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VRIJE UNIVERSITEIT BRUSSEL

PhD in Medical Sciences
2020-2021

INVITATION to the Public defence of

Lars COSTERS

To obtain the academic degree of **'DOCTOR OF MEDICAL SCIENCES'**

An MEG investigation into working memory impairment in MS

The defence will take place on **Tuesday, 27 April 2021 at 5 p.m.**

and will be organised **online** accessible through the following Zoom Meeting link:

https://vub-qf.zoom.us/j/94274896567?pwd=WnZNckVQN2dpT0RvNW52TFFWMXFNQT09

Meeting ID: 942 7489 6567
Password: 959506

Summary of the dissertation

In this PhD dissertation, we investigate cognitive impairment in people with multiple sclerosis (PwMS), which is an important aspect of MS-related disability and has large effect on the quality of life and ability to work of PwMS. Monitoring cognition is, however, often a time-intensive task that demands the presence of a trained neuropsychologist which is why a group of experts developed the Brief International Cognitive Assessment for Multiple Sclerosis (BICAMS). In this dissertation, we validate this battery in a Belgian (Dutch-speaking) population and show the dangers of practice effects.

Working memory (WM) impairment is one of the most frequently affected domains in PwMS but the neurophysiology of WM itself is still relatively unclear. Because of this, we performed a magnetoencephalography (MEG) study in healthy controls to extensively describe the neurophysiological mechanism underlying WM function. Based on these findings, we were able to investigate which of these mechanisms were disturbed in PwMS. We discovered a mechanism of an impaired theta power increase in the right hippocampus, a brain region in which atrophy and microstructural damage had frequently been linked to WM impairment in PwMS. This was the first neurophysiological evidence of hippocampal dysfunction that could be related to working memory performance in MS, and this finding could be the basis for the development of future treatments based on brain stimulation techniques.

Curriculum Vitae

Lars Costers graduated from the Universiteit Gent with as a Master in Experimental and Theoretical Psychology after doing a research internship at the University College London (Queen Square) about oxygen treatment in an animal model of MS. In 2016, he started a PhD at the Vrije Universiteit Brussel under supervision of Prof. Dr. ir. Guy Nagels and Prof. Dr. ir. Jeroen Van Schependom after receiving an FWO Aspirant mandate for a research project on using magnetoencephalography to discover the neurophysiology of cognitive impairment in MS.