

Kjøreregler for Forelesningen

NB: Forelesningen vil bli tatt opp og lagt ut på YouTube etterpå. Hvis du ikke ønsker å komme med på opptaket, skru av mikrofon og video, og ikke del skjermen din. Du kan også velge å forlate denne forelesningen nå.

Stille spørsmål? Du kan når som helst bruke **Chat feltet på Skype** til å stille spørsmål. Du kan også **melde deg med navn** i feltet til å muntlig stille spørsmål med påsatt lyd og video. Men jeg følger ikke med på dette feltet mens jeg gir forelesning. Etter forelesningen, kan jeg besvare spørsmål (skriftlig & muntlig).





Biomarkers during working memory

András Puszta MD PhD



HELGELANDSSYKEHUSET



HELSE  NORD



Game!

- Grab a pen/pencil and paper!
- Repeat the number-sequences you hear in the same order!

Correct answers

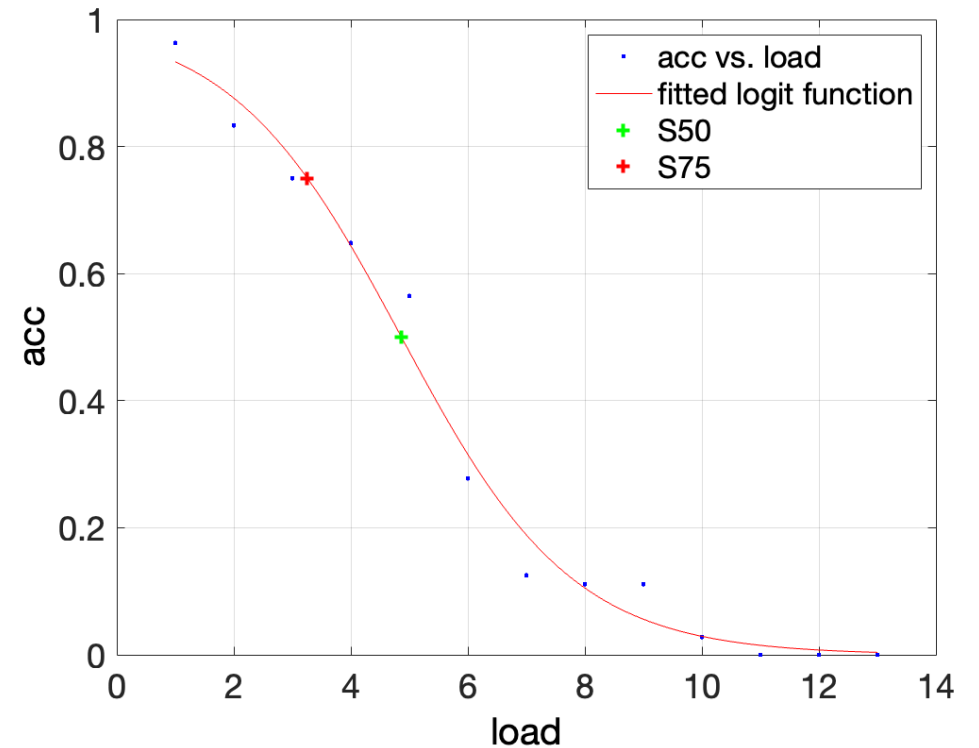
- 9 2 4 5 6
- 5 7 3 2 9 1
- 4 8 7 5 6 2 3
- 1 4 3 7 8 5 9 2
- 1 8 3 4 5 6 8 5 6
- 7 8 6 4 3 2 5 7 9 1

Go to www.menti.com
and use the code:

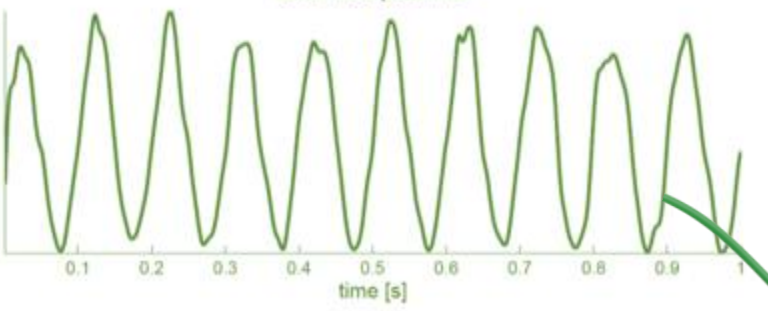
8377 4466

Short term memory

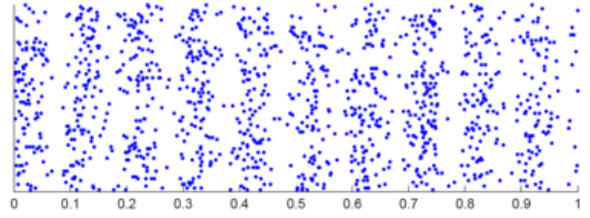
- 20-30 seconds
- Limited memory storage (magic number: 7 ± 2)
- Digit span task



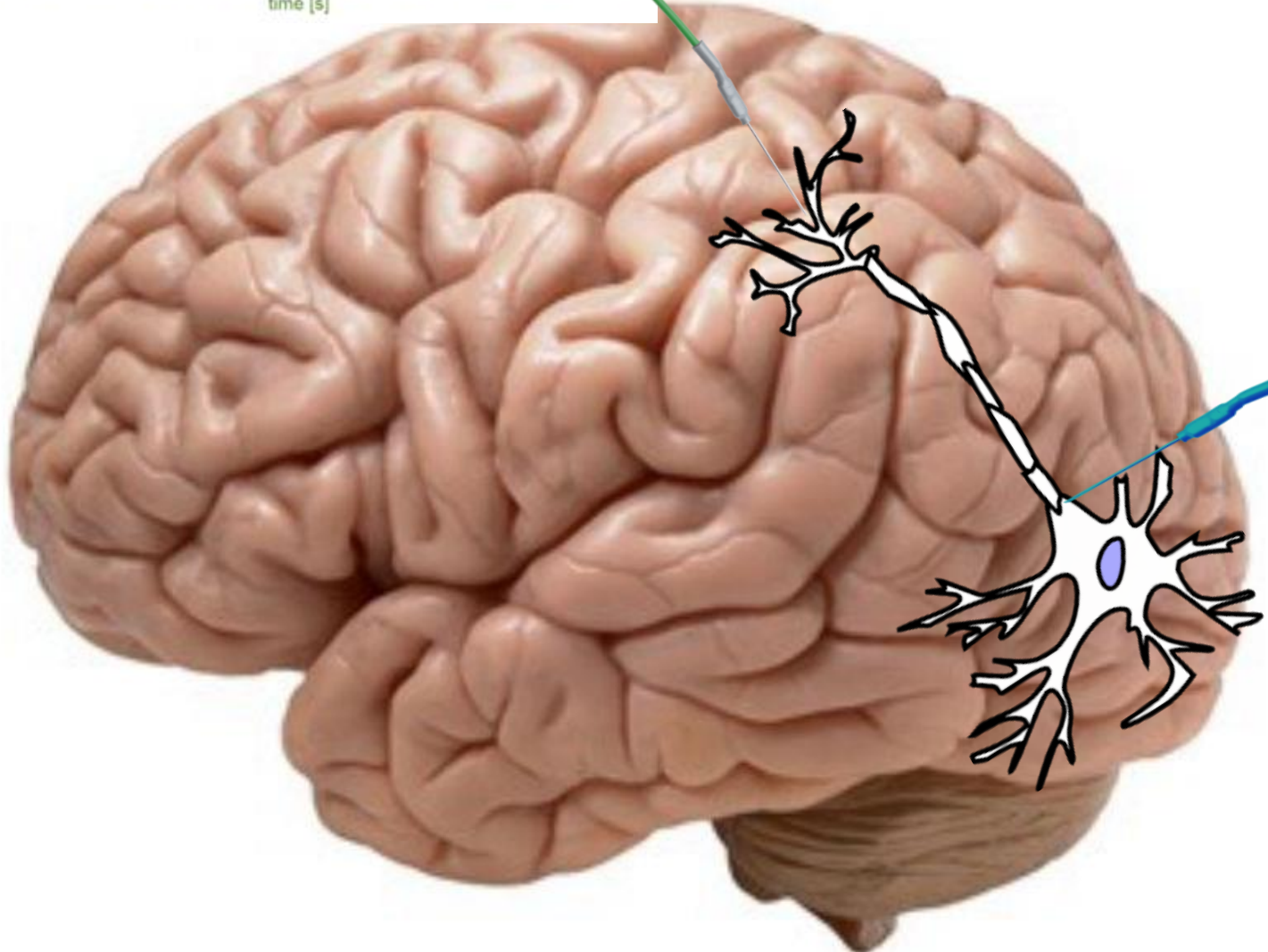
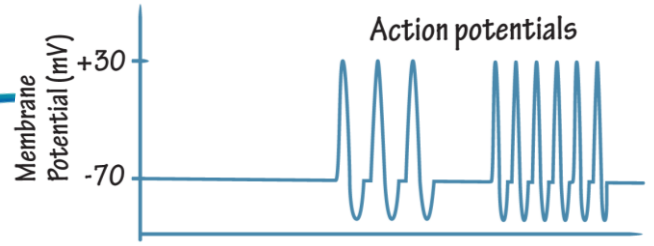
local field potential



neuronal spiking

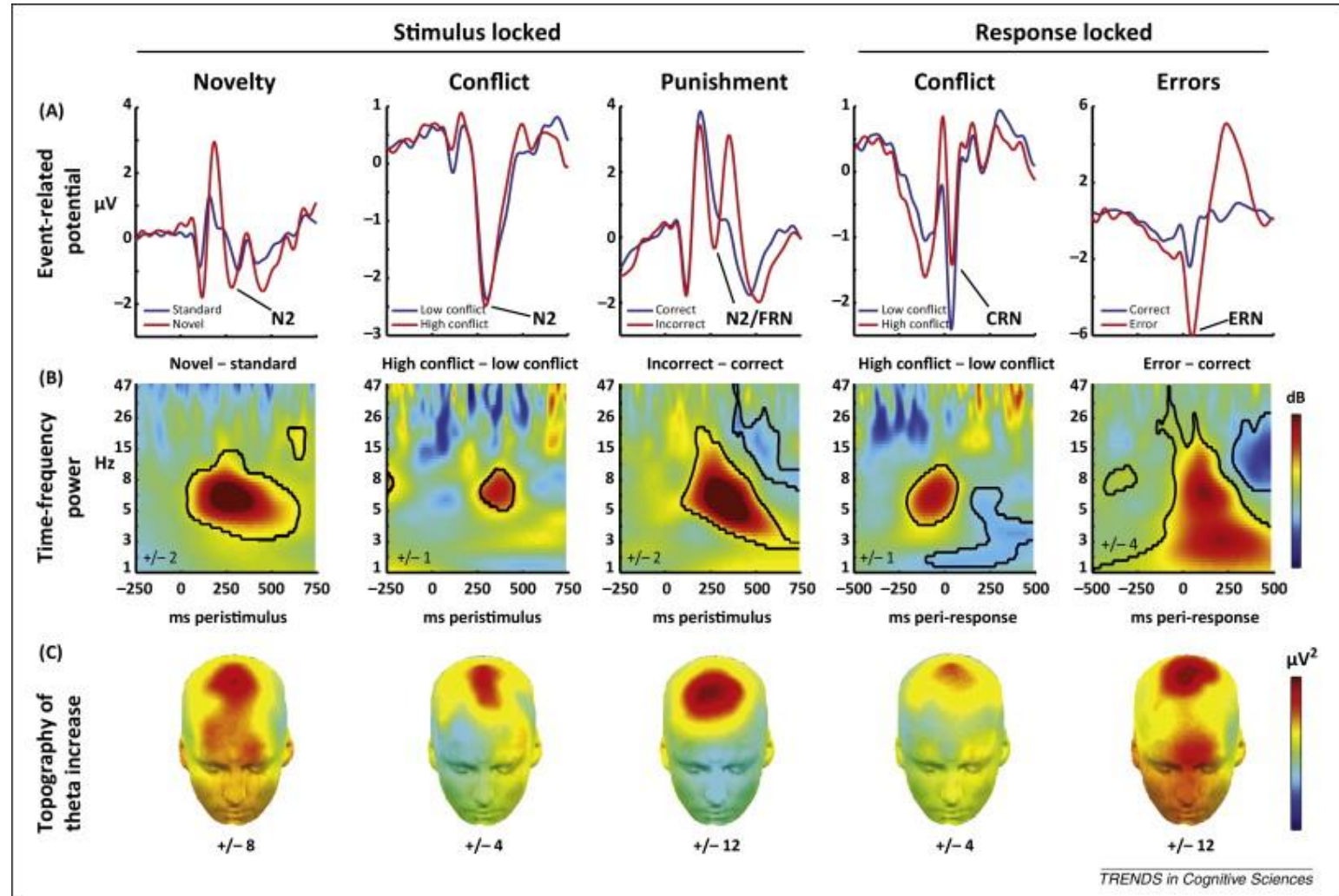


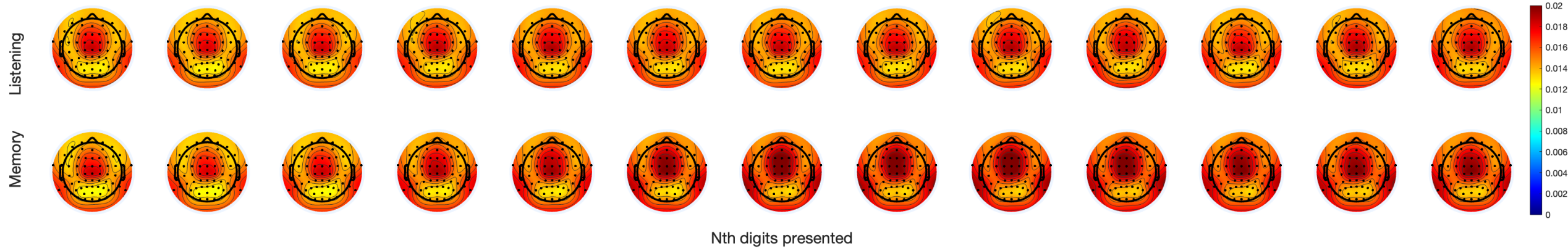
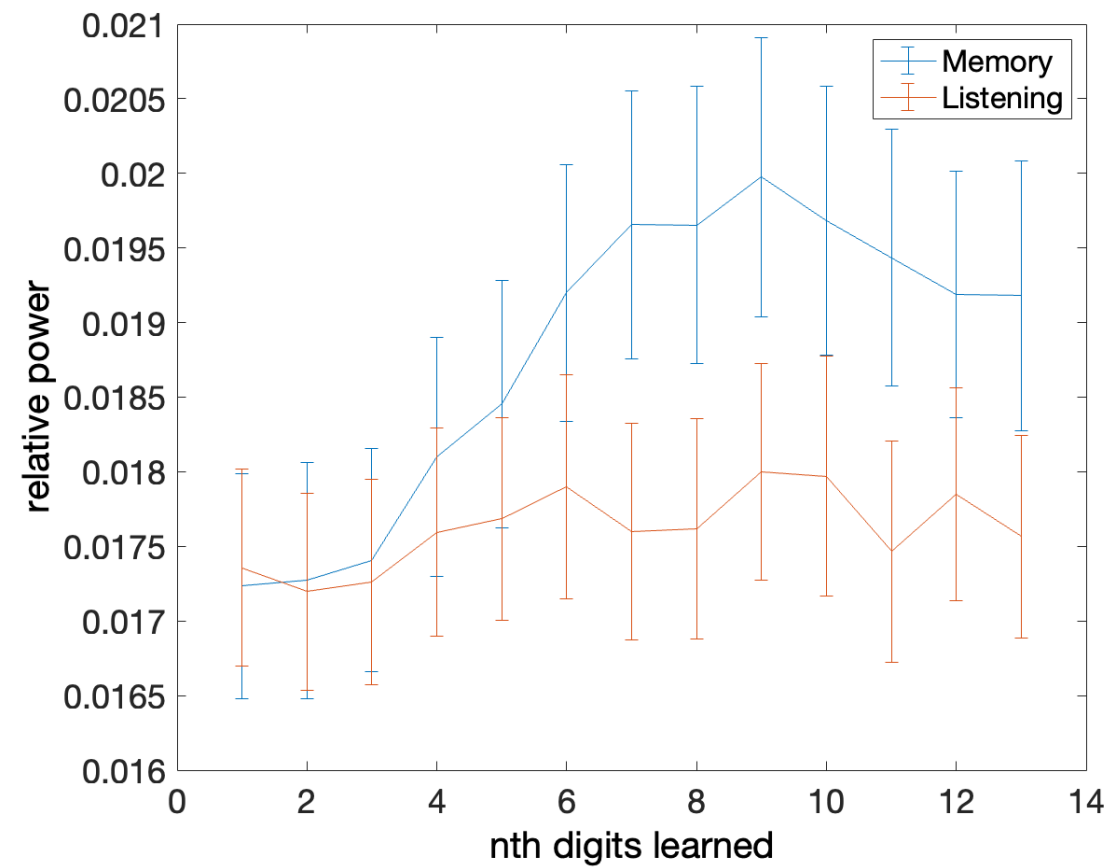
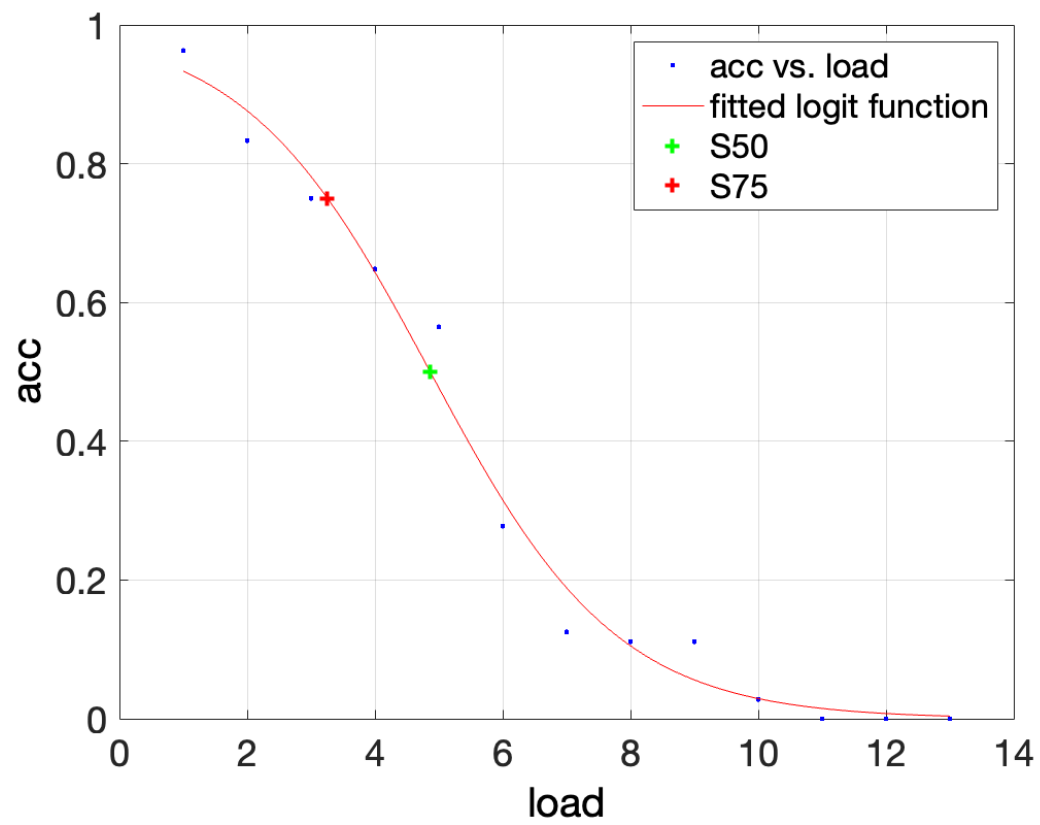
Action potentials



Theta oscillations

- Frontal midline theta





Working memory –GAME!

- Repeat the number-sequences you hear in the opposite order!

Correct answers

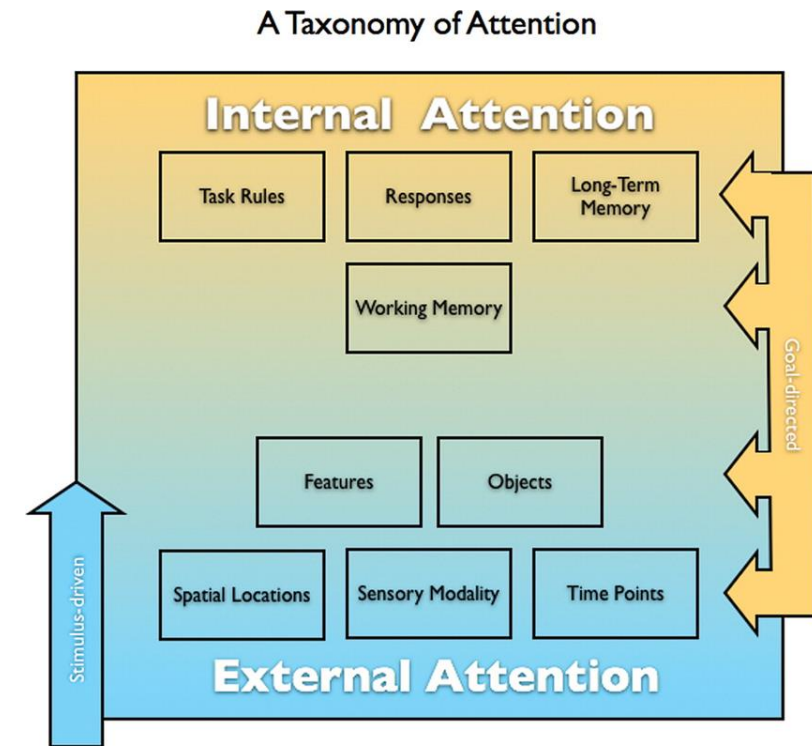
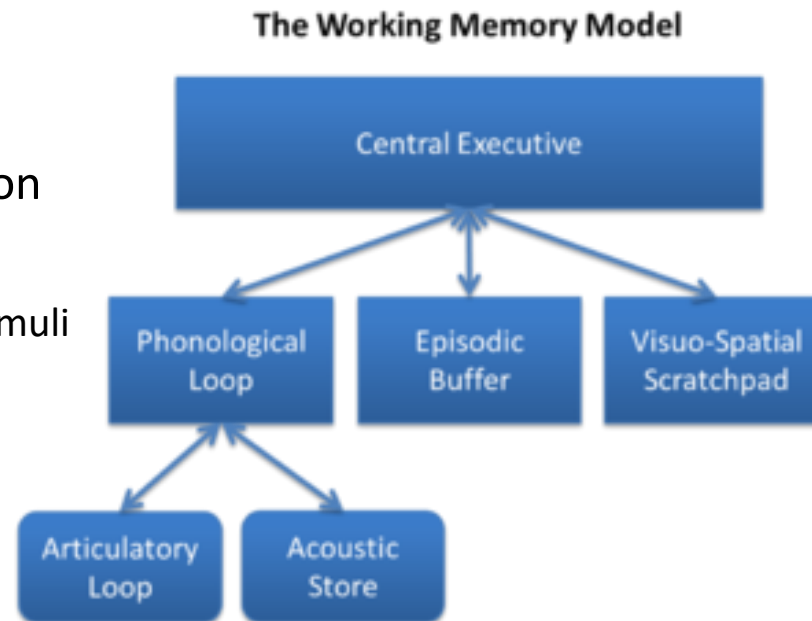
- 2 1 4
- 3 4 8 9
- 9 2 4 5 6
- 5 7 3 2 9 1
- 4 8 7 5 6 2 3
- 1 4 3 7 8 5 9 2
- 1 8 3 4 5 6 8 5 6
- 7 8 6 4 3 2 5 7 9 1
- 4 12
- 9 8 4 3
- 6 5 4 2 9
- 1 9 2 3 7 5
- 3 2 6 5 7 8 4
- 2 9 5 8 7 3 4 1
- 6 5 8 6 5 4 3 8 1
- 1 9 7 5 2 3 4 6 8 7


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What makes the memory «work»

- Attentional processes
 - Externally driven attention
 - Stimulus features
 - Spatial location
 - Internally driven attention
 - Manipulation of the stimuli
 - Rehearsal



 Chun MM, et al. 2011.
Annu. Rev. Psychol. 62:73–101

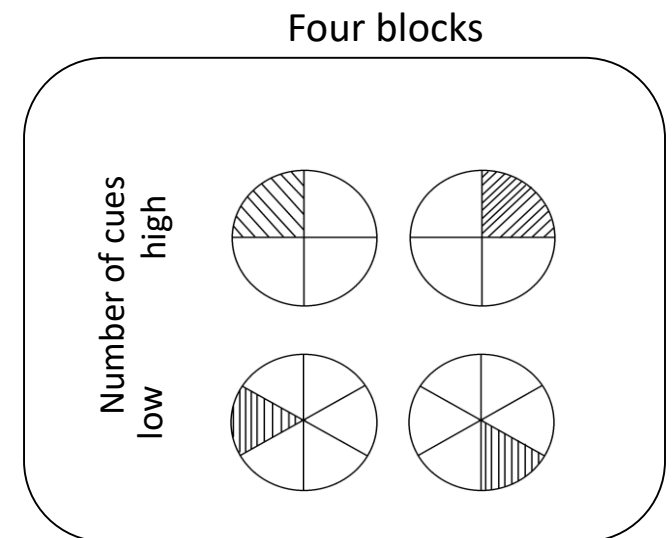
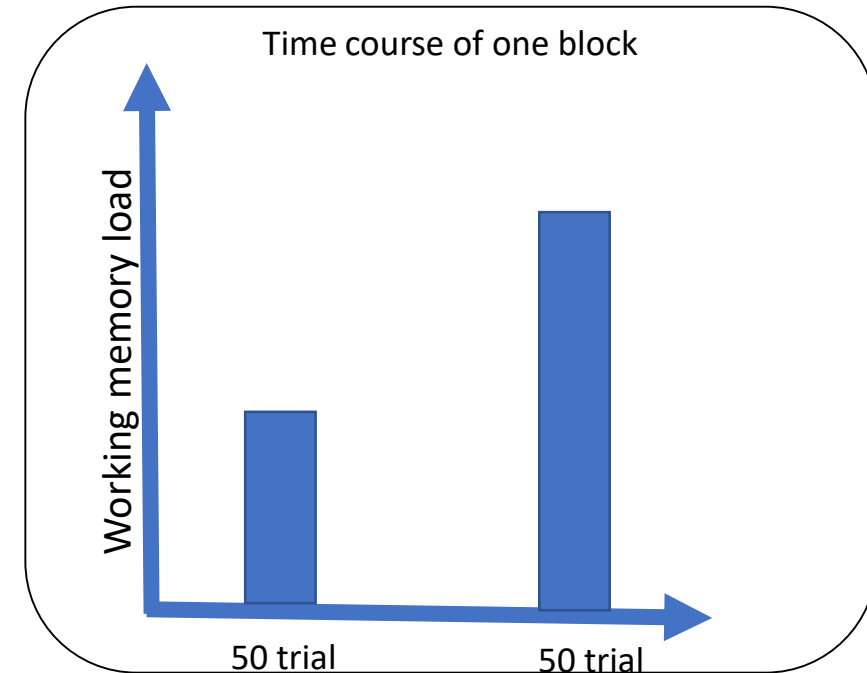
New test that developed

- We can manipulate
 - Internally driven attention (Memory load)
 - Externally driven attention (number of segments)

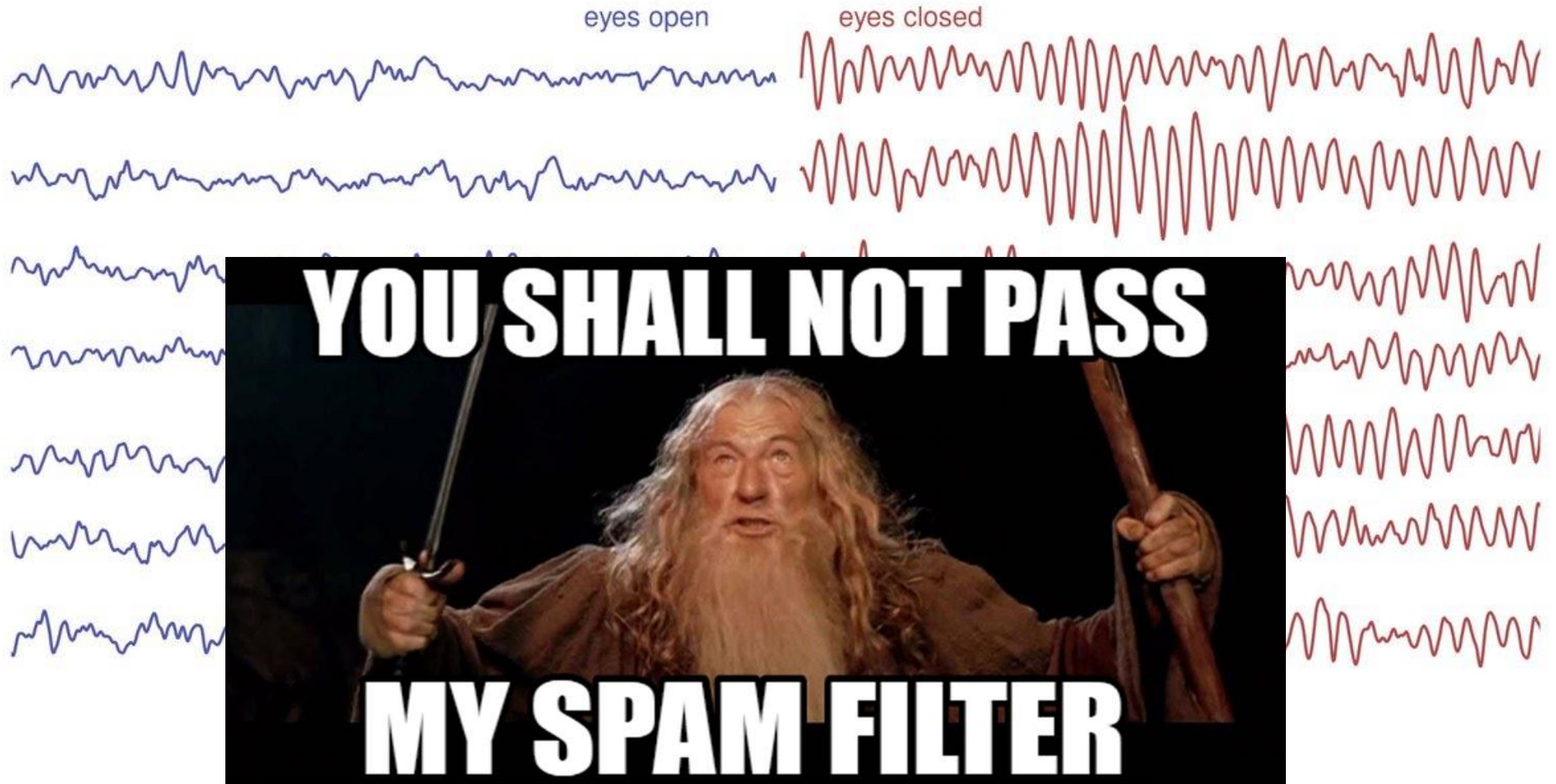
New test that developed

- We can manipulate
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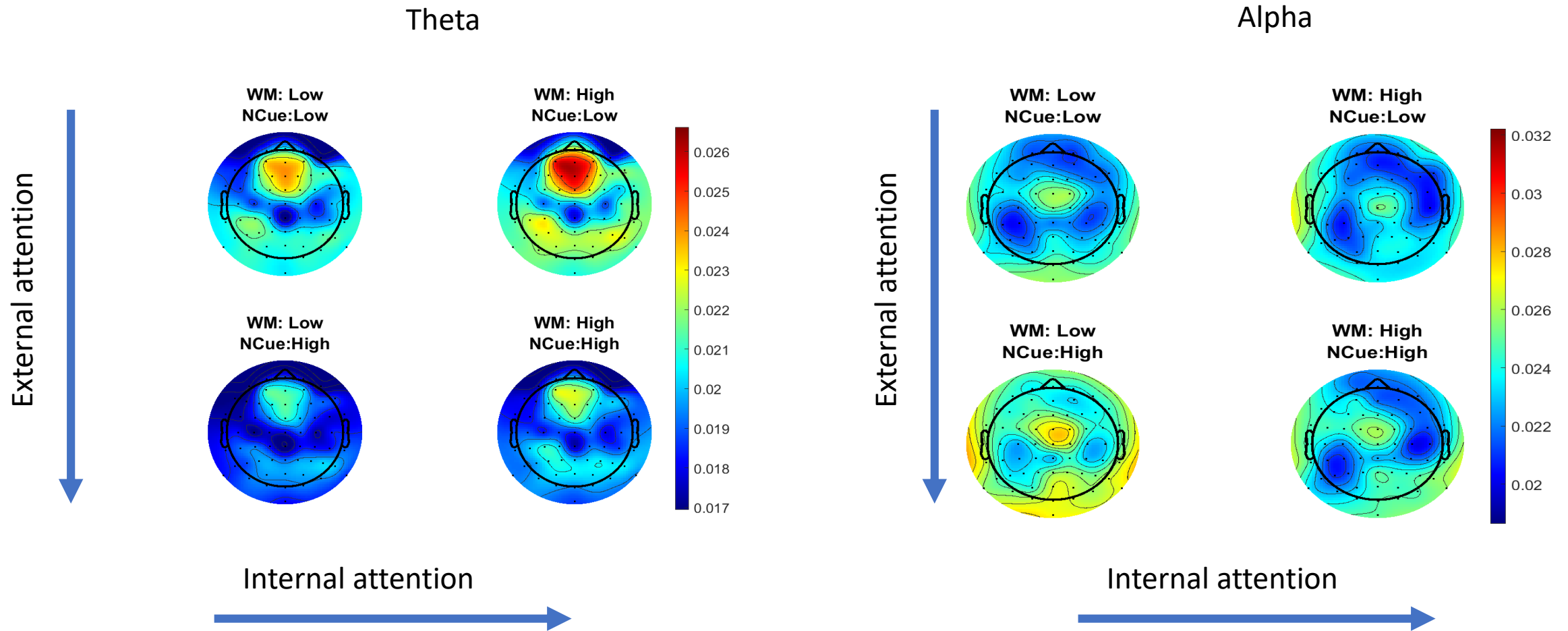
Another brain wave: alpha



Hypotheses

- Alpha wave – reflects more the Externally driven attention
- Theta waves – reflects more the Internally driven attention

Results

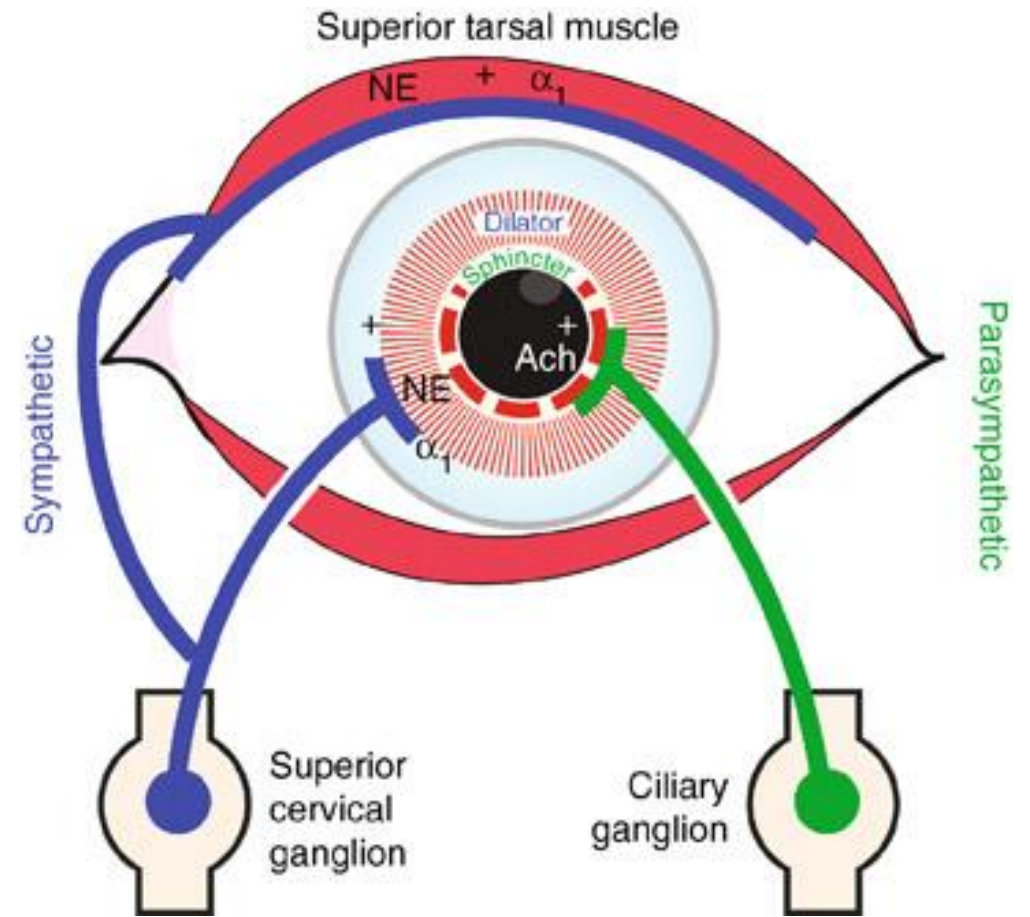
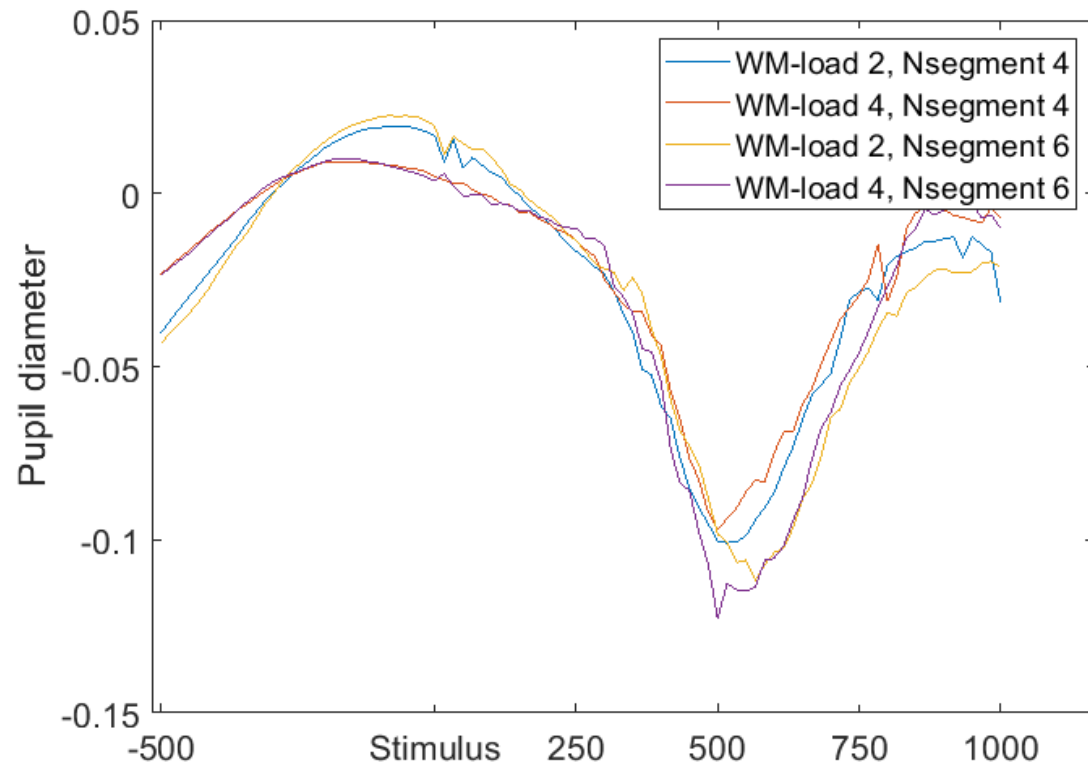


Biomarkers that not brain waves

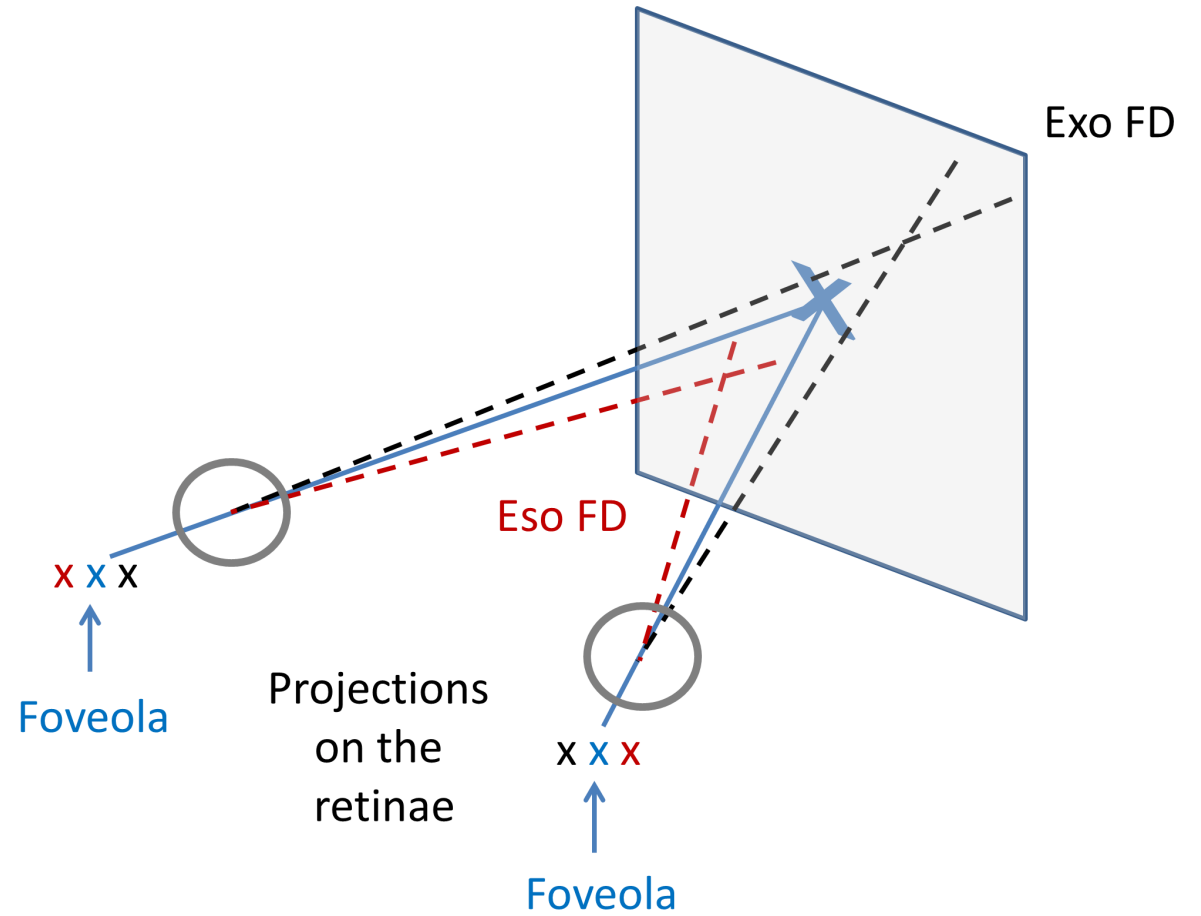
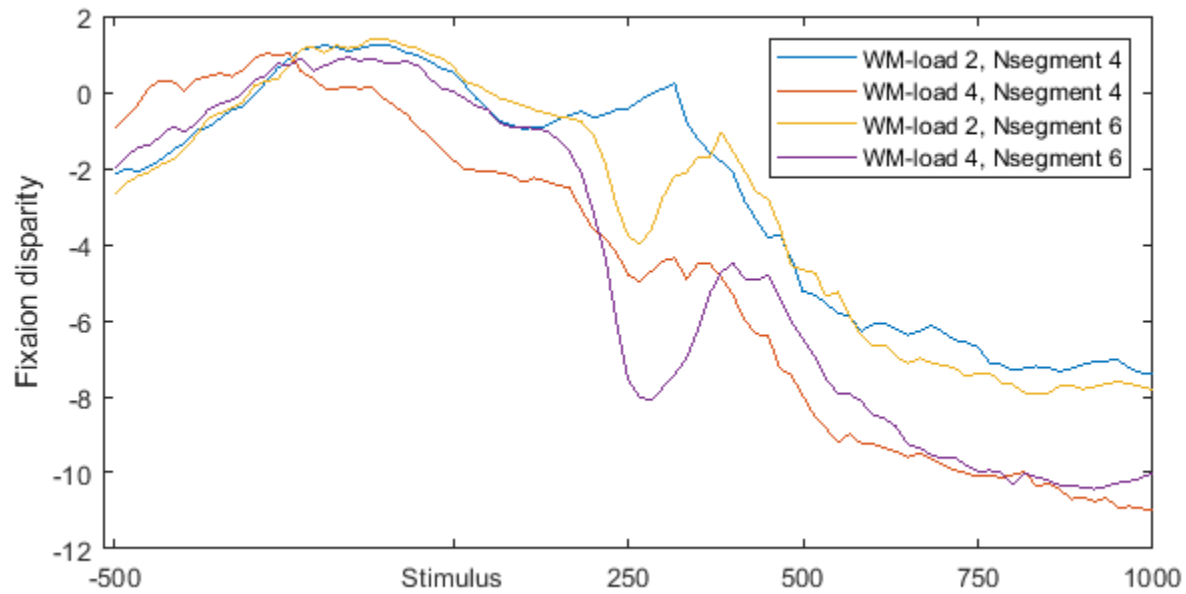
- Eye-movements
- Pupillometry



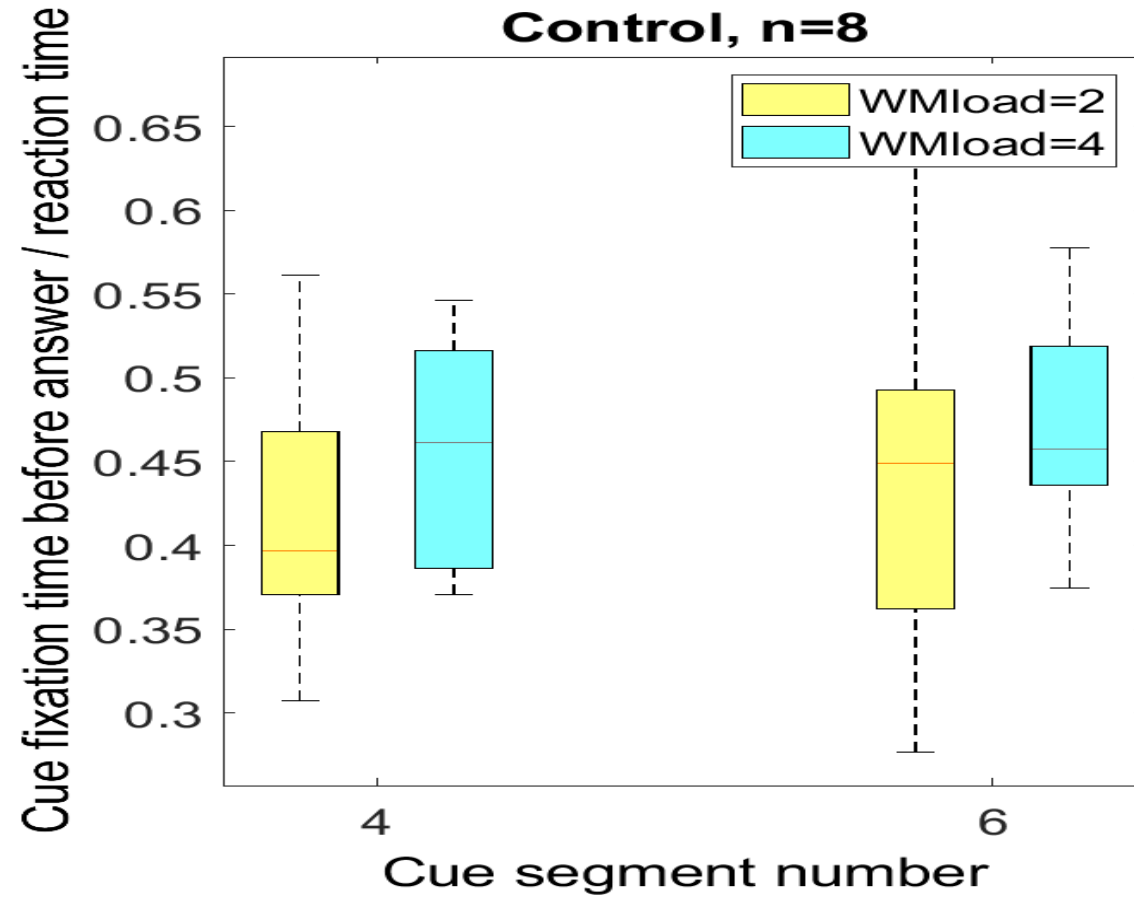
Pupillometry



Fixation disparity



Gaze fixation time



Conclusions, take home messages

- Attentional processes makes working memory “work”
 - Internal attention
 - Frontal midline theta
 - Fixation disparity/Pupillometry
 - External attention
 - Alpha waves
 - Gaze fixation time
- Newly developed cognitive test
 - successfully dissociated the former two



We are awesome!

Project ADHD II:



SYKEHUSET I VESTFOLD

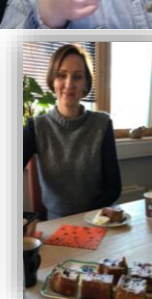
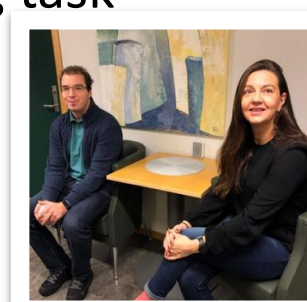
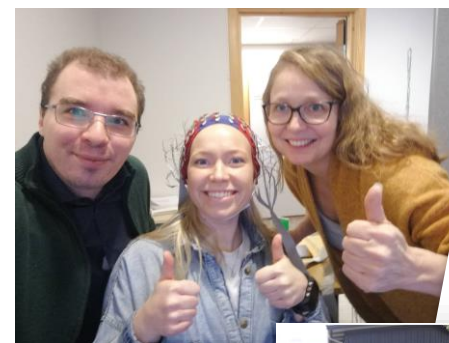


UiT Norges arktiske universitet



Main goal: investigate executive functions and connected brain waves in adult ADHD.

1. Neuropsychological assesment
2. Clinical questionnaires
3. EEG with three experimental tests:
 - Mind-wandering task
 - Stop signal task
 - ProgAet



Contact us!

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UiO : Universitetet i Oslo

