Introduction To Propensity Score Analysis

How to perform and interpret multivariable analysis, using plain language rather than complex derivations.

This book brings together a collection of articles on statistical methods relating to missing data analysis, including multiple imputation, propensity scores, instrumental variables, and Bayesian inference. Covering new research topics and real-world examples which do not feature in many standard texts. The book is dedicated to Professor Don Rubin (Harvard). Don Rubin has made fundamental contributions to the study of missing data. Key features of the book include: Comprehensive coverage of an imporant area for both research and applications. Adopts a pragmatic approach to describing a wide range of intermediate and advanced statistical techniques. Covers key topics such as multiple imputation, propensity scores, instrumental variables and Bayesian inference. Includes a number of applications from the social and health sciences. Edited and authored by highly respected researchers in the area.

A concise, introductory text, Propensity Score Methods and Applications describes propensity score methods (PSM) and how they are used to balance the distributions of observed covariates between treatment conditions as a means to reduce selection bias. This new QASS title specifically focuses on the procedures of implementing PSM for research in social sciences, instead of merely demonstrating the effectiveness of the method. Using succinct and approachable language to introduce the basic concepts of PSM, authors Haiyan Bai and M. H. Clark present basic concepts, assumptions, procedures, available software packages, and step-by-step examples for implementing PSM using real-world data, with exercises at the end of each chapter allowing readers to replicate examples on their own.

One of the primary motivations for clinical trials and observational studies of humans is to infer cause and effect. Disentangling causation from confounding is of utmost importance. Fundamentals of Causal Inference explains and relates different methods of confounding adjustment in terms of potential outcomes and graphical models, including standardization, difference-in-difference, difference-in-differences estimation, the front-door, instrumental variables estimation, and propensity score methods. It also covers effect-measure modification, precision variables, mediation analyses, and time-dependent confounding. Several real data examples, simulation studies, and analyses using R motivate the methods throughout. The book assumes familiarity with basic statistics and probability, regression, and R and is suitable for seniors or graduate students in statistics, biostatistics, and data science as well as PhD students in a wide variety of other disciplines, including epidemiology, pharmacy, the health sciences, education, and the social, economic, and behavioral sciences. Beginning with a brief history and a review of essential elements of probability and statistics, a unique feature of the book is its focus on real and simulated datasets with all binary variables to reduce complex methods down to their fundamentals. Calculus is not required, but a willingness to tackle mathematical notation, difficult concepts, and intricate logical arguments is essential. While many real data examples are included, the book also features the Double What-If Study, based on simulated data with known causal mechanisms, in the belief that the methods are best understood in circumstances where they are known to either succeed or fail. Datasets, R code, and solutions to odd-numbered exercises are available at www.routledge.com.

JAMA Guide to Statistics and Methods

Analysis of Correlated Data with SAS and R

Practical Propensity Score Methods Using R

Matched Sampling for Causal Effects

Analysis of Observational Health Care Data Using SAS

Many of the concepts and terminology surrounding modern causal inference can be quite intimidating to the novice. Judea Pearl presents a book ideal for beginners in statistics, providing a comprehensive introduction to the field of causality. Examples from classical statistics are presented throughout to demonstrate the need for causality in resolving decision-making dilemmas posed by data. Causal methods are also compared to traditional statistical methods, whilst questions are provided at the end of each section to aid student learning.

This book summarizes current knowledge regarding the theory of estimation for semiparametric models with missing data, in an organized and comprehensive manner. It starts with the study of semiparametric methods when there are no missing data. The description of the theory of estimation for semiparametric models is both rigorous and intuitive, relying on geometric ideas to reinforce the intuition and understanding of the theory. These methods are then applied to problems with missing, censored, and coarsened data with the goal of deriving estimators that are as robust and efficient as possible.

Comparative effectiveness research (CER) is the generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care (IOM 2009). CER is conducted to develop evidence that will aid patients, clinicians, purchasers, and health policy makers in making informed decisions at both the individual and population levels. CER encompasses a very broad range of types of studies—experimental, observational, prospective, retrospective, and research synthesis. This volume covers the main areas of quantitative methodology for the design and analysis of CER studies. The volume has four major sections—causal inference; clinical trials; research synthesis; and specialized topics. The audience includes CER methodologists, quantitative-trained researchers interested in CER, and graduate students in statistics, epidemiology, and health services and outcomes research. The book assumes a masters-level course in regression analysis and familiarity with clinical research.

In recent years, interest in rigorous impact evaluation has grown tremendously in policy-making, economics, public health, social sciences and international relations. Evidence-based policy-making has become a recurring theme in public policy, alongside greater demands for accountability in public policies and public spending, and requests for independent and rigorous impact evaluations for policy evidence. Frlich and Sperlich offer a comprehensive and up-to-date approach to quantitative impact evaluation analysis, also known as causal inference or treatment effect analysis, illustrating the main approaches for identification and estimation: experimental studies, randomization inference and randomized control trials (RCTs), matching and propensity score matching and weighting, instrumental variable estimation, difference-in-differences, regression discontinuity designs, quantile treatment effects, and evaluation of dynamic treatments. The book is designed for economics graduate courses but can also serve as a manual for professionals in research institutes, governments, and international organizations, evaluating the impact of a wide range of public policies in health, environment, transport and economic development.

Models and Judgment for Valid Comparisons

Propensity Score Analysis

Methods in Comparative Effectiveness Research

Using Propensity Scores in Quasi-Experimental Designs

Counterfactuals and Causal Inference

An accessible, contemporary introduction to the methods for determining cause and effect in the social sciences "Causation versus correlation has been the basis of arguments--economic and otherwise--since the beginning of time. Causal Inference: The Mixtape uses legit real-world examples that I found genuinely thought-provoking. It's rare that a book prompts readers to expand their outlook; this one did for me."--Marvin Young (Young MC) Causal inference encompasses the tools that allow social scientists to determine what causes what. In a messy world, causal inference is what helps establish the causes and effects of the actions being studied--for example, the impact (or lack thereof) of increases in the minimum wage on employment, the effects of early childhood education on incarceration later in life, or the influence on economic growth of introducing malaria nets in developing regions. Scott Cunningham introduces students and practitioners to the methods necessary to arrive at meaningful answers to the questions of causation, using a range of modeling techniques and coding instructions for both the R and the Stata programming languages.

A one-of-a-kind resource on identifying and dealing with bias in statistical research on causal effects Do cell phones cause cancer? Can a new curriculum increase student achievement? Determining what the real causes of such problems are, and how powerful their effects may be, are central issues in research across various fields of study. Some researchers are highly skeptical of drawing causal conclusions except in tightly controlled randomized experiments, while others discount the threats posed by different sources of bias, even in less rigorous observational studies. Bias and Causation presents a complete treatment of the subject, organizing and clarifying the diverse types of biases into a conceptual framework. The book treats various sources of bias in comparative studies—both randomized and observational—and offers guidance on how they should be addressed by researchers. Utilizing a relatively simple mathematical approach, the author develops a theory of bias that outlines the essential nature of the problem and identifies the various sources of bias that are encountered in modern research. The book begins with an introduction to the study of causal inference and the related concepts and terminology. Next, an overview is provided of the methodological issues at the core of the difficulties posed by bias. Subsequent chapters explain the concepts of selection bias, confounding, intermediate causal factors, and information bias along with the distortion of a causal effect that can result when the exposure and/or the outcome is measured with error. The book concludes with a new classification of twenty general sources of bias and practical advice on how mathematical modeling and expert judgment can be combined to achieve the most credible causal conclusions. Throughout the book, examples from the fields of medicine, public policy, and education are incorporated into the presentation of various topics. In addition, six detailed case studies illustrate concrete examples of the significance of biases in everyday research. Requiring only a basic understanding of statistics and probability theory, Bias and Causation is an excellent supplement for courses on research methods and applied statistics at the upper-undergraduate and graduate level. It is also a valuable reference for practicing researchers and methodologists in various fields of study who work with statistical data. This book was selected as the 2011 Ziegel Prize Winner in Technometrics for the best book reviewed by the journal. It is also the winner of the 2010 PROSE Award for Mathematics from The American Publishers Awards for Professional and Scholarly Excellence

For many years, there has been a great deal of work done on chronic congestive heart failure while acute heart failure has been considered a difficult to handle and hopeless syndrome. However, in recent years acute heart failure has become a growing area of study and this is the first book to cover extensively the diagnosis and management of this complex condition. The book reflects the considerable amounts of new data reported and many new concepts which have been proposed in the last 3-4 years looking at the epidemiology, diagnostic and treatment of acute heart failure.

For more than 40 years, SAGE has been one of the leading international publishers of works on quantitative research methods in the social sciences. This new collection provides readers with a representative sample of the best articles in quantitative methods that have appeared in SAGE journals as chosen by W. Paul Vogt, editor of other successful major reference collections such as Selecting Research Methods (2008) and Data Collection (2010). The volumes and articles are organized by theme rather than by discipline. Although there are some discipline-specific methods, most often quantitative research methods cut across disciplinary boundaries. Volume One: Fundamental Issues in Quantitative Research Volume Two: Measurement for Causal and Statistical Inference Volume Three: Alternatives to Hypothesis Testing Volume Four: Complex Designs for a Complex World

Causal Inference in Statistics

The Decrees of Memphis and Canopus: The Rosetta stone

Semiparametric Theory and Missing Data

Statistical Methods for Handling Incomplete Data

A Practical Guide for Clinicians

R is a powerful and free software system for data analysis and graphics, with over 5,000 add-on packages available. This book introduces R using SAS and SPSS terms with which you are already familiar. It demonstrates which of the add-on packages are most like SAS and SPSS and compares them to R's built-in functions. It steps through over 30 programs written in all three packages, comparing and contrasting the packages' differing approaches. The programs and practice datasets are available for download. The glossary defines over 50 R terms using SAS/SPSS jargon and again using R jargon. The table of contents and the index allow you to find equivalent R functions by looking up both SAS statements and SPSS commands. When finished, you will be able to import data, manage and transform it, create publication quality graphics, and perform basic statistical analyses. This new edition has updated programming, an expanded index, and even more statistical methods covered in over 25 new sections.

This book guides researchers in performing and presenting high-quality analyses of all kinds of non-randomized studies, including analyses of observational studies, claims database analyses, assessment of registry data, survey data, pharmaco-economic data, and many more applications. The text is sufficiently detailed to provide not only general guidance, but to help the researcher through all of the standard issues that arise in such analyses. Just enough theory is included to allow the reader to understand the pros and cons of alternative approaches and when to use each method. The numerous contributors to this book illustrate, via real-world numerical examples and SAS code, appropriate implementations of alternative methods. The end result is that researchers will learn how to present high-quality and transparent analyses that will lead to fair and objective decisions from observational data.

Analysis of Correlated Data with SAS and R: 4th edition presents an applied treatment of recently developed statistical models and methods for the analysis of hierarchical binary, count and continuous response data. It explains how to use procedures in SAS and packages in R for exploring data, fitting appropriate models, presenting programming codes and results. The book is designed for senior undergraduate and graduate students in the health sciences, epidemiology, statistics, and biostatistics as well as clinical researchers, and consulting statisticians who can apply the methods with their own data analyses. In each chapter a brief description of the foundations of statistical theory needed to understand the methods is given, thereafter the author illustrates the applicability of the techniques by providing sufficient number of examples. The last three chapters of the 4th edition contain introductory material on propensity score analysis, meta-analysis and the treatment of missing data using SAS and R. These topics were not covered in previous editions. The main reason is that there is an increasing demand by clinical researchers to have these topics covered at a reasonably understandable level of complexity. Mohamed Shoukri is principal scientist and professor of biostatistics at The National Biotechnology Center, King Faisal Specialist Hospital and Research Center and Al-Faisal University, Saudi Arabia. Professor Shoukri's research includes analytic epidemiology, analysis of hierarchical data, and clinical biostatistics. He is an associate editor of the 3Biotech journal, a Fellow of the Royal Statistical Society and an elected member of the International Statistical Institute.

Scientific progress depends on good research, and good research needs good statistics. But statistical analysis is tricky to get right, even for the best and brightest of us. You'd be surprised how many scientists are doing it wrong. Statistics Done Wrong is a pithy, essential guide to statistical blunders in modern science that will show you how to keep your research blunder-free. You'll examine embarrassing errors and omissions in recent research, learn about the misconceptions and scientific politics that allow these mistakes to happen, and begin your quest to reform the way you and your peers do statistics. You'll find advice on: –Asking the right question, designing the right experiment, choosing the right statistical analysis, and sticking to the plan –How to think about p values, significance, insignificance, confidence intervals, and regression –Choosing the right sample size and avoiding false positives –Reporting your analysis and publishing your data and source code –Procedures to follow, precautions to take, and analytical software that can help Scientists: Read this concise, powerful guide to help you produce statistically sound research. Statisticians: Give this book to everyone you know. The first step toward statistics done right is Statistics Done Wrong.

Statistics Done Wrong

The Woefully Complete Guide

Fundamentals of Causal Inference

A Practical Approach to Development, Validation, and Updating

Statistical Approaches to Causal Analysis

This book is for statistical practitioners, particularly those who design and analyze studies for survival and event history data. Building on recent developments motivated by counting process and martingale theory, it shows the reader how to extend the Cox model to analyze multiple/correlated event data using marginal and random effects. The focus is on actual data examples, the analysis and interpretation of results, and computation. The book shows how these new methods can be implemented in SAS and S-Plus, including computer code, worked examples, and data sets.

Did mandatory busing programs in the 1970s increase the school achievement of disadvantaged minority youth? Does obtaining a college degree increase an individual's labor market earnings? Did the use of the butterfly ballot in some Florida counties in the 2000 presidential election cost Al Gore votes? If so, was the number of miscast votes sufficiently large to have altered the election outcome? At their core, these types of questions are simple cause-and-effect questions. Simple cause-and-effect questions are the motivation for much empirical work in the social sciences. This book presents a model and set of methods for causal effect estimation that social scientists can use to address causal questions such as these. The essential features of the counterfactual model of causality for observational data analysis are presented with examples from sociology, political science, and economics.

This text presents statistical methods for studying causal effects and discusses how readers can assess such effects in simple randomized experiments.

This book is designed to help researchers better design and analyze observational data from quasi-experimental studies and improve the validity of research on causal claims. It provides clear guidance on the use of different propensity score analysis (PSA) methods, from the fundamentals to complex, cutting-edge techniques. Experts in the field introduce underlying concepts and current issues and review relevant software programs for PSA. The book addresses the steps in propensity score estimation, including the use of generalized boosted models, how to identify which matching methods work best with specific types of data, and the evaluation of balance results on key background covariates after matching. Also covered are applications of PSA with complex data, working with missing data, controlling for unobserved confounding, and the extension of PSA to prognostic score analysis for causal inference. User-friendly features include statistical program codes and application examples. Data and software code for the examples are available at the companion website (www.guilford.com/pan-materials).

Applied Multivariate Statistical Concepts

Statistics for Data Science and Policy Analysis

SAGE Quantitative Research Methods

A Primer

Multivariable Analysis

Fully updated to reflect the most recent changes in the field, the Second Edition of Propensity Score Analysis provides an accessible, systematic review of the origins, history, and statistical foundations of propensity score analysis, illustrating how it can be used for solving evaluation and causal-inference problems. With a strong focus on practical applications, the authors explore various strategies for employing PSA, discuss the use of PSA with alternative types of data, and delineate the limitations of PSA under a variety of constraints. Unlike existing textbooks on program evaluation and causal inference, this book delves into statistical concepts, formulas, and models within the context of a robust and engaging focus on application.

This book brings together the best contributions of the Applied Statistics and Policy Analysis Conference 2019. Written by leading international experts in the field of statistics, data science and policy evaluation. This book explores the theme of effective policy methods through the use of big data, accurate estimates and modern computing tools and statistical modelling.

The application of causal inference methods is growing exponentially in fields that deal with observational data. Written by pioneers in the field, this practical book presents an authoritative yet accessible overview of the methods and applications of causal inference. With a wide range of detailed, worked examples using real epidemiologic data as well as software for replicating the analyses, the text provides a thorough introduction to the basics of the theory for non-time-varying treatments and the generalization to complex longitudinal data.

This book trains the next generation of scientists representing different disciplines to leverage the data generated during routine patient care. It formulates a more complete lexicon of evidence-based recommendations and support shared, ethical decision making by doctors with their patients. Diagnostic and therapeutic technologies continue to evolve rapidly, and both individual practitioners and clinical teams face increasingly complex ethical decisions. Unfortunately, the current state of medical knowledge does not provide the guidance to make the majority of clinical decisions on the basis of evidence. The present research infrastructure is inefficient and frequently produces unreliable results that cannot be replicated. Even randomized controlled trials (RCTs), the traditional gold standards of the research reliability hierarchy, are not without limitations. They can be costly, labor intensive, and slow, and can return results that are seldom generalizable to every patient population. Furthermore, many pertinent but unresolved clinical and medical systems issues do not seem to have attracted the interest of the research enterprise, which has come to focus instead on cellular and molecular investigations and single-agent (e.g., a drug or device) effects. For clinicians, the end result is a bit of a "data desert" when it comes to making decisions. The new research infrastructure proposed in this book will help the medical profession to make ethically sound and well informed decisions for their patients.

R for SAS and SPSS Users

A Really Short Introduction

Design of Observational Studies

Stata

Impact Evaluation

A practical, up-to-date, step-by-step guidance on causal analysis; which features worked example datasets throughout to see methods in action. McBee clearly demonstrates techniques such as Rubin causal model, direct acyclic graphs and propensity score analysis.

This book provides a clear and thorough introduction to meta-analysis, the process of synthesizing data from a series of separate studies. Meta-analysis has become a critically important tool in fields as diverse as medicine, pharmacology, epidemiology, education, psychology, business, and ecology. Introduction to Meta-Analysis: Outlines the role of meta-analysis in the research process Shows how to compute effects sizes and treatment effects Explains the fixed-effect and random-effects models for synthesizing data Demonstrates how to assess and interpret variation in effect size across studies Clarifies concepts using text and figures, followed by formulas and examples Explains how to avoid common mistakes in meta-analysis Discusses controversies in meta-analysis Features a web site with additional material and exercises A superb combination of lucid prose and informative graphics, written by four of the world's leading experts on all aspects of meta-analysis. Borenstein, Hedges, Higgins, and Rothstein provide a refreshing departure from cookbook approaches with their clear explanation of the what and why of meta-analysis. The book is ideal as a course textbook or for self-study. My students, who used pre-publication versions of some of the chapters, raved about the clarity of the explanations and examples. David Rindskopf, Distinguished Professor of Educational Psychology, City University of New York, Graduate School and University Center, & Editor of the Journal of Educational and Behavioral Statistics. The approach taken by Introduction to Meta-analysis is intended to be primarily conceptual,

and it is amazingly successful at achieving that goal. The reader can comfortably skip the formulas and still understand their application and underlying motivation. For the more statistically sophisticated reader, the relevant formulas and worked examples provide a superb practical guide to performing a meta-analysis. The book provides an eclectic mix of examples from education, social science, biomedical studies, and even ecology. For anyone considering leading a course in meta-analysis, or pursuing self-directed study, Introduction to Meta-analysis would be a clear first choice. Jesse A. Berlin, ScD Introduction to Meta-Analysis is an excellent resource for novices and experts alike. The book provides a clear and comprehensive presentation of all basic and most advanced approaches to meta-analysis. This book will be referenced for decades. Michael A. McDaniel, Professor of Human Resources and Organizational Behavior, Virginia Commonwealth University Prediction models are important in various fields, including medicine, physics, meteorology, and finance. Prediction models will become more relevant in the medical field with the increase in knowledge on potential predictors of outcome, e.g. from genetics. Also, the number of applications will increase, e.g. with targeted early detection of disease, and individualized approaches to diagnostic testing and treatment. The current era of evidence-based medicine asks for an individualized approach to medical decision-making. Evidence-based medicine has a central place for meta-analysis to summarize results from randomized controlled trials; similarly prediction models may summarize the effects of predictors to provide individu- ized predictions of a diagnostic or prognostic outcome. Why Read This Book? My motivation for working on this book stems primarily from the fact that the development and applications of prediction models are often suboptimal in medical publications. With this book I hope to contribute to better understanding of relevant issues and give practical advice on better modelling strategies than are nowadays widely used. Issues include: (a) Better predictive modelling is sometimes easily possible; e.g. a large data set with high quality data is available, but all continuous predictors are dich- omized, which is known to have several disadvantages.

Updated companion volume to the ever popular Statistics at Square One (SS1) Statistics at Square Two, Second Edition, helps you evaluate the many statistical methods in current use. Going beyond the basics of SS1, it covers sophisticated methods and highlights misunderstandings. Easy to read, it includes annotated computer outputs and keeps formulas to a minimum. Worked examples of methods such as multiple and logical regression reinforce the text. Each chapter concludes with exercises to stimulate learning. All those who need to understand statistics in clinical research papers and apply them in their own research will value this compact and coherent guide.

Theory and Practice
Fundamentals and Developments
Applied Bayesian Modeling and Causal Inference from Incomplete-Data Perspectives
Understanding Modern Statistical Applications in Medicine
Statistics at Square Two

Find guidance on using SAS for multiple imputation and solving common missing data issues. Multiple Imputation of Missing Data Using SAS provides both theoretical background and constructive solutions for those working with incomplete data sets in an engaging example-driven format. It offers practical instruction on the use of SAS for multiple imputation and provides numerous examples that use a variety of public release data sets with applications to survey data. Written for users with an intermediate background in SAS programming and statistics, this book is an excellent resource for anyone seeking guidance on multiple imputation. The authors cover the MI and MIANALYZE procedures in detail, along with other procedures used for analysis of complete data sets. They guide analysts through the multiple imputation process, including evaluation of missing data patterns, choice of an imputation method, execution of the process, and interpretation of results. Topics discussed include how to deal with missing data problems in a statistically appropriate manner, how to intelligently select an imputation method, how to incorporate the uncertainty introduced by the imputation process, and how to incorporate the complex sample design (if appropriate) through use of the SAS SURVEY procedures. Discover the theoretical background and see extensive applications of the multiple imputation process in action. This book is part of the SAS Press program.

This book, first published in 2007, is for the applied researcher performing data analysis using linear and nonlinear regression and multilevel models.

Publisher's Note: Products purchased from Third Party sellers are not guaranteed by the publisher for quality, authenticity, or access to any online entitlements included with the product. The world-renowned experts at JAMA® explain statistical analysis and the methods used in medical research Written in the language and style appropriate for clinicians and researchers, this new JAMA Guide to Statistics and Methods provides explanations and expert discussion of the statistical analytic approaches and methods used in the medical research reported in articles appearing in JAMA and the JAMA Network journals. This addition to the JAMAevidence® series is particularly timely and necessary because today's physicians and other health care professionals must pursue lifelong learning to keep up with the ever-expanding universe of new medical science and evidence-based clinical information. Readers and users of research articles must have a firm grasp of the myriad new statistical, analytic, and methodologic approaches used in contemporary medical studies. To provide concrete examples, the explanations in the book link to research articles that incorporate the specific statistical test or methodological approach being discussed.

Due to recent theoretical findings and advances in statistical computing, there has been a rapid development of techniques and applications in the area of missing data analysis. Statistical Methods for Handling Incomplete Data covers the most up-to-date statistical theories and computational methods for analyzing incomplete data. Features Uses the mean score equation as a building block for developing the theory for missing data analysis Provides comprehensive coverage of computational techniques for missing data analysis Presents a rigorous treatment of imputation techniques, including multiple imputation fractional imputation Explores the most recent advances of the propensity score method and estimation techniques for nonignorable missing data Describes a survey sampling application Updated with a new chapter on Data Integration Now includes a chapter on Advanced Topics, including kernel ridge regression imputation and neural network model imputation The book is primarily aimed at researchers and graduate students from statistics, and could be used as a reference by applied researchers with a good quantitative background. It includes many real data examples and simulated examples to help readers understand the methodologies.

Methods and Principles for Social Research
Randomization in Clinical Trials
Introduction to Meta-Analysis
Causal Inference in Statistics, Social, and Biomedical Sciences
Bias and Causation

Practical Propensity Score Methods Using R by Walter Leite is a practical book that uses a step-by-step analysis of realistic examples to help students understand the theory and code for implementing propensity score analysis with the R statistical language. With a comparison of both well-established and cutting-edge propensity score methods, the text highlights where solid guidelines exist to support best practices and where there is scarcity of research. Readers will find that this scaffolded approach to R and the book's free online resources help them apply the text's concepts to the analysis of their own data.

Matched sampling is often used to help assess the causal effect of some exposure or intervention, typically when randomized experiments are not available or cannot be conducted. This book presents a selection of Donald B. Rubin's research articles on matched sampling, from the early 1970s, when the author was one of the major researchers involved in establishing the field, to recent contributions to this now extremely active area. The articles include fundamental theoretical studies that have become classics, important extensions, and real applications that range from breast cancer treatments to tobacco litigation to studies of criminal tendencies. They are organized into seven parts, each with an introduction by the author that provides historical and personal context and discusses the relevance of the work today. A concluding essay offers advice to investigators designing observational studies. The book provides an accessible introduction to the study of matched sampling and will be an indispensable reference for students and researchers.

Stata is one of the most popular statistical software in the world and suited for all kinds of users, from absolute beginners to experienced veterans. This book offers a clear and concise introduction to the usage and the workflow of Stata. Included topics are importing and managing datasets, cleaning and preparing data, creating and manipulating variables, producing descriptive statistics and meaningful graphs as well as central quantitative methods, like linear (OLS) and binary logistic regressions and matching. Additional information about diagnotical tests ensures that these methods yield valid and correct results that live up to academic standards. Furthermore, users are instructed how to export results that can be directly used in popular software like Microsoft Word for seminar papers and publications. Lastly, the book offers a short yet focussed introduction to scientific writing, which should guide readers through the process of writing a first quantitative seminar paper or research report. The book underlines correct usage of the software and a productive workflow which also introduces aspects like replicability and general standards for academic writing. While absolute beginners will enjoy the easy to follow point-and-click interface, more experienced users will benefit from the information about do-files and syntax which makes Stata so popular. Lastly, a wide range of user-contributed software („Ados") is introduced which further improves the general workflow and guarantees the availability of state of the art statistical methods.

Using Propensity Scores in Quasi-Experimental Designs, by William M. Holmes, examines how propensity scores can be used to reduce bias with different kinds of quasi-experimental designs and to fix or improve broken experiments. Requiring minimal use of matrix and vector algebra, the book covers the causal assumptions of propensity score estimates and their many uses, linking these uses with analysis appropriate for different designs. Thorough coverage of bias assessment, propensity score estimation, and estimate improvement is provided, along with graphical and statistical methods for this process. Applications are included for analysis of variance and covariance, maximum likelihood and logistic regression, two-stage least squares, generalized linear regression, and general estimation equations. The examples use public data sets that have policy and programmatic relevance across a variety of disciplines.

Modeling Survival Data: Extending the Cox Model
Secondary Analysis of Electronic Health Records
Causal Inference
Multiple Imputation of Missing Data Using SAS
Clinical Prediction Models

More comprehensive than other texts, this new book covers the classic and cutting edge multivariate techniques used in today's research. Ideal for courses on multivariate statistics/analysis/design, advanced statistics or quantitative techniques taught in psychology, education, sociology, and business, the book also appeals to researchers with no training in multivariate methods. Through clear writing and engaging pedagogy and examples using real data, Hahs-Vaughn walks students through the most used methods to learn why and how to apply each technique. A conceptual approach with a higher than usual text-to-formula ratio helps reader's master key concepts so they can implement and interpret results generated by today's sophisticated software. Annotated screenshots from SPSS and other packages are integrated throughout. Designed for course flexibility, after the first 4 chapters, instructors can use chapters in any sequence or combination to fit the needs of their students. Each chapter includes a 'mathematical snapshot' that highlights the technical components of each procedure, so only the most crucial equations are included. Highlights include: -Outlines, key concepts, and vignettes related to key concepts preview what's to come in each chapter -Examples using real data from education, psychology, and other social sciences illustrate key concepts -Extensive coverage of assumptions including tables, the effects of their violation, and how to test for each technique -Conceptual, computational, and interpretative problems mirror the real-world problems students encounter in their studies and careers -A focus on data screening and power analysis with attention on the special needs of each particular method -Instructions for using SPSS via screenshots and annotated output along with HLM, Mplus, LISREL, and G*Power where appropriate, to demonstrate how to interpret results -Templates for writing research questions and APA-style write-ups of results which serve as models -Propensity score analysis chapter that demonstrates the use of this increasingly popular technique -A review of matrix algebra for those who want an introduction (prerequisites include an introduction to factorial ANOVA, ANCOVA, and simple linear regression, but knowledge of matrix algebra is not assumed) -www.routledge.com/9780415842365 provides the text's datasets preformatted for use in SPSS and other statistical packages for readers, as well as answers to all chapter problems, Power Points, and test items for instructors

Praise for the First Edition "All medical statisticians involved in clinical trials should read this book..." - Controlled Clinical Trials Featuring a unique combination of the applied aspects of randomization in clinical trials with a nonparametric approach to inference, Randomization in Clinical Trials: Theory and Practice, Second Edition is the go-to guide for biostatisticians and pharmaceutical industry statisticians. Randomization in Clinical Trials: Theory and Practice, Second Edition features: Discussions on current philosophies, controversies, and new developments in the increasingly important role of randomization techniques in clinical trials A new chapter on covariate-adaptive randomization, including minimization techniques and inference New developments in restricted randomization and an increased focus on computation of randomization tests as opposed to the asymptotic theory of randomization tests Plenty of problem sets, theoretical exercises, and short computer simulations using SAS® to facilitate classroom teaching, simplify the mathematics, and ease readers' understanding Randomization in Clinical Trials: Theory and Practice, Second Edition is an excellent reference for researchers as well as applied statisticians and biostatisticians. The Second Edition is also an ideal textbook for upper-undergraduate and graduate-level courses in biostatistics and applied statistics. William F. Rosenberger, PhD, is University Professor and Chairman of the Department of Statistics at George Mason University. He is a Fellow of the American Statistical Association and the Institute of Mathematical Statistics, and author of over 80 refereed journal articles, as well as The Theory of Response-Adaptive Randomization in Clinical Trials, also published by Wiley. John M. Lachin, ScD, is Research Professor in the Department of Epidemiology and Biostatistics as well as in the Department of Statistics at The George Washington University. A Fellow of the American Statistical Association and the Society for Clinical Trials, Dr. Lachin is actively involved in coordinating center activities for clinical trials of diabetes. He is the author of Biostatistical Methods: The Assessment of Relative Risks, Second Edition, also published by Wiley.

An observational study is an empiric investigation of effects caused by treatments when randomized experimentation is unethical or infeasible. Observational studies are common in most fields that study the effects of treatments on people, including medicine, economics, epidemiology, education, psychology, political science and sociology. The quality and strength of evidence provided by an observational study is determined largely by its design. Design of Observational Studies is both an introduction to statistical inference in observational studies and a detailed discussion of the principles that guide the design of observational studies. Design of Observational Studies is divided into four parts. Chapters 2, 3, and 5 of Part I cover concisely, in about one hundred pages, many of the ideas discussed in Rosenbaum's Observational Studies (also published by Springer) but in a less technical fashion. Part II discusses the practical aspects of using propensity scores and other tools to create a matched comparison that balances many covariates. Part II includes a chapter on matching in R. In Part III, the concept of design sensitivity is used to appraise the relative ability of competing designs to distinguish treatment effects from biases due to unmeasured covariates. Part IV discusses planning the analysis of an observational study, with particular reference to Sir Ronald Fisher's striking advice for observational studies, "make your theories elaborate." The second edition of his book, Observational Studies, was published by Springer in 2002.

Data Analysis Using Regression and Multilevel/Hierarchical Models
Propensity Score Methods and Applications
With R
Acute Heart Failure