



Executive functions in adult ADHD

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HELSE  NORD



History of ADHD

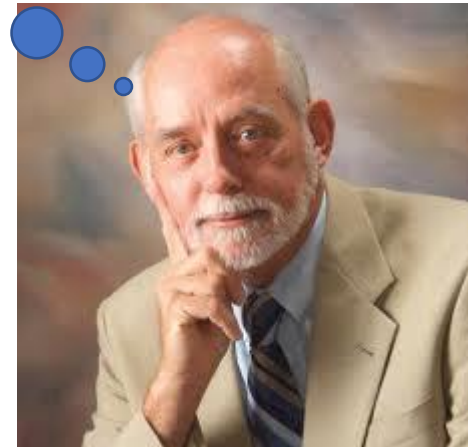
- First mentioned in 1775
 - Melchior Adam Weikard (german physicist) : **“Mangel der Aufmerksamkeit” (Attention deficit)**
 - Witch-hunt: “Is there no thunderbolt left in the sky, in order come down and slam this creature into the ground?”
 - Colleague’s wife: “I am so glad that my husband is unable to write!”
- 1972:
 - (a) poor investment and maintenance of effort
 - (b) deficient modulation of arousal to meet situational demands
 - (c) seeking of immediate reinforcement
 - (d) difficulties with impulse control
- Until 1978 primarily children disease

Focus on my voice!

Functional differences

- Inhibitory control
- Self-motivation
- Working memory
- Internalization of speech
- Reconstitution
- Inattention

One function
above all!



Etiology – neurodevelopmental disorder

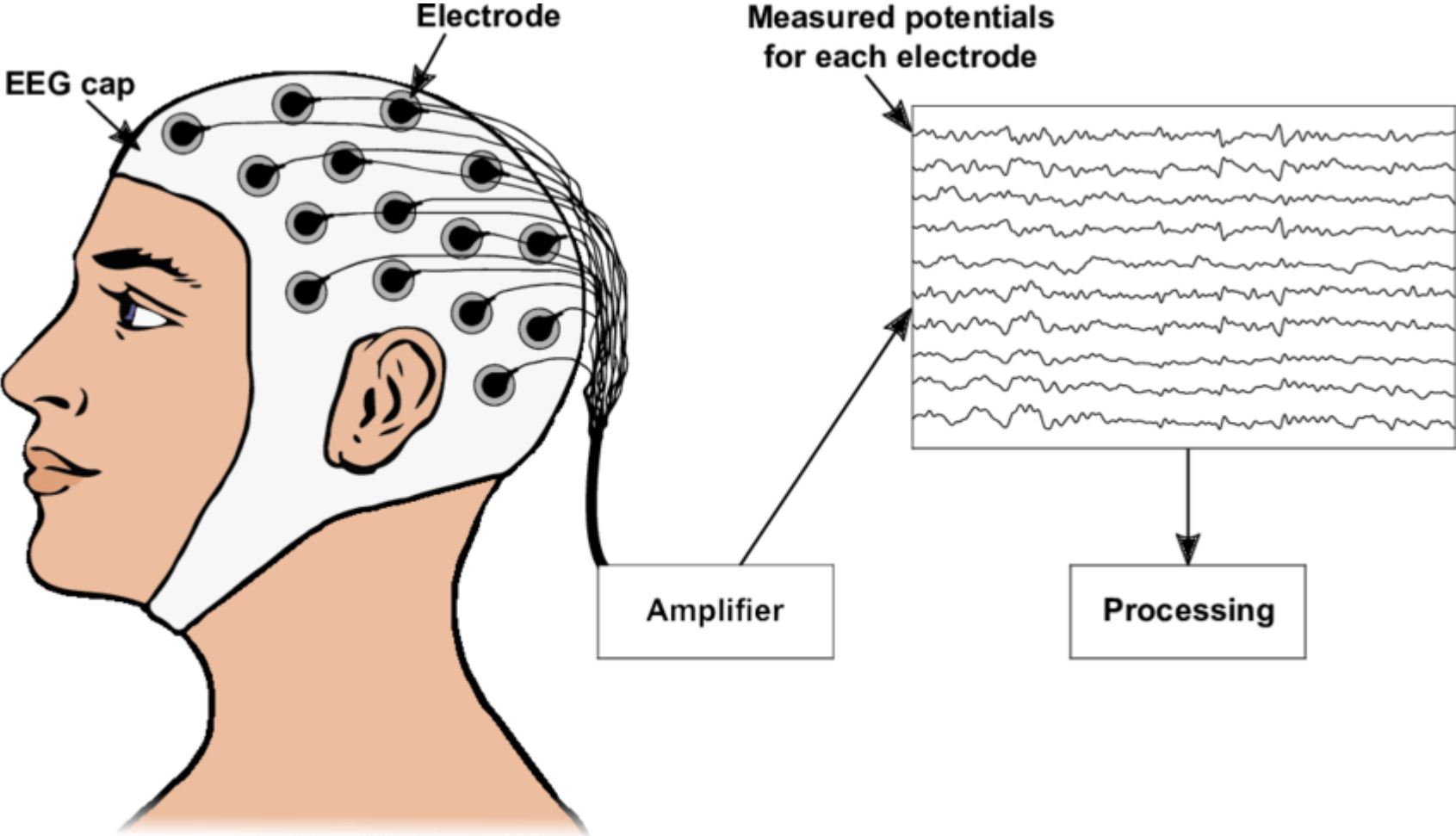
- Genetic
 - Inconclusive results
 - Hypothesis-driven tests showed alterations in Dopamin-receptor-1, 5
 - Genom-wide test confirmed an elevation of DRD-5, but it was not significant
- Acquired
 - Brain damage in any form
- Idiopathic

Is there anything objective in the brain that
we can measure

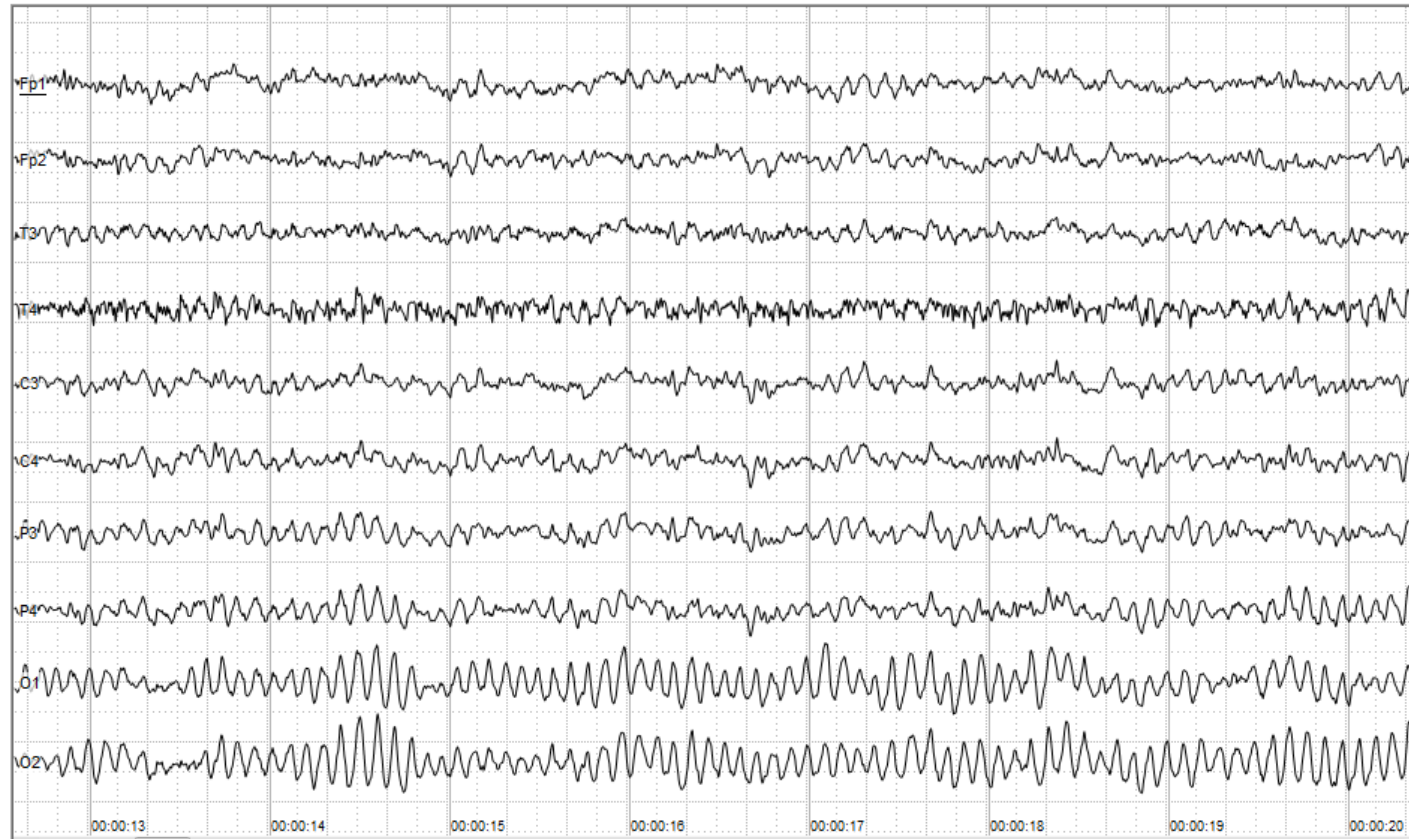
How can we study the brain?

- Invasive methods:
 - Deep electrodes
 - Histology
- Non-invasive methods:
 - fMRI
 - EEG
 - Cognitive tests

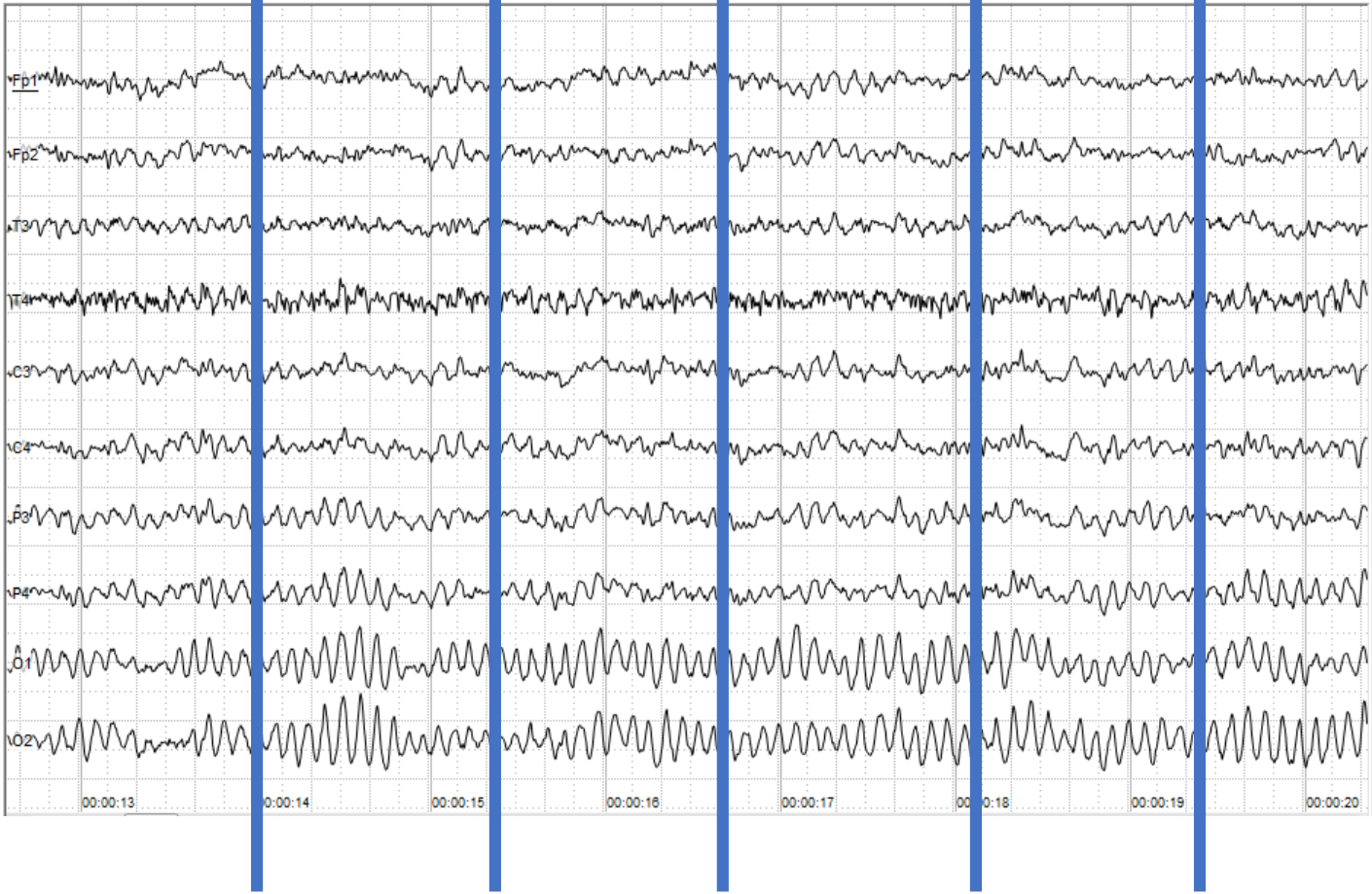
EEG



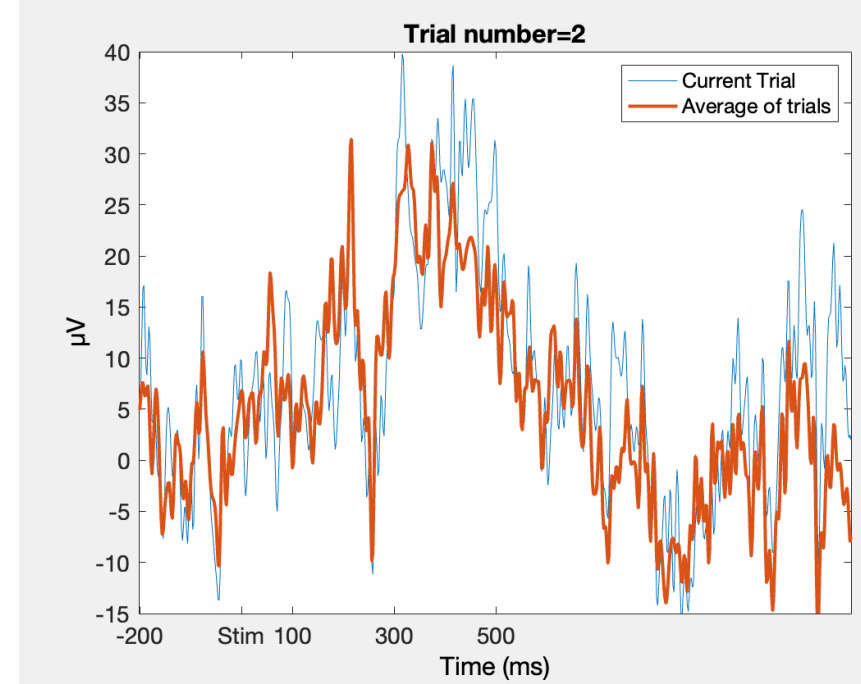
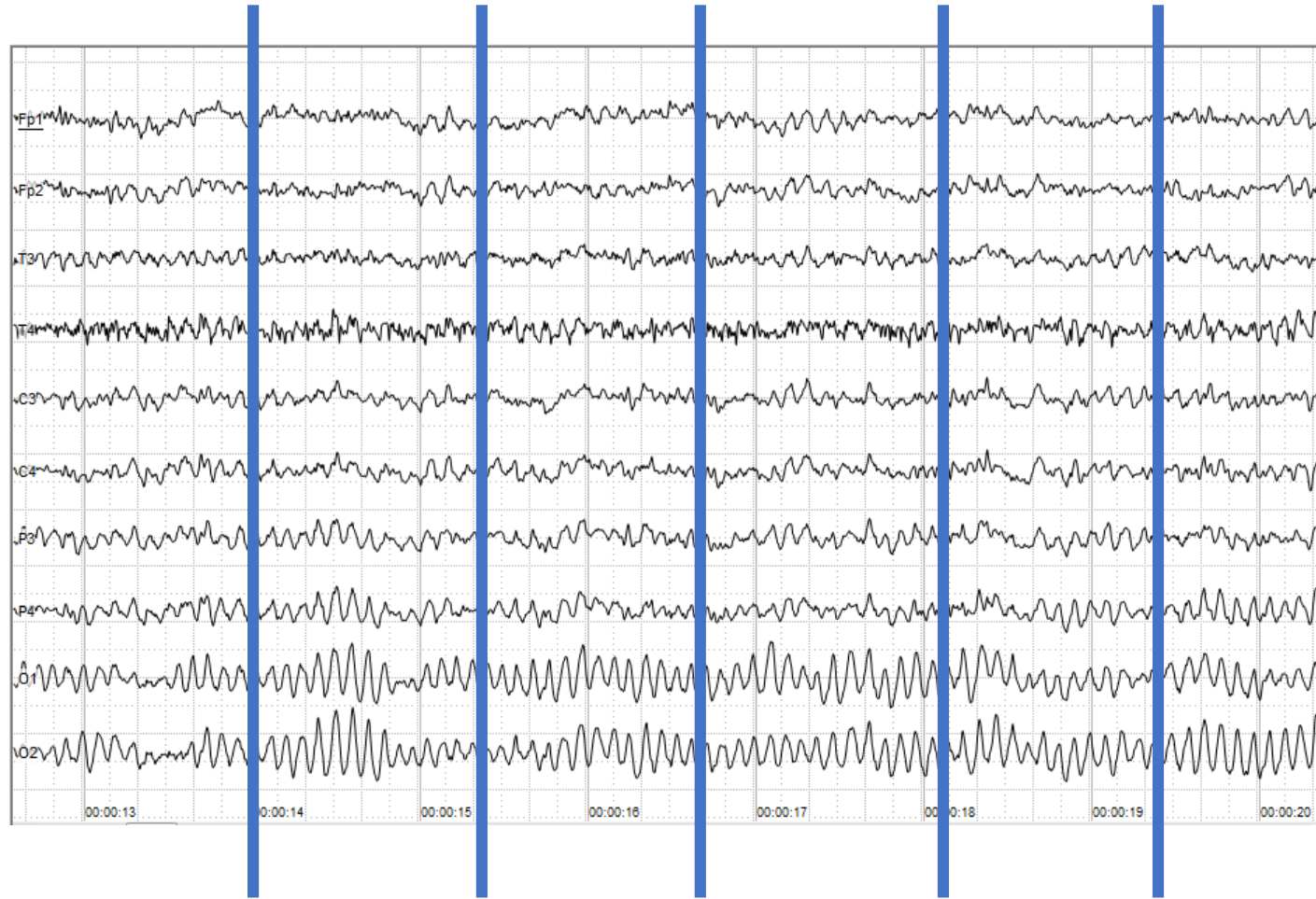
EEG → ERP



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Earlier results from Mosjøen

- Mueller, A., Candrian, G., Grane, V. A., Kropotov, J. D., Ponomarev, V. A., & Baschera, G. M. (2011). Discriminating between ADHD adults and controls using independent ERP components and a support vector machine: a validation study. *Nonlinear biomedical physics*, 5(1), 1-18.
- Grane, V. A., Endestad, T., Pinto, A. F., & Solbakk, A. K. (2014). Attentional control and subjective executive function in treatment-naive adults with Attention Deficit Hyperactivity Disorder. *PLoS one*, 9(12), e115227.
- Grane, V. A., Brunner, J. F., Endestad, T., Aasen, I. E. S., Kropotov, J., Knight, R. T., & Solbakk, A. K. (2016). ERP correlates of proactive and reactive cognitive control in treatment-naive adult ADHD. *PLoS One*, 11(7), e0159833.

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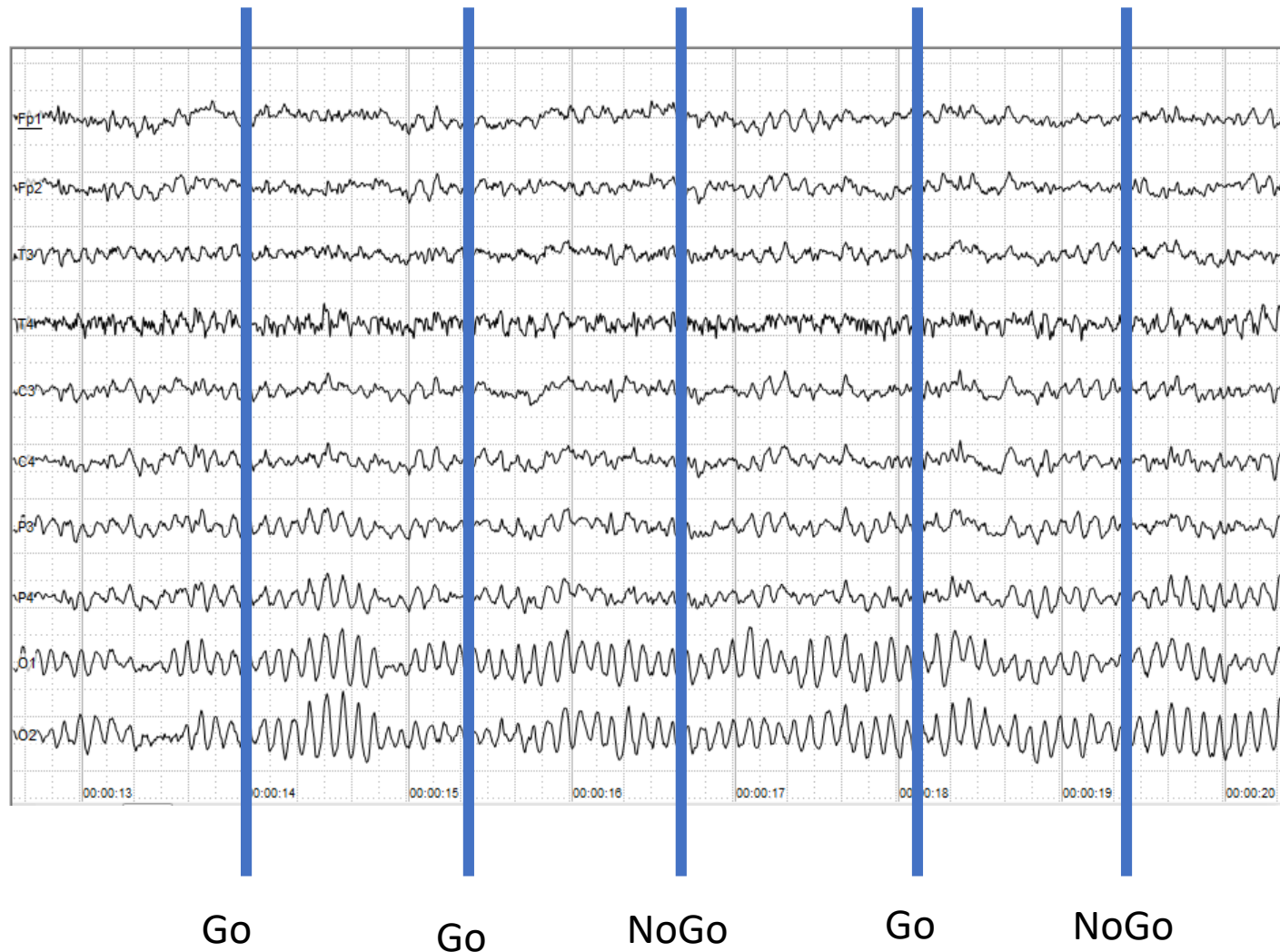
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Go-NoGo Task:

Animal-Press button(Go)

Plant – don't press the button (NoGo)

EEG → ERP

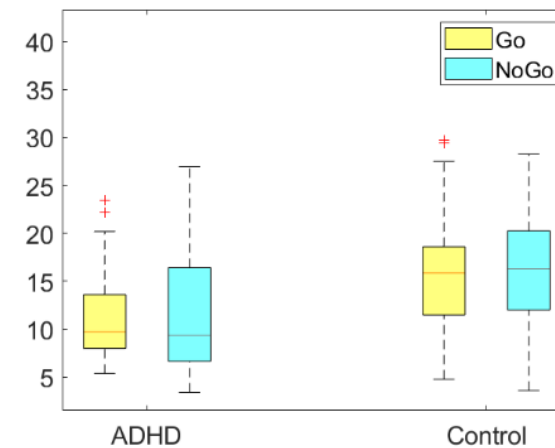
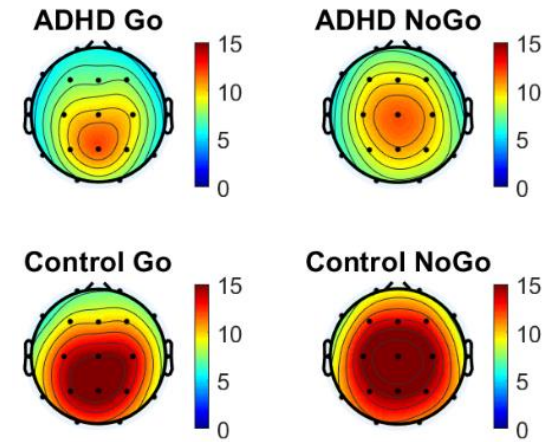
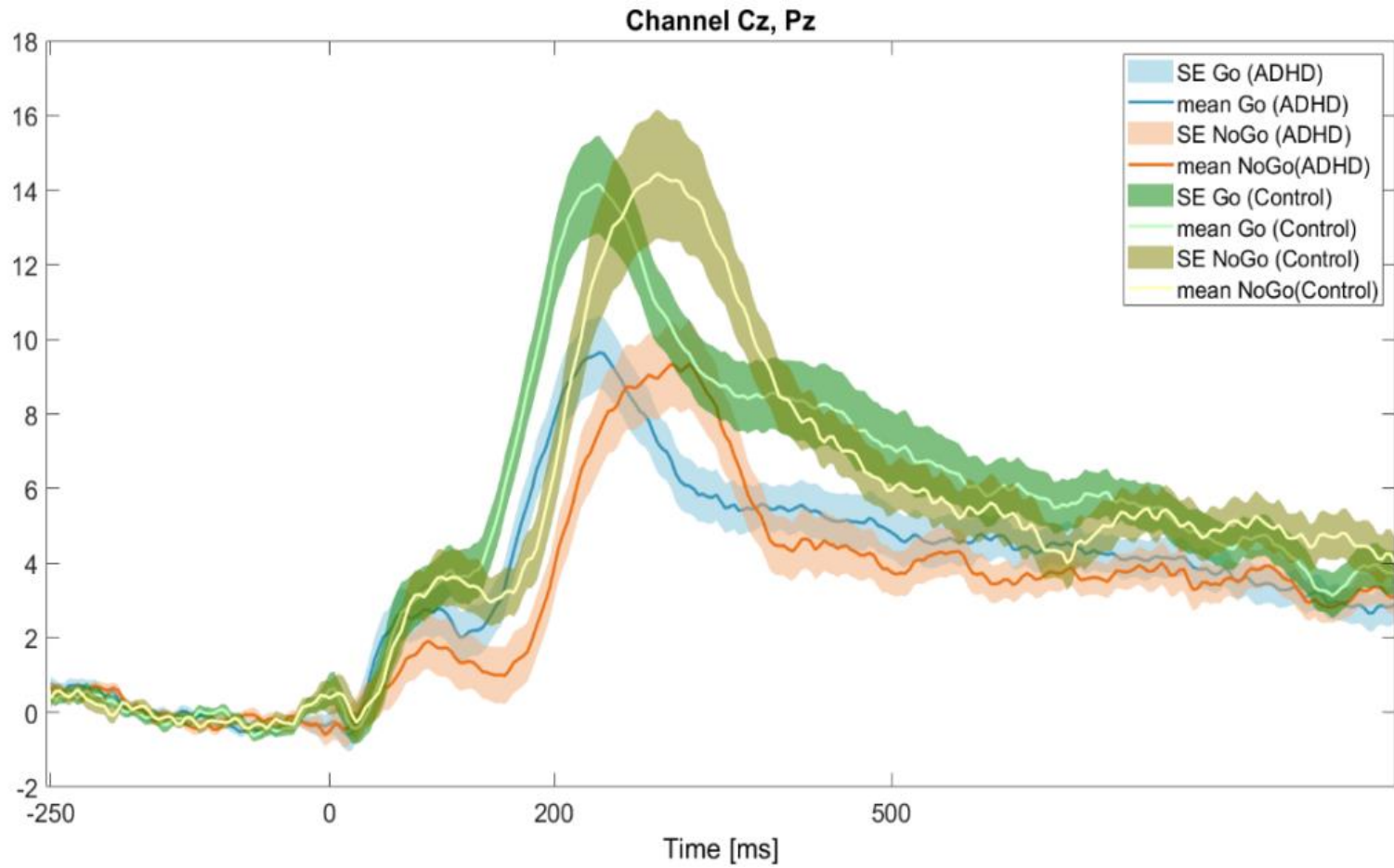


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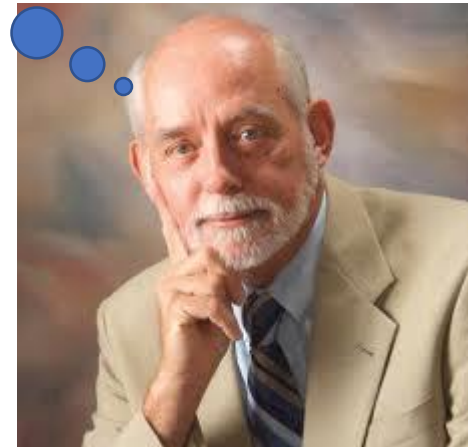
New publication on its way!



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New project:

- Inhibitory control



Stop signal task

- Self-motivation

- Working memory



Progressive Acquired equivalence task

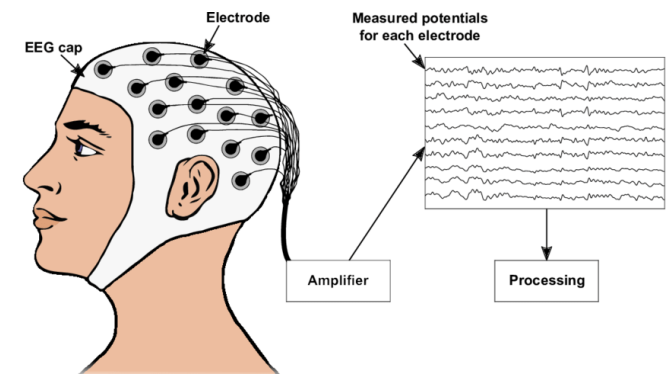
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Mind wandering task

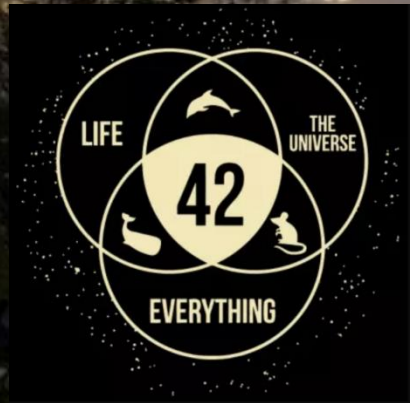


Adult ADHD II project

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
 - Acquired equivalence test

Thank you for your attention!



Adult ADHD II project: We are recruiting healthy controls!

Do you want to participate in our study?

Contact us!

Neuropsychology avd. Mosjøen

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Andras Puszta (Andras.Puszta@Helgelandssykehuset.no)

What we need

- One day of your life
- Your brain
- Be motivated

What will you get:

- A great day with us
- Detailed feedback of your brain
- Norgesbillett

