RDN YOUNG SCIENTIST COLLOQUIUM

Monday, October 24th, 16.00 ct, FNO 01/117

How do we perceive the world around us?
On faces, bodies and spatial relations

How children and adults represent individual faces despite image variation: An fMRI adaptation study – *Marisa Nordt, MSc (Developmental Neuropsychology, Dep. of Psychology, RUB)*

Behavioral studies suggest that face recognition performance reaches its peak not until age 30. However, it is not yet fully understood which aspects of face recognition contribute to this prolonged development. A crucial aspect of face recognition in daily life is the ability to recognize faces despite changes, such as varying viewpoints or changes in lighting. In the present study, we employed fMRI adaptation using various images of the same person to study the individual-level selectivity of face-selective regions in children and young adults. In the talk I present results from both functionally and anatomically defined regions of interest in ventral temporal cortex, thereby shedding light on the question of early versus late maturity of the face processing network.

Is the whole the sum of its parts? Configural processing of headless bodies in the right fusiform gyrus – *Dr. Denise Soria Bauser (Dep. of Neuropsychology, Inst. of Cognitive Neuroscience, RUB)*

It is controversial whether human bodies, like human faces, are processed by specialized cortical mechanisms. In the present study, we used an fMR-adaptation paradigm to investigate whether there are neuronal populations that show selective adaptation to whole bodies compared to the sum of their parts. The right fusiform body area (FBA) showed a preference for whole bodies compared to the sum of their parts as the right and left fusiform face area showed a preference for whole faces compared to the sum of their parts. Thus, the present data support the idea that configural body and face processing is mediated by the fusiform gyrus. The current data further support the view that bodies are a special stimulus class with specific characteristics which are processed in body-sensitive brain areas.

Toward the grounding of language in a neural-dynamic model – *Mathis Richter, MSc (Embodied Cognition Group, Institute for Neuroinformatics, RUB)*

„The red ball is to the left of the green ball." To understand such a linguistic description of a visual scene, one has to actively link the discrete speech concepts to objects in the continuous world and discover spatial relations between them. These complex cognitive processes have not been modeled in a biologically plausible manner. This may be because it requires solving fundamental problems: the neural pointer problem, the binding problem, and the problem of generating discrete processing steps from time-continuous neural processes.

We present a prototypical solution to these problems in a dynamic, pervasively neural model of relational processing. It is comprised of dynamic neural fields that hold representations close to sensorimotor surfaces as well as dynamic neural nodes that hold discrete, language-like representations. Making the connection between these two types of representations enables the model to ground and produce simple relational phrases, all based on real visual input. We demonstrate how the dynamic neural processes autonomously generate the required processing steps for both static and dynamic scenes.