Distinct EEG bifurcation dynamics in report and no-report conditions of a visual masking paradigm

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EEG masking: report vs. no-report

Report:

No-report:

Difference maps (visible minus masked)

stim-mask SOAs:
visible = 200ms
masked = 33ms

Cohen et al. (2020) J Neurosci
New Masking Experiment

- Stimuli: Kouider et al. (2013) *Science*
- 5 evenly spaced SOAs:
  - Shortest 2 SOAs = never seen
  - Middle SOA = threshold (seen on 50% of trials)
  - Longest 2 SOAs = always seen
- Report condition: replicate Del Cul et al. (2007)
- No-report condition: isolate NCCs from task-related activity
Design

Response window 1050-1450 ms

Mask 2 100 ms

Mask-only trial 17% of trials

Report stimulus perception seen/not seen 100% of trials

No-report Condition

Respond to infrequent green rings 15% of trials

Green ring trial

Variable SOA 17, 33, 50, 67, or 83 ms

Stimulus 8 ms

Time

Time 0 (time-shifted in analysis to match each SOA)
Behavioral Results
EEG Results: P1 (100-140ms)
EEG Results: P3b (300-600ms)

Report

No P3b

No-report

P3b

Amplitude (µV)

Stimulus-Mask SOA (ms)

SOA 17
SOA 33
SOA 50
SOA 67
SOA 83

Report
No-report
EEG Results: N2 (250-300ms)

Report

No-report

- Amplitude (μV)
- Stimulus-Mask SOA (ms)

SOA 17, SOA 33, SOA 50, SOA 67, SOA 83

N2
Results Summary

- **P1 (100-140ms)** = early sensory stage (pre-conscious)
  - matches linear increase in stimulus strength [x]

- **P3b (300-600ms)** = late decision stage (post-conscious)
  - matches sigmoid shape of behavioral reports [✓]
  - present in report, absent in no-report [x]

- **N2 (250-300ms)** = intermediate perceptual stage (NCC?)
  - matches sigmoid shape of behavioral reports [✓]
  - present in no-report, obscured by P3b in report [✓]
General conclusions

- No-report EEG (masking & IB):
  - challenge GNW’s prediction of late sustained ignition (300-600ms)
  - NCCs earlier & more transient (200-300ms)

- What does this mean for GNW?
  - accommodate results? “global playground”? earlier/briefer ignitions?

- Future plans with data & paradigm:
  - decoding (TG), intertrial EEG variability, extend to fMRI & ECoG?
Thanks for your attention (and awareness)!

Funding:
- NSF
- TWCF
- Reed College

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Post-doc position