

Statistics And Experimental Design For Psychologists A Model Comparison Approach

This book discusses special modifications and extensions of designs that arise in certain fields of application such as genetics, bioinformatics, agriculture, medicine, manufacturing, marketing, etc. Well-known and highly-regarded contributors have written individual chapters that have been extensively reviewed by the Editor to ensure that each individual contribution relates to material found in Volumes 1 and 2 of this book series. The chapters in Volume 3 have an introductory/historical component and proceed to a more advanced technical level to discuss the latest results and future developm.

Purposefully designed as a resource for practicing and student toxicologists, *Statistics and Experimental Design for Toxicologists and Pharmacologists, Fourth Edition* equips you for the regular statistical analysis of experimental data. Starting with the assumption of basic mathematical skills and knowledge, the author supplies a complete and systematic yet practical introduction to the statistical methodologies available for, and used in, the discipline. For every technique presented, a worked example from toxicology is also presented. See what's new in the Fourth Edition: The first practical guide to performing meta analysis allowing for using the power inherent in multiple similar studies Coverage of Bayesian analysis and data analysis in pharmacology and toxicology Almost 200 problems with solutions Discussion of analysis of receptor binding assays, safety pharmacology assays and other standard types conducted in pharmacology A new chapter explaining the basics of Good Laboratory Practices (GLPs) For those with computer skills, this edition has been enhanced with the addition of basic SAS Written specifically for toxicologists and pharmacologists, the author draws on more than 30 years of experience to provide understanding of the philosophical underpinnings for the overall structure of analysis. The book's organization fosters the ordered development of skills and yet still facilitates ease of access to information as needed. This Fourth Edition gives you the tools necessary to perform rigorous and critical analysis of experimental data and the insight to know when to use them.

Experimental Design for the Life Sciences teaches the reader how to effectively design experiments to ensure today's students are equipped with the skills they need to be the researchers of tomorrow. With a refreshingly approachable and articulate style, the book explains the essential elements of experimental design in clear, practical terms, so the reader can grasp and apply even the most challenging concepts, including power analysis and pseudoreplication. The inter-relatedness of experimental design, statistics, and ethical considerations is emphasised throughout the book and, above all, *Experimental Design for the Life Sciences* demonstrates how good experimental design relies on clear thinking and biological understanding, not mathematical or statistical complexity - putting it at the heart of any biosciences student's education.

Professionals in all areas – business; government; the physical, life, and social sciences; engineering; medicine, etc. – benefit from using statistical experimental design to better understand their worlds and then use that understanding to improve the products, processes, and programs they are responsible for. This book aims to provide the practitioners of tomorrow with a memorable, easy to read, engaging guide to statistics and experimental design. This book uses examples, drawn from a variety of established texts, and embeds them in a business or scientific context, seasoned with a dash of humor, to emphasize the issues and ideas that led to the experiment and the what-do-we-do-next? steps after the experiment. Graphical data displays are emphasized as means of discovery and communication and formulas are minimized, with a focus on interpreting the results that software produce. The role of subject-matter knowledge, and passion, is also illustrated. The examples do not require specialized knowledge, and the lessons they contain are transferrable to other contexts. *Fundamentals of Statistical Experimental Design and Analysis* introduces the basic elements of an experimental design, and the basic concepts underlying statistical analyses. Subsequent chapters address the following families of experimental designs: Completely Randomized designs, with single or multiple treatment factors, quantitative or qualitative Randomized Block designs Latin Square designs Split-Unit designs Repeated Measures designs Robust designs Optimal designs Written in an accessible, student-friendly style, this book is suitable for a general audience and particularly for those professionals seeking to improve and apply their understanding of experimental design.

Populations, samples and variates; Summarizing observed measurements; Distributions and their characteristic properties; Probability and the binomial distribution; The poisson distribution; The normal distribution: its occurrence; The normal distribution: its use in significance tests; Other tests of significance; Setting limits to estimates; Correlation; Linear regression; The principles of experimental design: the completely randomized design; Randomized blocks and some extensions; Precision of results; Simple factorial experiments; Missing observations and non-normality; Nonparametric significance tests.

This volume is a collection of exercises with their solutions in *Design and Analysis of Experiments*. At present there is not a single book which collects such exercises. These exercises have been collected by the authors during the last four decades during their student and teaching years. They should prove useful to graduate students and research workers in Statistics. In Chapter 1, theoretical results that are needed for understanding the material in this book, are given. Chapter 2 lists the exercises which have been collected by the authors. The solutions of these problems are given in Chapter 3. Finally an index is provided for quick reference. Grateful appreciation for financial support for Dr. Kabe's research at St. Mary's University is extended to National Research Council of Canada and St. May's University Senate Research Committee. For his visit to the Department of Mathematics and Statistics the authors are thankful to the Bowling Green State University.

Here, the authors explain the basic ideas so as to generate interest in modern problems of experimental design. The topics discussed include designs for inference based on nonlinear models, designs for models with random parameters and stochastic processes, designs for model discrimination and incorrectly specified (contaminated) models, as well as examples of designs in functional spaces. Since the authors avoid technical details, the book assumes only a moderate background in calculus, matrix algebra, and statistics. However, at many places, hints are given as to how readers may enhance and adopt the basic ideas for advanced problems or applications. This allows the book to be used for courses at different levels, as well as serving as a useful reference for graduate students and researchers in statistics and engineering.

This is the first textbook for psychologists which combines the model comparison method in statistics with a hands-on guide to computer-based analysis and clear explanations of the links between models, hypotheses and experimental designs. Statistics is often seen as a set of cookbook recipes which must be learned by heart. Model comparison, by contrast, provides a mental roadmap that not only gives a deeper level of understanding, but can be used as a general procedure to tackle those problems which can be solved using orthodox statistical methods. *Statistics and Experimental Design for Psychologists* focusses on the role of Occam's principle, and explains significance testing as a means by which the null and experimental hypotheses are compared using the twin criteria of parsimony and accuracy. This approach is backed up with a strong visual element, including for the first time a clear illustration of what the F-ratio actually does, and why it is so ubiquitous in statistical testing. The book covers the main statistical methods up to multifactorial and repeated measures, ANOVA and the basic experimental designs associated with them. The associated online supplementary material extends this coverage to multiple regression, exploratory factor analysis, power calculations and other more advanced topics, and provides screencasts demonstrating the use of programs on a standard statistical package, SPSS. Of particular value to third year undergraduate as well as graduate students, this book will also have a broad appeal to anyone wanting a deeper understanding of the scientific method. Contents: What is Science? Comparing Different Models of a Set of Data Testing Hypotheses and Recording the Result: Types of Validity Basic Descriptive Statistics (and How Pierre Laplace Saved the World) Bacon's Legacy: Causal Models, and How to Test Them How Hypothesis Testing Copes with Uncertainty: The

Legacy of Karl Popper and Ronald Fisher Gaussian Distributions, the Building Block of Parametric Statistics Randomized Controlled Trials, the Model T Ford of Experiments The Independent Samples t-Test, the Analytical Engine of the RCT Generalising the t-Test: One-Way ANOVA Multifactorial Designs and Their ANOVA Counterparts Repeated Measures Designs, and Their ANOVA Counterparts Appendices: On Finding the Right Effect Size Why Orthogonal Contrasts are Useful Mathematical Justification for the Occam Line Glossary Further Reading References Index Readership: Students of undergraduate and graduate level psychology, and academics involved in research. The second edition of *Statistics for Experimenters* focuses on applications in the physical, engineering, biological, and social sciences. From the beginning, the book's source of ideas is the scientific method itself and the need of the investigator to make his or her research as effective as possible through proper choice and conduct of experiments and appropriate analysis of data. After a problem is stated, appropriate statistical methods of design and analysis are discussed. And frequently, examples are presented for which standard mathematical assumptions are wrong, thus forcing the reader's attention onto the essential precautions necessary in the conduct of the experiment to ensure valid conclusions.

This book provides the first time user of statistics with an understanding of how and why statistical experimental design and analysis can be an effective problem solving tool. It presents experimental designs which are useful for small screening and response surface experiments.

What statistics is all about; Measurement: the choice of an endpoint; Descriptive statistics: frequency curves, averages, and variability; Making inferences about population parameters: general principles; The normal curve; The distribution; Comparing the means of an experimental and a control group; The analysis of variance: single classification; The analysis of variance: nested designs randomized blocks, and factorial experiments; Determining the linear relationship between variables: the correlation coefficient; Chi-square tests of nominal data; Order statistics for ranked data.

This engaging text shows how statistics and methods work together, demonstrating a variety of techniques for evaluating statistical results against the specifics of the methodological design. Richard Gonzalez elucidates the fundamental concepts involved in analysis of variance (ANOVA), focusing on single degree-of-freedom tests, or comparisons, wherever possible. Potential threats to making a causal inference from an experimental design are highlighted. With an emphasis on basic between-subjects and within-subjects designs, Gonzalez resists presenting the countless "exceptions to the rule" that make many statistics textbooks so unwieldy and confusing for students and beginning researchers. Ideal for graduate courses in experimental design or data analysis, the text may also be used by advanced undergraduates preparing to do senior theses. Useful pedagogical features include: Discussions of the assumptions that underlie each statistical test Sequential, step-by-step presentations of statistical procedures End-of-chapter questions and exercises Accessible writing style with scenarios and examples This book is intended for graduate students in psychology and education, practicing researchers seeking a readable refresher on analysis of experimental designs, and advanced undergraduates preparing senior theses. It serves as a text for graduate level experimental design, data analysis, and experimental methods courses taught in departments of psychology and education. It is also useful as a supplemental text for advanced undergraduate honors courses.

A complete and well-balanced introduction to modern experimental design Using current research and discussion of the topic along with clear applications, *Modern Experimental Design* highlights the guiding role of statistical principles in experimental design construction. This text can serve as both an applied introduction as well as a concise review of the essential types of experimental designs and their applications. Topical coverage includes designs containing one or multiple factors, designs with at least one blocking factor, split-unit designs and their variations as well as supersaturated and Plackett-Burman designs. In addition, the text contains extensive treatment of: Conditional effects analysis as a proposed general method of analysis Multiresponse optimization Space-filling designs, including Latin hypercube and uniform designs Restricted regions of operability and debarred observations Analysis of Means (ANOM) used to analyze data from various types of designs The application of available software, including Design-Expert, JMP, and MINITAB This text provides thorough coverage of the topic while also introducing the reader to new approaches. Using a large number of references with detailed analyses of datasets, *Modern Experimental Design* works as a well-rounded learning tool for beginners as well as a valuable resource for practitioners.

Emphasizes the strategy of experimentation, data analysis, and the interpretation of experimental results. Features numerous examples using actual engineering and scientific studies. Presents statistics as an integral component of experimentation from the planning stage to the presentation of the conclusions. Deep and concentrated experimental design coverage, with equivalent but separate emphasis on the analysis of data from the various designs. Topics can be implemented by practitioners and do not require a high level of training in statistics. New edition includes new and updated material and computer output.

Research Design and Statistical Analysis provides comprehensive coverage of the design principles and statistical concepts necessary to make sense of real data. The book's goal is to provide a strong conceptual foundation to enable readers to generalize concepts to new research situations. Emphasis is placed on the underlying logic and assumptions of the analysis and what it tells the researcher, the limitations of the analysis, and the consequences of violating assumptions. Sampling, design efficiency, and statistical models are emphasized throughout. As per APA recommendations, emphasis is also placed on data exploration, effect size measures, confidence intervals, and using power analyses to determine sample size. "Real-world" data sets are used to illustrate data exploration, analysis, and interpretation. The book offers a rare blend of the underlying statistical assumptions, the consequences of their violations, and practical advice on dealing with them. Changes in the New Edition: Each section of the book concludes with a chapter that provides an integrated example of how to apply the concepts and procedures covered in the chapters of the section. In addition, the advantages and disadvantages of alternative designs are discussed. A new chapter (1) reviews the major steps in planning and executing a study, and the implications of those decisions for subsequent analyses and interpretations. A new chapter (13) compares experimental designs to reinforce the connection between design and

analysis and to help readers achieve the most efficient research study. A new chapter (27) on common errors in data analysis and interpretation. Increased emphasis on power analyses to determine sample size using the G*Power 3 program. Many new data sets and problems. More examples of the use of SPSS (PASW) Version 17, although the analyses exemplified are readily carried out by any of the major statistical software packages. A companion website with the data used in the text and the exercises in SPSS and Excel formats; SPSS syntax files for performing analyses; extra material on logistic and multiple regression; technical notes that develop some of the formulas; and a solutions manual and the text figures and tables for instructors only. Part 1 reviews research planning, data exploration, and basic concepts in statistics including sampling, hypothesis testing, measures of effect size, estimators, and confidence intervals. Part 2 presents between-subject designs. The statistical models underlying the analysis of variance for these designs are emphasized, along with the role of expected mean squares in estimating effects of variables, the interpretation of interactions, and procedures for testing contrasts and controlling error rates. Part 3 focuses on repeated-measures designs and considers the advantages and disadvantages of different mixed designs. Part 4 presents detailed coverage of correlation and bivariate and multiple regression with emphasis on interpretation and common errors, and discusses the usefulness and limitations of these procedures as tools for prediction and for developing theory. This is one of the few books with coverage sufficient for a 2-semester course sequence in experimental design and statistics as taught in psychology, education, and other behavioral, social, and health sciences. Incorporating the analyses of both experimental and observational data provides continuity of concepts and notation. Prerequisites include courses on basic research methods and statistics. The book is also an excellent resource for practicing researchers.

Presents readers with a user-friendly, non-technical introduction to statistics and the principles of plant and crop experimentation. Avoiding mathematical jargon, it explains how to plan and design an experiment, analyse results, interpret computer output and present findings. Using specific crop and plant case studies, this guide presents: * The reasoning behind each statistical method is explained before giving relevant, practical examples * Step-by-step calculations with examples linked to three computer packages (MINITAB, GENSTAT and SAS) * Exercises at the end of many chapters * Advice on presenting results and report writing Written by experienced lecturers, this text will be invaluable to undergraduate and postgraduate students studying plant sciences, including plant and crop physiology, biotechnology, plant pathology and agronomy, plus ecology and environmental science students and those wanting a refresher or reference book in statistics.

This book offers a step-by-step guide to the experimental planning process and the ensuing analysis of normally distributed data, emphasizing the practical considerations governing the design of an experiment. Data sets are taken from real experiments and sample SAS programs are included with each chapter. Experimental design is an essential part of investigation and discovery in science; this book will serve as a modern and comprehensive reference to the subject.

Includes index.

The development and introduction of new experimental designs in the last fifty years has been quite staggering, brought about largely by an ever-widening field of applications. Design and Analysis of Experiments, Volume 2: Advanced Experimental Design is the second of a two-volume body of work that builds upon the philosophical foundations of experimental design set forth by Oscar Kempthorne half a century ago and updates it with the latest developments in the field. Designed for advanced-level graduate students and industry professionals, this text includes coverage of incomplete block and row-column designs; symmetrical, asymmetrical, and fractional factorial designs; main effect plans and their construction; supersaturated designs; robust design, or Taguchi experiments; lattice designs; and cross-over designs.

This illustrated textbook for biologists provides a refreshingly clear and authoritative introduction to the key ideas of sampling, experimental design, and statistical analysis. The author presents statistical concepts through common sense, non-mathematical explanations and diagrams. These are followed by the relevant formulae and illustrated by w Continuing a best-selling tradition, the third edition of Quality by Experimental Design uses the same easy-to-read and understand format that made the previous two editions so popular with newcomers and experienced readers alike. Completely revised and revamped, the third edition has lost none of the features that made each of the previous editions bestsellers in their own right. Written in Thomas Barker's trademark, conversational style, the third edition includes new topics on inference, more realistic practice problems, examples using Minitab®, and a large dose of Robust Design philosophy and methods. Barker integrates the Robust Design, sometimes known as the Taguchi approach, as a natural part of the design effort and establishes a criterion for measurement variables. He provides step-by-step guides to the Minitab software that give you the ability to apply the concepts in practical applications and includes easy to use experimental design templates. The author presents the mathematical aspects of statistical experimental design in an intuitive rather than a theoretical manner. Emphasizing both the philosophy and the techniques for setting up experiments, the book shows you how to achieve increased efficiency, timely accomplishment of goals, visualization through graphical and numerical representation, and control of the experiment through careful planning. Those new to QED will find some of the most powerful ideas in scientific investigation and engineering understanding in this book. Seasoned QED'ers will appreciate the new insight it offers and timely reviews of subjects in which they may have become a bit rusty.

The book provides necessary knowledge for readers interested in developing the theory of uniform experimental design. It discusses measures of uniformity, various construction methods of uniform designs, modeling techniques, design and modeling for experiments with mixtures, and the usefulness of the uniformity in block, factorial and supersaturated designs. Experimental design is an important branch of statistics with a long history, and is extremely useful in multi-

factor experiments. Involving rich methodologies and various designs, it has played a key role in industry, technology, sciences and various other fields. A design that chooses experimental points uniformly scattered on the domain is known as uniform experimental design, and uniform experimental design can be regarded as a fractional factorial design with model uncertainty, a space-filling design for computer experiments, a robust design against the model specification, and a supersaturated design and can be applied to experiments with mixtures.

A heuristic introduction to experimental design; Optimum statistical experimental design as a branch of mathematical statistics; Definitions of the most important experimental designs; Properties and the construction of block designs; The number of nonisomorphic elementary bib in restricted; The analysis of block designs; The choice of optimal experimental designs; Appendix.

This text provides an overall research design strategy by emphasizing how research hypotheses relate to treatment design. The author provides as realistic a setting as possible for conducting an actual research project. Examples, often based on actual research studies, describe the research venue and establish a specific problem; then the corresponding research hypothesis is identified with a treatment design that addresses it. The examples provide practical pointers relating the treatment design to the experiment design.

Scientists planning experiments in medical and behavioral research will find this handbook and dictionary an invaluable desk reference tool. Also recommended as a textbook for students of Experimental Design or accompanying courses in Statistics. Principles of experimental design are introduced, techniques of experimental design are described, and advantages and disadvantages of often used designs are discussed. This two-part volume, a handbook of experimental design and a dictionary providing short explanations for many terms related to experimental design, contains information that will not quickly become outdated.

A revision of this classic statistics text for first-year graduate students in psychology, education and related social sciences. The two new authors are former students of Winer's. They have updated, rewritten and reorganized the text to fit the course as it is now taught.

This richly illustrated book provides an overview of the design and analysis of experiments with a focus on non-clinical experiments in the life sciences, including animal research. It covers the most common aspects of experimental design such as handling multiple treatment factors and improving precision. In addition, it addresses experiments with large numbers of treatment factors and response surface methods for optimizing experimental conditions or biotechnological yields. The book emphasizes the estimation of effect sizes and the principled use of statistical arguments in the broader scientific context. It gradually transitions from classical analysis of variance to modern linear mixed models, and provides detailed information on power analysis and sample size determination, including 'portable power' formulas for making quick approximate calculations. In turn, detailed discussions of several real-life examples illustrate the complexities and aberrations that can arise in practice. Chiefly intended for students, teachers and researchers in the fields of experimental biology and biomedicine, the book is largely self-contained and starts with the necessary background on basic statistical concepts. The underlying ideas and necessary mathematics are gradually introduced in increasingly complex variants of a single example. Hasse diagrams serve as a powerful method for visualizing and comparing experimental designs and deriving appropriate models for their analysis. Manual calculations are provided for early examples, allowing the reader to follow the analyses in detail. More complex calculations rely on the statistical software R, but are easily transferable to other software. Though there are few prerequisites for effectively using the book, previous exposure to basic statistical ideas and the software R would be advisable.

Design and Analysis of Experiments with R presents a unified treatment of experimental designs and design concepts commonly used in practice. It connects the objectives of research to the type of experimental design required, describes the process of creating the design and collecting the data, shows how to perform the proper analysis of the data, and illustrates the interpretation of results. Drawing on his many years of working in the pharmaceutical, agricultural, industrial chemicals, and machinery industries, the author teaches students how to: Make an appropriate design choice based on the objectives of a research project Create a design and perform an experiment Interpret the results of computer data analysis The book emphasizes the connection among the experimental units, the way treatments are randomized to experimental units, and the proper error term for data analysis. R code is used to create and analyze all the example experiments. The code examples from the text are available for download on the author's website, enabling students to duplicate all the designs and data analysis. Intended for a one-semester or two-quarter course on experimental design, this text covers classical ideas in experimental design as well as the latest research topics. It gives students practical guidance on using R to analyze experimental data.

Experimental Design: Procedures for Behavioral Sciences, Fourth Edition is a classic text with a reputation for accessibility and readability. It has been revised and updated to make learning design concepts even easier. Roger E. Kirk shows how three simple experimental designs can be combined to form a variety of complex designs. He provides diagrams illustrating how subjects are assigned to treatments and treatment combinations. New terms are emphasized in boldface type, there are summaries of the advantages and disadvantages of each design, and real-life examples show how the designs are used.

This concise, self-contained and cohesive book focuses on commonly used and recently developed methods for designing and analyzing high-throughput screening (HTS) experiments from a statistically sound basis. Combining ideas from biology, computing and statistics, the author explains experimental designs and analytic methods that are amenable to rigorous analysis and interpretation of RNAi HTS experiments. The opening chapters are carefully presented to be accessible both to biologists with training only in basic statistics and to computational scientists and statisticians with basic biological knowledge. Biologists will see how new experiment designs and rudimentary data-handling strategies for

RNAi HTS experiments can improve their results, whereas analysts will learn how to apply recently developed statistical methods to interpret HTS experiments.

Experimental Design and Statistics for Psychology: A First Course is a concise, straightforward and accessible introduction to the design of psychology experiments and the statistical tests used to make sense of their results. Makes abundant use of charts, diagrams and figures. Assumes no prior knowledge of statistics. Invaluable to all psychology students needing a firm grasp of the basics, but tackling of some of the topic's more complex, controversial issues will also fire the imagination of more ambitious students. Covers different aspects of experimental design, including dependent versus independent variables, levels of treatment, experimental control, random versus systematic errors, and within versus between subjects design. Provides detailed instructions on how to perform statistical tests with SPSS.

Downloadable instructor resources to supplement and support your lectures can be found at www.blackwellpublishing.com/sani and include sample chapters, test questions, SPSS data sets, and figures and tables from the book.

Praise for the First Edition: "If you . . . want an up-to-date, definitive reference written by authors who have contributed much to this field, then this book is an essential addition to your library." —Journal of the American Statistical Association Fully updated to reflect the major progress in the use of statistically designed experiments for product and process improvement, *Experiments, Second Edition* introduces some of the newest discoveries—and sheds further light on existing ones—on the design and analysis of experiments and their applications in system optimization, robustness, and treatment comparison. Maintaining the same easy-to-follow style as the previous edition while also including modern updates, this book continues to present a new and integrated system of experimental design and analysis that can be applied across various fields of research including engineering, medicine, and the physical sciences. The authors modernize accepted methodologies while refining many cutting-edge topics including robust parameter design, reliability improvement, analysis of non-normal data, analysis of experiments with complex aliasing, multilevel designs, minimum aberration designs, and orthogonal arrays. Along with a new chapter that focuses on regression analysis, the *Second Edition* features expanded and new coverage of additional topics, including: Expected mean squares and sample size determination One-way and two-way ANOVA with random effects Split-plot designs ANOVA treatment of factorial effects Response surface modeling for related factors Drawing on examples from their combined years of working with industrial clients, the authors present many cutting-edge topics in a single, easily accessible source. Extensive case studies, including goals, data, and experimental designs, are also included, and the book's data sets can be found on a related FTP site, along with additional supplemental material. Chapter summaries provide a succinct outline of discussed methods, and extensive appendices direct readers to resources for further study. *Experiments, Second Edition* is an excellent book for design of experiments courses at the upper-undergraduate and graduate levels. It is also a valuable resource for practicing engineers and statisticians.

The distinguishing feature of experimental psychology is not so much the nature of its theories as the methods used to test their validity. The first edition of *Experimental Design and Statistics* provided a clear and lucid introduction to these methods and the statistical techniques which support them. For this new edition the text has been revised, the coverage of two-sample tests has been extended, and new sections have been added introducing one-sample tests, linear regression and the product-moment correlation coefficient. Problems associated with the applications of experimental design and how to use observations of behaviour in research are key questions for all introductory students of psychology. This new and expanded edition provides them with an invaluable text and source.

Understanding Statistics and Experimental Design How to Not Lie with Statistics Springer

Let this down-to-earth book be your guide to the statistical integrity of your work. Without relying on the detailed and complex mathematical explanations found in many other statistical texts, *Principles of Experimental Design for the Life Sciences* teaches how to design, conduct, and interpret top-notch life science studies. Learn about the planning of biomedical studies, the principles of statistical design, sample size estimation, common designs in biological experiments, sequential clinical trials, high dimensional designs and process optimization, and the correspondence between objectives, design, and analysis. Each of these important topics is presented in an understandable and non-technical manner, free of statistical jargon and formulas. Written by a biostatistical consultant with 25 years of experience, *Principles of Experimental Design for the Life Sciences* is filled with real-life examples from the author's work that you can quickly and easily apply to your own. These examples illustrate the main concepts of experimental design and cover a broad range of application areas in both clinical and nonclinical research. With this one innovative, helpful book you can improve your understanding of statistics, enhance your confidence in your results, and, at long last, shake off those statistical shackles!

This open access textbook provides the background needed to correctly use, interpret and understand statistics and statistical data in diverse settings. Part I makes key concepts in statistics readily clear. Parts I and II give an overview of the most common tests (t-test, ANOVA, correlations) and work out their statistical principles. Part III provides insight into meta-statistics (statistics of statistics) and demonstrates why experiments often do not replicate. Finally, the textbook shows how complex statistics can be avoided by using clever experimental design. Both non-scientists and students in Biology, Biomedicine and Engineering will benefit from the book by learning the statistical basis of scientific claims and by discovering ways to evaluate the quality of scientific reports in academic journals and news outlets.

Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 34.

Chapters: Bayesian experimental design, Best linear unbiased prediction, Bootstrap error-adjusted single-sample technique, C+-probability, Causal inference, Comparing means, Descriptive research, Design of experiments, Dual-flashlight plot, Factorial experiment, Fold change, Fractional factorial design, Kolmogorov-Smirnov test, Mixed model, Multivariate analysis, Newey-West estimator, Optimal design, Pocock

