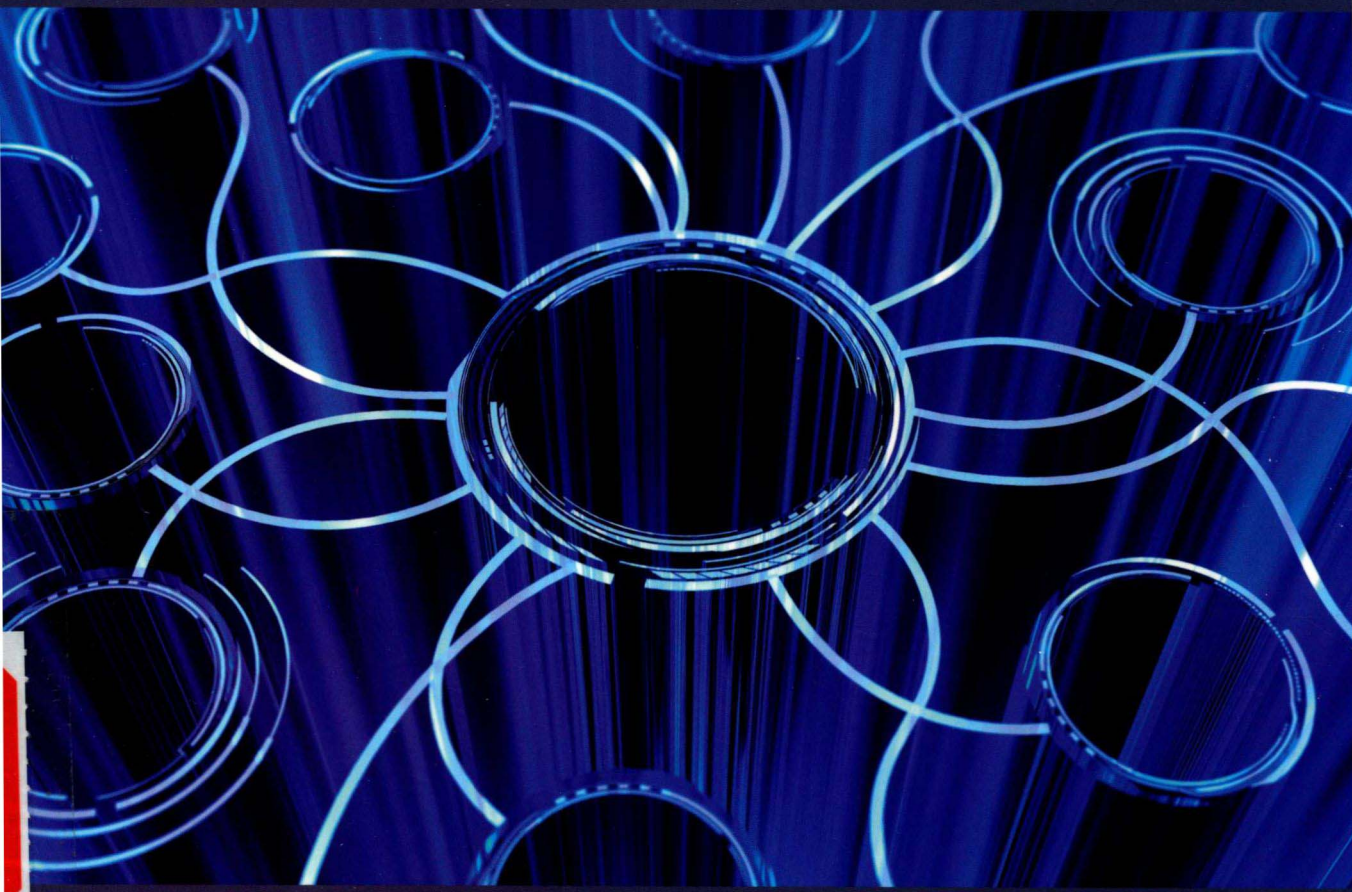
STATISTICS *for* HUMAN SERVICE EVALUATION



REGINALD O. YORK

STATISTICS *for* HUMAN SERVICE EVALUATION

"York provides an easy-to-follow 'how-to' text for practitioners who want to evaluate client progress. The book guides practitioners in the selection of appropriate statistical tests to compare groups, assess change from pre- to posttests, and assess outcomes in single system design. York's text is one that practitioners will want to keep on their bookcase and refer back to over the years."

—**Carolyn L. Turturro**, University of Arkansas at Little Rock

"This is the most comprehensive book on statistical analysis of data for human service evaluation. Social work educators, psychologists, clinicians, and sociologists would be well served in making use of this all-inclusive text."

—**Jitendra Kapoor**, Alabama A&M University

"This textbook empowers students to understand not only how to run statistics, but why they will run their chosen statistics. It closes the gap between 'scary statistics' and practical alienation of statistics in the profession."

—**Marjorie C. Shavers**, Heidelberg University

"The author sees data analysis and statistics through a student's perspective. Use of a task-based approach to statistics makes it more relevant to students and easier to grasp."

—**Roseanna McCleary**, California State University, Bakersfield

This practical book shows how both Excel® and SPSS® can be used for analyzing data for human service evaluation. Assuming no prior instruction for statistics, the text utilizes a "learn by doing" approach: Readers see the use of statistics demonstrated and then are encouraged to apply their own data to statistical analysis with step-by-step guidance. Decision trees, practice exercises, and quizzes ensure readers will be well prepared to practice data analysis in a wide variety of human services situations.

Cover Image: ©iStockphoto.com/Andrey Prokhor

ISBN 978-1-4833-8669-0

90000

9 781483 386690

SAGE www.sagepublishing.com
Los Angeles | London | New Delhi | Singapore | Washington DC | Melbourne

YORK

STATISTICS *for* HUMAN SERVICE EVALUAT

SAGE

Statistics for Human Service Evaluation

Reginald O. York

University of North Carolina, Wilmington

SAGE

Los Angeles | London | New Delhi
Singapore | Washington DC | Melbourne

SAGE

FOR INFORMATION:

SAGE Publications, Inc.
2455 Teller Road
Thousand Oaks, California 91320
E-mail: order@sagepub.com

SAGE Publications Ltd.
1 Oliver's Yard
55 City Road
London, EC1Y 1SP
United Kingdom

SAGE Publications India Pvt. Ltd.
B 1/I 1 Mohan Cooperative Industrial Area
Mathura Road, New Delhi 110 044
India

SAGE Publications Asia-Pacific Pte. Ltd.
3 Church Street
#10-04 Samsung Hub
Singapore 049483

Acquisitions Editor: Nathan Davidson
Editorial Assistant: Heidi Dreiling
eLearning Editor: Morgan Shannon
Production Editor: Bennie Clark Allen
Copy Editor: Paula L. Fleming
Typesetter: C&M Digitals (P) Ltd.
Proofreader: Sue Schon
Indexer: Mary Mortensen
Cover Designer: Michael Dubowe
Marketing Manager: Shari Countryman

Copyright © 2017 by SAGE Publications, Inc.

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the publisher.

All trademarks depicted within this book, including trademarks appearing as part of a screenshot, figure, or other image are included solely for the purpose of illustration and are the property of their respective holders. The use of the trademarks in no way indicates any relationship with, or endorsement by, the holders of said trademarks. SPSS is a registered trademark of International Business Machines Corporation. Excel is a registered trademark of Microsoft Corporation.

Printed in the United States of America

Library of Congress Cataloging-in-Publication Data

ISBN: 978-1-4833-8669-0

This book is printed on acid-free paper.

16 17 18 19 20 10 9 8 7 6 5 4 3 2 1

此为试读，需要完整PDF请访问：www.ertongbook.com

Statistics for Human Service Evaluation

SAGE was founded in 1965 by Sara Miller McCune to support the dissemination of usable knowledge by publishing innovative and high-quality research and teaching content. Today, we publish over 900 journals, including those of more than 400 learned societies, more than 800 new books per year, and a growing range of library products including archives, data, case studies, reports, and video. SAGE remains majority-owned by our founder, and after Sara's lifetime will become owned by a charitable trust that secures our continued independence.

Los Angeles | London | New Delhi | Singapore | Washington DC | Melbourne

Preface

This text addresses the need to know how to use statistics to evaluate human services. The intended audience is undergraduate and graduate students of the human service professions as well as those currently employed in these fields. It is written under the assumption that the reader has no prior instruction in statistics.

As a human service professional, you might, for example, need to compare pretest and posttest scores on anxiety for a group of clients of a mental health agency or compare the grades of middle school students who have had a special program with those who have not. Whatever your research question and study design, determining whether the data achieve statistical significance is the key task of statistical analysis of data. If statistical significance is not achieved, your data can be explained too easily by chance. Thus, you cannot conclude they are evidence for the success of an intervention. Upon completion of this book, the human service professional will know how to select an appropriate statistic for a given research study, enter the data into a special computer file that accompanies this book, and determine whether statistical significance has been demonstrated. This book teaches these skills in a user-friendly way unequaled by any other text.

The human service professional also needs to know how to use the research of others to inform current practice, so it is essential to be able to examine evidence regarding human service interventions. Armed with the ability to engage in the statistical analysis of data, the human service professional who completes this book will be in a superior position to critically evaluate such work.

The field of human services encompasses a variety of professions, including social work, psychology, nursing, counseling, and allied health professions such as recreational therapy. Students preparing for these professions sometimes are called upon to use statistics to evaluate human services, and many academic programs in the human services include research methods and statistics in their curricula. Furthermore, some professionals employed in the human services are expected to evaluate their practice or to help others to do so. These students and these professionals need a user-friendly guide to the statistical analysis of data. Unfortunately, many current texts on statistics are written by and for the academic scholar rather than the student or professional in the field. This book attempts to address this need.

This book is organized to help the user achieve competence in the use of statistics, not just to be better able to talk about statistical concepts in the abstract. It starts with an examination of basic concepts and then turns to the task of finding a statistical measure for a particular situation. After these topics, the reader learns how to use specific statistics

to answer key research questions. The chapters concerning this last objective start with an examination of how to use statistics to describe a sample of people and then turn to the task of testing the evaluative hypothesis with reference to the research design employed. The first of these chapters examines the one-group pretest–posttest design, and subsequent chapters explain how to use specific statistics for other research designs.

The statistical tests reviewed in this book are those needed to evaluate the extent to which the objectives of human service interventions have been achieved and how you might explain client gain by examining its relationship to other variables such as age, gender, motivation, and so forth. The typical evaluative research questions for the front-line practitioner are the following:

- Are posttest scores for our clients better than pretest scores?
- Did the clients of our program achieve better gain than people who did not get our service?
- Did the clients of one of our interventions achieve better gain than the clients who received a different intervention?
- Was the proportion of our clients who were successful after treatment greater than the proportion of people who normally become successful without treatment?
- Were scores of a particular client better during the treatment period than during the baseline period (before services were given)?
- Was a given client more likely to achieve successful behaviors (e.g., completing the weekly school homework successfully) during the treatment period than during the baseline period?
- What client characteristics or other variables predict treatment outcome or client response to service?

This book addresses all of the above questions, along with several more. In other words, if you wish to pursue any of these questions, you will find step-by-step guidance in these pages.

This book follows the principle of learning by doing. Readers see the use of statistics demonstrated and then are encouraged to apply statistical analysis to their own data. They get to the application of each statistic by a process that starts with a statement of the research question, moves to a clarification of the structure of the data that have been compiled, engages in a review of a chart that leads the reader to the appropriate statistical test, and finishes by showing how to enter data into the computer for analysis. The user of this text does not learn about the independent *t* test, for example, until they are presented with a research question and data that require its use.

Underlying this general approach is a set of principles related to adult learning. A central tenet is that adults are most receptive to learning when they have a need to know. When I need to compare pretest and posttest scores of my clients, I will be prepared to identify and apply a statistical test that will help me. While I am using that test, I will need to understand certain concepts of statistics, such as data independence, variance, and the difference between a parametric statistic and a nonparametric one. If these concepts are explained to me when I need to use a given statistic, I will be more receptive to learning about them, and I will be more likely to retain that knowledge for

future use. However, I will not need to know the formula for that statistic because the computer does that work for me, and I will not be motivated to learn a formula because I see no utility in it. I will also not be motivated to learn about statistical tests one by one, or statistical concepts one by one, without reference to a task I need to complete. This is perhaps the key distinction between this book on statistics and other books, which tend to introduce concepts one by one and statistical tests one by one without regard to the task you need to complete right now.

Another key distinction is the user-friendly format of this book, especially for the typical evaluation research study conducted in the human services, where professionals often conduct their own studies with their own clients. Such studies may compare the pretest and posttest scores of clients, compare the gain scores of clients with the gain scores of a comparison group, or compare a single client's treatment scores with his or her baseline scores. You will have the opportunity to enter a set of data from an evaluative study, find the appropriate statistic, and use a special Excel® file configured for that specific statistic. All you will need to do is enter your data as instructed and see the results. You will not need to learn how to use Excel's statistical functions. This book includes nine Excel files, each for a different evaluative research situation, and these files cover almost all the evaluative studies that students and professionals tend to undertake using data they have generated.

The statistical software IBM® SPSS® Statistics* is also illustrated in this book. This software is better suited than Excel for large databases when a number of variables are being examined. SPSS is not as accessible to the human service professional as Excel, so if you decide or need to use SPSS, you will have more to learn than if you use the convenient Excel files that come with this book. But in keeping with the user-friendly nature of this text, you will see step-by-step instructions for using SPSS for the majority of the evaluative research situations presented.

Each chapter takes the reader through a step-by-step process. Then the three appendixes provide quick references to choosing a statistic and using the computer to perform the analysis.

Here is a synopsis of the contents of this book.

- Chapter 1 is an introduction to how we use statistics and some basic statistical concepts in this regard. It also describes how the reader will go through the step-by-step process of finding a statistical test and analyzing data using the special Excel files designed for this book (or SPSS for those who have access to this software and wish to use it).
- Chapter 2 gives an overview of using computer software, specifically Excel and SPSS, to analyze study data.
- Chapter 3 reviews the questions that need to be answered in order to choose a statistic for a study and provides a set of charts that guide a reader in the selection of a statistic.
- Chapter 4 addresses the task of describing a sample of people, such as the clients in your evaluative study, using basic descriptive statistics including frequencies, proportions, mean, median, mode, and standard deviation.

*SPSS is a registered trademark of International Business Machines Corporation.

- Chapter 5 provides guidance on the analysis of data with a one-group pretest–posttest evaluative research design. Depending on the structure of the data, the paired *t* test, the one-sample *t* test, or the binomial test may be most appropriate. In each case, step-by-step instructions with examples are given for how to employ the special Excel file to complete the data analysis; instructions are also given for using SPSS.
- Chapter 6 addresses the task of analyzing data when you are comparing groups, such as when you have gain scores of a treatment group and a control group. Based on the structure of your data, you may be advised to employ the independent *t* test or chi square. As in the previous chapter, the reader is provided with step-by-step instructions for using the special Excel file or SPSS.
- Chapter 7 shows how to analyze data when you have a single-subject research design. Step-by-step instructions are given on the employment of the standard deviation approach, the one-sample *t* test, and the binomial test. Which test is appropriate depends, of course, on the structure of your data.
- Chapter 8 focuses on explanatory research rather than evaluative research, but it does so in the context of evaluating practice. Client gain is used as the dependent variable (the variable to be explained) in the illustrations of the independent *t* test, analysis of variance, Pearson correlation, and multiple regression analysis.
- Chapter 9 is the first of two chapters that provide more detail on several statistical tests. These two chapters focus on data measured at the nominal and ordinal levels (statistical tests for data measured at the interval level are well covered in previous chapters). The focus here is not on step-by-step procedures but on a fuller explanation of the nature of the statistic. Included in this review are chi square, the phi coefficient, the McNemar test, and the binomial test. All of these tests except for McNemar have been seen in prior chapters.
- Chapter 10 provides a fuller review of several statistical tests for data measured at the ordinal level. Included are the Spearman rank correlation coefficient, the Wilcoxin matched pairs signed ranks test, the Mann-Whitney U test, and the Kruskal-Wallis one-way analysis of variance.
- Chapter 11 covers statistical analysis of data for evidence-based practice. In this chapter, the reader examines the nature of evidence-based practice and reviews tools for analysis that have emerged from this movement. This chapter is organized by levels of evidence, from the single research study to the traditional literature review to the meta-analysis, and, finally, to the systematic review of evidence. The procedures for each type of evidence illustrate strengths and limitations of using this form of evidence. The special role of the effect size is discussed along with procedures for identifying different types of bias in each approach to finding evidence. Practical suggestions are given for the student and practitioner regarding how to review this literature effectively.

After reviewing the content and doing the exercises in this book, the reader will be competent to analyze data for the evaluation of human services conducted at the practitioner level. Users of this text can expect to be able to complete the data analysis part of an evaluation of their own practice. Furthermore, they will be able to make sense of evaluative research studies published in the literature.

此为试读，需要完整PDF请访问：www.ertongbook.com

Acknowledgments

SAGE Publishing gratefully acknowledges the following reviewers for their kind assistance:

Jerry Bean, *The Ohio State University*

Bruce D. Friedman, *California State University, Bakersfield*

Sunday Fakunmoju, *Westfield State University*

John M. Gonzalez, *University of Texas—Rio Grande Valley*

Rashmi Gupta, *San Francisco State University*

Richard J. Harris, *University of Texas at San Antonio*

Shinaz Jindani, *Savannah State University*

Jitendra Kapoor, *Alabama A&M University*

Roseanna McCleary, *California State University, Bakersfield*

April L. Murphy, *Western Kentucky University*

Stella M. Resko, *Wayne State University*

Marjorie C. Shavers, *Heidelberg University*

Carolyn L. Turturro, *University of Arkansas at Little Rock*

About the Author

Reginald O. York, PhD, is a Professor in the School of Social Work at the University of North Carolina, Wilmington, where he has taught since 2005. Previously, he served on the social work faculties of East Carolina University and The University of North Carolina at Chapel Hill. In addition, he is the author of *Human Service Planning* (The University of North Carolina Press, 1982), *Building Basic Competencies in Social Work Research* (Allyn and Bacon, 1997), *Conducting Social Work Research* (Allyn and Bacon, 1998), and *Evaluating Human Services* (Pearson, 2009). Prior to his entry into academia, he served as a foster care social worker, a child protective services supervisor, and the director of two human service organizations. His research interests include evidence-based practice, social work education, and human service management.

Brief Contents

Preface		xv
Acknowledgments		xix
About the Author		xxi
Chapter 1	Why Do We Use Statistics?	1
Chapter 2	Using the Computer for Statistical Analysis of Data	23
Chapter 3	Selecting a Statistic to Answer Your Research Question	35
Chapter 4	Using Descriptive Statistics to Describe Your Study Sample	51
Chapter 5	Analyzing Data With Pretest and Posttest Measurements of One Group	75
Chapter 6	Analyzing Data When You Are Comparing Two Groups	97
Chapter 7	Analyzing Data When You Are Evaluating a Single Client	117
Chapter 8	Explaining Client Gain	131
Chapter 9	A Synopsis of Selected Statistical Tests for Examining Nominal Data	161
Chapter 10	A Synopsis of Selected Statistical Tests for Examining Ordinal Data	169
Chapter 11	Statistics for Evidence-Based Practice	177

Key Terms 189

Answers to Quizzes and Review Questions 197

Appendixes 199

References 239

Index 241

Detailed Contents

Preface xv

Acknowledgments xix

About the Author xxi

Chapter 1 Why Do We Use Statistics? 1

Basic Concepts We Need to Know

Why We Use Statistics 2
What You Will Find in the Rest of This Chapter 3
Two Key Issues Addressed by Data Analysis—Practical Significance and Statistical Significance 4
Statistical Significance 4
Practical Significance 7
What Change in Scores Would Be of Practical Significance? 8
Using Statistics to Describe Clients, Evaluate Services, and Explain Client Behavior 9
Variables 9
Some Examples of Types of Research 10
Descriptive and Inferential Statistics 11
How Do We Analyze Data the User-Friendly Way? 12
1. Our Research Question 13
2. The Structure of Our Data 13
3. The Statistic That We Can Use 13
4. Data Analysis With the Excel File 14
5. Conclusions 14
What You Will Learn From This Book 15
Quiz 19
Key Terms 20

Chapter 2 Using the Computer for Statistical Analysis of Data 23

Using Excel for Statistical Analysis 23
Using SPSS for Statistical Analysis 24
The Structure of Excel and SPSS for Data Analysis 26

Using Excel in a User-Friendly Approach to Data Analysis—An Illustration 27
1. Our Research Question: Are Self-Esteem Scores Higher at Posttest Than at Pretest? 28
2. Our Data Structure Reveals Interval Data With Matched Scores 28
3. For Matched Scores, the Paired *t* Test Will Be Our Statistic 29
4. Our Data Reveal Higher Posttest Scores at a Statistically Significant Level 29
5. We Conclude That Clients Exhibited a Significant Gain on Self-Esteem 31
Reporting Your Findings 31
Summary of How to Use Excel 32
Quiz 32

Chapter 3 Selecting a Statistic to Answer Your Research Question 35

Finding a Descriptive Statistic 37
Finding a Statistic to Test Your Hypothesis in Evaluative Research 38
The Study Hypothesis 39
Things to Do Before You Seek a Statistic for an Evaluative Hypothesis 39
Articulating the Outcome Objective 39
Articulating the Study Hypothesis 40
Determining Your Data Structure for Testing the Evaluative Hypothesis 41
What Is Your Evaluative Research Design? 42
One-Group Pretest–Posttest Design 42
Comparison Group Design 42
Alternative Treatment Design 42
Limited AB Single-Subject Design 42
AB Single-Subject Design 43
BC Single-Subject Design 43
ABC Single-Subject Design 43
At What Level Is Your Dependent Variable Measured? 43
The Special Case of the Dichotomous Variable 44
Are the Data From Paired Samples or Independent Samples? 44
Finding Your Statistic for Testing the Evaluative Research Hypothesis: One Example 45
Determining Whether the Data Support Your Evaluative Research Hypothesis 45
Using Exhibit A.1 for the One-Group Pretest–Posttest Design 45

此为试读，需要完整PDF请访问：www.ertongbook.com