The online course agenda
'Inferential Statistics using IBM SPSS (Intermediate)'
Course programme as part of the
'Excellence Initiative – Research University'
(IDUB) Programme

Academic teachers and research and technical specialists, after the proper registration can be qualified as course participants.

The course lasts for 30 teaching hours in total.

Trainer: dr Breno Silva, Faculty of Modern Languages

Learners will be able to deal with non-linear data, multilevel data, and will be able to conduct analysis on several variables in order to identify commonalities (e.g., factors) among the variables.

Learning outcomes
After completing the course, a participant will:
- Understand how to explore the data, check assumptions, solve potential problems (when possible), and conduct the most common tests designed to compare groups and analyze relationships between variables.
- Have basic knowledge of more modern, robust, and computationally intensive methods such as bootstrapping and Monte Carlo simulations.
- Have basic knowledge of some types of non-linear regression models.
- Have basic knowledge of linear mixed-effects models: theory and practice.
- Become familiar with exploratory factor analysis: theory and practice.

Expectations of the participants (skills, applications, equipment):

- English proficiency at B2 (upper-intermediate) or higher

- Software IBM SPSS statistics installed and ready to use (the license is available for staff and students at the University of Warsaw)
- Completion of the first part of this course: Inferential Statistics Using IBM SPSS (Basics).
- Those participants who have not completed the course are required to have at a minimum working knowledge of the following topics:
    - The meaning of p values and the importance of effects sizes
    - The assumptions of parametric tests: how to check the assumptions and potentially solve problems when the assumptions are not met.
    - T-tests (independent and dependent), ANOVAs (including interactions).
    - Linear regression analysis (simple and multiple regression) and their assumptions (except for multicollinearity).

Description of the class programme:

1. We will go through a brief review on the common assumptions introduced in the "basics" part of the course. The review will also include running the tests and interpreting the results. Some of the tests to be reviewed include t-tests, ANOVAs, and linear regressions.
2. We will delve deeper into the assumptions, especially kurtosis, (influential) outliers, and (multi)collinearity. This will also cover how to diagnose and potentially solve problems.

3. We will review bootstrapping and briefly discuss Monte Carlo simulations.
4. We will conduct and interpret non-linear regressions. Some of the distributions we may explore include binomial (outcome variable with 2 levels [e.g., yes/no answers]), logit (ordinal outcome variable with 2 or more levels), and Poisson (count outcome variable [e.g., how many times a person has failed a course]). All these tests are conducted using the generalized linear models interface in SPSS, and their interpretation is similar.
5. We will spend a few meetings learning the theory underpinning linear-mixed effects models and how to conduct them (only simple models!). We will analyse existing results and conduct our own. This is a very powerful but relatively novel technique that has been gaining popularity fast. It is also very flexible and thus complex. This is why we will cover only the basics. Still, extra material will be provided for those interested in furthering their knowledge, which is highly advised.
6. We will spend a few lessons learning the basics of exploratory factor analysis (EFA). These lessons may include some or all of the following:
   - Difference between EFA and principal component analysis (PCA).
   - The assumptions of EFA.
   - Deciding on an appropriate extraction method
   - Deciding on how many factors to retain
   - Choosing an appropriate rotation
   - Interpreting EFA results