

Course in Simple and Multiple Correspondence Analysis, Department of Sociology, University of Bergen.

Week 48, 2009.

Credits: 9 ECTS-credits.

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Course Description: Simple and multiple correspondence analysis

In the social sciences, multiple correspondence analysis (MCA) is a statistical technique that first and foremost has become known through the work of the late Pierre Bourdieu (1930-2002), in particular “Distinction” (Bourdieu 1984), “Homo Academicus” (Bourdieu 1988) and “The State Nobility” (Bourdieu 1996).

As a counterpart to principal component analysis (PCA), a geometric technique for the analysis of metric variables, MCA is a geometric technique for the analysis of categorical or categorized variables. Originating in the early 1960s and the French statistician Jean-Paul Benzécri’s work in mathematical linguistics, MCA represents and models data sets as clouds of points in a multidimensional Euclidean space. The interpretation of the data is based on these clouds of points. By combining MCA with inferential techniques and variance analysis, we arrive at an integrated framework of interpretation that also is known under the name of Geometric Data Analysis (GDA).

In a combination of lectures and laboratory exercises, this course will introduce students to the fundamental properties, procedures and rules of interpretation of the most commonly used forms of correspondence analysis, i.e. simple correspondence analysis (CA) and MCA, and also to the most commonly used software. Particular attention will be paid to how MCA can be used in the construction of social spaces.

The course starts with an historical introduction to Benzécri’s work on contingency tables, and to the key ideas and basic properties in geometric data analysis. A first explanation of the procedures, the key concepts and the fundamental rules of interpretation will be given through a simple correspondence analysis (CA) of a standard contingency table.

Thereafter, and using Pierre Bourdieu’s work as a point of reference, we will go through the generalisation from CA to MCA by analysing an Individuals x Variables table. Particular emphasis will be put on the definition of distances between individuals, of distances between categories or modalities, the fundamental rules for the interpretation of axes in MCA, on how MCA can be integrated with variance analysis, and also on more general guidelines and coding principles.

We will then proceed to the more detailed exploration of the cloud of individuals, the introduction of supplementary variables, the use of concentration ellipses and how MCA also can be used in a confirmatory or explanatory mode by introducing variables as structuring factors in the constructed space. Tools for statistical inference, i.e. confidence ellipses around mean modality points in factorial planes, will also be

presented, as will also the integration of MCA and hierarchical clustering as a way of further validation of the results.

The analysis of textual data will be covered in separate lectures.

Although the course mainly will concentrate on CA and MCA, the analysis of Burt-tables, Categorical PCA, homogeneity analysis (HOMALS) and joint correspondence analysis (JCA) will also be covered.

In addition to the books, chapters, articles and texts listed in the curriculum below, a course handout will be distributed at the first lecture. Other texts may be added.

Complete reading list: recommended, alternative and additional literature (to be revised and updated, a list for each of the lectures will also given):

Aldenderfer, Mark S. & Roger K. Blashfield (1984). *Cluster Analysis*. QASS #44. Beverly Hills: Sage Publications. 80 pp.

Bennett, Tony & al. (2008) *Class, Culture Distinction*. London: Routledge.
Chapter 3: Mapping British cultural taste and participation.
Chapter 4: Individuals in cultural maps. Pp. 41-72.

The BMS: (Karl M. van Meter, Marie-Ange Schiltz, Philippe Cibois and Lisa Mounier) (1994). "Correspondence Analysis: A History and French Sociological Perspective." In Greenacre, Michael J. & Blasius, Jörg, eds., *Correspondence Analysis in the Social Sciences: Recent Developments and Applications*. San Diego: Academic Press. Pp.128-138.

Bourdieu, Pierre (1984) *Distinction*. Cambr. Mass.: Harvard University Press.
Chapter 5: The Sense of Distinction.
Chapter 6: Cultural Goodwill.
Appendix 1. Some Reflections on the Method. Pp. 264-370 & pp.503-518.

Bourdieu, Pierre (1988). *Homo Academicus*. Cambridge: Polity Press.
Chapter 2: The Conflict of Faculties
Appendix 4: The Analyses of Correspondences pp. 36-127 & pp. 271-277.

Bourdieu, Pierre (1996). *The State Nobility*. Stanford: Stanford University Press.
Part IV. Chapter 1: The Production of a Nobility.
Chapter 2: A Rite of Institution. Pp.264-335

Greenacre, Michael J. (1993). *Correspondence Analysis in Practice*. London: Academic Press. Chapter 18: Homogeneity Analysis. Pp. 151-161.

Greenacre, Michael J. (2007). *Correspondence Analysis in Practice*. London: Chapman & Hall.
Chapter 9: Two-dimensional Displays, pp. 65-72.
Chapter 19: Joint Correspondence Analysis, pp. 145-152. 15 pages.

Hjellbrekke, Johs. (1999). Innføring i korrespondanseanalyse. Bergen: Fagbokforlaget.

Hjellbrekke, Johs. & al (2007). The Norwegian Field of Power anno 2004. In *European Societies*, Volume 9, Issue 2 May 2007 , pp. 245 – 273. 30 pp.

Lebaron, Frédéric: "[The Space of Economic Neutrality. Trajectories and Types of Legitimacy of Central Bank Managers](#)", pp. 208-229 in *International Journal of Contemporary Sociology*, 37, 2, October 2000. 20 pages

Lebaron, Frédéric: "Economists and the Economic Order. The Field of Economists and the Field of Power in France," *European Societies*, Vol. 3, No. 1, 2001, pp. 91-110. 20 pages

Lebart, Ludovic (2006). Validation Techniques in Multiple Correspondence Analysis. Chapter 7 in Greenacre, Michael J. & Blasius, Jörg, eds. *Multiple Correspondence Analysis and Related Methods*. London: Chapman & Hall, pp. 179-196. 20 pages.

Lebart, Ludovic, André Salem & Lisette Barry. (1998). Exploring Textual Data. Dordrecht: Kluwer.

Le Roux, Brigitte & Henry Rouanet (1998). "Interpreting Axes in Multiple Correspondence Analysis: Method of the Contributions of Points and Deviations." In Greenacre & Blasius, *Visualization of Categorical Data*. San Diego: Academic Press, pp. 197-220. 23 pages.

Le Roux, Brigitte and Henry Rouanet (2003). [Geometric data analysis of individual differences](#). pp. 1-36. <http://epgy.stanford.edu/research/>

Le Roux, Brigitte & Henry Rouanet (2004). *Geometric Data Analysis. From Correspondence Analysis to Structured Data Analysis*. Dordrecht: Kluwer Academic Publishers.

Chapter 1: Overview of Geometric Data Analysis. Pp.1-22

Chapter 3: Euclidian Cloud. Pp. 106-116

Chapter 5: Multiple Correspondence Analysis. Pp. 214-241.

Chapter 6: Structured Data Analysis. Pp. 251-256, 265-268

Chapter 9: Research Case Studies. Pp. 365-394. 88 pages.

Le Roux, Brigitte, Henry Rouanet, Mike Savage and Alan Warde (2008): "Class and Cultural Division in the UK." Under publication. <http://www.cresc.ac.uk/publications/papers.html> pp.1-29. 29 pages.

Murtagh, Fionn (2005). *Correspondence Analysis and Data Coding with Java and R*. Chapter 1: Introduction

Romesburg, H. Charles (2004). Cluster Analysis for Researchers. North Carolina: LULU Press. Pp. 129-134.

Rosenlund, Lennart & Prieur, Annick (2007). « Danish Social Spaces » In Hjellbrekke & al. *Arbeid, kunnskap og sosial ulikhet. (Work, Knowledge and Social Inequality.)* Oslo: Unipub. Pp. 257-287. 30 pp.

Henry Rouanet (2006). "The Geometric Analysis of Structured Individuals X Variables Tables." Chapter 5 in Greenacre, Michael J. & Blasius, Jörg, eds. (2006). *Multiple Correspondence Analysis and Related Methods*. London: Chapman & Hall, pp.138-159. 20 pages.

Rouanet, Henry & Werner Ackermann and Brigitte Le Roux
"The Geometric Analysis of Questionnaires: The Lesson of Bourdieu's La Distinction." Pp. 5-18 in *Bulletin de Méthodologie Sociologique*, January 2000, N.65. 13 pages.

SPSS 13.0. Categories. Chapters on Correspondence Analysis, Categorical PCA and Multiple Correspondence Analysis.

Lectures and reading list:

TBA.

Lab sessions:

Brigitte Le Roux, Mikael Börjesson, Philippe Bonnet (2006):

Performing Multiple Correspondence Analysis (MCA) USING SPAD 1 (VERSION 6.5) Can be downloaded from

<http://www.skeptron.uu.se/broady/sec/p-gda-0609-spadguide-mca.pdf> (more material can be downloaded from the same site)