

## **When style matters: Do oculomotor fingerprint and brain dynamics explain visual exploration and memory strategies?**

### **ABSTRACT:**

#### **Background**

When looking at visual images, the eyes move to the most salient and behaviourally relevant objects. Saliency and semantic information significantly explain where people look. Less is known about the role of intrinsic brain dynamics in shaping oculomotor behaviour and about the link between eye movements and memory recall.

#### **Aims**

We aimed to study the link between eye movement dynamics during free-viewing, subsequent memory recall of visual stimuli, and intrinsic brain dynamics measured with high density EEG.

#### **Method**

We pursued such aims through three experiments. In Experiment 1 we collected eye-movements while participants were freely viewing a set of images, a subset of which was subsequently recalled. In Experiment 2 we collected high-density EEG (hdEEG) data during resting-state in observers with different spontaneous viewing styles. In Experiment 3 we collected simultaneous eye-tracking and hdEEG data during image-viewing. As an extension of the project, we applied the same approach on eye movements of Alzheimer's Disease (AD) patients.

#### **Results**

We identified spontaneous visual exploration styles in free-viewing which relate to stable properties of resting-state brain dynamics. We also identified subtle oculomotor alterations in AD. We are currently investigating the relationship between eye-movements and online brain activity to identify oculomotor markers of altered brain dynamics.

#### **Conclusions**

Overall, this project supported the hypothesis that intrinsic brain dynamics have a role in shaping oculomotor behaviour in free-viewing. The investigation of the link between oculomotor behaviour and intrinsic brain processes can help the identification of oculomotor markers of neurodegenerative pathologies such as AD.

#### **Keywords**

Eye movements, Intrinsic brain dynamics, Oculomotor behaviour, Memory

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### **Published Work:**

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