N°214	
Coordinator	Mélanie BERTIN
Dates	02 to 05 November 2021
Credits/ECTS	3 ECTS
Duration or Course Format	3 days of 7 hours + 1 day of 6 hours = 34 hours Due to bank holiday on November 1st the module will last only 4 days.
Location	EHESP 20 Avenue George Sand 93210 LA PLAINE ST DENIS
Description	The goal is to provide knowledge and skills in performing and interpreting the results of multivariate analyses and of multidimensional exploratory methods including principal component analysis, correspondence analysis and cluster analyses. More specifically, multidimensional analyses will be view as a statistical methods used in public health to analyse high-dimensional data sets. This technic is particularly adequate to synthetizing variables highly correlated and eliminating collinearity problem in multiple regression (i.e. creation of a composite index). Complementarity between modelling approaches and multidimensional exploratory analysis will be presented. Each day is designed to alternate between lectures, exercises and computer lab on either Stata or R software depending on students' preferences.
Prerequisites	Advanced core in biostatistics and in Epidemiology Basic in R or module 215 with Nolwenn LE MEUR *Introduction in R* Vidéo by Séverine Deguen + exercices
Course learning objectives	***Learning objectives****: at the end of the module, the students should be able to:* - Identify the main difference between supervised learning (modelling approaches) and unsupervised learning (PCA/MCA/clustering) and their complementarity - Be familiar with the methodological concepts of the most common multidimensional methods: principal component analysis, cluster analysis and to understand the extension of PCA analysis to other variables types as factorial analysis or correspondence analysis. To implement and to interpret the results including the statistical tables, such as contribution of variable on each components, correlation, eigen values and also correlation circle and dendrogram, and also parameters estimates from statistical models
Competences	**Competences :** • Uses vital statistics and health indicators effectively to increase knowledge and generate evidence about population health, including within at-risk and vulnerable groups • Knows how to retrieve, analyse and appraise evidence from all data sources to support decision-making Teaching activities : • 4 Lectures • 2 exercises • 4 labs in R • 2 conferences • 1 LCA • 1 group project. Evaluation :

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Group project of 5 students (number depending on module participants),
Written exam (1 hour) due for November, 20th

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<tr><td>Structure
(details of sessions title/speaker/date /duration)</td><td>
Details of the sessions
<table>
<tr><th></th><th>am</th><th>pm</th></tr>
<tr><td>Day 1:</td><td>Module introduction and presentation
PCA lecture</td><td>Exercises (application of PCA lecture)
PCA lab-R</td></tr>
<tr><td>Day 2 :</td><td>CA/MCA lecture
Exercises (application of MCA lecture)</td><td>MCA lab-R
Group project</td></tr>
<tr><td>Day 3 :</td><td>Clustering lecture
Conference - Cindy Padilla</td><td>clustering lab-R
Group project</td></tr>
<tr><td>Day 4 :</td><td>Conference - Maxime raffray
Other Data Mining analysis (LCA)</td><td>Group project</td></tr>
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<tr><td>Resources</td><td>François Husson you tube channel
https://www.youtube.com/channel/UCyz4M1pwJBNfjMFaUCHCNUQ</td></tr>
<tr><td>Course requirement</td><td>Students are expected to attend all lectures and seminars. Class attendance will be checked accordingly.
Students are expected to read and analyse selected papers for the group work before the courses.</td></tr>
<tr><td>Grading and assessment</td><td>Group project (started in class and due for November 21st, 11 : 00 pm)</td></tr>
<tr><td>Course policy</td><td>
Attendance & punctuality
Regular and punctual class attendance is a prerequisite for receiving credit in a course. Students are expected to attend each class. Attendance will be taken at each class.
The obligations of attendance and punctuality cover every aspect of the course: - lectures, conferences, group projects, assessments, examinations, as described in EHESP Academic Regulations http://mph.ehesp.fr EHESP Academic Regulation Article. 3).
If students are not able to make it to class, they are required to send an email to the instructor and to the MPH program coordinating team explaining their absence prior to the scheduled class date. All supporting documents are provided to the end-of-year panel.
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Students who miss class are responsible for content. Any student who misses a class has the responsibility for obtaining copies of notes, handouts and assignments. If additional assistance is still necessary, an appointment should be scheduled with the instructor. Class time is not to be used to go over material with students who have missed class.

Lateness: Students who are more than 10 minutes late may be denied access to a class. Repeated late arrivals may be counted as absences (See http://mph.ehesp.fr EHESP Academic Regulation Article. 3 Attendance & Punctuality)

Maximum absences authorized & penalty otherwise
Above 20% of absences will be designated a fail for a given class. The students will be entitled to be reassessed in any failed component(s). If they undertake a reassessment or they retake a module this means that they cannot normally obtain more than the minimum pass mark (i.e. 10 out of 20)

Exceptional circumstances
Absence from any examination or test, or late submission of assignments due to illness, psychological problems, or exceptional personal reasons must be justified; otherwise, students will be penalized, as above mentioned. Students must directly notify their professor or the MPH academic secretariat before
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	the exam or before the assignment deadline. Before accepting the student's justification, the professor or the MPH academic secretariat has the right to request either a certificate from the attending physician or from a psychologist, or from any other relevant person (See http://mph.ehesp.fr EHESP Academic Regulation Article 4 Examinations). **Courtesy**: All cell phones/pages MUST be turned off during class time. Students are required to conduct themselves according to professional standards, eating during class time is not permitted during class time, such as course or group work.
Valuing diversity	Diversity enriches learning. It requires an atmosphere of inclusion and tolerance, which oftentimes challenges our own closely-held ideas, as well as our personal comfort zones. The results, however, create a sense of community and promote excellence in the learning environment. This class will follow principles of inclusion, respect, tolerance, and acceptance that support the values of diversity. Diversity includes consideration of: (1) life experiences, including type, variety, uniqueness, duration, personal values, political viewpoints, and intensity; and (2) factors related to "diversity of presence," including, among others, age, economic circumstances, ethnic identification, family educational attainment, disability, gender, geographic origin, maturity, race, religion, sexual orientation and social position.
Course evaluation	EHESP requests that you complete a course evaluation at the end of the school year. Your responses will be anonymous, with feedback provided in the aggregate. Open-ended comments will be shared with instructors, but not identified with individual students. Your participation in course evaluation is an expectation, since providing constructive feedback is a professional obligation. Feedback is critical, moreover, to improving the quality of our courses, as well as for instructor assessment.