UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Psychometry for Neuropsycology

2324-1-F5108P005

Learning area

Methods, techniques and tools of psychology
Statistics and quantitative methods

Learning objectives

Knowledge and understanding

- Statistical techniques and methodological approaches for neuropsychological research.
- Statistical techniques and methodological approaches for neuropsychology in the clinical setting
- Experimental, Quasi-experimental and observational designs and analysis
- Simple and complex relationships between variables of different types
- Thorough understanding of the neuropsychological measure.
- Single case studies

Ability to apply knowledge and understanding

- Know how to analyse data from different types of research designs
- Understand and evaluate the quality of the statistical analyses present in the literature
- Knowing how to analyse and understand complex relationships between variables
- Critically evaluate and use different types of psychological measures
- Interpret scores on neuropsychological tests
- Evaluate the effectiveness of neuropsychological interventions
- Use of statistical software

Contents

The course presents a series of statistical techniques and methodological concepts useful for the acquisition and analysis of neuropsychological data, both in the experimental and clinical fields. Univariate and multivariate techniques are presented. Particular emphasis is given to the type of results obtainable and their interpretation. Some fundamental concepts of measurement in psychology are also developed.

Detailed program

Statistical models and statistical inference
Sampling and Power Analysis
General linear model
Factorial designs
Repeated measures designs
Single-Case study designs
Building a neuropsychological measure
The scoring of neuropsychological measures
Sensitivity, specificity and ROC curves
Measuring the effectiveness of neuropsychological interventions
Principles of factor analysis
Principles of Bayesian reasoning

Prerequisites

Basics of descriptive statistics (indices of central tendency and dispersion). Basics of inferential statistics: Simple regression and correlation, t-test.

Teaching methods

The course will be organized in 42 hours of lectures and 18 hours of laboratory exercises.
Lectures will focus on the theoretical basis of the statistical techniques in the program, their applicability, with particular emphasis on their interpretation. With the help of numerous examples taken from the neuropsychological literature, the aim is to make the notions of statistics understandable to students with different formal backgrounds and different learning levels of logical-mathematical subjects. The discussion of data analysis in the classroom is considered an integral part of the lessons.

During the lab hours, exercises on real data and applications of the techniques seen in class will be proposed.

Erasmus students can contact the teacher to agree on the possibility of studying on a bibliography in English and/or the possibility of taking the exam in English.

Assessment methods

Written exam with multiple choice questions (30) and open questions (3). Optional oral exam. The multiple-choice questions will particularly evaluate the learning of theoretical knowledge regarding psychometric measurement and the statistical models underlying data analysis. Multiple-choice questions account for 1/2 of the total grade.
The open-ended questions will focus on evaluating the ability to apply such theoretical knowledge to research design and data analysis. The student can demonstrate the ability to understand a research design, identify the proper statistical analyses useful for answering specific research questions, carry out the analyses with the software, correctly interpret the results and report them according to international standards. Open questions account for 1/2 of the total grade

The optional oral exam is offered to students who believe that the result of the written exam does not adequately reflect their preparation and will focus on both theoretical understanding and data analysis skills. The oral exam starts from the discussion of the written exam and regards all the topics covered in class. In case of oral integration, the final mark will be given by the average of the written and oral exams.

Textbooks and Reading Materials

The material for the study will be made available by the teacher on the e-learning page of the course. Scientific publications that will focus on specific topics will also be indicated.

For students who wish to have additional, more structured textual support, please refer to some recommended texts. These texts do not form part of the study program and must be considered as optional and supportive.
The texts are:

- Gallucci M., Leone L., Berlingeri, E. (2017). Modelli statistici per le scienze sociali, seconda edizione. Milano: Pearson Educational.
- Maroof, D. A. (2012). Statistical methods in neuropsychology: Common procedures made comprehensible. New York, NY: Springer.
- Navarro DJ and Foxcroft DR (2022). learning statistics with jamovi: a tutorial for psychology students and other beginners. (Version 0.75). DOI: 10.24384/hgc3-7p15

Sustainable Development Goals

QUALITY EDUCATION