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Understanding brain plasticity in perceptual learning

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The perception of motion is thought to be highly associated with neuronal activity in the medial temporal lobe as confirmed in a range of studies. In a current project we aim to investigate perceptual learning in the context of an experimental task using coherently moving dots. Using a rather simple biophysical neuronal model for the task simulation, we are able to determine central model parameters based on previous findings and obtained behavioral results. On the base of a neuronal model with a high degree of biological plausibility, we are thus able to analyze different effects of attention. Further more behavioural results raise the question whether a minimal threshold (in terms of presentation time or percentage of coherently moving dots) is necessary for the training of the perceptual task and to what extend *super*-threshold learning might influence a preliminary existing perceptual threshold. The high degree of detail used in the biophysical model allows on the one hand the investigation of these questions and, on the other hand, the computation of resulting fMRI signals to form predictions regarding experimental findings. Thus, using neuronal models we are able to guide behavioral experiments and support the fMRI data analysis using standard GLM (General linear model) methods but as well model-free fMRI analysis techniques as ICA (independent component analysis).

References

1. Stemme A, Deco G: **Neuronal and cortical dynamical mechanisms underlying brain functions.** *Elsevier Handbook of Cognitive Science* 2008:221-242.