

DGCN05 – Practical Training & Thesis

Project proposal

Project title: StressMemGen: Stress and memory accuracy vs. generalization

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Principal Investigator: Dr. Erno Hermans

Donders Theme(s): Theme 3: Development and Lifelong Plasticity

Research centre: DCCN

Project description: Stressful and emotional experiences activate hormone and brain systems that create strong memories. It remains unclear, how the *quality* of such memories is affected. Human studies show contradictory results and no integrative theory exists that explains these apparently conflicting findings. We propose a novel model which postulates that the two main stress hormones noradrenaline (NA) and cortisol (CORT) exert opposite effects on the accuracy vs. generalization of memories through distinct effects on brain systems-level processes underlying the time-dependent process of memory consolidation. This model will be tested by conducting human behavioral, pharmacological and neuroimaging studies. Our experiment aims to identify the neural circuits that predict and support recent vs. remote and accurate vs. generalized memory and their modulation by NA and CORT, respectively. For this purpose we use a fear conditioning paradigm within a virtual environment. The results have important implications for disorders characterized by an overgeneralization of the traumatic experience to safe or novel situations, such as PTSD.

Relevant literature: Roozendaal et al. (Nat Rev Neurosci, 2009)

Jöels et al. (Trends Cogn Sci, 2006)

Atucha et al. (PNAS, 2017)

Dunsmoor et al. (Nature, 2015)

de Voogd et al. (bioRxiv, 2019)

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¹ If more on-site supervisors are involved, please add their names as well.