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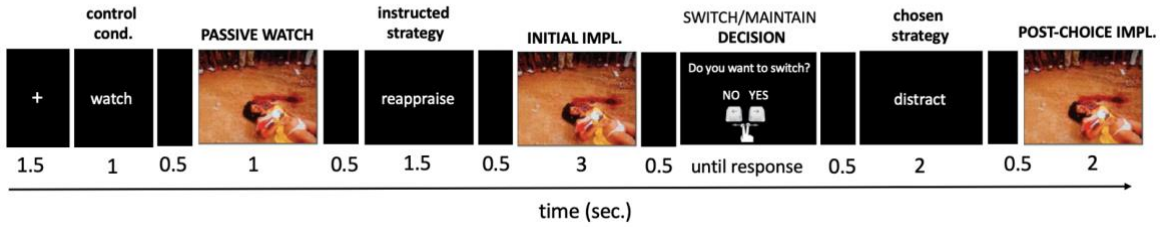
I want to convey my gratitude for receiving the NENS exchange grant, which allowed me to visit Prof. Karin Roelofs' group at the Donders Centre for Cognitive Neuroimaging (DCCN). Having the opportunity to visit Prof. Karin Roelofs' Experimental Psychopathology and Affective Neuroscience (EPAN) Lab (https://www.epanlab.nl/) helped me to work on both the conceptual and methodological aspect of my Ph.D. thesis and acquire new analytical skills.

In my PhD project, I investigate the moderating impact of situational factors on the effectiveness of cognitive emotion regulation (ER) strategies and neural mechanisms associated with the selection and adjustment of these strategies to changing situational demands, using EEG. I focus on two leading ER strategies: distraction, which involves diverting attention away from the source of emotional arousal, and cognitive reappraisal, which involves changing the meaning of emotional stimuli to reduce their negative impact.

During my research stay in Prof. Roelofs' Lab, I have analyzed the results from the third and final study of my PhD thesis. In this study, my aim was to identify the neural predictors and consequences of dynamic switching between ER strategies (distraction and reappraisal) with the use of time-frequency, source localization and connectivity analyses based on oscillatory activity of the brain. Participants were instructed to (alternately) apply one of these strategies to downregulate their emotional responses to negative pictures, and to monitor the effectiveness of that strategy. Next, they were given the choice to maintain using the same strategy (*maintain* condition) or to switch to the alternative strategy (*switch* condition) if they feel the current strategy failed to efficiently downregulate their negative emotions (see Fig. 1).

Figure 1



Note. A sample trial structure.

Using this paradigm, I planned to test predictions of a novel neurocognitive model of emotional regulation by Koch et al., (2018, Neuroscience and Biobehavioral Reviews), which proposes that emotional control (including switching between alternative ER strategies) relies on the monitoring of the effectiveness of the current (chosen) as well as the alternative (unchosen) strategy, and these processes rely on different neural regions. Based on this model, experiencing an ER failure should motivate ER switch decisions, which would be supported by the *medial* frontopolar cortex (mFP). By contrast, experiencing an ER success would engage the *lateral* frontopolar cortex (lFP), which would be associated with ER maintain decisions. Based on decision-making literature (Boorman et al., 2009), increased activity of the lFP would be accompanied by an increased activity of and connectivity between the lFP and the posterior parietal cortex (PPC) *before the decision to switch* (i.e., or before the implementation of an alternative ER strategy) as this structure was suggested to implement the switching behavior. Since frontal theta oscillations were shown to be implicated in

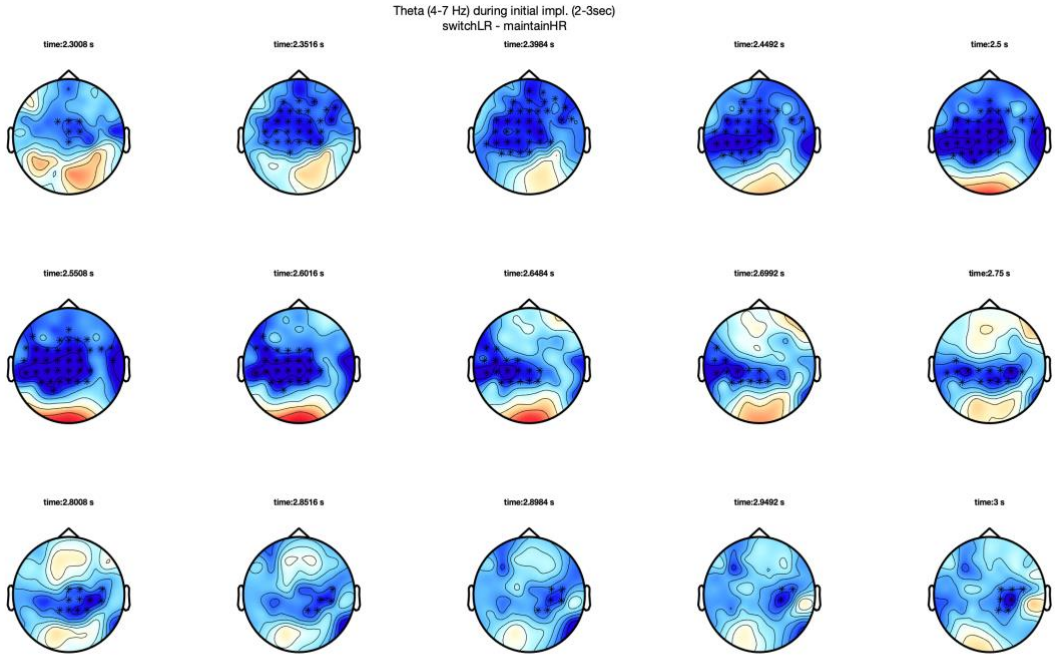
control over emotional behavior (Bramson et al., 2018; Cavanagh & Frank, 2014) as well as performance-based monitoring processes (Cavanagh et al., 2012; Wokke et al., 2017), we expected differences in neuronal activation (i.e., power) between switch and maintain trials to be reflected within this frequency band.

The visit allowed me to work on and consult the details of the advanced EEG analysis plans with the members of the EPAN Lab and researchers from the DCCN, including the developers of the FieldTrip toolbox I am using for analysing the data from this experiment (Oostenveld et al., 2011). Importantly, during my research stay, I deepened my theoretical knowledge about these advanced analysis methods by attending the weekly M/EEG expert consultation meetings. I also acquired hands-on experience in performing time-frequency analysis, statistical analysis using non-parametric cluster-based permutation techniques (see Fig. 2), source localization analysis using beamformers. During my stay, I was able to apply these methods on my own data under the supervision of more experienced EPAN members, who run similar analyses in the past (Bramson et al., 2018). Finally, I was also able to meet in person the authors of the novel emotion regulation model (Koch et al., 2018) that I tested in this study and discuss plans for potential future collaboration during my post-doc, continuing this line of research.

In summary, the visit funded by the NENS exchange grant have contributed to expanding my statistical and analytical toolbox, allowing me to acquire new skills and to implement these skills in one of the studies that will constitute my PhD thesis. Learning from the world-class experts on and developers of these state-of-the-art M/EEG analysis methods which will, certainly, have invaluable impact on my future scientific career, allowing me to apply these methods at my home laboratory and in my future studies.

Christmas Party with the EPAN Lab members.

Figure 2



Note. Theta oscillation (4-7 Hz) channel-time cluster showing significant differences between switch (from reappraisal) versus maintain (reappraisal) trials during initial implementation phase ($n_{\text{participants}} = 61$).

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