

# PROC TABULATE

## by Example

*Second Edition*



Lauren Haworth Lake and Julie McKnight



From *PROC TABULATE by Example*. Full book available for purchase [here](#).

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## Chapter 1

# Benefits of Using PROC TABULATE

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## Introduction

SAS software provides hundreds of ways for you to analyze your data. You can use the DATA step to slice and dice your data, and there are dozens of procedures that will process your data and produce all types of statistics. But it is likely that no matter how you organize and analyze your data, you will end up producing a report in the form of a table.

Whether your reports are for an article in a scientific journal, a market analysis for a client, or an internal report for your boss, what you need is a concise table with all of the pertinent results in one place.

This is why every SAS user needs to know how to use PROC TABULATE. While the TABULATE procedure does not do anything that you cannot do with other procedures, the payoff is in the output. PROC TABULATE computes a variety of statistics, and it neatly packages the results in a single table.

Instead of running two or three procedures and then having to either turn in your results as a big stack of output or retype the results into a table, you can use PROC TABULATE to create a single piece of output that is ready for delivery.

To illustrate the similarities and differences between PROC TABULATE and other SAS procedures, the following example takes the same analysis and produces the results, first using PROC MEANS and then using PROC TABULATE.

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## Example without Using PROC TABULATE

Here is the situation: Your boss wants to know the average age, income, and education of your customers, overall and by gender. "No problem," you say, "SAS software can do that easily." To get the overall means, you use the following code:

```
PROC MEANS;
```

```
VAR AGE INCOME EDUC;
RUN;
```

This code produces **Output 1.1**. The column under the heading Mean has your desired results.

**Output 1.1** MEANS Procedure Output

#### The MEANS Procedure

Variable	N	Mean	Std Dev	Minimum	Maximum
AGE	6639	48.6140985	16.5979491	25.0000000	90.0000000
INCOME	6639	25065.80	23850.49	0	263253.00
EDUC	6639	13.0403675	2.9534702	4.0000000	19.0000000

But wait a minute, didn't your boss also want the results broken down by gender? Now you have to add another procedure to your program. To get the breakdown by gender, you repeat the same PROC MEANS, adding a BY statement:

```
PROC MEANS;
  BY GENDER;
  VAR AGE INCOME EDUC;
RUN;
```

This code produces **Output 1.2**. Your additional results are shown in two columns, one under **GENDER=Female** and one under **GENDER=Male**. So now you have everything your boss wants. The only problem is that it is scattered across three different places in two separate pieces of output.

**Output 1.2** Using PROC MEANS with BY Groups

#### The MEANS Procedure

##### GENDER=Female

Variable	N	Mean	Std Dev	Minimum	Maximum
AGE	3559	49.5279573	17.1580374	25.0000000	90.0000000
INCOME	3559	17780.09	17070.60	0	263253.00
EDUC	3559	12.9322843	2.8992197	4.0000000	19.0000000

##### GENDER=Male

Variable	N	Mean	Std Dev	Minimum	Maximum
AGE	3080	47.5581169	15.8635747	25.0000000	90.0000000
INCOME	3080	33484.58	27520.48	0	251998.00
EDUC	3080	13.1652597	3.0105845	4.0000000	19.0000000

You can retype the data into a table in your word processor, but that takes time and might introduce errors. Or, you can give your boss the pages of output with the relevant results



circled — not a very professional solution. Or, you can turn to a different procedure that is more suitable for the task: PROC TABULATE.

## Example Using PROC TABULATE

To produce exactly what your boss wants, use the following code:

```
PROC TABULATE;
  CLASS GENDER;
  VAR AGE INCOME EDUC;
  TABLE (AGE INCOME EDUC)*MEAN, GENDER ALL;

RUN;
```

This generates **Output 1.3**. It has all of the numbers your boss wants in a single table, and it is ready for delivery.

**Output 1.3** PROC TABULATE Table

		GENDER		All
		Female	Male	
AGE	Mean	49.53	47.56	48.61
INCOME	Mean	17780.09	33484.58	25065.80
EDUC	Mean	12.93	13.17	13.04

Okay, so if PROC TABULATE is so great, why doesn't everybody use it? The answer is that many users find PROC TABULATE hard to learn. The syntax is not as intuitive as some other SAS procedures. The goal of this book is to debunk the myth that PROC TABULATE is impossible to learn. The following chapters walk you through the process of building PROC TABULATE tables step by step, with plenty of examples, from basic to advanced. Then, when you are ready to build your own tables, all you need to do is copy one of the examples and modify it to meet your needs.

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# About This Book

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---

## Purpose

The book provides real– world examples that provide SAS users with a step-by-step guide to producing tables and reports with the TABULATE procedure.

---

## Is This Book for You?

This book is aimed at all levels of users, but depending on your level of expertise, some parts might be more helpful than others. Here is a guide to what parts of the book will be the most help for you.

Beginning users:	If you are not familiar with SAS software and have little or no experience with PROC TABULATE, you should read "The Basics" in detail. After that, the examples in "Intermediate Topics" will be more understandable, and you can use them as needed. Some of the examples in "Advanced Topics" require more expertise with the DATA step and other SAS procedures and tools. You might wish to save these until you have further experience with SAS.
Intermediate users:	If you have already built simple PROC TABULATE tables, you can skim "The Basics" and move on to read "Intermediate Topics" in more detail. Then, you can go on to take advantage of the examples in "Advanced Topics."
Advanced users:	If you are already comfortable with PROC TABULATE table production, you will want to skim "Intermediate Topics," and then go on to read "Advanced Topics" in more detail.
All users:	No matter what your level of expertise, you should look at "Common Errors" whenever you run into problems.

---

## Prerequisites

This book assumes that you have basic knowledge of SAS software.

---

## What's New?

- The PROC TABULATE syntax has been updated to reflect most of the new features added since version 7.
- Output Delivery System (ODS) examples and tips have been added.
- All examples have been run to show HTML output.

---

## Scope of This Book

This book provides a wide range of beginner, intermediate, and advanced examples.

You do not have to read this book from cover to cover to take advantage of the PROC TABULATE techniques that it contains. The book is set up as a series of examples, so you can zoom in on the information that best meets your needs.

1. Find the chapter that seems to cover the general type of table you are interested in. For example, if you need help with percentages, try [Chapter 7, "Handling Percentages," on page 75](#) or [Chapter 8, "Handling Complex Percentages," on page 87](#).
2. Flip through the chapter looking at the example output until you find a table that looks approximately like the table that you are trying to build.
3. After reading the explanation, use the example code to start building your own table. Figure out which variables you want to use for your rows, and substitute them for the row variables in the example code. Then figure out which variables you want to use for your columns, and substitute them for the column variables in the example code. Finally, figure out which statistics you want to use, and substitute them for the statistics in the example code.
4. Do a test run of your code to see whether you have got the approximate table that you were looking for. If you run into problems, reread the explanation. If you are still stuck, refer to the chapters in the "Common Errors" section.
5. Once the basic structure is correct, you can work on cleaning up and refining your table. Chapters 9–13 cover topics related to revising the appearance of your table.

---

## About the Examples

### **Software Used to Develop the Book's Content**

All of the output was created with SAS 9.4.

### **Example Code and Data**

You can access the example code and data for this book by linking to its author page at <http://support.sas.com/publishing/authors>. Select the name of the author. Then, look for the cover thumbnail of this book, and select Example Code and Data to display the SAS programs that are included in this book.

For an alphabetical listing of all books for which example code and data are available, see <http://support.sas.com/bookcode>. Select a title to display the book's example code.

If you are unable to access the code through the website, send email to [saspress@sas.com](mailto:saspress@sas.com).

### **Output and Graphics Used in This Book**

The HTML output is created using a specialized ODS style that is created for SAS Press books. Your default HTML output will look different.

---

## Additional Resources

This book is designed to guide you step by step through the table production process, but there is a lot of information about PROC TABULATE that is beyond the scope of this book to present. The following page lists a number of useful references: SAS manuals related to PROC TABULATE, background reading for newer SAS users, and additional tips and techniques from other SAS users.

- *Getting Started with the SAS 9.4 Output Delivery System*
- *SAS 9.4 Output Delivery System: Procedures Guide*
- *SAS 9.4 Output Delivery System: User's Guide, Third Edition*
- *Base SAS 9.4 Procedures Guide, Third Edition*
- *SAS 9.4 Statements: Reference, Third Edition*
- *SAS 9.4 System Options: Reference, Third Edition*
- *SAS 9.4 Formats and Informats: Reference*
- *SAS 9.4 Macro Language: Reference, Third Edition*

Background Reading for Beginners

- Delwiche, L. and Slaughter, S. (1995), *The Little SAS Book: A Primer*, Cary, NC: SAS Institute Inc.

- Pass, R. (1997), "PROC REPORT: An Introduction to the Batch Language," *Proceedings of the Twenty-Second Annual SAS Users Group International Conference*, 22, 682-691.

More Tips and Techniques for Intermediate and Advanced Users

- McLawhorn, Kathryn (2013), "Tips for Generating Percentages Using the SAS® TABULATE Procedure" *Proceedings of the SAS® Global Forum 2013 Conference, Paper 134-2013*. Cary, NC: SAS® Institute Inc.
- Pass, Ray, McNeill, Sandy (2004), "PROC TABULATE: Doin' It in STYLE" *Proceedings of the Twenty-Ninth Annual SAS® Users Group International Conference, Paper 085-29*. Cary, NC: SAS® Institute Inc.
- Bilenas, Jonas V. (2005), "Making Sense of PROC TABULATE" *Proceedings of the Thirtieth Annual SAS® Users Group International Conference, Paper 243-30*. Cary, NC: SAS® Institute Inc.
- Bruns, D. (1997), "The Truly Advanced Features of the TABULATE Procedure," *Proceedings of the Twenty-Second Annual SAS® Users Group International Conference*, 22, 251-256. Cary, NC: SAS® Institute Inc.
- Pass, Ray (2005) "I'll Have the PROC TABULATE a la ODS Please, with a Table of Contents on the Side" *Proceedings of the Thirtieth Annual SAS® Users Group International Conference, Paper 007-30*. Cary, NC: SAS® Institute Inc.
- Gravely, A. (1998), *Your Guide to Survey Research Using the SAS® System*, Cary, NC: SAS Institute Inc.
- Li, C. and Sun, J. (1998), "Using Hyperlink to Organize SAS HTML Output," *Proceedings of the Twenty-Third Annual SAS® Users Group International Conference*, 23, 986-990. Cary, NC: SAS Institute Inc.
- Mason, P. (1996), *In the Know ... Tips and Techniques from Around the Globe*, Cary, NC: SAS Institute Inc.
- Noga, S. and Abolafia, J. (1998), "The Tabulate Procedure: One Step Beyond the Final Chapter," *Proceedings of the Twenty-Third Annual SAS Users Group International Conference*, 23, 839-844. Cary, NC: SAS Institute Inc.
- Andersen, Sheree H. et al. (1994), *Reporting From the Field: SAS Software Experts Present Real-World Report-Writing Applications*, Cary, NC: SAS® Institute Inc.
- Tien, P., Lin, T., and McGranachan, M. (1997), "Some Tips and Examples for Using PROC TABULATE," *Proceedings of the Twenty-Second Annual SAS® Users Group International Conference*, 22, 1024-1029. Cary, NC: SAS® Institute Inc.

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# About the Authors

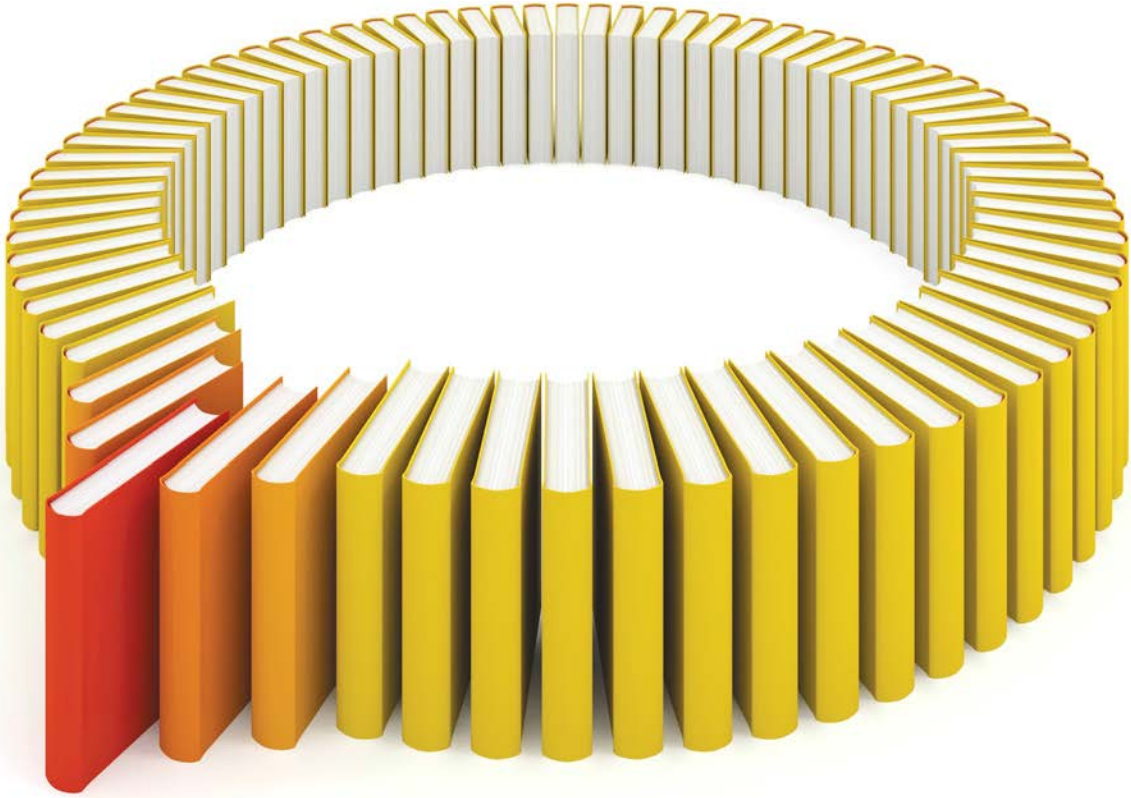
---



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