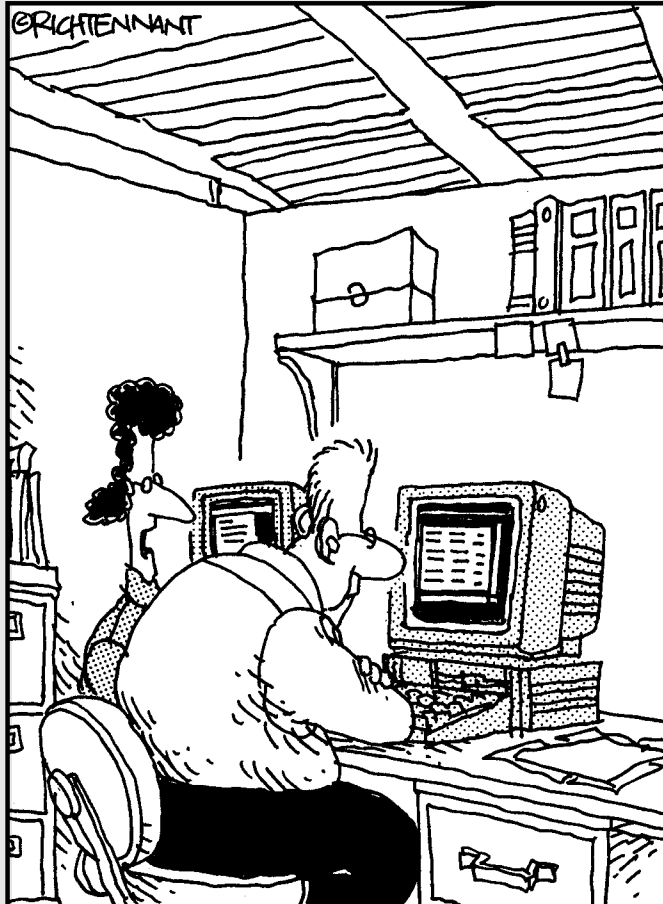
After you read through this book, you might crave more details about specific areas that we cover. (Or maybe those cravings are related to the candy-themed examples.) The best starting place for more information is the SAS support Web site at <http://support.sas.com>.

If this book transforms you into a card-carrying SAS user, your next step might be to seek out others like you. That will be easy because millions of people around the globe use SAS. And do you know what? They like to get together every so often in SAS user groups. User group meetings and conferences provide a great way to find out more from your peers about how to use SAS in practical and creative ways. User group information is available from SAS at <http://support.sas.com>.

Part I

Welcome to SAS!

The 5th Wave By Rich Tennant



“This isn’t a quantitative or a qualitative estimate of the job. This is a wish-upon-a-star estimate of the project.”

W ***In this part . . .***
hat exactly is SAS anyway? Is it really a
Scandinavian airline (wrong SAS), or do those
letters mean something else?

In this part, you discover how to see the world for what it is: a huge bucket of data. And we show you how you can use SAS software to pull some of that data together and draw useful information from it. We introduce you to some of the basic tools that will become your companions as you begin your journey toward SAS savviness.