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ERP CORE

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If you use the ERP CORE in a publication, please cite: Kappenman, E. S., Farrens, J., Zhang, W., Stewart, A. X., & Luck, S. J. (2020, May 22). ERP CORE: An Open Resource for Human Event-Related Potential Research. <https://doi.org/10.31234/osf.io/4azqm> (or the peer-reviewed version once it is published).

ERP CORE

Compendium of Open Resources and Experiments

- 6 optimized ERP paradigms, 7 ERP components
 - 5 to 11 minutes per task
- Experiment control scripts for each paradigm
 - Presentation (download free trial at <http://neurobs.com>)
- Data set with EEG from 40 neurotypical young adults in each paradigm (32 channels)
- Broad set of results and data quality measures
- Analysis pipelines and scripts in EEGLAB/ERPLAB

P3

N400

MMN

N2pc

N170

ERN+LRP

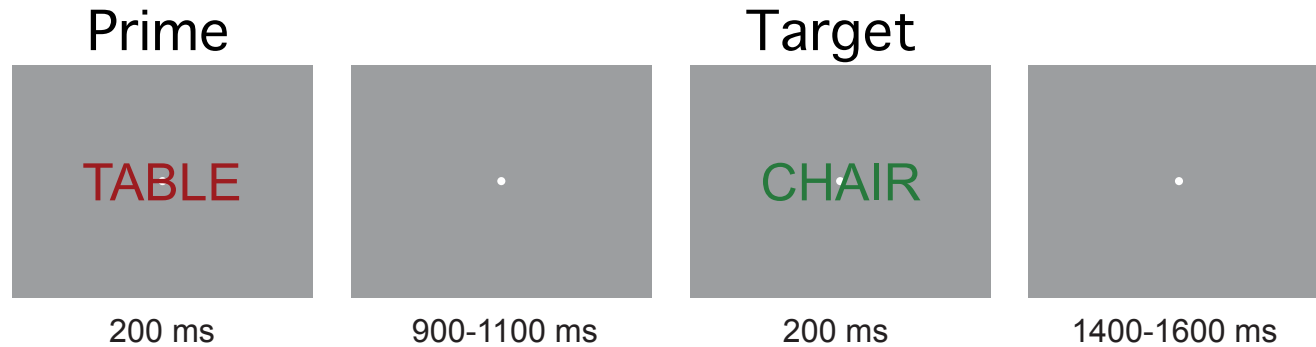
<https://doi.org/10.18115/D5JW4R>

Preprint

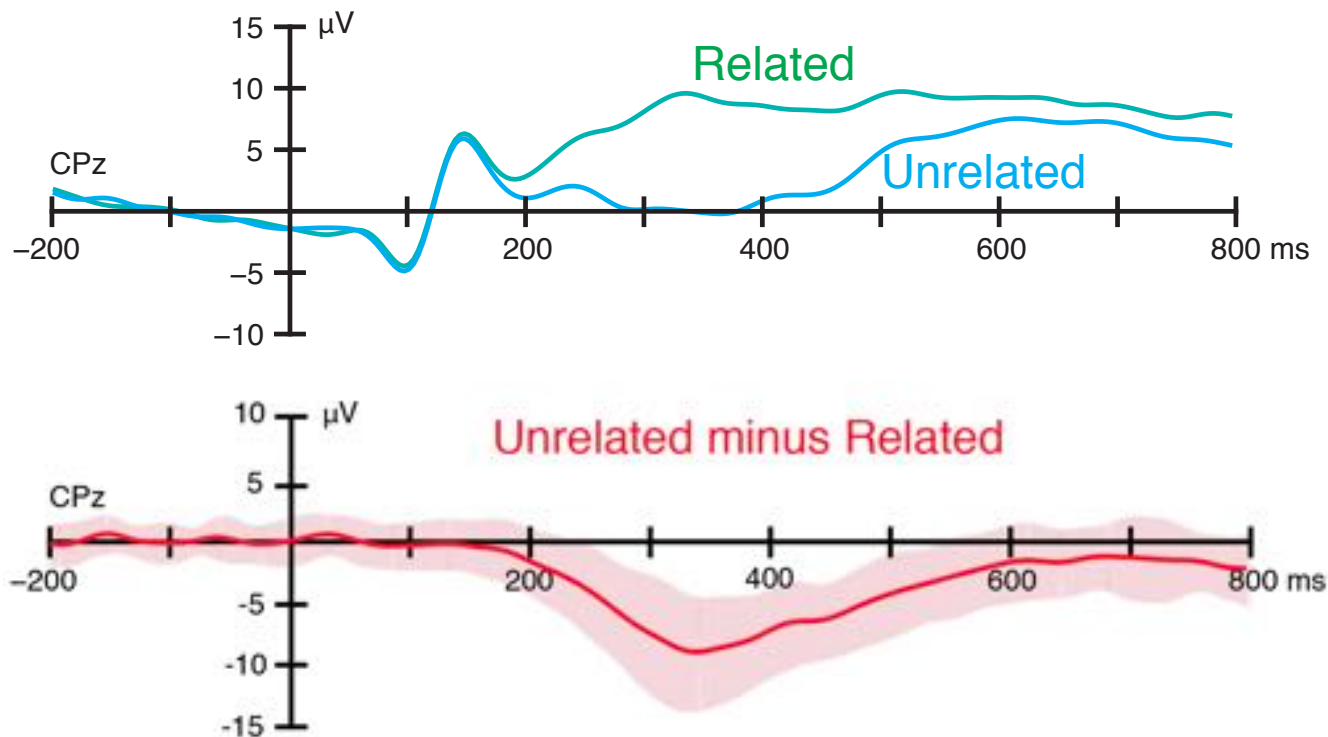
The screenshot shows the PsyArXiv Preprints interface. At the top, the header includes the PsyArXiv logo, the title 'ERP CORE: An Open Resource for Human Event-Related Potential Research', and a green 'Edit preprint' button. Below the title, the authors are listed: Emily Kappenman, Jaclyn Farrens, Wendy Zhang, Andrew Stewart, and Steven Luck. A section for 'AUTHOR ASSERTIONS' shows 'Conflict of Interest: No'. A light blue banner states: 'Pending: PsyArXiv uses post-moderation. This preprint is publicly available and searchable but is subject to removal by a moderator.' The main content area is divided into two columns. The left column shows a PDF viewer with the abstract text, which is partially obscured by line numbers (32-45). The right column contains a 'Download preprint' button, a 'Downloads: 351' counter, a 'plaudin' endorsement badge from Morgan Hough and Yuri Pavlov, social media sharing icons, and the full abstract text. The abstract describes the ERP CORE resource, which includes optimized paradigms, experiment control scripts, data processing pipelines, and sample data for seven widely used ERP components: N170, mismatch negativity (MMN), N2pc, N400, P3, lateralized readiness potential (LRP), and error-related negativity (ERN). It states that this resource makes it possible for researchers to 1) employ standardized ERP paradigms in their research, 2) apply carefully designed analysis pipelines and use a priori selected parameters for data processing, 3) rigorously assess the quality of their data, and 4) test new analytic techniques with standardized data from a wide range of paradigms. Below the abstract, there is a 'Preprint DOI' link: <https://doi.org/10.31234/osf.io/4azqm>.

Kappenman, E. S., Farrens, J., Zhang, W., Stewart, A. X., & Luck, S. J. (2020). ERP CORE: An Open Resource for Human Event-Related Potential Research. *PsyArXiv*. <https://doi.org/10.31234/osf.io/4azqm>

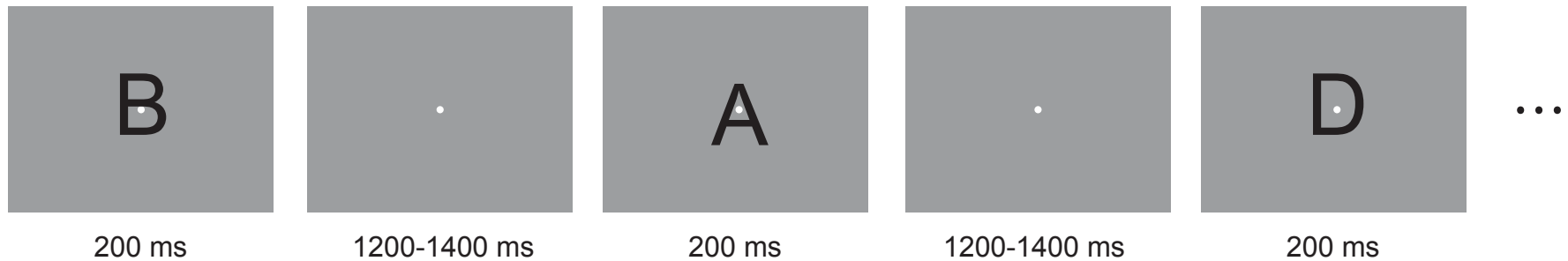
Word Pair Judgment: N400



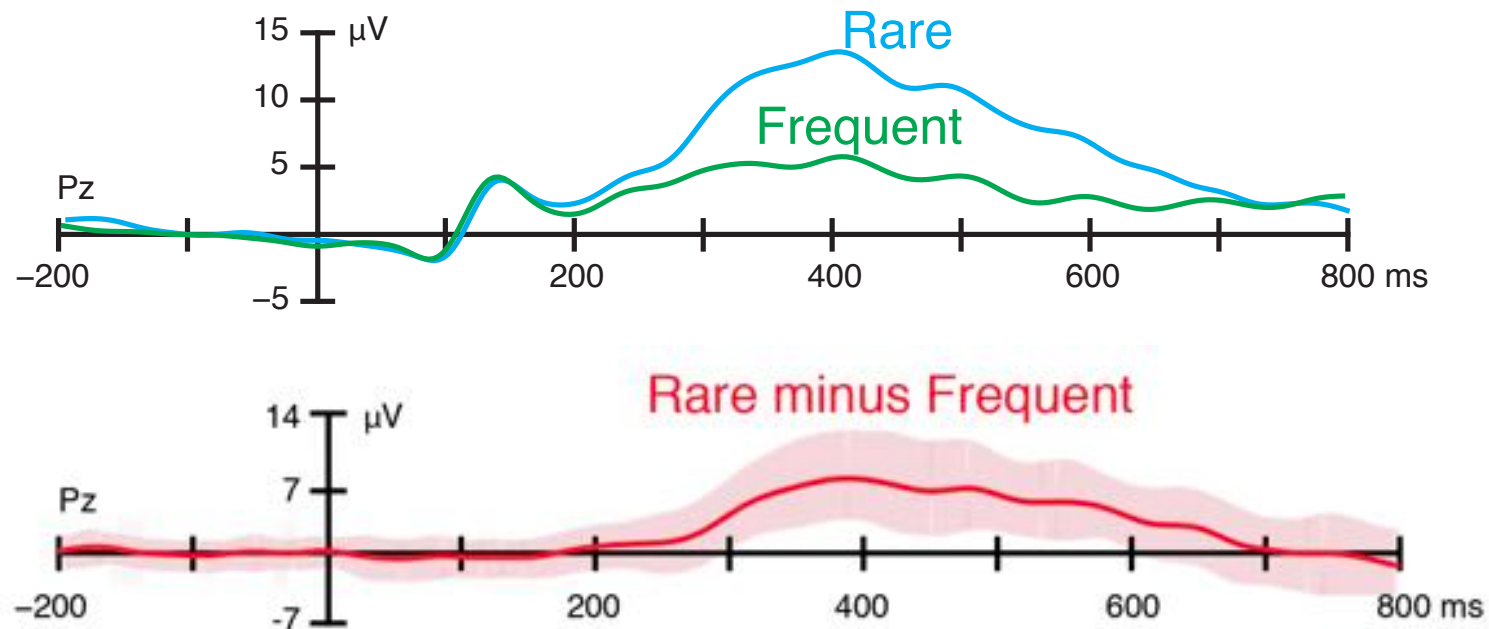
Task: Target semantically related vs. unrelated to prime



Active Visual Oddball: P3b

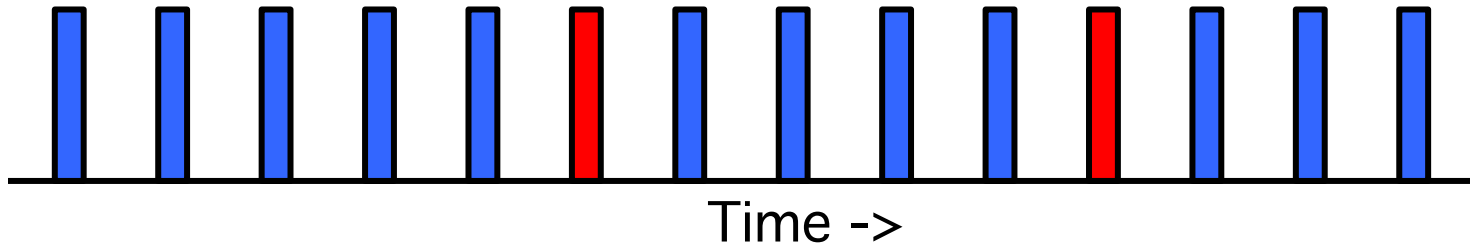


Stimuli: A, B, C, D, E (20% each; 1 is target)
 Task: Press one button for target, another for nontarget

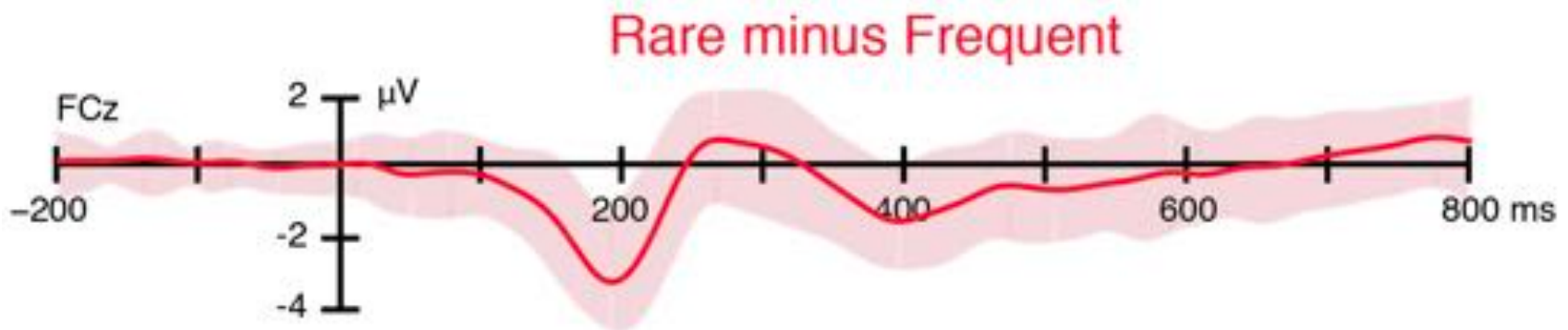
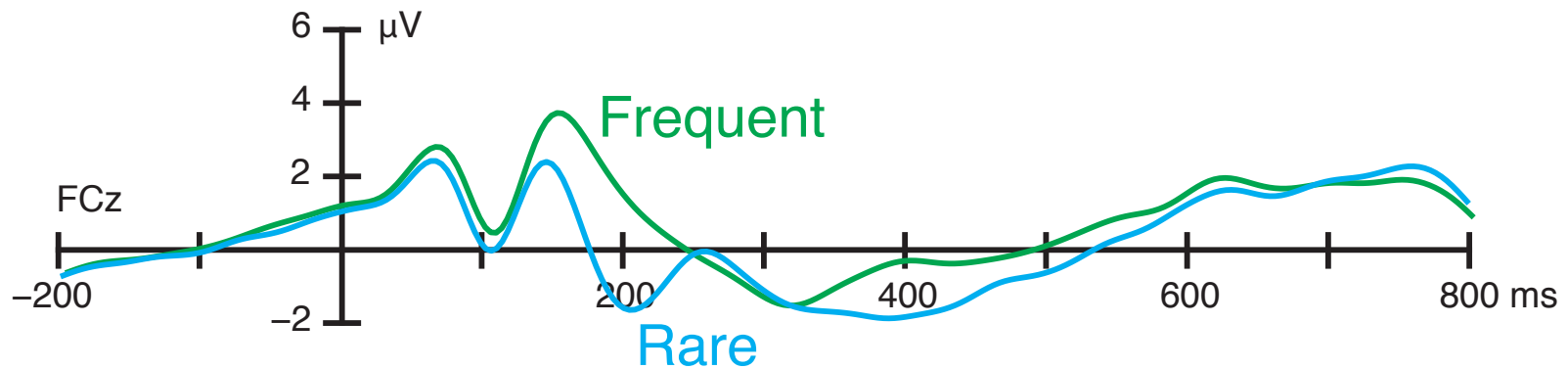


Passive Auditory Oddball: MMN

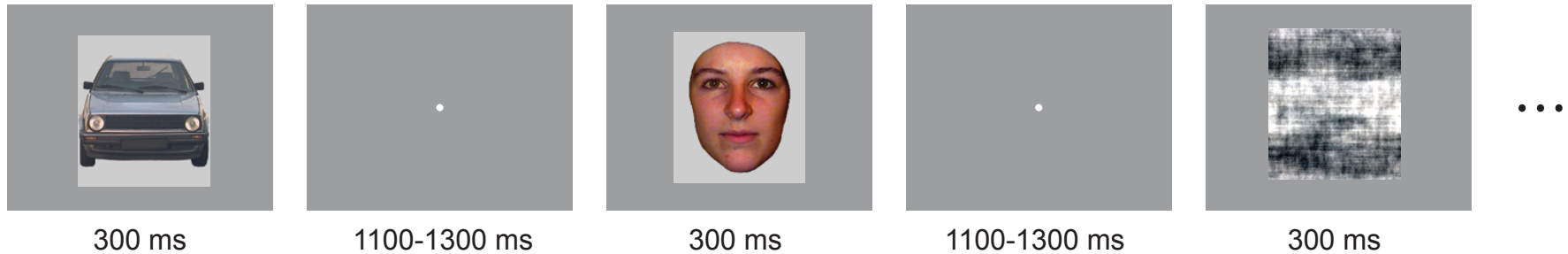
10



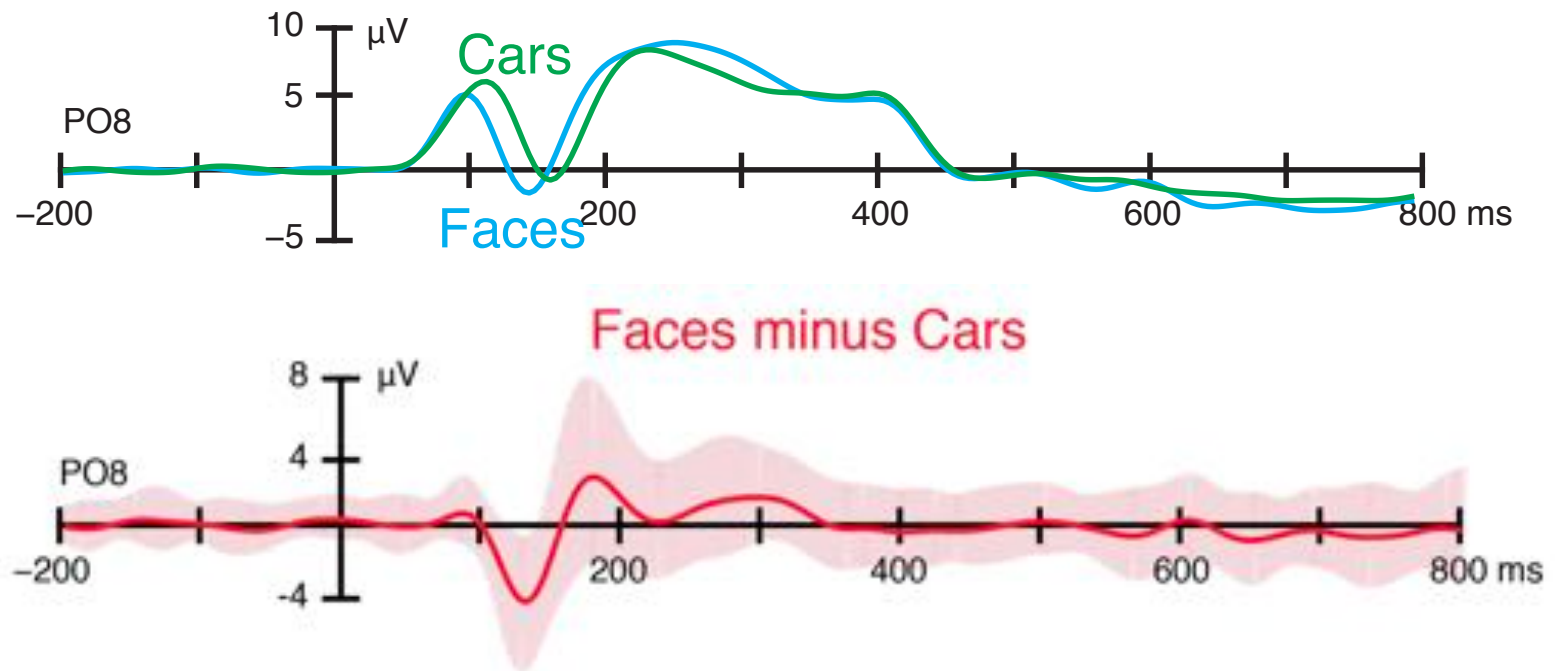
Stimuli: 80% 1000 Hz, 80 dB / 20% 1000 Hz, 70 dB



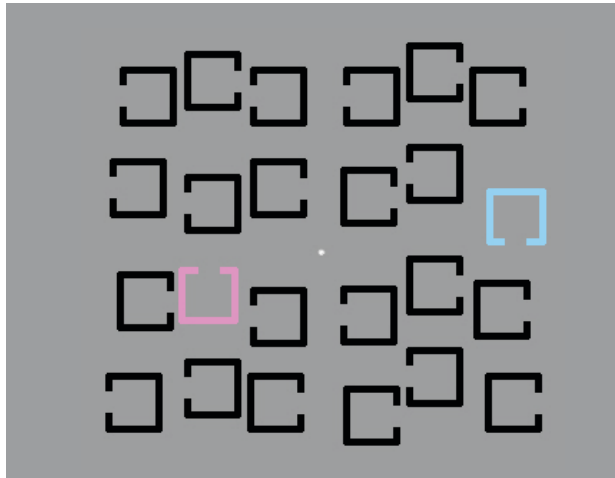
Face Perception: N170



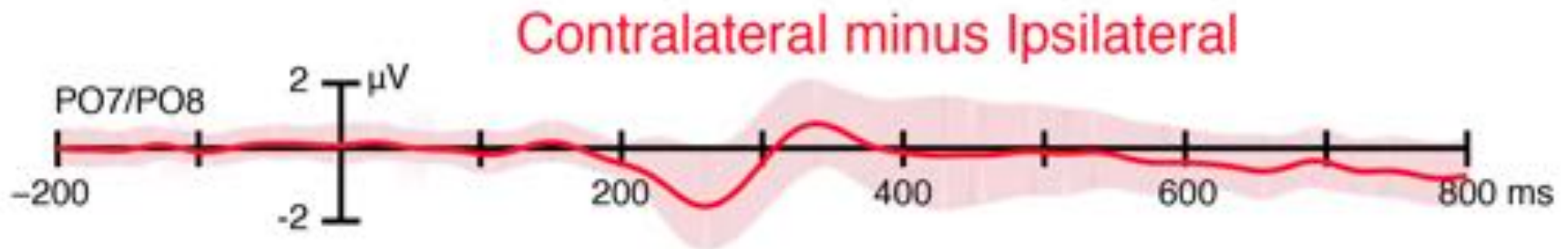
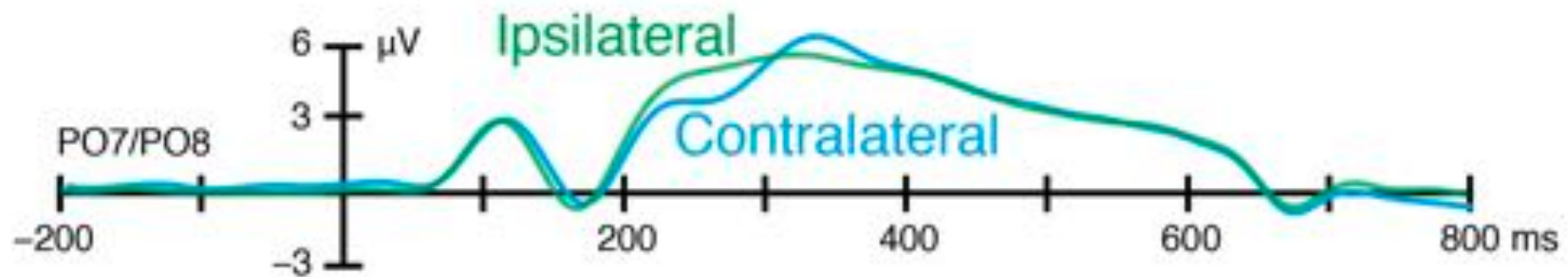
Stimuli: Faces, Cars, Scrambled Faces, Scrambled Cars
 Task: Press one button for intact, another for scrambled



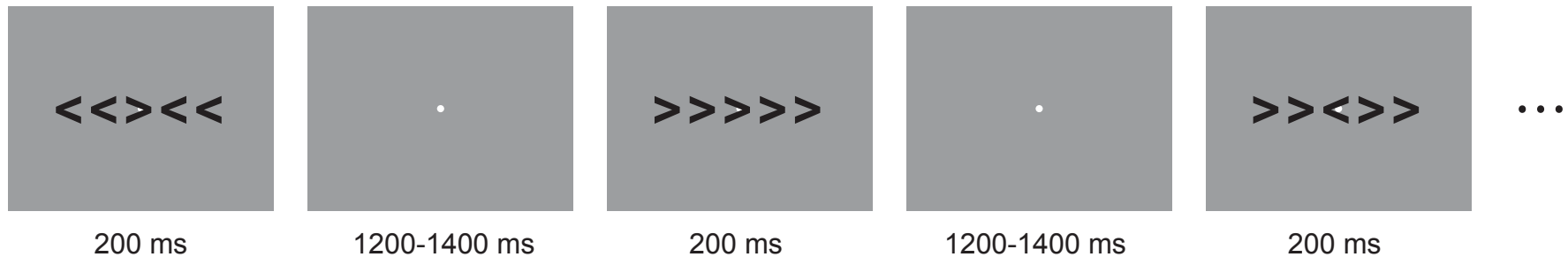
Visual Attention: N2pc



Task: Press button to indicate location of gap on attended-color item

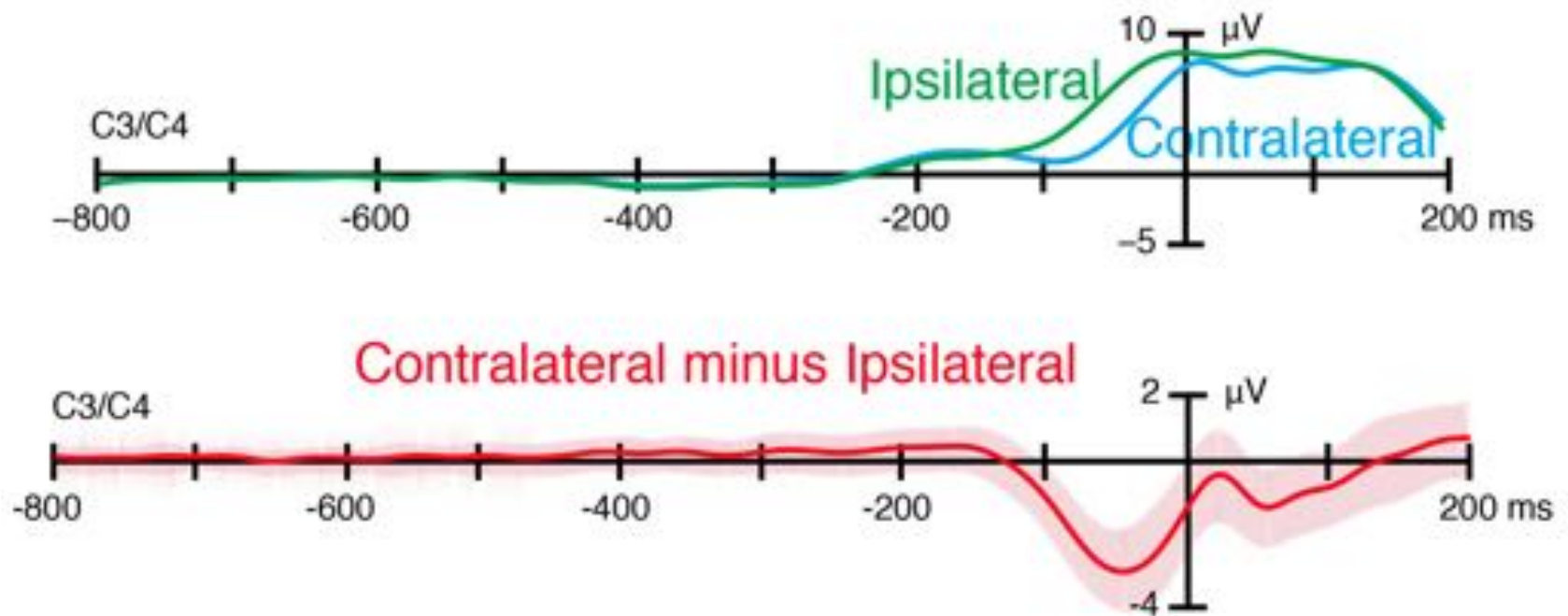


Flankers: LRP

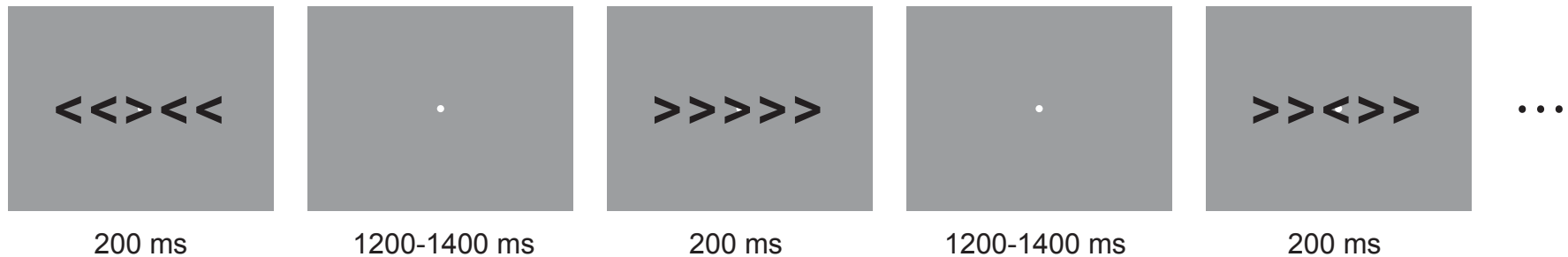


Stimuli: Compatible, Incompatible

Task: Press button to indicate direction of central arrow

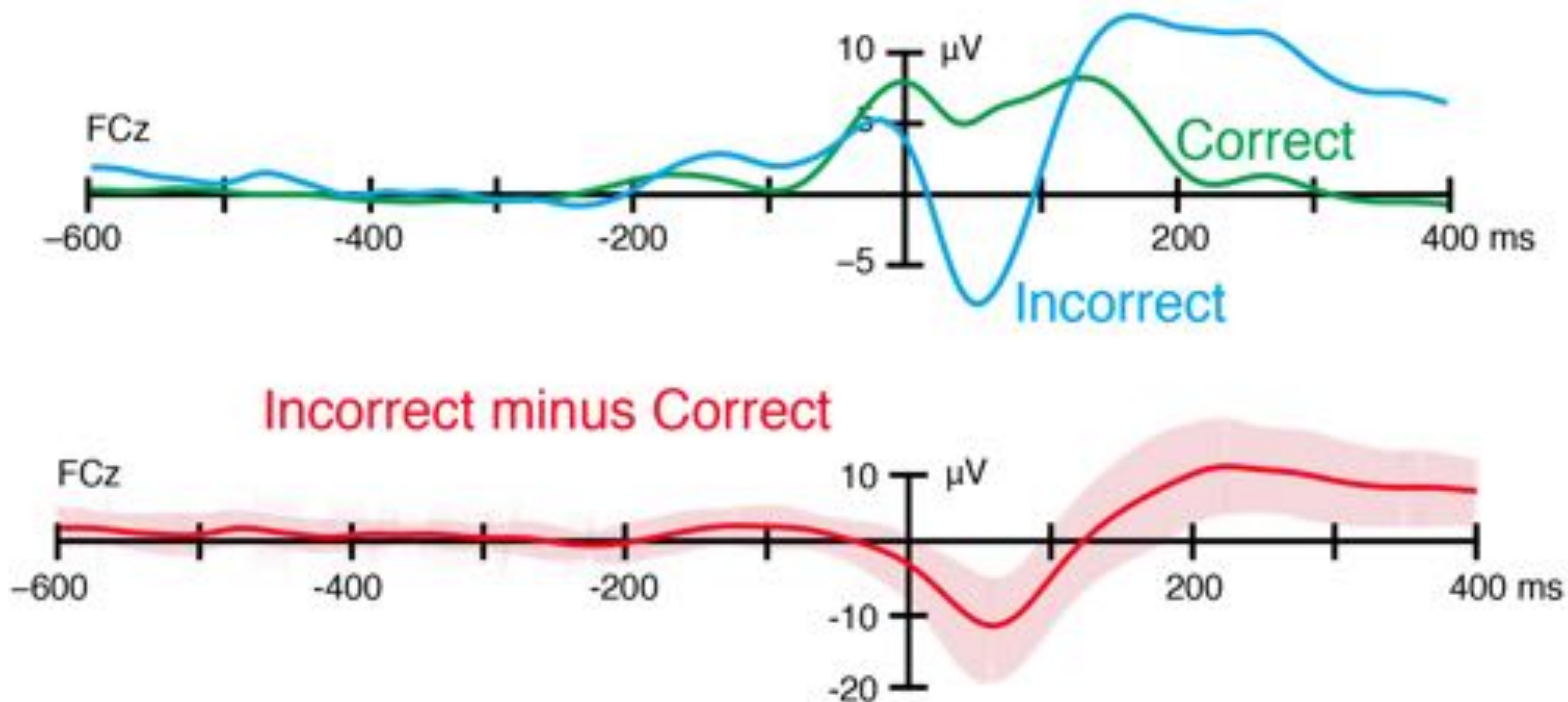


Flankers: ERN



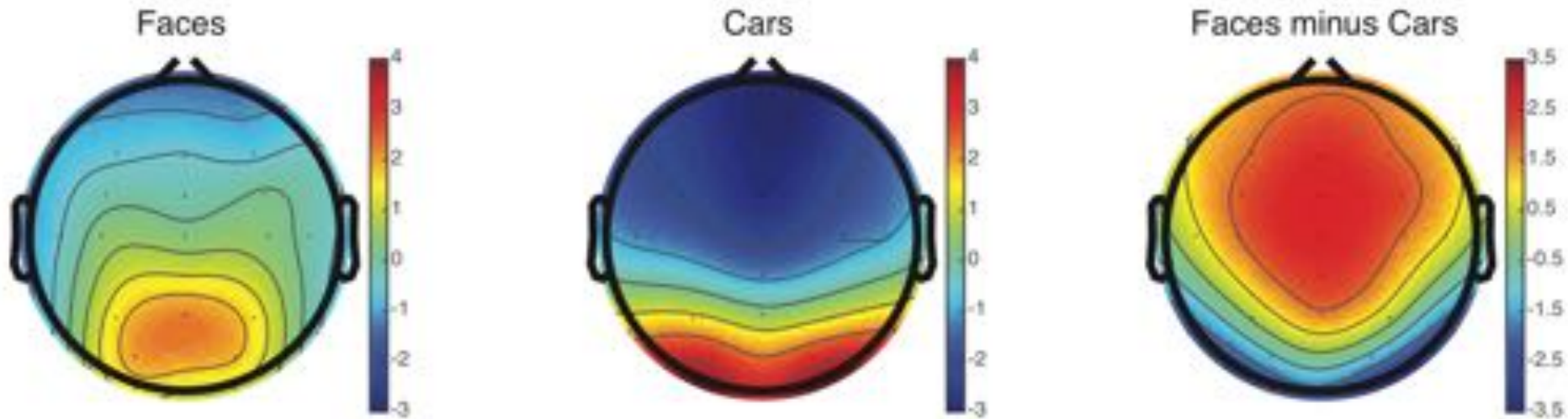
Stimuli: Compatible, Incompatible

Task: Press button to indicate direction of central arrow



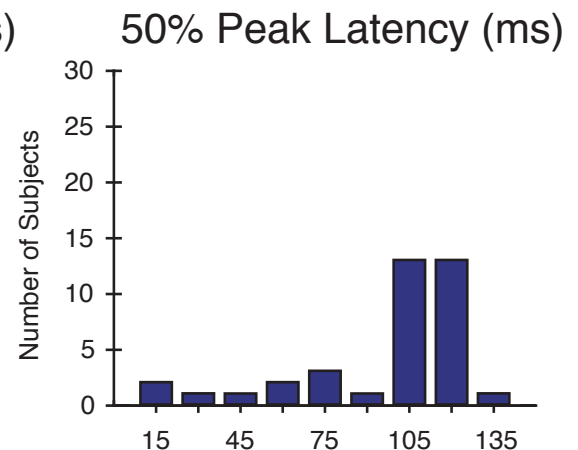
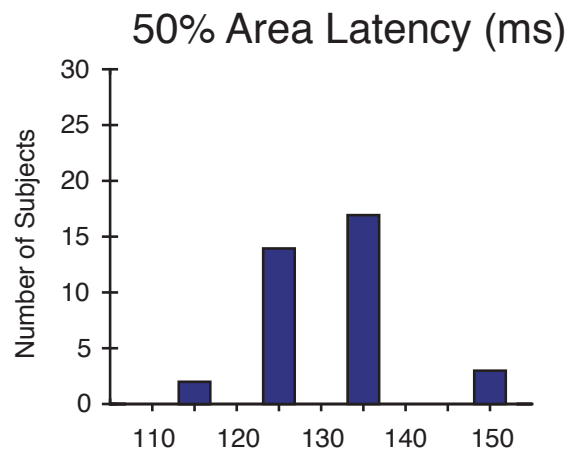
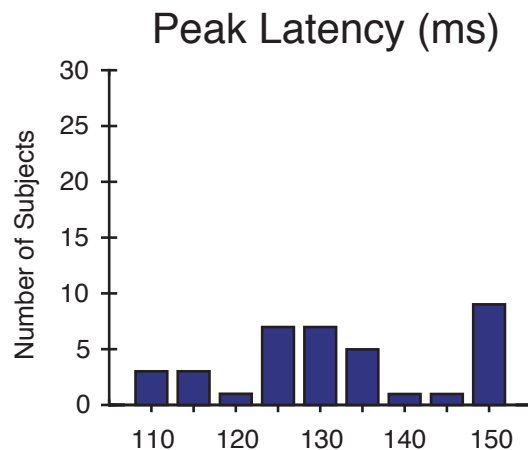
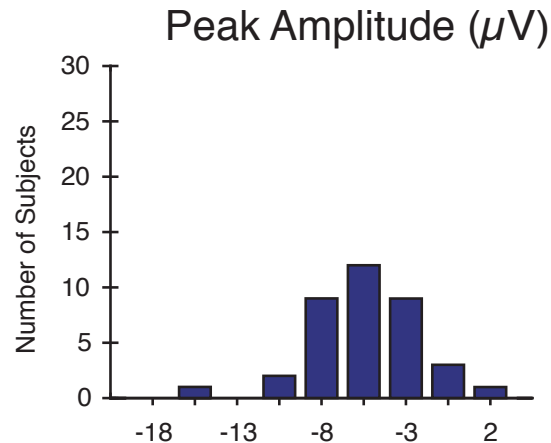
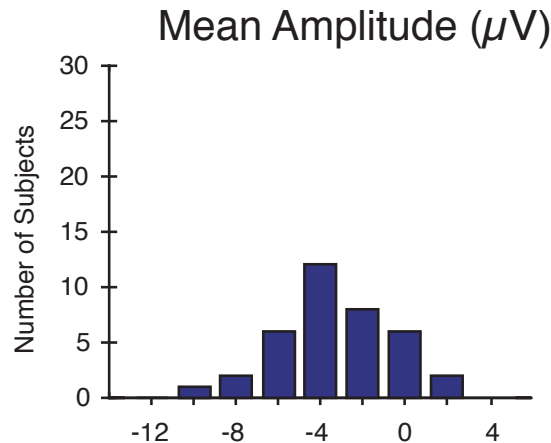
For Each Component...

Scalp Maps



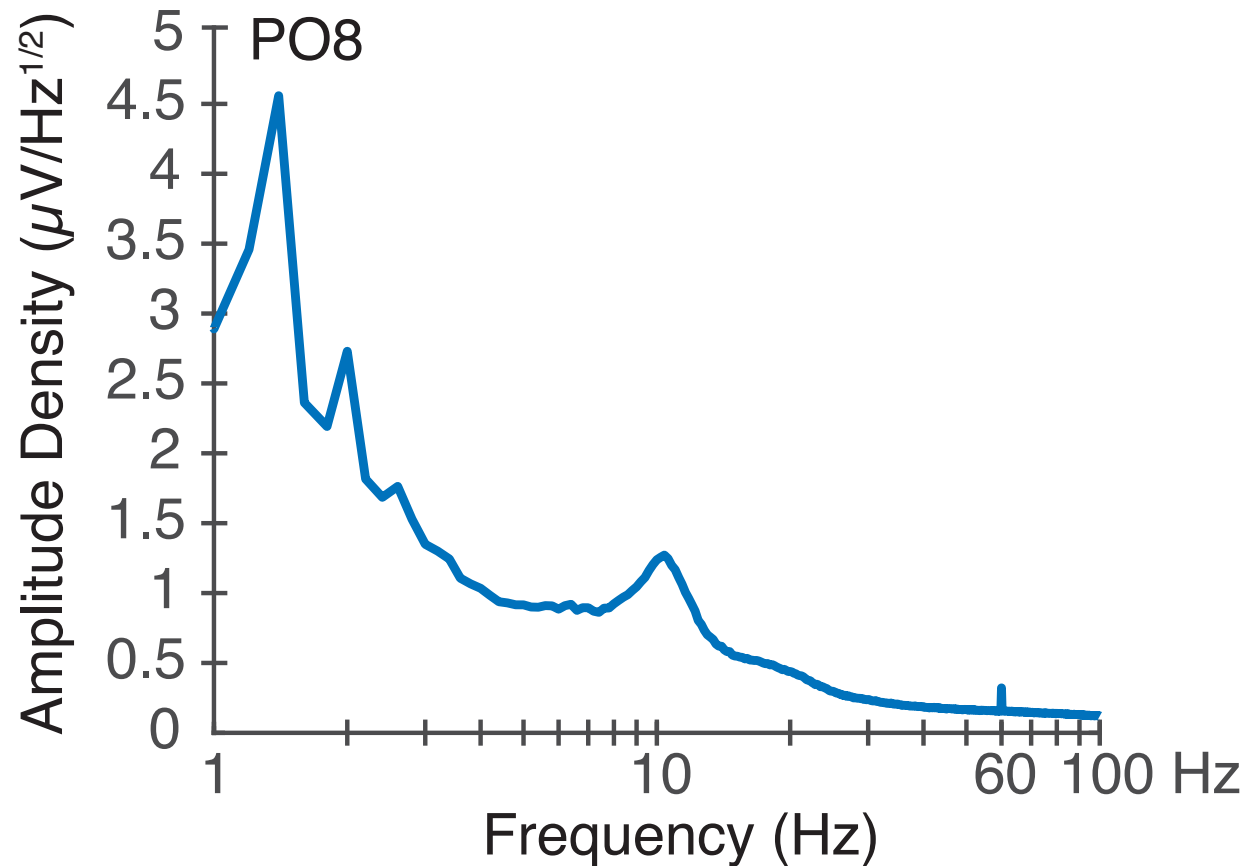
For Each Component...

Multiple Amplitude & Latency Measures



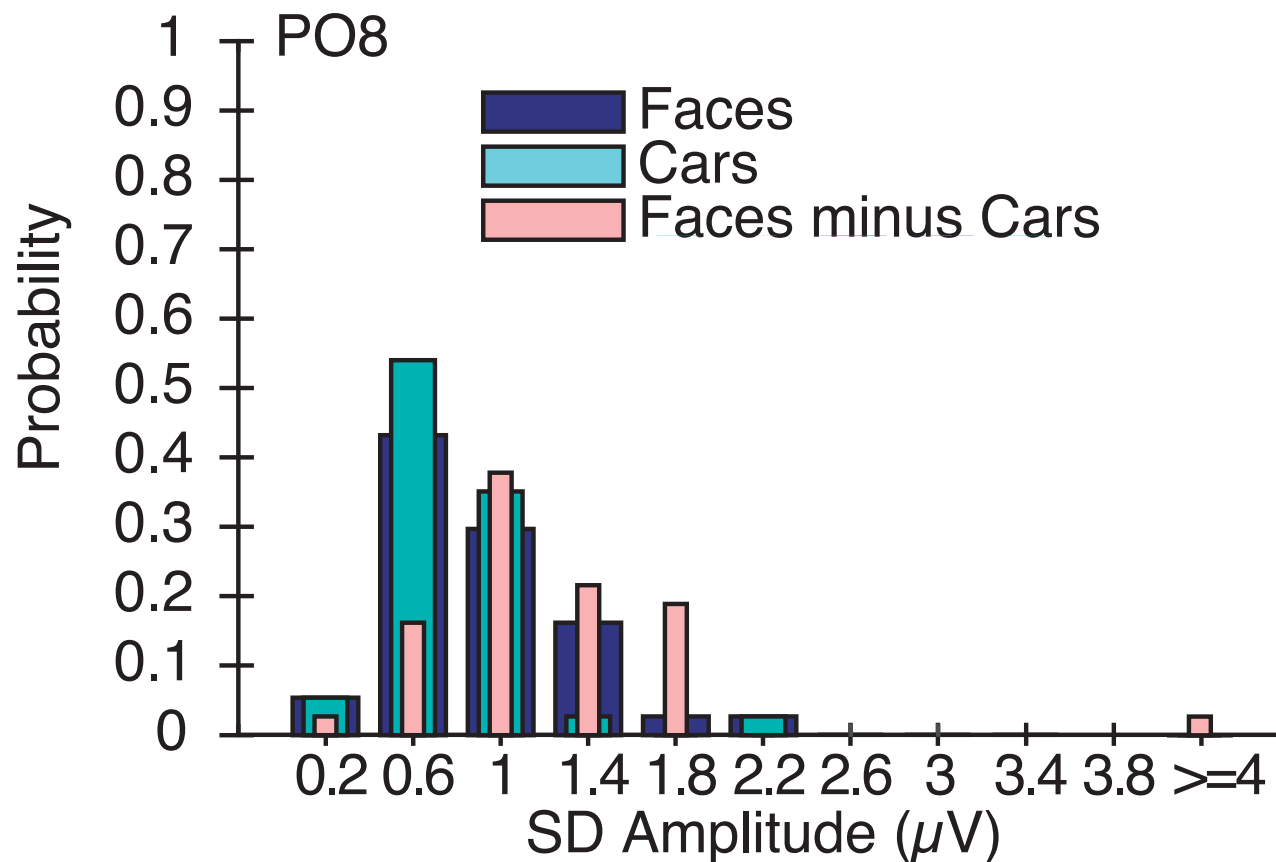
For Each Component...

Amplitude Spectrum



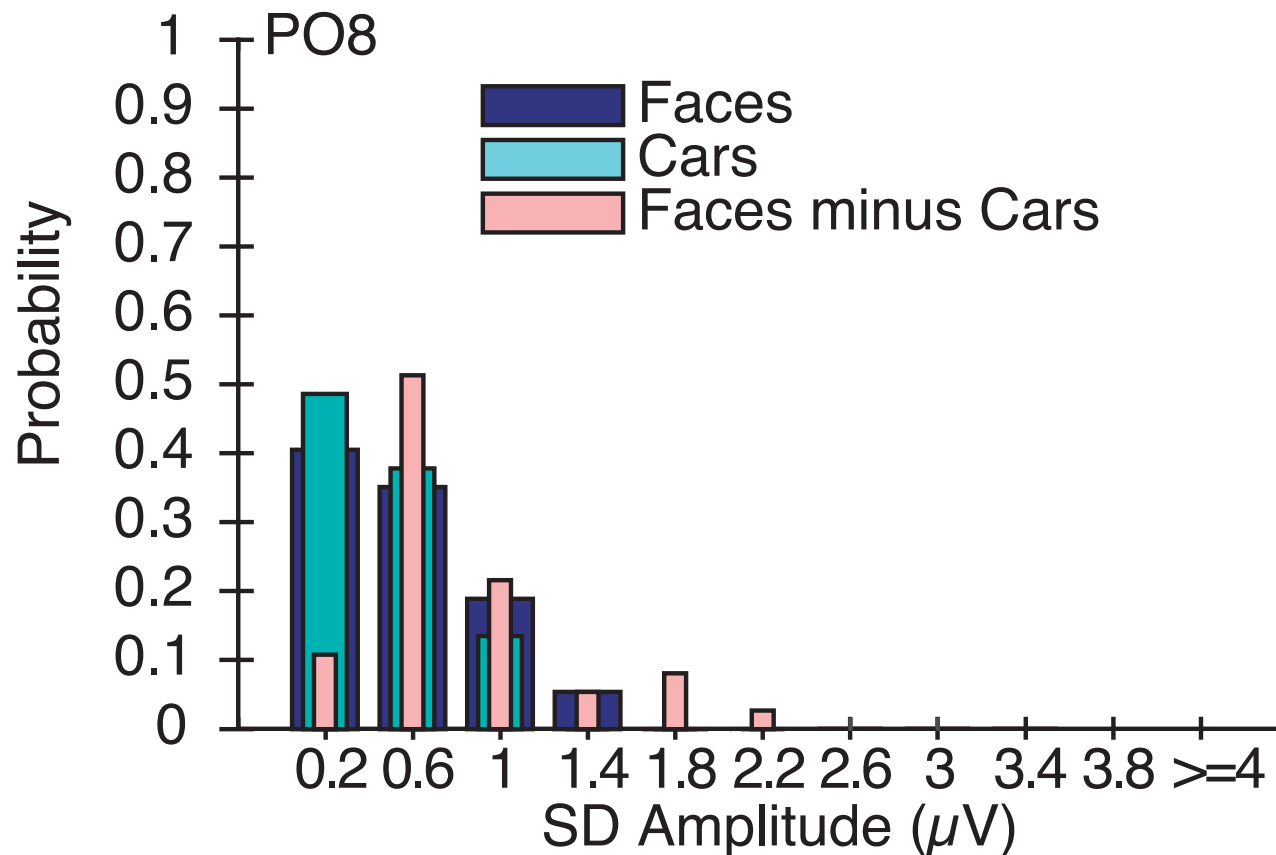
For Each Component...

Baseline Noise Level



For Each Component...

Measurement Window Noise Level



ERP CORE

Learning Goals

- Experimental design: avoiding confounds
- Artifacts: detection & correction
- Fourier analysis
- P-hacking and biases in data analysis
 - How to choose electrode sites and time windows
- Statistical analysis with real data
 - Correlations among measures
- From point-and-click to simple scripting to programming new analyses

P3

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N170

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