Ansøgning om studienævnets godkendelse af forskningsaktivitet i projektet "Foundations of RT measurement" som valgfag

Response time is one of the most important variables in Psychology and Neuroscience, response times inform us about the duration and organization of mental processes. In ergonomics, educational studies and in neuropsychological assessment, researchers are interested in the time that is needed to solve a problem or an assignment.

In many of these research areas, it is very common to "clean" the data before determining response time performance (e.g., Ratcliff, 1993). For example, outliers (i.e., unusually fast or slow responses) are eliminated from the data, as well as incorrect and omitted responses. It is assumed that the cleaned data better reflect the duration of the mental processes when the participant concentrates on the task. Instead of asking: “How long did it take to find the correct response?”, studies ask “How long did it take if the correct response has actually been found?”

In the proposed project this widespread practice will be challenged. The basic argument is that omitting any “problematic” behavior from a data set yields a biased and incomplete picture of performance. Alternative ways for estimating response times will be investigated (e.g., Koch et al., 2013), and their reliability and validity will be compared to classical methods.

The student will investigate and illustrate the use of the method in Neuropsychological Assessment by analyzing simulated data using the classical method and the method used proposed by Koch et al. (2013). A reanalysis of the large reference data used for Zimmermann and Fimm’s (1989) Test for attentional performance will illustrate how reliability and validity can be improved by taking into account the information provided by the incorrect responses.

The student will be part of the active research environment at the Center for Visual Cognition and will obtain supervision and insight all stages of the research process. The student will report the results in a standard scientific manuscript.

Students can expect effective, research-based teaching in the form of:

- Introduction to the research process in general, and research projects at the Center for Visual Cognition specifically.
- Introduction to the use of programs to set up and presentation of experiments and analysis of the collected data using advanced statistical methodology.
- Introduction to the use of the R statistical programming language.
- Participation in current research under continuous supervision (weekly 1h meetings)

It is expected that the student shows great interest and independence in the acquisition of the necessary skills and management and analysis of data. It is also expected that the students actively acquires knowledge of the relevant methodology and literature.

The scope of the tasks corresponds to 200 hours. The course also includes the reading of a syllabus of a maximum of 1000 pages and the preparation of a manuscript (ca. 20 pages) that summarizes the research activity performed and the relevant literature.
The research activity is suited for Master students only (15 ECTS). If the student makes substantial contributions to the research project, coauthorship on the publication may be considered, but there is not automatic coauthorship associated with this research activity.

Learning goals

- Probability theory and stochastic models of information processing
- Detailed knowledge of mathematical modelling of mental processes
- Planning of experiments in cognitive psychology
- Manuscript preparation

Competences and skills

- Extension of the student's knowledge in psychological methods, for example, bootstrap, permutation tests, analysis of event times
- Neuropsychological assessment of attention
- Programming skills in script-based statistical languages (R core team, 2015)
- Data management

With best regards,

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References


Luce, R. D. (1986). *Response times. Their role in inferring elementary mental organization.* Oxford: Oxford University Press.


Additional references will be added because literature search is part of the project.