



STATISTICAL METHODS FOR PRACTICE AND RESEARCH

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Statistical Methods for Practice and Research

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A guide to data analysis using SPSS

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Response Books

A division of SAGE Publications

New Delhi ♦ Thousand Oaks ♦ London

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First published in 2006 by



Response Books

A division of Sage Publications India Pvt Ltd
B-42, Panchsheel Enclave
New Delhi 110 017
www.indiasage.com

Sage Publications Inc
2455 Teller Road
Thousand Oaks
California 91320

Sage Publications Ltd
1 Oliver's Yard
55 City Road,
London EC1Y 1SP

Published by Tejeshwar Singh for Response Books, typeset in 11/13.5 Palatino by Star Compugraphics Private Limited, Delhi and printed at Chaman Enterprises, New Delhi.

Second Printing 2007

Library of Congress Cataloging-in-Publication Data

Gaur, Ajai S., 1977–

Statistical methods for practice and research: a guide to data analysis
using SPSS/Ajai S. Gaur, Sanjaya S. Gaur.
p. cm.

Includes bibliographical references.

1. SPSS (Computer file) 2. Social sciences—Statistical methods—Computer programs. 3. Social sciences—Research—Statistical methods.

I. Gaur, Sanjaya S., 1969– II. Title.

HA32.G38

005.5'5—dc22

2006

2006015343

ISBN: 10: 0-7619-3502-9 (PB)

10: 81-7829-657-8 (India-PB)

13: 978-0-7619-3502-5 (PB)

13: 978-81-7829-657-9 (India-PB)

Sage Production Team: Anindita Pandey, Girish Sharma and Santosh Rawat

To our parents

Shri Ram Saran and Smt. Sumitra

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Preface

For business managers and practicing researchers, many times it becomes difficult to solve the real life problems involving statistical methods using software packages. The books on managerial statistics do give a comprehensive picture of statistics as a facilitating tool for managerial decision-making but they invariably fail in helping the manager/researcher in solving and getting results for practical problems. With the help of simple examples, these books very successfully explain simple calculation procedures as well as the concepts behind them. However manual calculations, being cumbersome, tiresome and error-prone can be successful only to the extent of explaining the concepts and not for solving the real life research problems involving huge amount of data.

For this reason, most of the practical statistical analyses is done with the help of an appropriate software package. A manager/researcher, is only required to prepare the input data and should be able to get the final result easily with the help of software packages, so that focused attention can be given to various other aspects of problem solving and decision making.

A wide variety of software packages such as SPSS, Minitab, SAS, STATA, S-PLUS etc. are available for statistical analyses. Microsoft Excel can also be used very successfully to solve a wide variety of problems. Some books on managerial statistics even provide with spreadsheet templates where different results can be obtained by changing the input data. However, without the practical knowledge of working with a specialized software package, such templates are not helpful beyond academic interest.

This book is an effort towards facilitating business managers and researchers in solving statistical problems using computers. We have chosen SPSS, which is a very comprehensive and widely available package for statistical analyses. We have illustrated its usage with the help of simple practical problems. The objective is to make the readers understand how they can use various statistical techniques for their own research problems. Throughout the book, point and click method has been used in place of writing the syntax, even though syntax has been provided for interested users at the end of each analysis. The advantage of the point and click method is that it does not require any advance knowledge of the syntax

and altogether eliminates the need to learn different types of command for different analyses.

The book is aimed primarily at academic researchers, MBA students, doctoral, masters and undergraduate students of mathematics, management science and various other science and social science disciplines, practicing managers, marketing research professionals etc. It is also expected to serve as a companion volume to any standard text book of Statistics and Marketing Research and for use in such courses in business schools and engineering colleges.

The book comprises of 11 chapters. Chapter 1 presents a brief overview of SPSS. Chapter 2 gives an overview of basic statistical concepts with the aim of helping in a quick revision of basic concepts, which one commonly encounters while carrying out data analyses. For an in-depth understanding of these concepts, readers are advised to refer to any standard text book on statistics. Chapter 3 presents the use of SPSS in calculating descriptive statistics and presenting a visual display of the data. Chapters 4 and 5 present statistical techniques for comparing means of two or more than two groups. Chapter 6 describes a chi-square test for discrete data. Correlation analyses is presented in Chapter 7, followed by multiple regression in Chapter 8 and logistic regression in Chapter 9. Finally, we present data reduction techniques and methods for establishing scale reliability in Chapter 10 and advanced data handling and manipulation techniques in Chapter 11.

The illustrations are based on the SPSS 14.0 version. However, earlier versions of SPSS (10, 11, 12, 13) are functionally not much different from this version. The users of the earlier versions will find it equally useful for their purpose. With this book, we hope, you can analyze your data on your own, and appreciate the real use of statistics.

Acknowledgements

Many people have made this book possible. We would especially like to thank our students and participants of the research methods workshops we conducted all over India for refining our thinking and for motivating us to write a text on this subject. Our sincere thanks are due to Andrew Delios for his unusual tutelage on finer aspects of data analyses. The publishing team at Sage, New Delhi has been very helpful. Leela, Shweta and Anindita need special mention for their patience and support during the publication process. We would also like to thank Chapal, without whose persistence this book would have never come out. Finally, we thank our families—Sanjaya's family: Nirmal, Kamaksi and Vikrant, and Ajai's family: Deeksha—for their continued support and encouragement, without which this project would not have been attempted, much less finished.

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Introduction to SPSS

SPSS is a very powerful and user friendly program for statistical analyses. Anyone with a basic knowledge of statistics who is familiar with *Microsoft Office* can easily learn how to run very complicated analyses in SPSS with a simple click of the mouse. We begin this chapter from how to open the SPSS program and go on to explain different menus on the tool bar, the starting commands, and the basic procedures of data entry.

1.1 STARTING SPSS

The SPSS program can be installed in a computer using a CD or from the network. A free trial version of the program can be obtained using the coupon provided at the end of this book. Once installed, SPSS can be opened like any other Windows-based application by clicking on the *Start* menu at the bottom left hand corner of the screen and clicking on *SPSS for Windows* from the list of programs. Opening the SPSS program for the first time will produce a dialogue box as shown in Figure 1.1. This dialogue box is not of any particular use, select *Don't show this dialogue box in the future*, and click on the *Cancel* button. This activates a window as shown in Figure 1.2. This is the main data editor window where all the data is entered, much like an Excel spreadsheet. A quick look at this screen (Figure 1.2) reveals that it is quite similar to most of the other Windows-based applications such as MS Excel.

At the top of the screen there are different menus, which give access to various functions of SPSS. Below this, there is a toolbar, which has buttons for quick access to various functions. The same functions can be performed by choosing relevant options from the menus. At the bottom of the screen

we have a status bar. At the bottom of Figure 1.2, we can see “SPSS Processor is ready” in the status bar. It implies that SPSS has been installed properly and the license is valid. If the analysis is being run by the processor, status bar shows a message to that effect. The program can be closed by clicking on the close button at the top right hand corner, just like in any other Windows application software.

1.2 SPSS MAIN MENUS

SPSS 14.0 has 11 main menus, which provide access to every tool of the SPSS program. You can see the menus on the top of Figure 1.2. Readers must be familiar with some of the menu items like *File*, *Edit* etc. as these are

Figure 1.1

