

## **Internal and external world in parietal cortex**

### **ABSTRACT:**

#### **Background**

Neuroimaging studies showed that dorsal attention network (DAN) and default mode network (DMN) control “external/environmental” (i.e. endogenous and reflexive visual-spatial attention) vs. “internal” (i.e. body state, semantic memory, self-referential information) cortical information processing. Nevertheless, recent studies showed that parietal regions of DAN are less involved in the visuo-spatial attention when subjects perform the task after an intensive training.

#### **Aim**

We tested the hypothesis of a causal role of AG and IPS (and by extension the role of the DMN and DAN) in the regulation of cortical neural synchronization mechanisms (reflected by alpha rhythms) in two different cognitive domains (i.e. semantic memory and visuo-spatial attention). Furthermore, in a parallel study we tested the hypothesis that the causal role of IPS observed in the visuo-spatial attention become less important when subjects perform the task after an intensive training.

#### **Results**

We found that both performance and anticipatory alpha de-synchronization were affected by stimulation of IPS only during visuo-spatial attention, and of AG only during semantic decisions. Moreover, we report that during a shape identification task only inhibitory TMS interference with visual cortices (V2d/V3 and LO) impaired behavioural performance, whereas interference with IPS did not.

#### **Conclusions**

Our results indicate a clear double dissociation of task by cortical location, suggesting the existence of multiple dedicated parietal channels for the modulation of anticipatory alpha rhythms. Moreover, only activity in topographically appropriate visual regions is causally involved in identifying learned shapes

#### **Keywords**

Parietal cortex, Dorsal attention network, Default mode network, EEG rhythms, rTMS

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### **Published Work:**

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