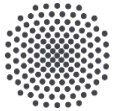


University of Stuttgart

Computational Cognitive Science

SimTech

Investigating the effects of overlap and event durations on neural responses

Master Thesis - Intro Talk

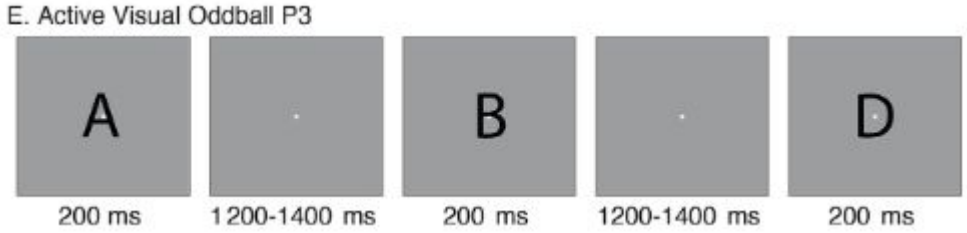
Martin Geiger

16.05.2022

I. Experiment: P300

P300 Experiment

ERP CORE P3 oddball paradigm:



→ larger positive voltage for targets (rare)

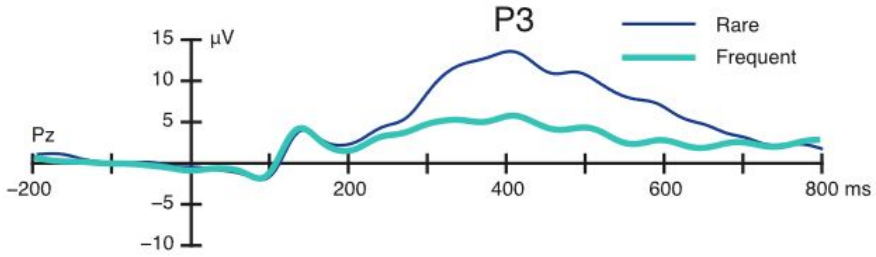
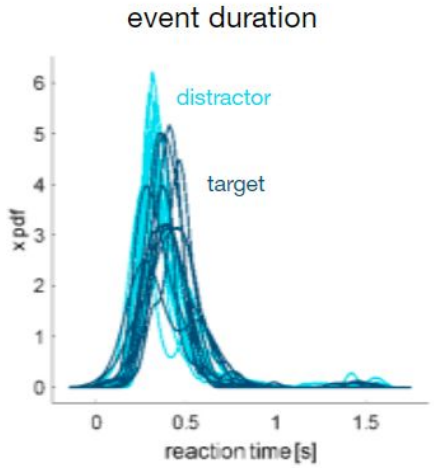


Fig. 2. Grand average parent ERP waveforms (left)

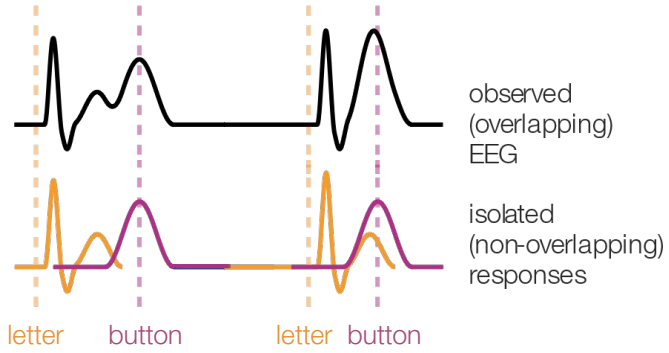
(Kappenman et al., 2021)

Overlap

Reaction time:



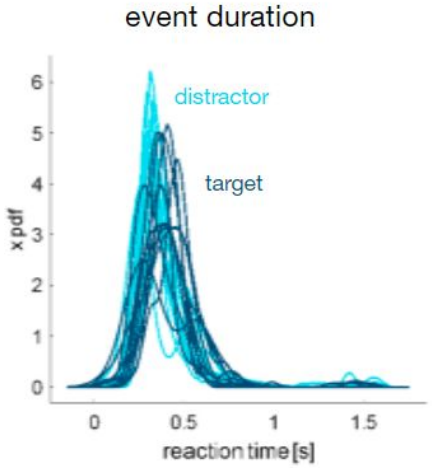
Overlap:



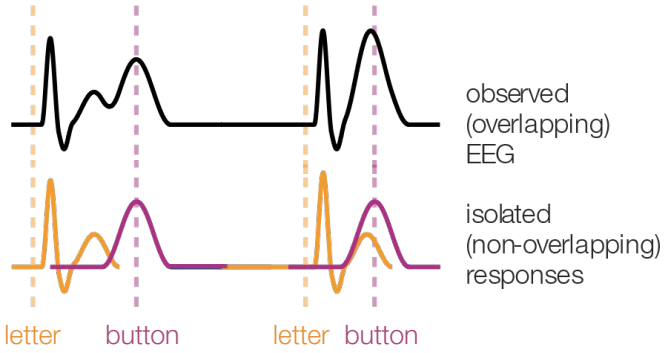
(Ehinger & Dimigen, 2019)

Overlap

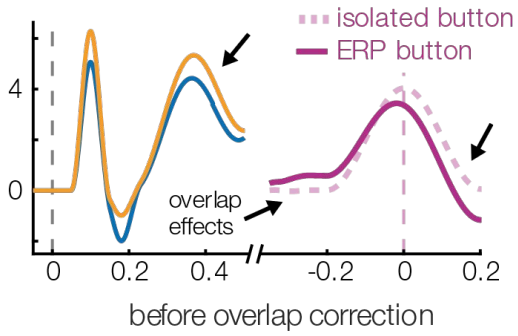
Variation in reaction time:



Variation in reaction time induces varying overlap:



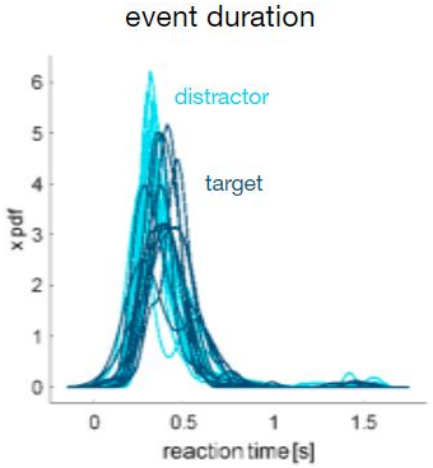
→ averaging:



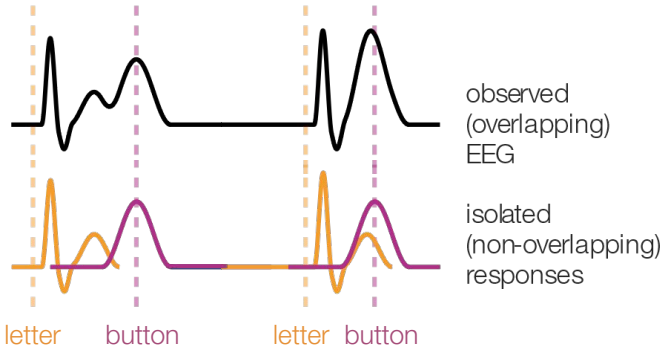
(Ehinger & Dimigen, 2019)

Overlap

Variation in reaction time:



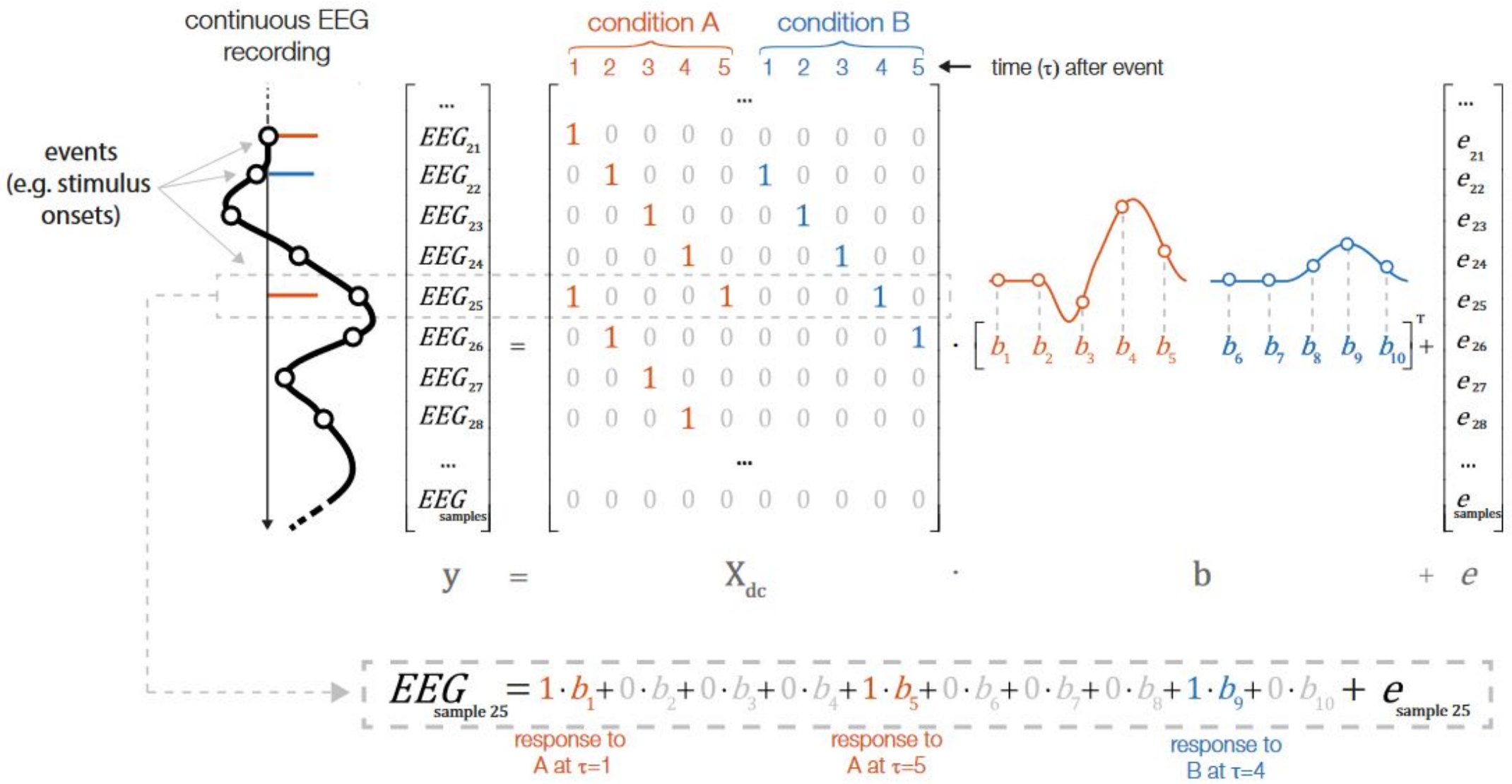
Variation in reaction time induces varying overlap:



→ linear deconvolution for overlap correction

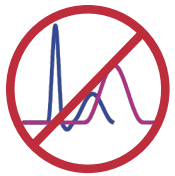
(Ehinger & Dimigen, 2019)

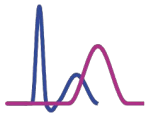
Linear regression model

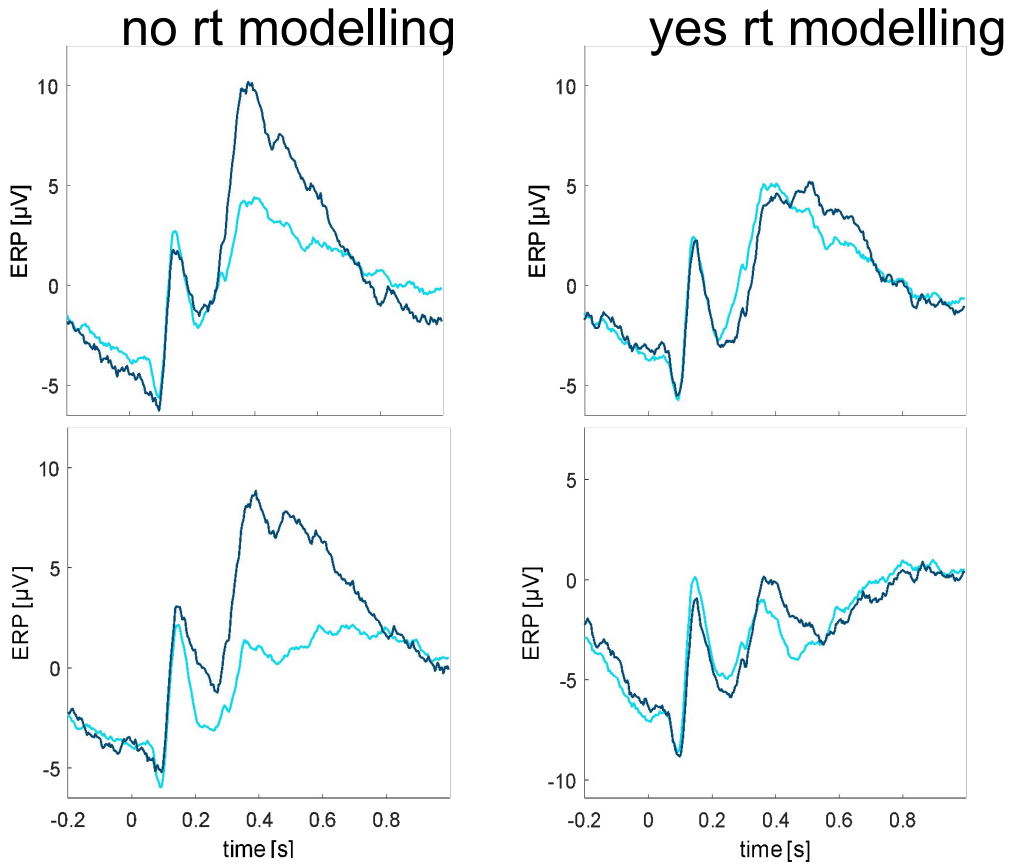


(Ehinger & Dimigen, 2019)

What's new?







But P300 still exists response-locked!

→ **model RT for both stimulus & response**

→ Too little data!

Goals

I. Record EEG data with 40 participants

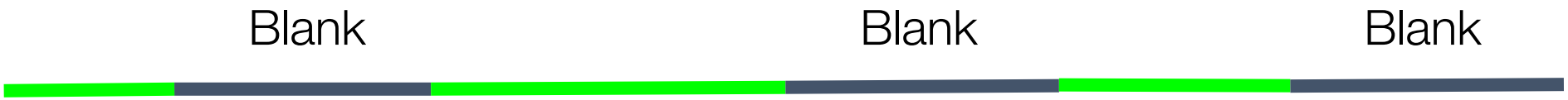
II. Test Hypothesis:
The amplitude difference of the P300 component between target and distractor trials is an effect of reaction time.

II.

Experiment: Stimulus Duration

Stimulus duration

Part I:



Part II:

Goals:

I. Record EEG data
II. Analyse effects of stimulus duration
III. Difference in estimated ERPs due to number of overlapping potentials?

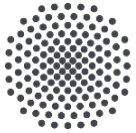
References

Ehinger, B. V., & Dimigen, O. (2019). Unfold: An integrated toolbox for overlap correction, non-linear modeling, and regression-based EEG analysis. *PeerJ*, 7 (10), 33. https://doi.org/10.7717/peerj.7838

Kappenman, E. S., Farrens, J. L., Zhang, W., Stewart, A. X., & Luck, S. J. (2021). ERP CORE: An open resource for human event-related potential research. *NeuroImage, 225*. https://doi.org/10.1016/j.neuroimage.2020.117465

https://thenounproject.com/, last accessed: 13.05.2022, 15:20 p.m.

Thank you for your attention!



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