Crash Course: ERP analysis basics

Julian Elias Reiser[1] & Laura-Isabelle Klatt[1]

[1] *Leibniz Research Centre for Working Environment and Human Factors*
44139 Dortmund, Germany

It is our goal to provide a general, broad overview over the topic of EEG analysis and the underlying cognitive functions. Participants will learn about the neurophysiological principles of EEG measurement, how to clean recorded data and how to test this data using inference statistics. We will provide a hands-on experience as participants are encouraged to follow along the most important steps of ERP computation.
This course is targeted at an audience not yet familiar with the computational process of getting from raw data to an event-related potential and deriving relevant statistics. We will use a dataset freely available from an open science database and proceed to the final statistical tests in a step-by-step fashion.

Keywords

EEG/MEG

Prerequisites

Master degree students are as welcome as PhD students, though participants should have general knowledge about the conduction of scientific, psychological experiments. It is mandatory that participants have a computer at their disposal running Matlab and (a trial version of) Presentation. Prior statistical knowledge should encompass the conduction of dependent t-tests and repeated measures ANOVAs. Also, prior programming experience with Matlab might be of help.

Course Schedule (September 11th-12th, 14:00h – 18:00 CET)

Day 1 (Saturday, Sep 11th)		Day 2 (Sunday, Sep 12th)	
14:00	Welcome Day 1	14:00	Welcome Day 2 / Questions
14:30	What is the EEG and what do we measure?	14:30	Preprocessing in a nutshell (hands-on walkthrough)
15:30	How do we conduct an EEG experiment (digital lab visit)?	15:15	Independent components and how to exclude the artificial ones
16:00	First steps with EEGLab	15:45	From pre-processed data to ERP – peak detection and quantificiation
		16:30	Quick statistics
17:00	Prepration for the 2nd day	17:30	Farewell

Maximum Intake

12 participants

Additional requirements

Please make sure that you downloaded the following resources before September 11th (please check back later for the respective links).

- Presentation demo
- Script-Link
- Raw data link
- ICA data link

Recommended reading

1. Luck, S. J. (2005). *An introduction to the event-related potential technique*. MIT press.
2. Luck, S. J. (2011). Electrophysiological Correlates of the Focusing of Attention within Complex Visual Scenes: N2pc and Related Electrophysiological Correlates. In *The Oxford Handbook of Event-Related Potential Components*. Edited by Emily S. Kappenmann & Steven J. Luck.