

# DON'T PANIC!



# A HITCHHIKER'S GUIDE TO fNIRS DATA ANALYSIS FOR BLOCK-DESIGN PARADIGMS

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### (1) MOTIVATION

Are you new to the field of functional Near Infrared Spectroscopy (fNIRS)?

Are you wondering where to start and which analysis steps are suitable for your analysis?


Do you feel lost with the amount of possibilities to analyze your data?

What if we tell you that we are currently working on a **practical walkthrough** based on an exemplary fNIRS analysis for block-design paradigms?

What you can expect:

- A practical **guide** for fNIRS preprocessing
- **Analysis scripts** based on the NIRS Brain AnalyzIR toolbox (Santosa et al., 2018)
- **Open data set**

Check out our [OSF page](#) for updates



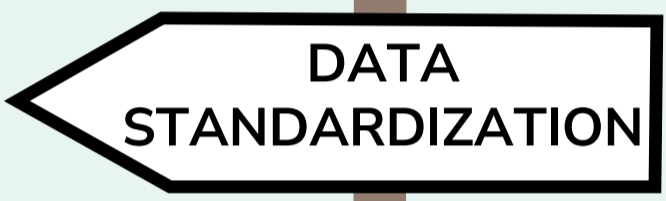
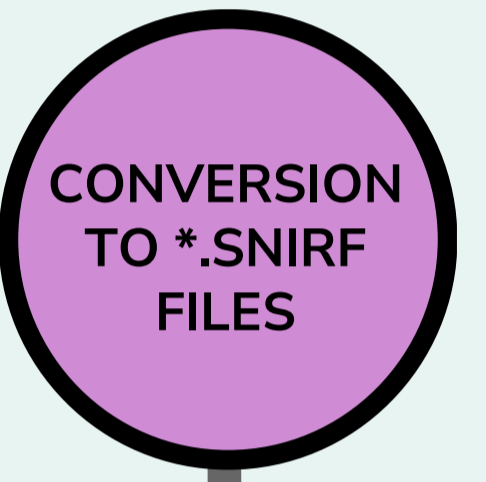
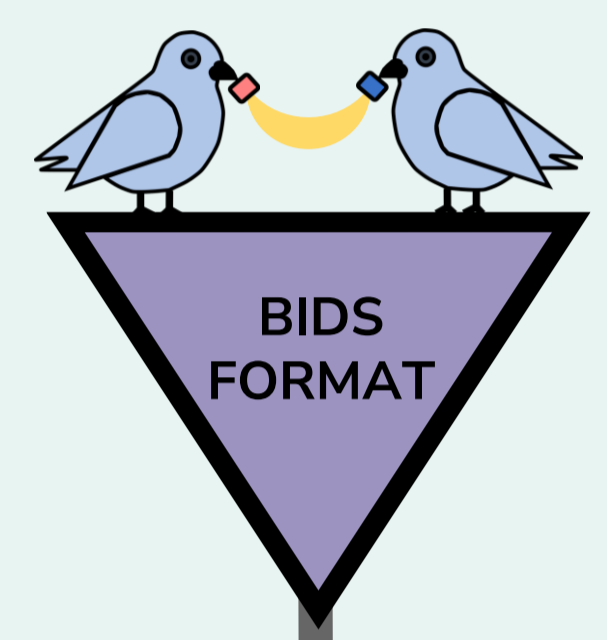
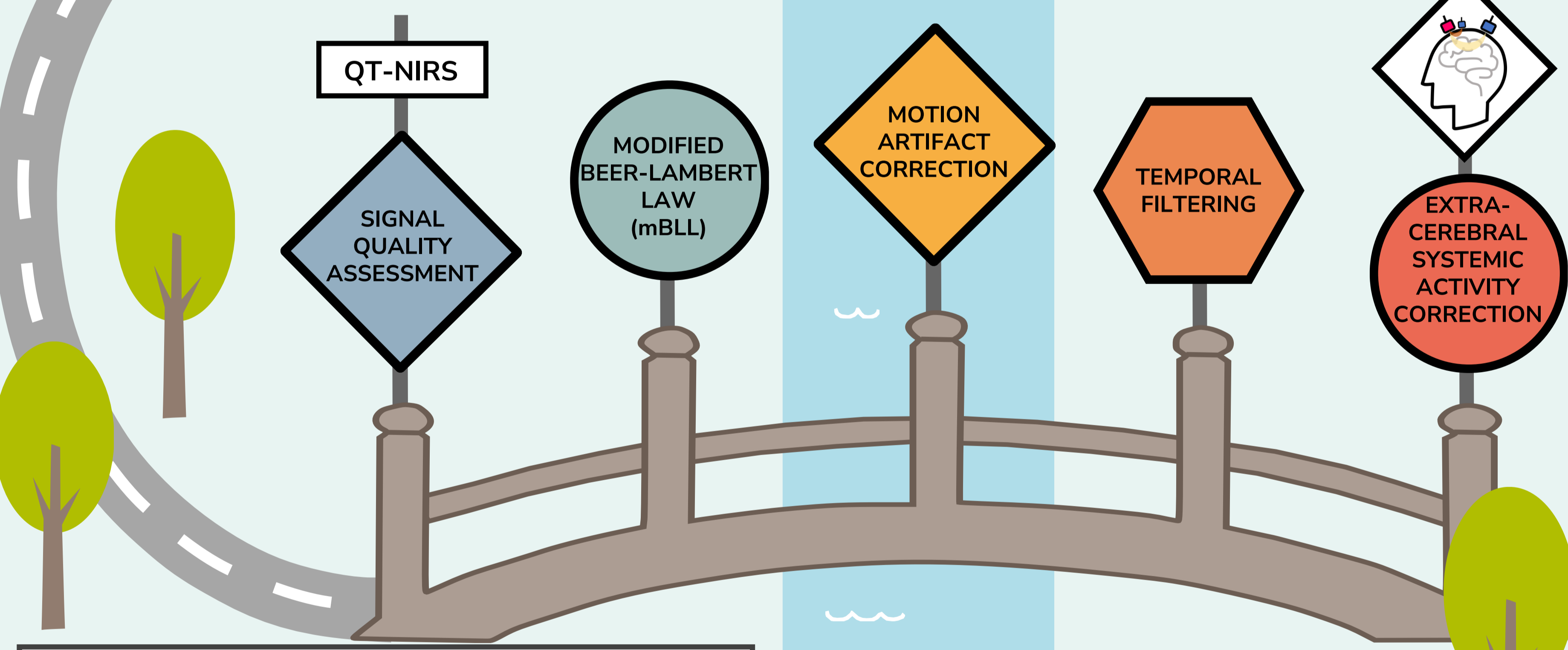
### (2) DATA STANDARDIZATION

**Brain Imaging Data Structure (BIDS) FORMAT:** Standard file structure for neuroimaging and behavioral data

**Shared NIRS Format (SNIRF):** Standardized NIRS format

- Facilitates storage, sharing and reproducibility

DATA PREPROCESSING

- QT-NIRS
- SIGNAL QUALITY ASSESSMENT
- MODIFIED BEER-LAMBERT LAW (mBLL)
- MOTION ARTIFACT CORRECTION
- TEMPORAL FILTERING
- EXTRA-CEREBRAL SYSTEMIC ACTIVITY CORRECTION

### (3) DATA PREPROCESSING

With this guide, we offer a practical walkthrough to fNIRS data analysis with a focus on block-design paradigms

- Based on current best practices for fNIRS publications (Yücel et al., 2021) and recommendations in the field for preprocessing steps

Analysis scripts will cover the following preprocessing steps:

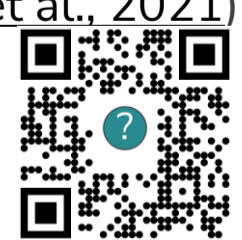
- **Signal Quality Assessment:** QT-NIRS toolbox
- **mBLL:** conversion from raw  $\rightarrow \Delta OD \rightarrow \Delta[HbX]$
- **Motion Artifact Correction:** comparison of different algorithms
- **Temporal Filtering:** IIR vs. FIR filter
- **Extracerebral Systemic Activity Correction:** methods with and without short-distance channels

### (5) IN THE MEANTIME ...

... there are other great resources available which can make it easier to get started:

- Plan your study in advance: A guide for fNIRS preregistrations (Schröder et al., 2022 Preprint)
- Best Practices for fNIRS publications (Yücel et al., 2021)
- fNIRS Analysis Club (fnirsanalysisclub.org)

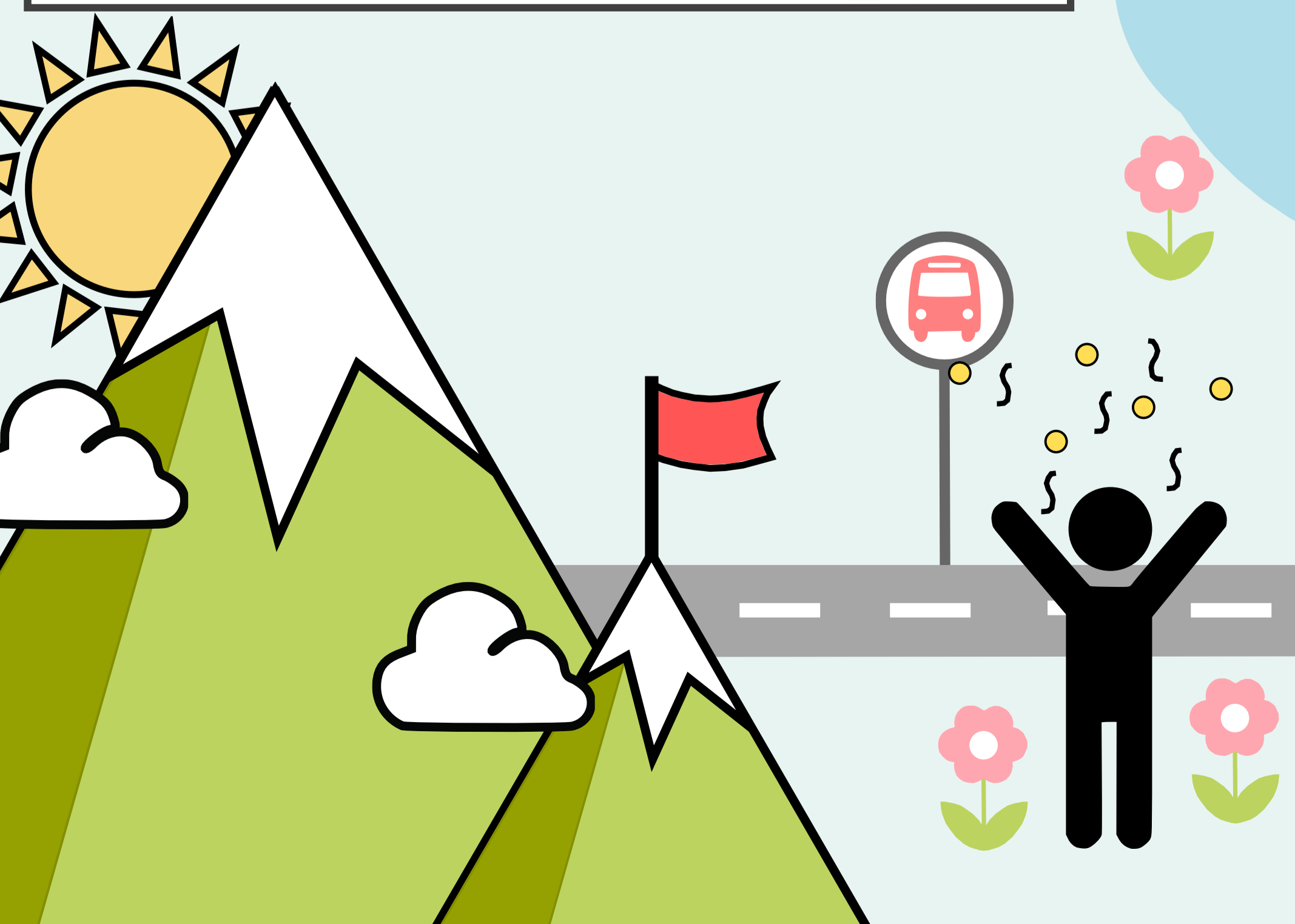
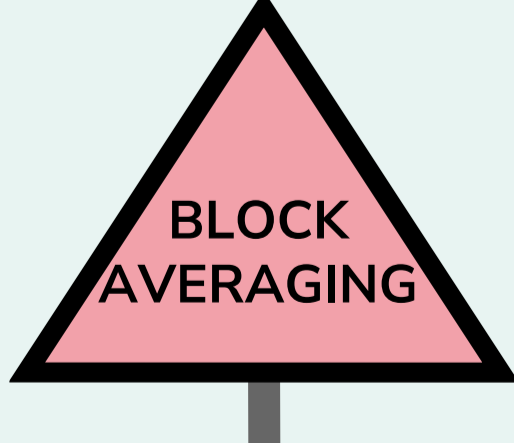
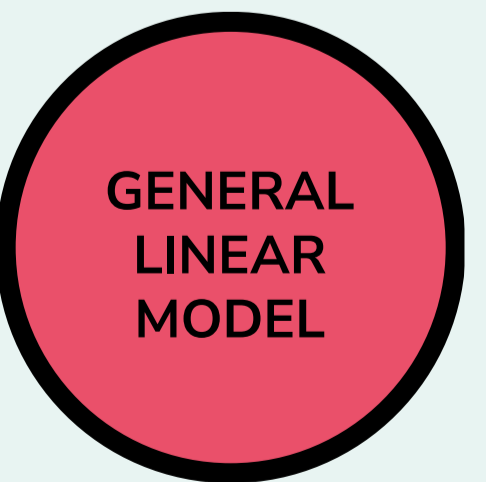
For further questions or comments scan me



### (4) DATA ANALYSIS

We will cover the two most commonly applied analysis approaches for block-design paradigms

- **Block Averaging**
- **General Linear Model (GLM):** predefined basis function vs. deconvolution model



### CONTACT

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