Ear-EEG for reliable brain research in everyday life

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Mobile ear-EEG provides new avenues for studying the brain. With the combination of ear-EEG, portable amplifiers, and smartphone-based experimentation, we can record brain activity unobtrusively in everyday life, allowing us to pose new research questions.

However, moving from a controlled full-cap lab-EEG study to a mobile ear-EEG recording in everyday life comes with many challenges. The widespread availability of cheap mobile-EEG devices and the apparent ease of use hide the fact that EEG is by itself an intricate technology when it comes to recording high-quality data and interpreting the results correctly. When we move beyond the lab, these difficulties remain, and additional challenges arise. In this workshop, we will address these issues and share with you our experience of mobile ear-EEG.

At the end of the workshop, you will have a clear understanding of how to use mobile-ear EEG.

Keywords

ear-EEG, cEEGrid, EEG/MEG, Mobile Brain/Body, auditory perception

Prerequisites

There are no prerequisites for this workshop. It would be great if you can share with us why you are interested in ear-EEG and what you are planning to do with it.

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

Day 1	
14:00	Welcome (why are you here?)
14:30	Introduction to ear-EEG
15:00	How to record (mobile) ear-EEG?
16:00	Coffee - break
16:15	How to analyze ear-EEG data?
17:15	Q & A Session
17:45	Farewell

Maximum Intake

25 participants

Long Description

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In this workshop, you will learn what you need to consider when you move from cap-EEG to ear-EEG and move from the lab to everyday life. You will learn for which research questions ear-EEG is suitable. You will learn how to place ear-EEG (here cEEGrids), and how to run ear-EEG experiments exclusively on a smartphone. You will learn how to relate EEG with concurrently recorded smartphone sensors and which aspects you need to consider when analyzing ear-EEG data.

At the end of the workshop, you have a clear understanding of how to use mobile-ear EEG.

Recommended Reading

- Bleichner, M. G., & Debener, S. (2017). Concealed, unobtrusive ear-centered EEG acquisition: cEEGrids for transparent EEG. *Frontiers in Human Neuroscience*, *11*(163), 163. https://doi.org/10.3389/fnhum.2017.00163
- Meiser, A., Tadel, F., Debener, S., & Bleichner, M. G. (2020). The Sensitivity of Ear-EEG: Evaluating the Source-Sensor Relationship Using Forward Modeling. *Brain Topography*, *1*, 1–15. https://doi.org/10.1007/s10548-020-00793-2
- Hölle, D., Meekes, J., & Bleichner, M. G. (2021). Mobile ear-EEG to study auditory attention in everyday life: Auditory attention in everyday life. *Behavior Research Methods*, 1–12. https://doi.org/10.3758/s13428-021-01538-0

Anything else

Have a look at the help page of the cEEGrid plugin.
https://gitlab.com/mgbleichner/ceegridplugin