You are looking at 1-14 of 14 items for: **keywords : analysis of variance**

**Analysis of variance framework**
J. C. Gower and G. B. Dijksterhuis

in *Procrustes Problems*

This chapter continues the discussion of the multi-set problem, presenting several forms of analysis of variance which have only a rudimentary form for the two sets Procrustes problem but which give more detailed information with K sets. The terms in this analysis of variance help with interpretation and throw more light on the possible choices of criteria suitable for fitting Procrustes models by least squares.

**T. N. Thiele's contributions to statistics 77**
A. Hald

in *Thiele: Pioneer in Statistics*

This chapter presents a reprint of Hald (1981), containing a detailed discussion of Thiele's contributions to statistics and a brief summary of some of his contributions to other areas. Topics covered include skew distributions, cumulants, estimation methods and k statistics, the linear model with normally distributed errors, analysis of variance, and a time series model combining Brownian motion and the linear model with normally distributed errors. Thiele's work is placed in a historical perspective and explained in modern terms.
Although detailed statistical analyses are beyond the scope of this book, there are some important general principles about organizing and analyzing data. Hypotheses have to be phrased in such a way that they can be tested and a level of ‘significance’ set for the outcome. This chapter presents a brief review of the most frequently used statistical tests that are available, including a discussion of parametric and non-parametric tests. The presentation of results and writing the project report or paper is an important part of any project.

Basic Statistics in Multivariate Analysis
Karen A. Randolph and Laura L. Myers

The complexity of social problems necessitates that social work researchers utilize multivariate statistical methods in their investigations. Having a thorough understanding of basic statistics can facilitate this process as multivariate methods have as their foundation many of these basic statistical procedures. In this pocket guide, the authors introduce readers to three of the more frequently used multivariate statistical methods in social work research—multiple linear regression analysis, analysis of variance and covariance, and path analysis—with an emphasis on the basic statistics as important features of these methods. The primary intention is to help prepare entry level doctoral students and early career social work researchers in the use of multivariate statistical methods by offering a straightforward and easy to understand explanation of these methods and the basic statistics that inform them. The pocket guide begins with a review of basic statistics, hypothesis testing with inferential statistics, and bivariate analytic methods. Subsequent sections describe bivariate and multiple linear regression analyses, one-way and two-way analysis of variance (ANOVA) and covariance (ANCOVA), and path analysis. In each chapter, the authors introduce the various basic statistical procedures by providing definitions, formulas, descriptions of the
underlying logic and assumptions of each procedure, and examples of how they have been applied in the social work research literature. The authors also explain estimation procedures and how to interpret results. Each chapter provides brief step-by-step instructions for conducting these statistical tests in Statistical Package for the Social Sciences (SPSS) and AMOS (SPSS, Inc. 2011), based on data from the National Educational Longitudinal Study of 1988 (NELS: 88). Finally, the book offers a companion website that provides more detailed instructions, as well as data sets and worked examples.

Random and systematic errors
Simon Parsons and William Clegg
in Crystal Structure Analysis: Principles and Practice

Published in print: 2009 Published Online: September 2009

This chapter outlines some basic statistical methods and shows their application in crystallography, particularly in analysing the results. Concepts include: random and systematic errors, precision and accuracy, and distributions and their properties. Important properties include the mean and standard deviation of a distribution. The normal (Gaussian) distribution is of particular importance in view of the Central Limit Theorem. The mean of a set of values may be weighted or unweighted, and the place of weights in crystallography is discussed, especially in structure refinement. Some statistical tests and tools are described and used, including normal probability plots and analyses of variance. Correlation and covariance among parameters and derived results are considered. Possible sources of systematic and other errors in crystal structures are listed and their impact assessed. A simple checklist is provided for assessing results.

Analysis of Variance (ANOVA) and Covariance (ANCOVA)
Karen A. Randolph and Laura L. Myers
in Basic Statistics in Multivariate Analysis

Published in print: 2013 Published Online: May 2013

Chapter 6 provides a description of one-way and two-way Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA) statistical
procedures. The chapter includes a presentation on the basic statistics that inform one-way ANOVA (i.e., the mean and the variance), components of the ANOVA summary table, estimation procedures, required assumptions, planned and post-hoc comparisons, and examples of the use of one-way ANOVA in social work research. Building on this, the next section provides an explanation of two-way ANOVA, including main and interaction effects, estimation procedures, required assumptions, and multiple comparisons as well as a description of examples of the use of two-way ANOVA in social work research. ANCOVA is covered in the third section, including basic statistics (i.e., adjusted mean and partitioned variance), the important role of the covariate, required assumptions as a consequence of including a covariate in the model, and ANCOVA examples from social work research. The final section provides step-by-step instructions for running one-way ANOVA in SPSS, using data from the National Education Longitudinal Study of 1988.

Comparing Groups: Analysis of Variance
Andy Hector

in The New Statistics with R: An Introduction for Biologists

Analysis of variance is introduced using a worked analysis of some data collected by Charles Darwin on inbreeding depression in experimental maize plants. ANOVA is used to compare the height of a group of cross-pollinated plants with a group of self-fertilized seedlings. The least squares process is explained including the calculation of sums of squares and variances and the calculation of F-ratios. The organization of the results of a linear model into an ANOVA table is explained. The R code necessary to perform the analysis is worked through and explained in terms of the underlying statistical concepts and the interpretation of the R output demonstrated.

Basic Concepts and Assumptions
Patrick Dattalo

in Analysis of Multiple Dependent Variables
This chapter begins with an introduction to multivariate procedures, which allow social workers and other human services researchers to analyze multidimensional social problems and interventions in ways that minimize oversimplification. Examples of multivariate statistical procedures to predict and describe relationships include multivariate multiple regression (MMR), multivariate analysis of variance (MANOVA), and multivariate analysis of covariance (MANCOVA). Structural equation modeling (SEM) may be used for data simplification and reduction, description, and prediction. The discussion then turns to the rationale for multivariate analysis followed by a description of the organization and contents of this book.

Design and Analysis of Experimental Research I
Peter Miksza and Kenneth Elpus

in Design and Analysis for Quantitative Research in Music Education
Published in print: 2018 Published Online: March 2018
Item type: chapter

This chapter builds on the previous chapter by elaborating from theories of causal knowledge presented earlier to practical considerations for the design, execution, and analysis of randomized experiments and randomized controlled trials in music education research. The straightforward statistical analysis of the two-group experimental designs is explained through the t test. The analysis of variance technique is explained for the analysis of experimental and quasi-experimental data involving more than two groups. The chapter closes with a discussion of the analysis of data arising from experiments where additional data, beyond group membership and the score on an outcome measure, is known about the participants (i.e., analysis of covariance).

The Relative Importance of Predation, Food, and Interspecific Competition for Growth of Prairie Vole (Microtus Ochrogaster) Populations
George O. Batzli, Steven J. Harper, and Yu-teh K. Lin

in The Quintessential Naturalist: Honoring the Life and Legacy of Oliver P. Pearson
Published in print: 2007 Published Online: March 2012
Item type: chapter
This chapter presents a new analysis of experimental data that examines the relative effects of three factors—predation, food supply, and interspecific competition—on the population growth of voles. It aims to test the proposition that predation is an important factor which reduces population growth of small mammals during population increases as well as declines, an idea called Pearson’s hypothesis. The chapter quantifies the relative impact on growth of prairie vole populations during the growing season of manipulating access by predators, food supply, and presence of a competing species (the meadow vole, M. ochrogaster). It finds that all three factors had substantial effects on population growth, but that predation had two–three times greater impact than did food supply or competition, using analysis of variance and linear modeling.

Design and Analysis of Experimental Research II
Peter Miksza and Kenneth Elpus

in Design and Analysis for Quantitative Research in Music Education
Published in print: 2018 Published Online: March 2018
Item type: chapter

This chapter introduces the reader to more possibilities for thinking about causal questions and for laying the foundational concepts necessary for conducting data analyses that correspond to more complex experimental designs. The discussion of experimental design types presented in chapter 8 is expanded to include within-subjects designs, factorial designs, mixed designs, and designs for multivariate outcomes. Prototypical examples of each design type are presented along with the typical analysis tools used for testing the associated experimental hypotheses. Hypothetical examples of research designs that are suitable for illustrating analyses with repeated-measures ANOVA, factorial or multiway ANOVA, and MANOVA (multivariate analysis of variance).

What Are ‘Natural Inequalities’?
Tim Lewens

in The Biological Foundations of Bioethics
Published in print: 2015 Published Online: April 2015
doi: 10.1093/acprof:oso/9780198712657.003.0009
Item type: chapter

The varying demands of justice are often thought to depend on a distinction between natural and social inequalities, but making this
distinction has been little discussed, and it has been dismissed by philosophers of biology. It cannot be established by a simple causal criterion, nor by the use of the analysis of variance, nor by distinguishing the innate from the acquired. Whether an inequality can be socially controlled provides the most plausible criterion, so ‘natural’ and ‘social’ are misleading labels for types of inequality. The analysis of these depends, besides, on how fine-grained the descriptions are; so it implausible to think that the natural/social distinction, when drawn in terms of social control, is relevant to theories of justice.

Introduction
Andy Hector
in The New Statistics with R: An Introduction for Biologists
Published in print: 2015 Published Online: March 2015
Publisher: Oxford University Press
Item type: chapter

The chapter sets out the aims of the book, the approach, what is covered in the book and what is not. The book starts by introducing several different variations of the basic linear model analysis (analysis of variance, linear regression, analysis of covariance, etc). Then two extensions are introduced: generalized linear models (for data with non-normal distributions) and mixed-effects models (for data with multiple levels and a hierarchical structure). The book ends by combining these two extensions into generalized linear mixed-effects models. To allow a learning-by-doing approach the R code necessary to perform the basic analysis is embedded in the text along with the key output from R.

Choosing among Procedures for the Analysis of Multiple Dependent Variables
Patrick Dattalo
in Analysis of Multiple Dependent Variables
Published in print: 2013 Published Online: May 2013
Publisher: Oxford University Press
Item type: chapter

This chapter summarizes similarities and differences between multivariate analysis of variance (MANOVA), multivariate analysis of covariance (MANCOVA), multivariate multiple regression (MMR), and structural equation modeling (SEM). It offers suggestions to guide their
differential use. It also compares and contrasts MANOVA and MANCOVA versus MMR, MANOVA and MANCOVA versus SEM, and MMR versus SEM.