



Imaging Diaschisis Following Stroke

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Genève, 24.11.2016



Hôpitaux
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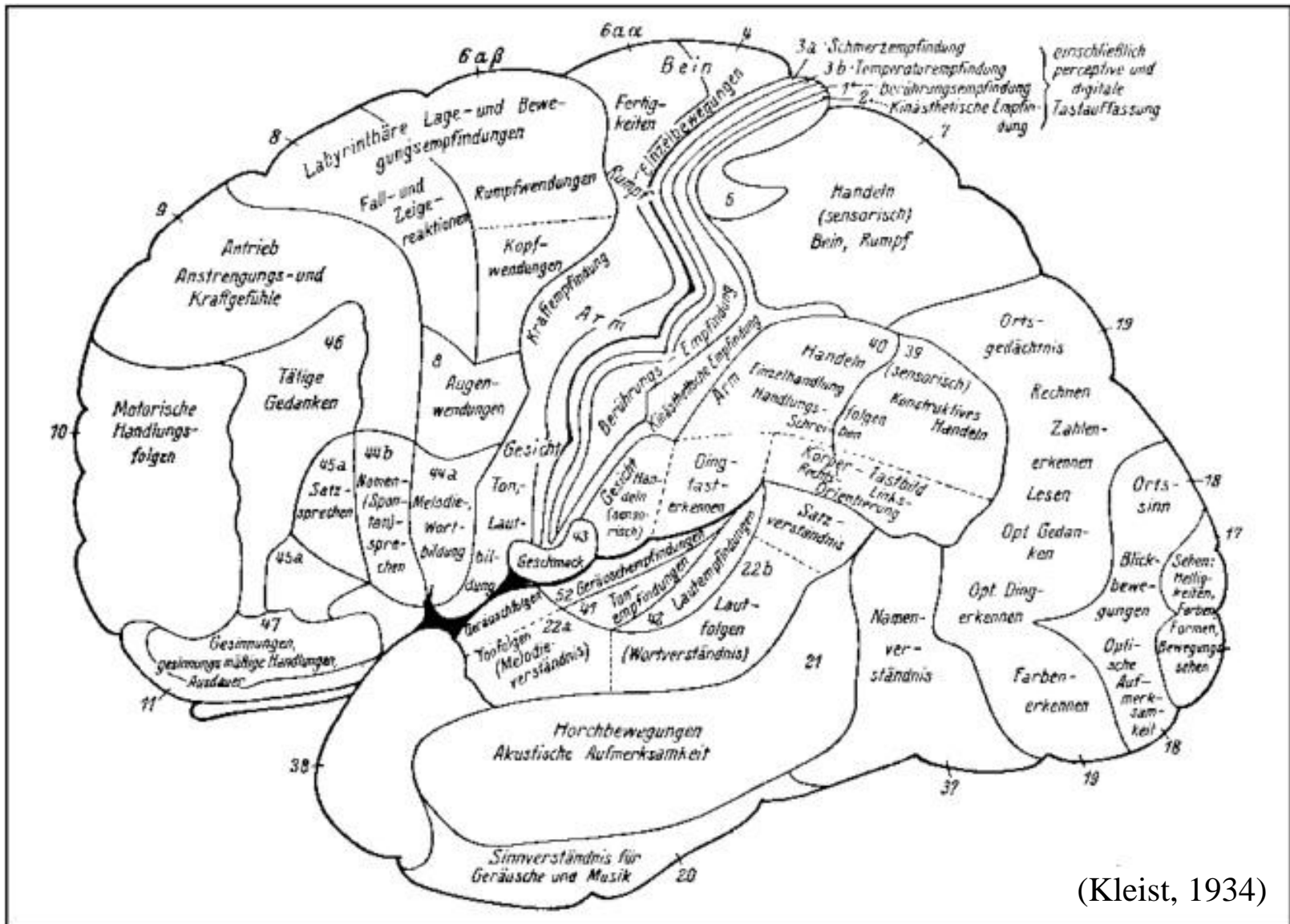
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*“The generally accepted theory according to which **aphasia, agnosia, apraxia** etc. are due to destruction of narrowly circumscribed appropriate **praxia, gnosia, and phasia centres**, must be finally discarded on the basis of more recent clinical and anatomical studies. It is just in the case of these **focal symptoms** that the concept of complicated **dynamic disorders in the whole cortex** becomes indispensable.”*

Constantin von Monakow
*Die Lokalisation im Grosshirn
und der Abbau der Funktion
durch kortikale Herde.*
Wiesbaden: Bergmann 1914.

Functional Neuroanatomy of the Cortex



(Kleist, 1934)

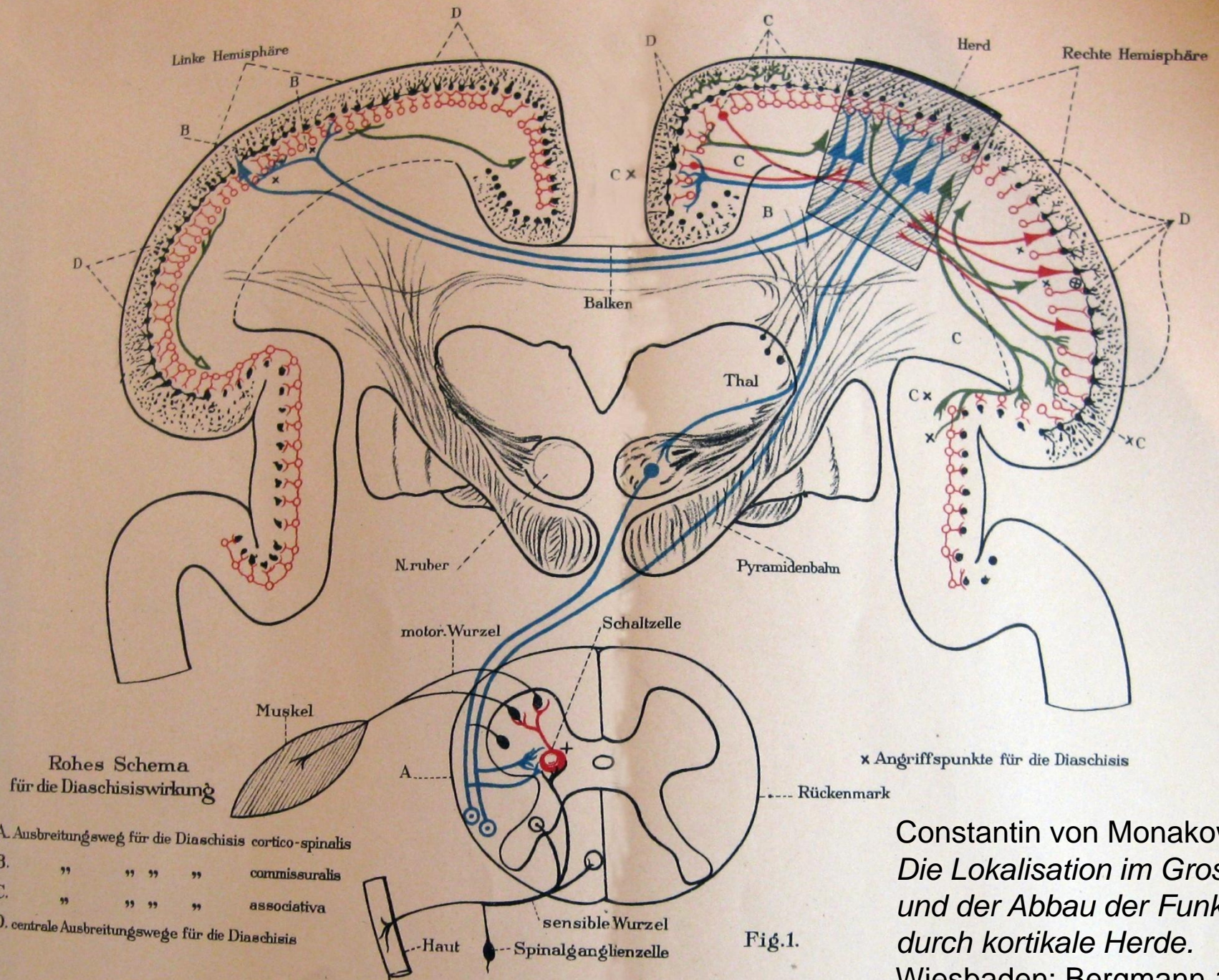
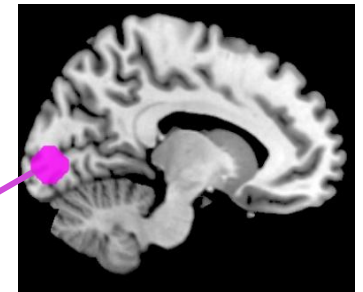
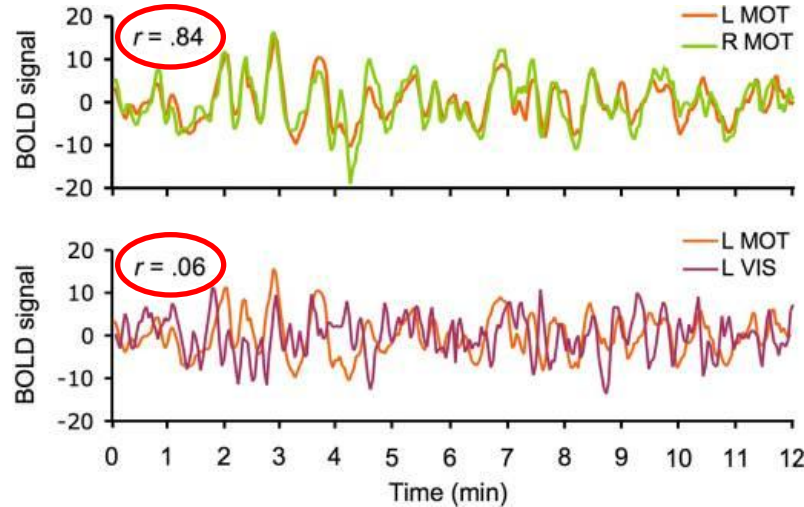
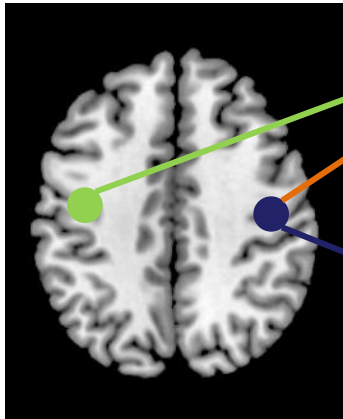


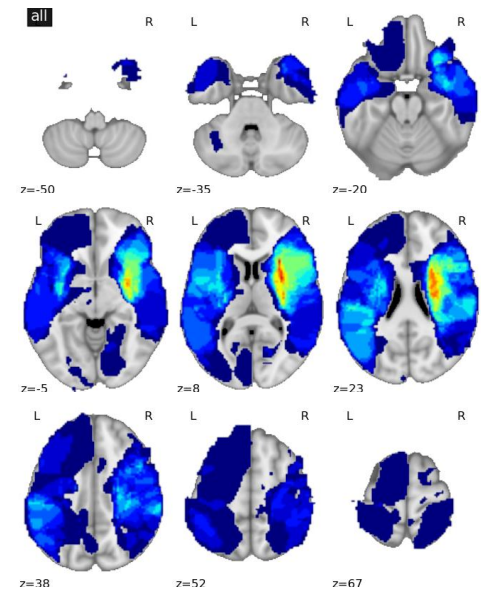
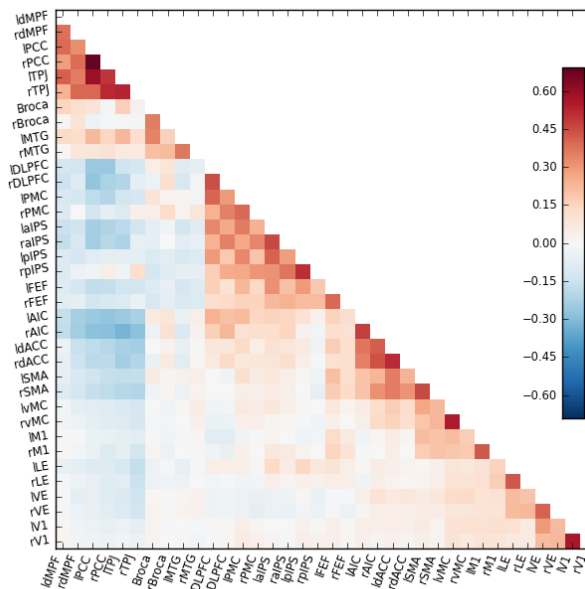
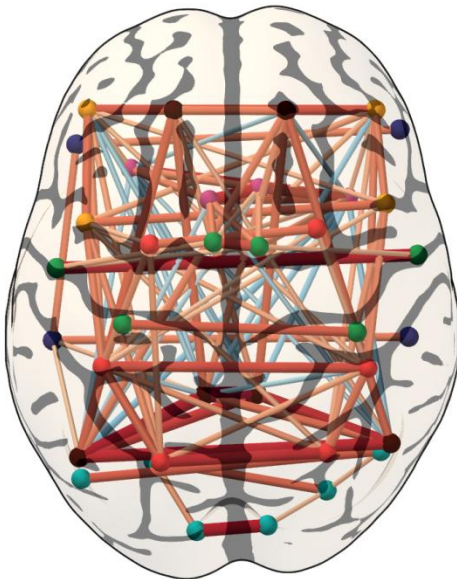
Fig.1.

Constantin von Monakow
*Die Lokalisation im Grosshirn
 und der Abbau der Funktion
 durch kortikale Herde.*
 Wiesbaden: Bergmann 1914.

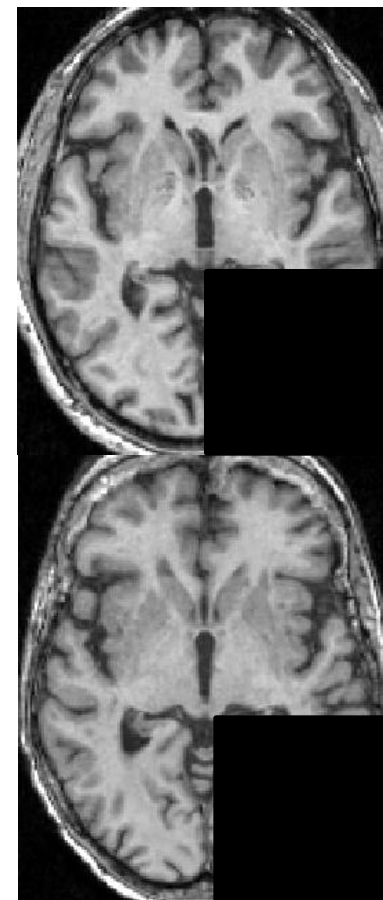
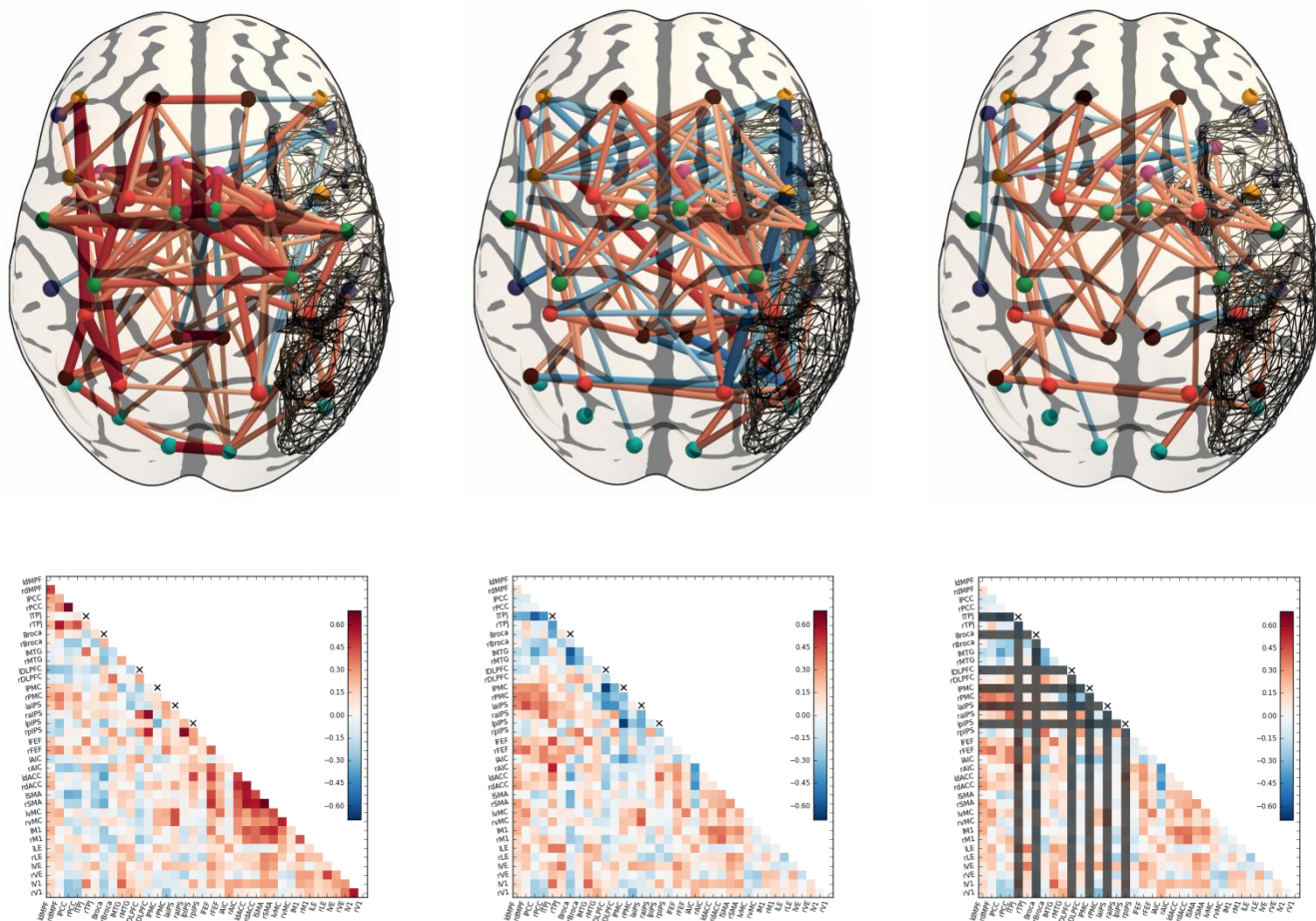
Spontaneous fluctuations of neural activity



(Adapted from van Dijk et al., 2010)

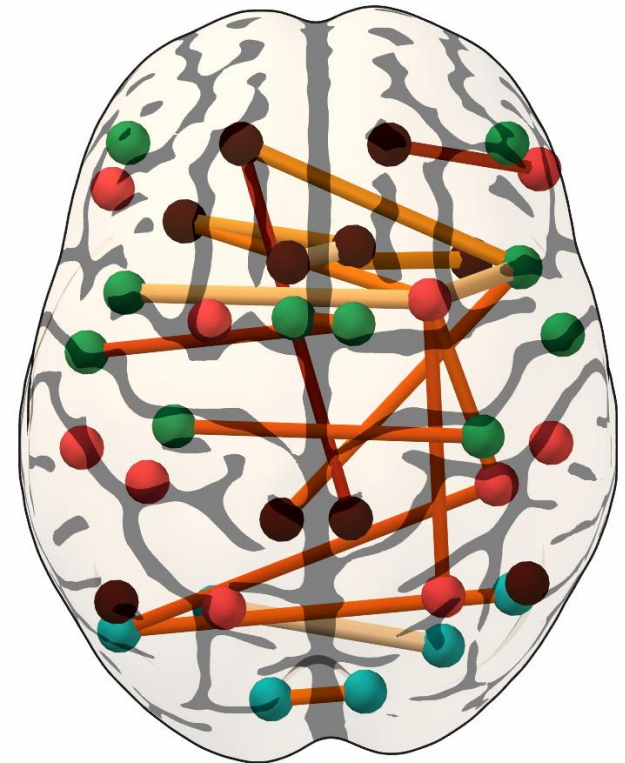
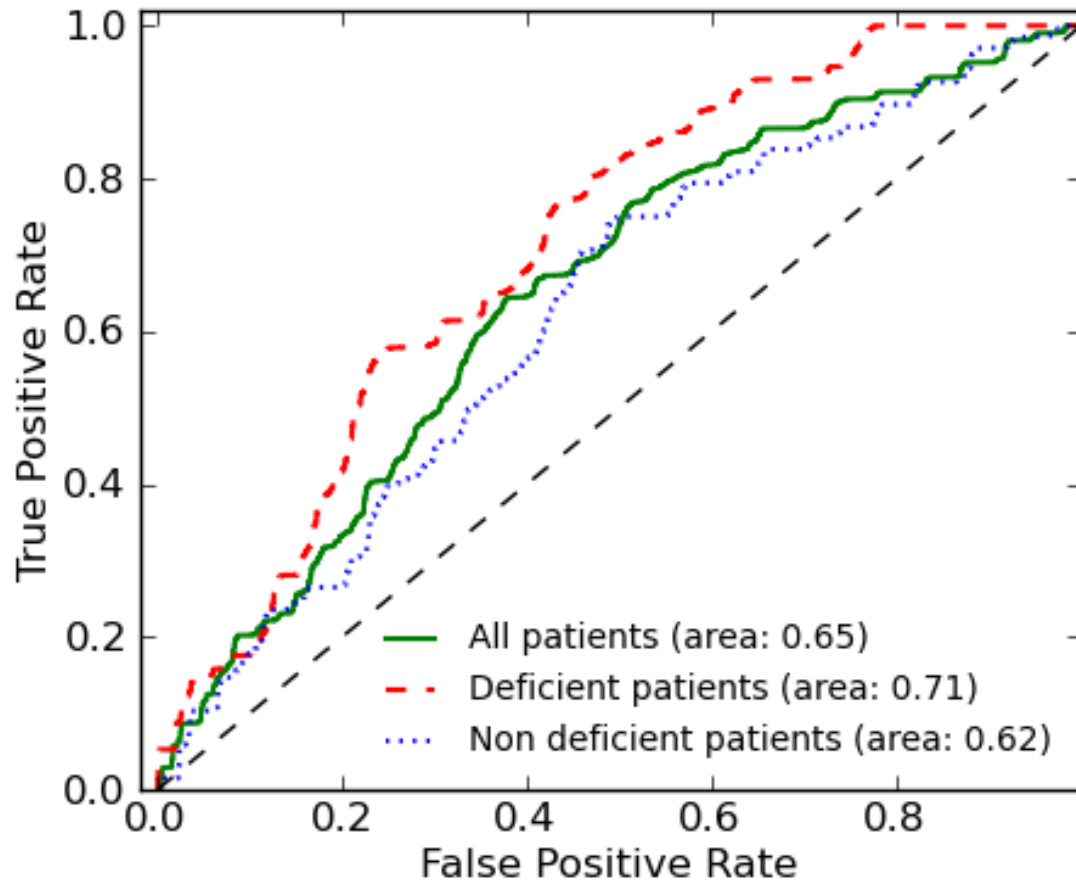


Single case analysis of functional connectivity



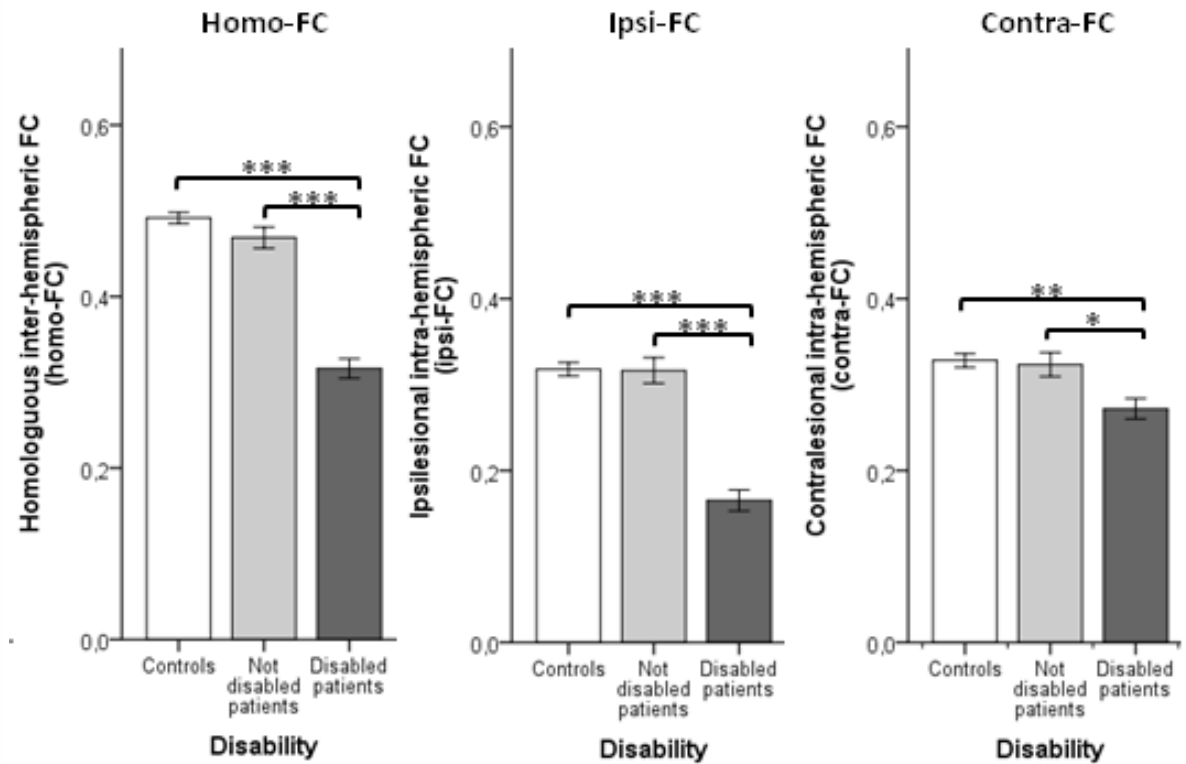
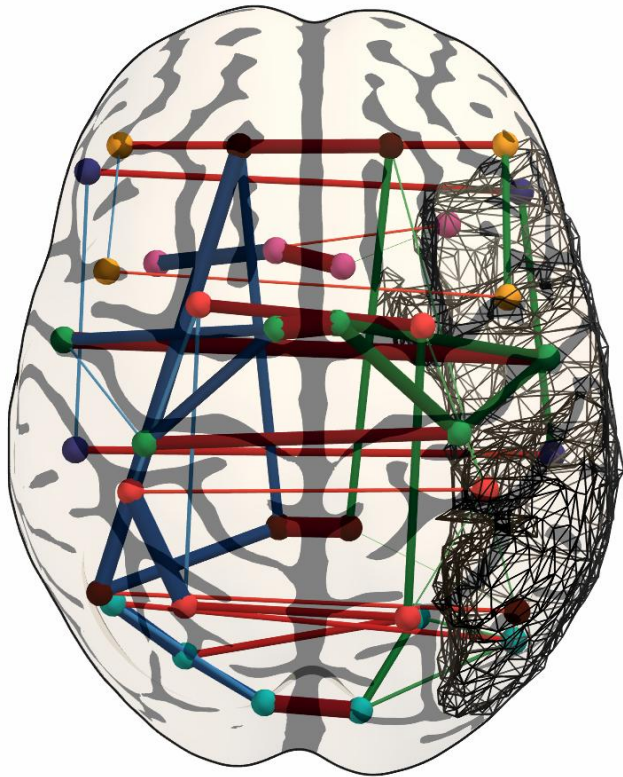
(Baronnet et al., in prep.)

Classification of individual patients



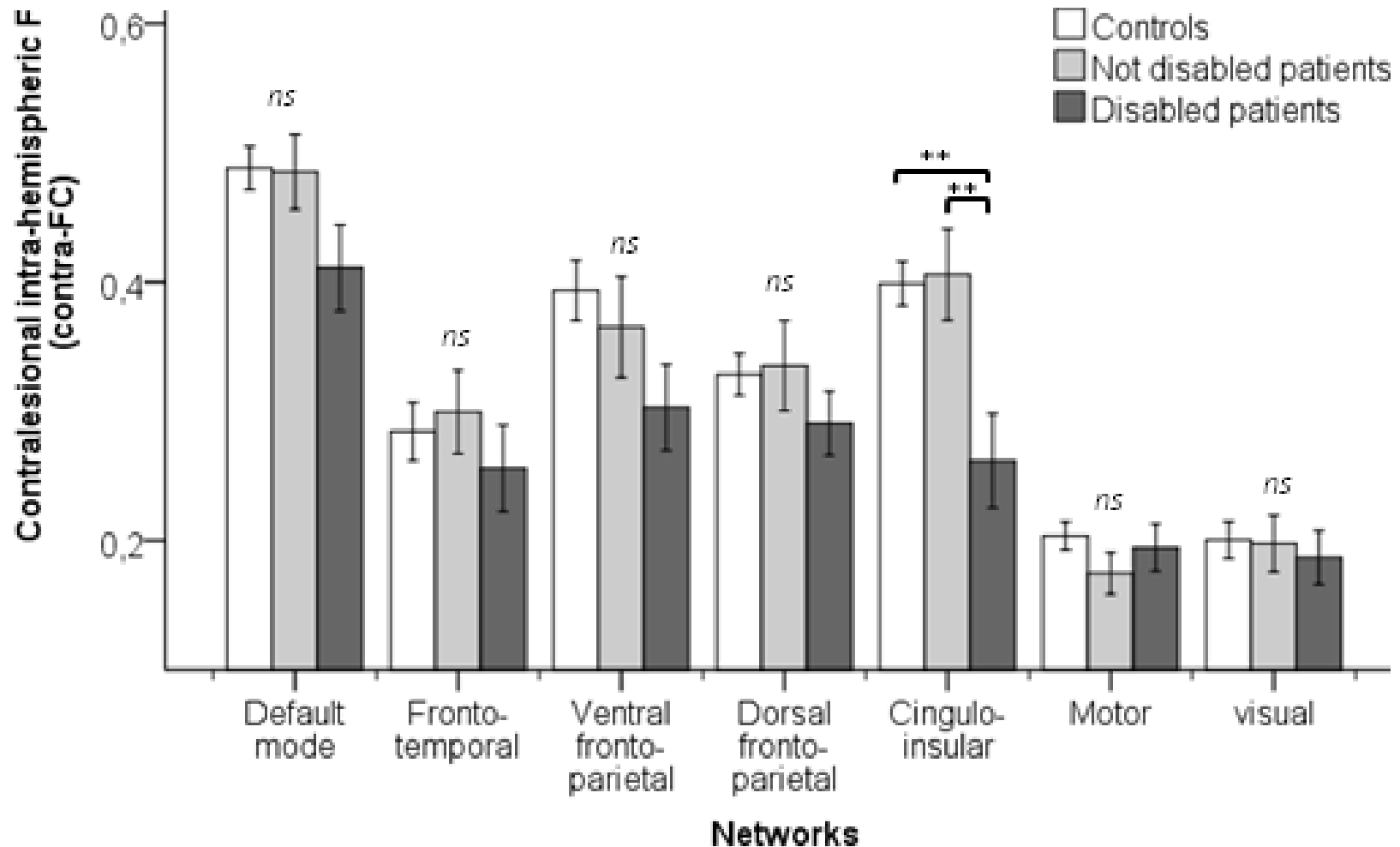
(Baronnet et al., in prep.)

Alterations of spontaneous activity as a function of connection type de



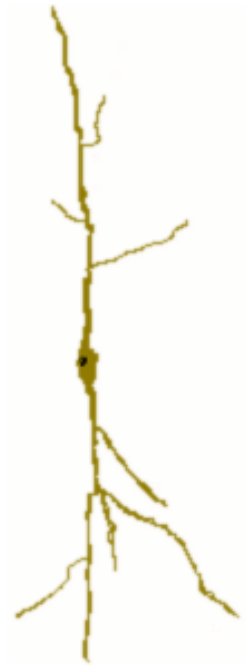
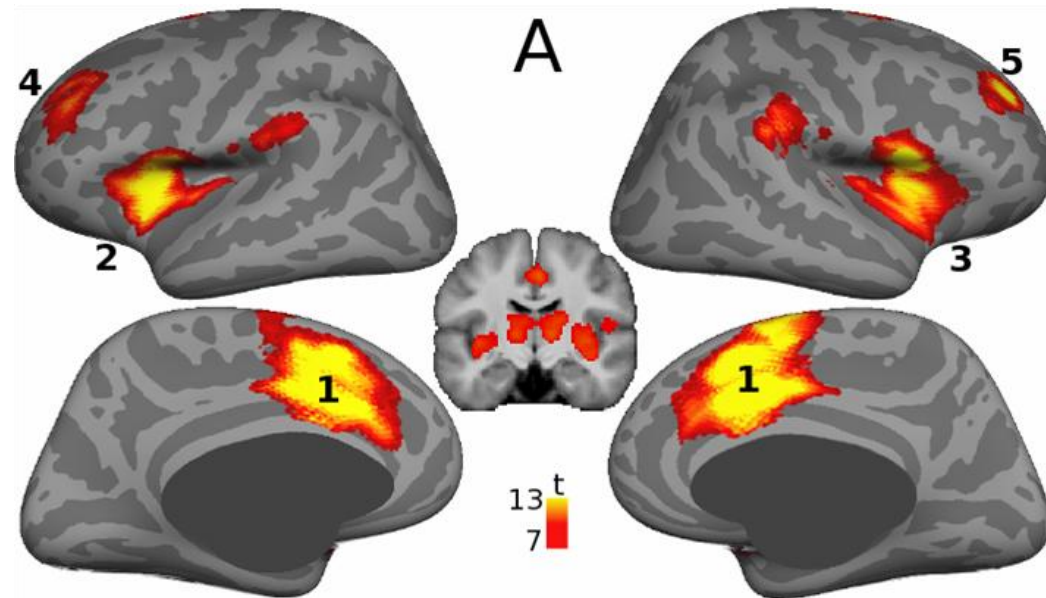
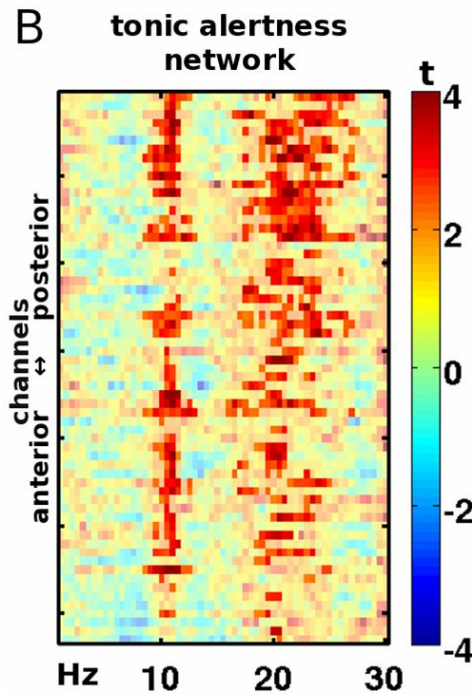
(Baronnet et al., *subm.*)

Diaschisis as a function of connectivity network



(Baronnet et al., *subm.*)

Un réseau vulnérable au coeur de la cognition



Sadaghiani et al., J Neurosci 2010

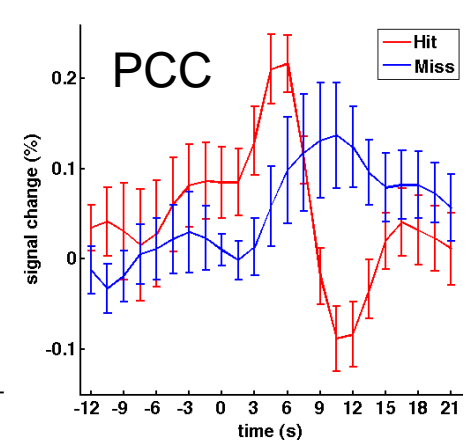
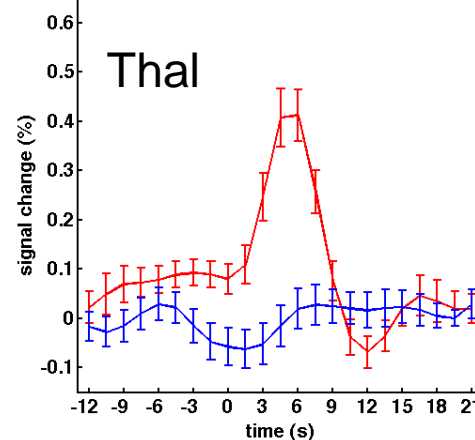
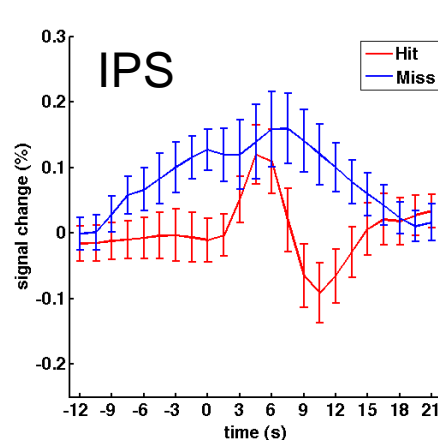
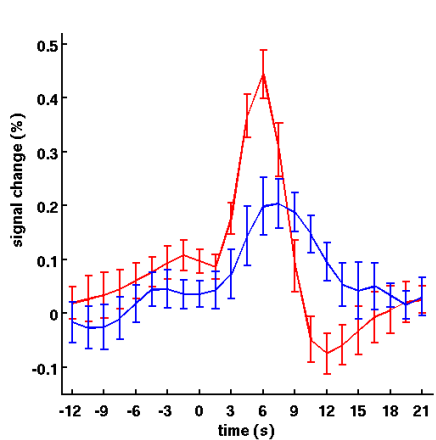
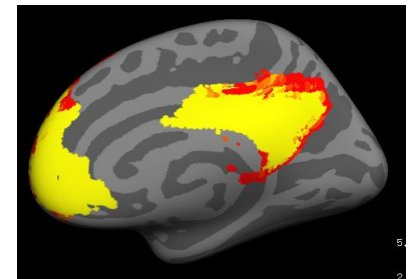
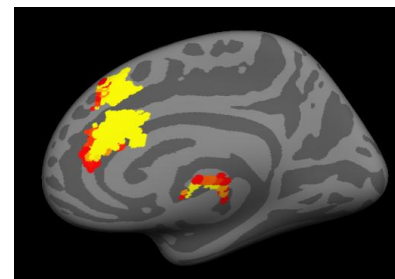
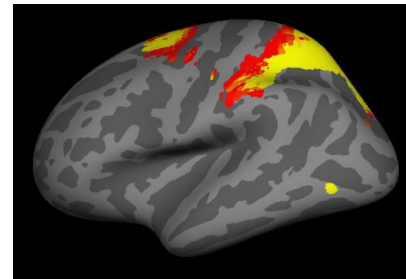
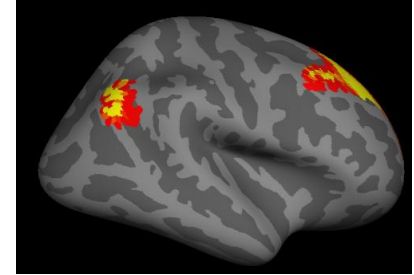
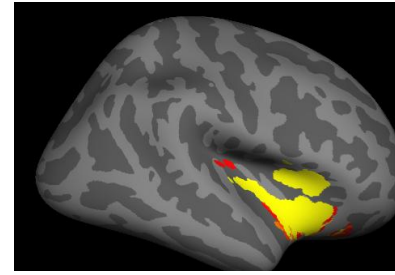
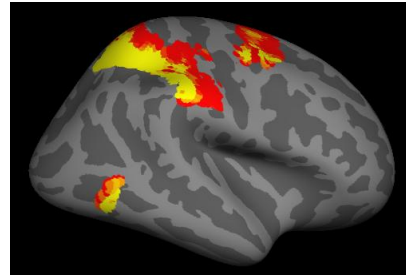
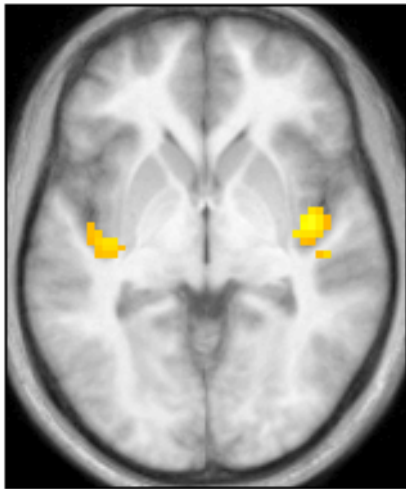
Distributed & Antagonistic Effects on Auditory Perception

auditory
cortex

attention
system

alertness
system

default mode
system



(Sadaghiani et al., J Neurosci, 2009)

The attention system of the human brain:

20 years after. (Petersen SE, Posner MI. Annu Rev Neurosci. 2012)

“A long established approach to tonic alertness is to use a long and usually rather boring task to measure sustained vigilance. Some of these tasks have grown out of the job of radar operators looking for near-threshold changes over long periods of time..”

“THE ORIGINAL NETWORKS

The three networks we described in 1990 included an **alerting network**, which focused on brain stem arousal systems along with right hemisphere systems related to sustained vigilance; an **orienting network** focused on, among other regions, parietal cortex; and an **executive network**, which included midline frontal/anterior cingulate cortex. [...]

“Alerting

[...] on producing and maintaining optimal vigilance and performance during tasks [...].”

“Orienting

The orienting network is focused on the ability **to prioritize sensory input by selecting a modality or location.** [...].”

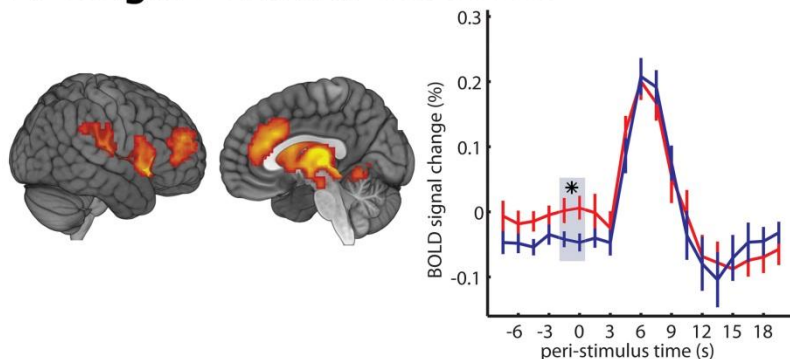
“One approach to the study of alerting is to use a **warning signal prior to a target event to produce a phasic change in alertness.** The warning cue leads to replacing the resting state with a new state that involves **preparation for detecting and responding to an expected signal.** If a speeded response is required to the target, reaction time improves following a warning. **This improvement is not due to the buildup of more accurate information about the target, which is not changed by the warning signal,** but the warning signal does change the speed of orienting attention and thus responding to the signal.”



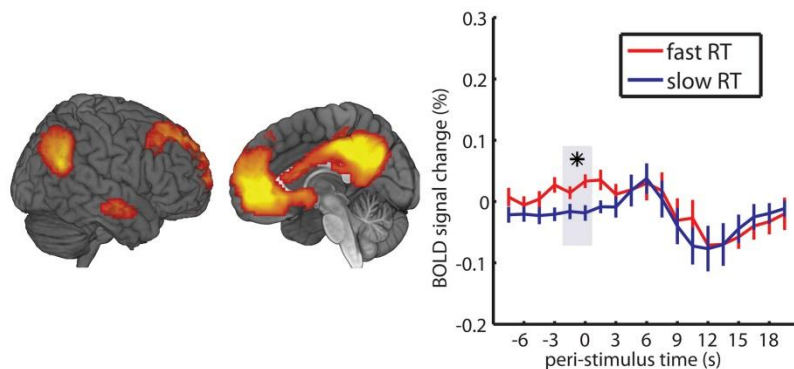
ATTENTION !

The Functional Neuroanatomy of Sustained Non-Selective Attention

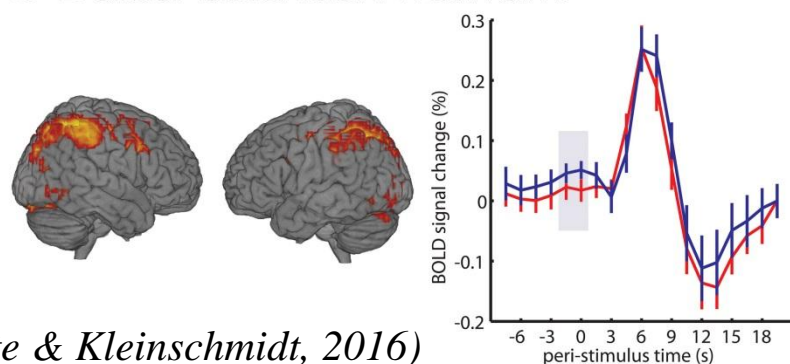
A Cingulo-Insular Network



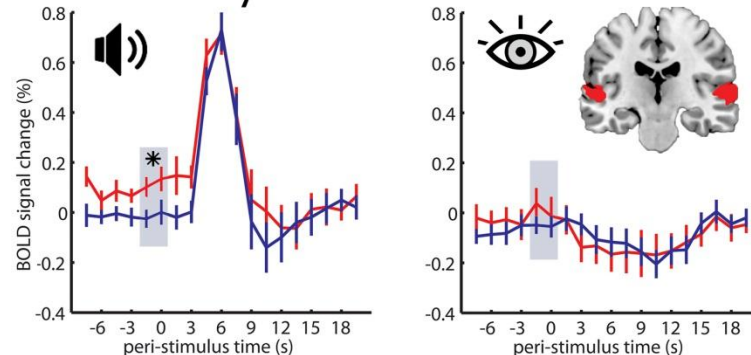
B Default mode network



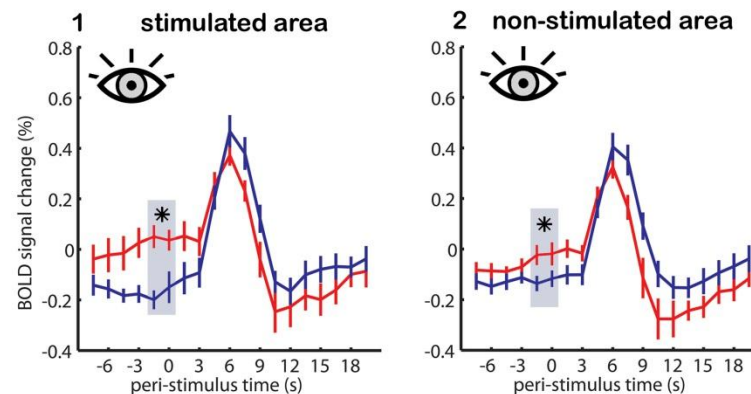
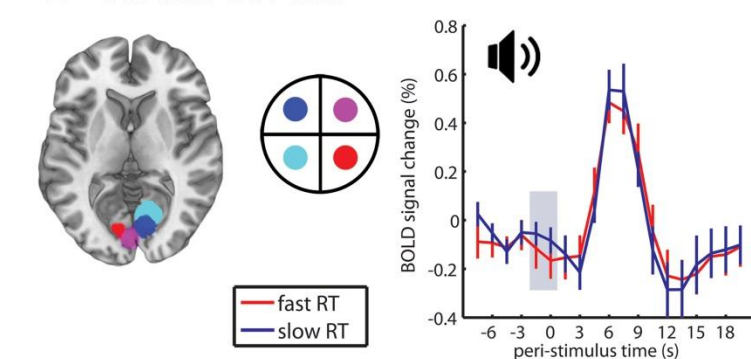
C Dorsal attention network



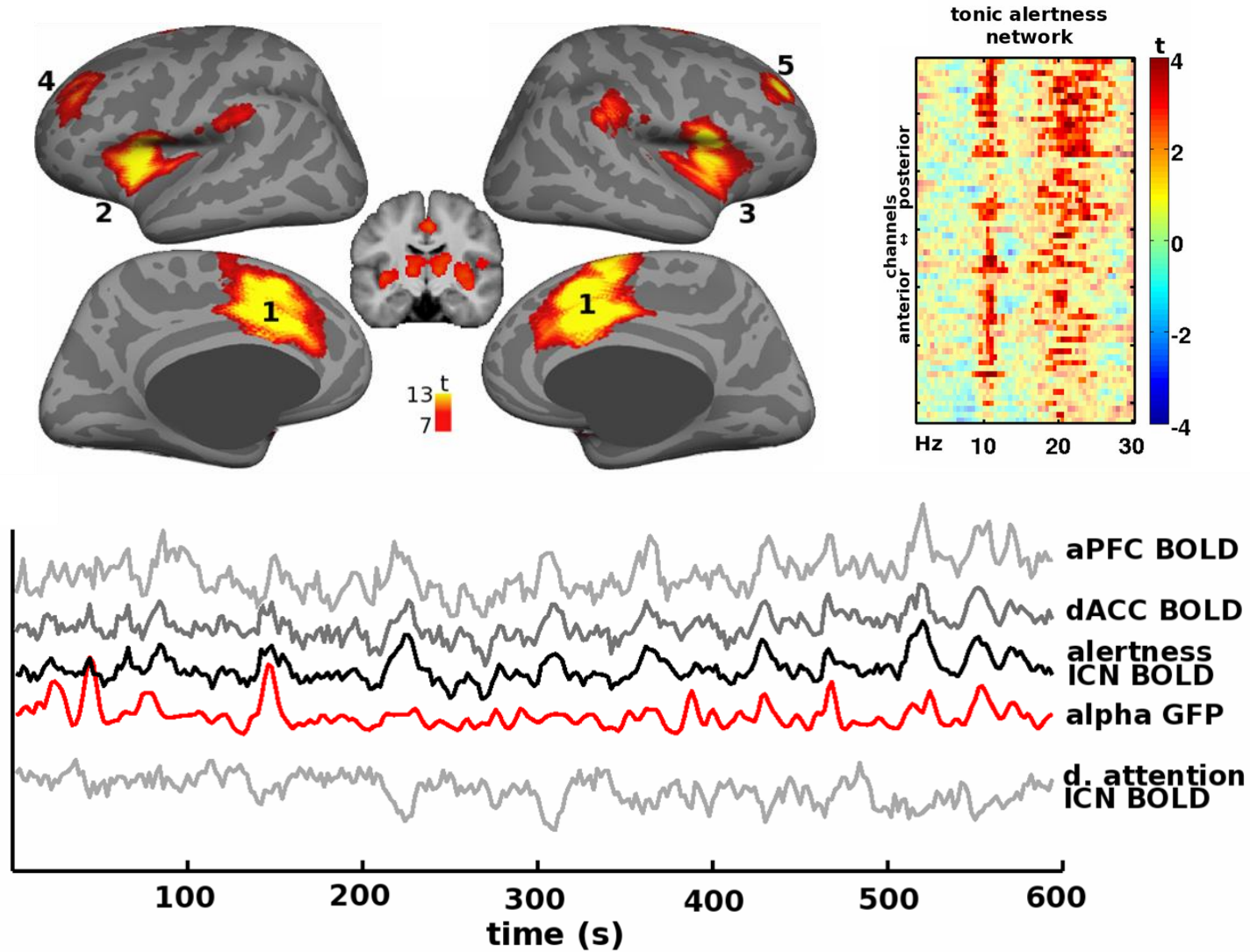
A Auditory cortex



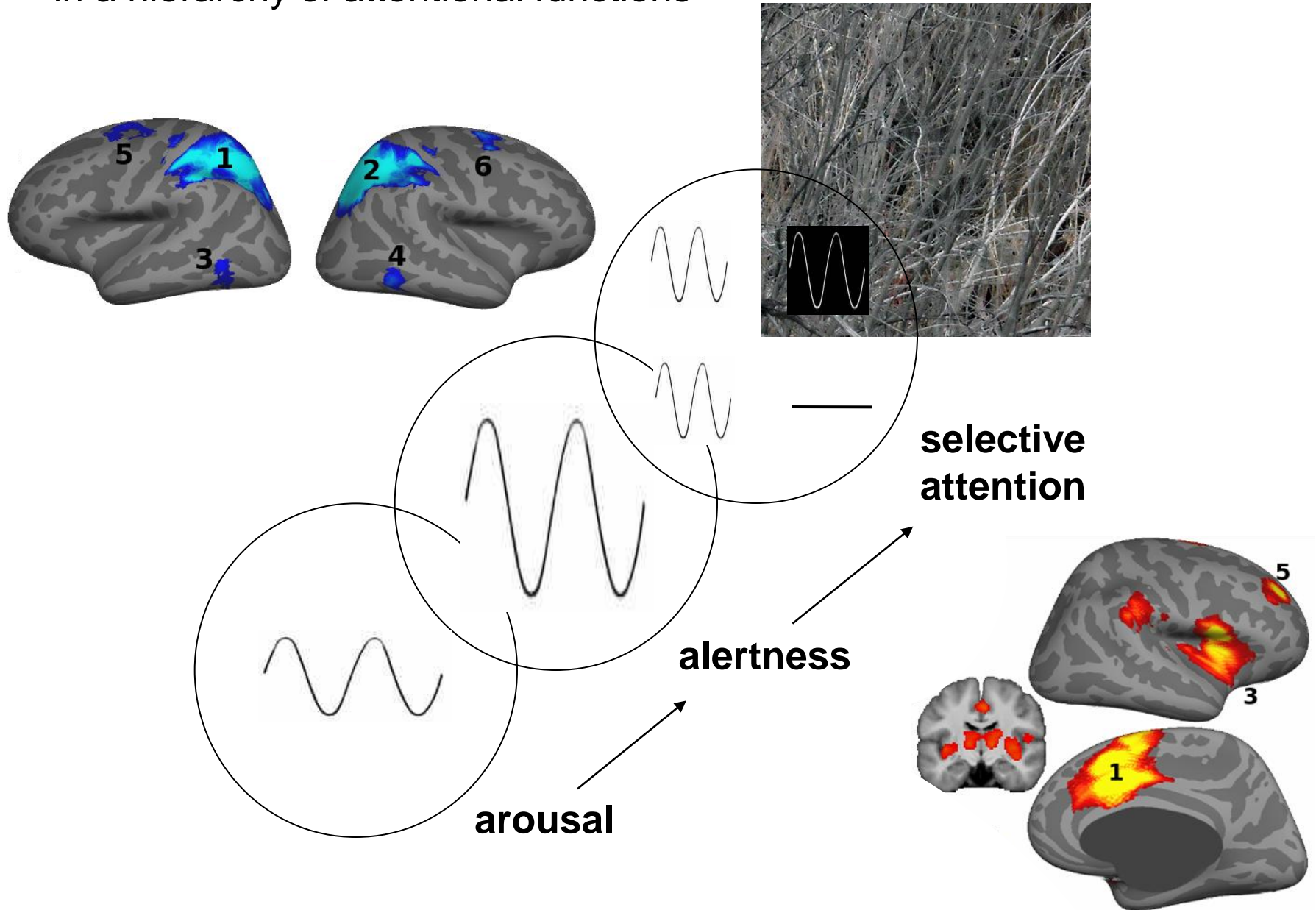
B Visual cortex



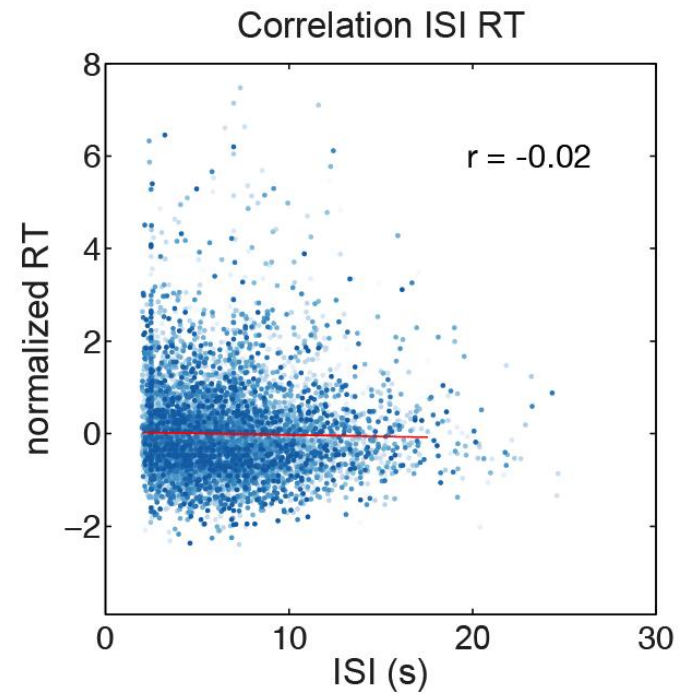
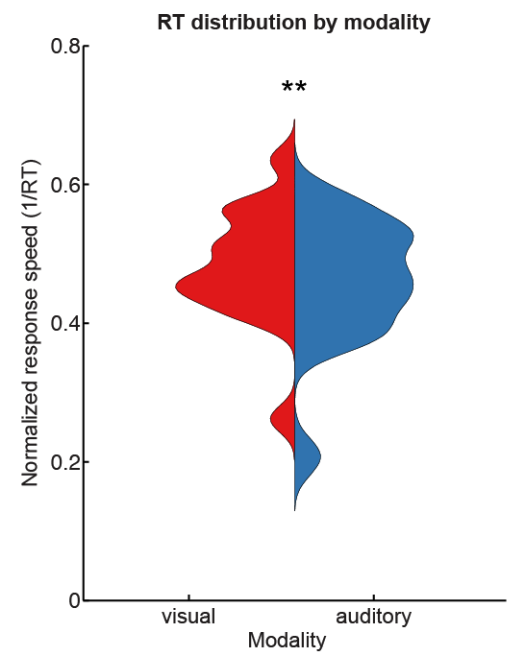
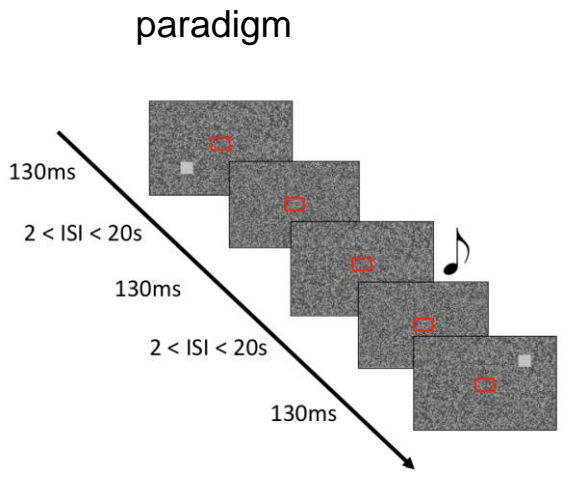
Slow Fluctuations of Ongoing Activity in Intrinsic fMRI networks and their spectral correlation in simultaneous EEG



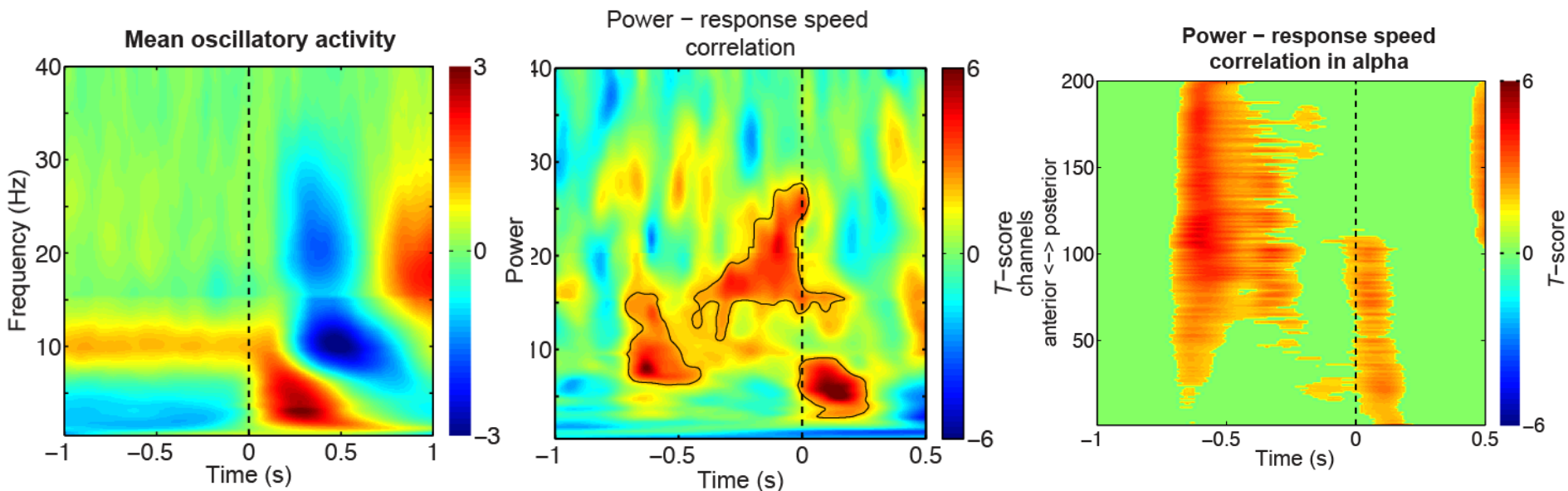
A model of alpha oscillations acting as a neural windshield wiper in a hierarchy of attentional functions



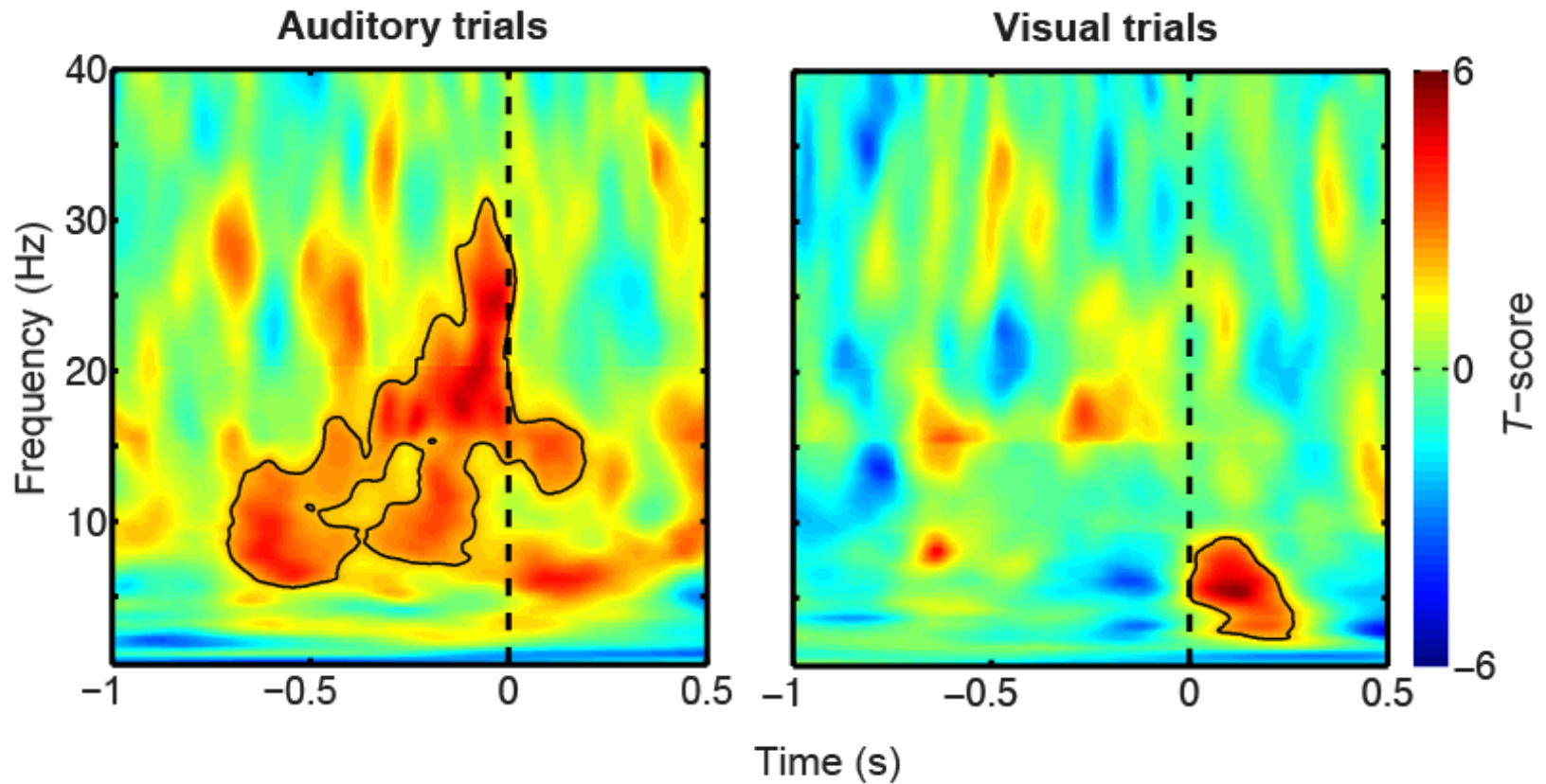
The Functional Neurophysiology of Sustained Non-Selective Attention



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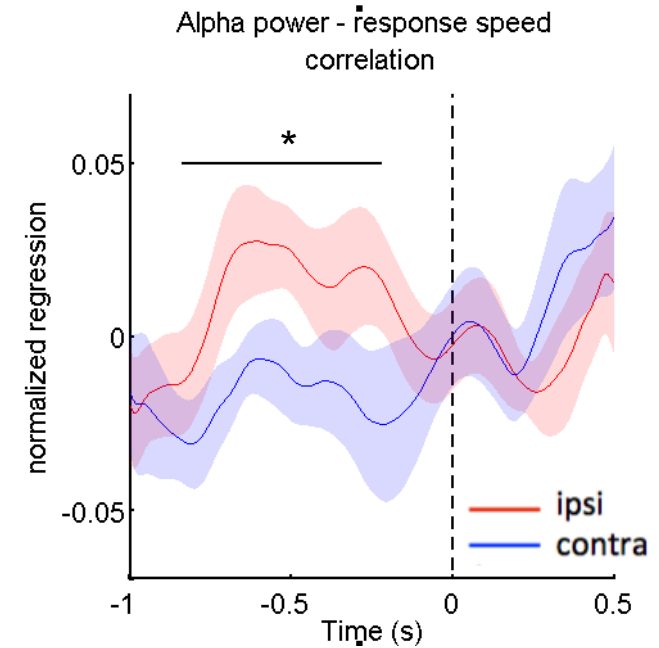
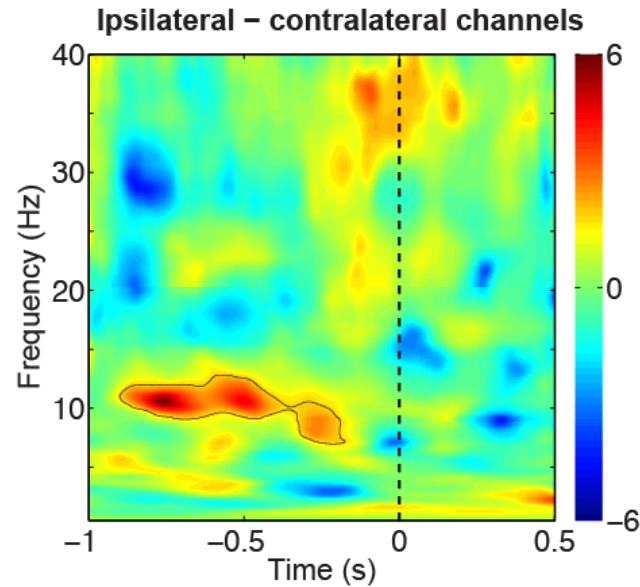
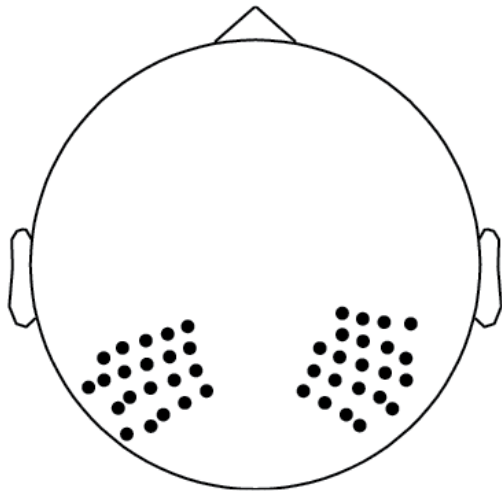


The Functional Neurophysiology of Sustained Non-Selective Attention

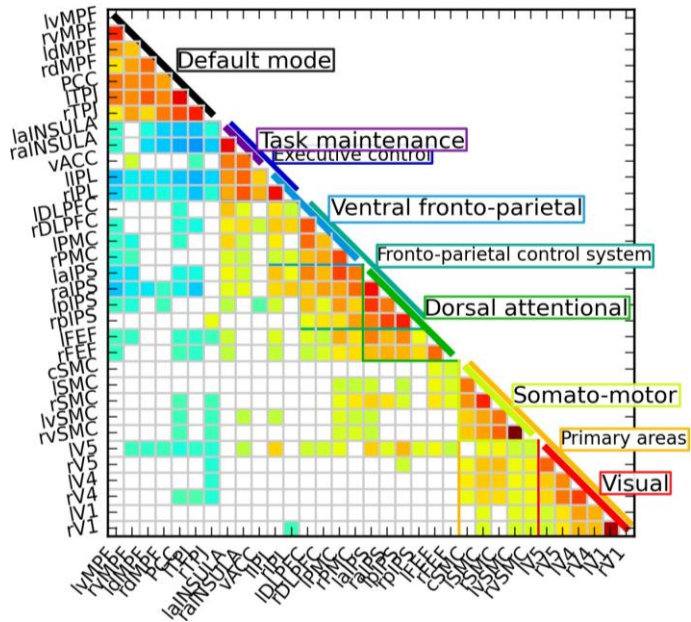
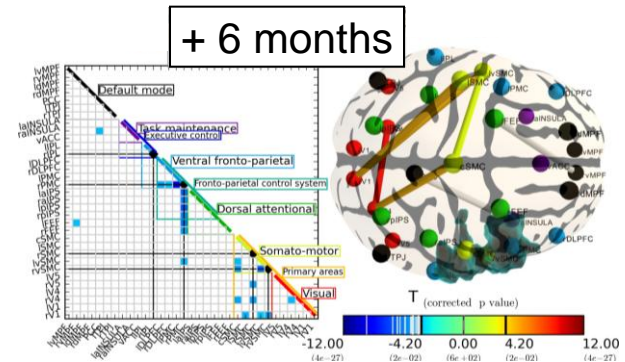
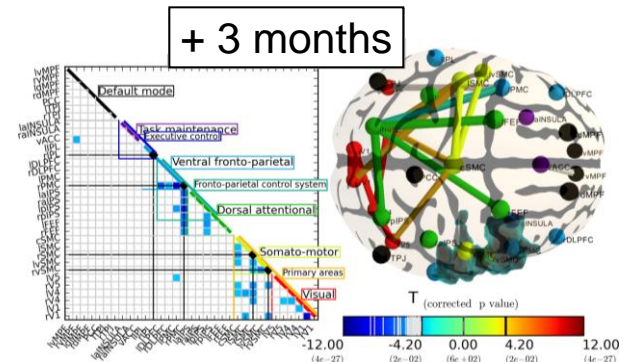
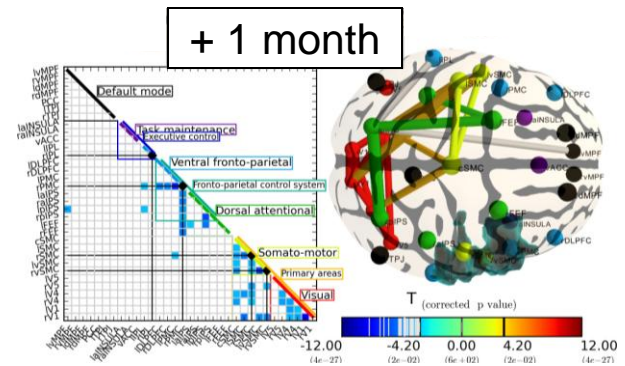
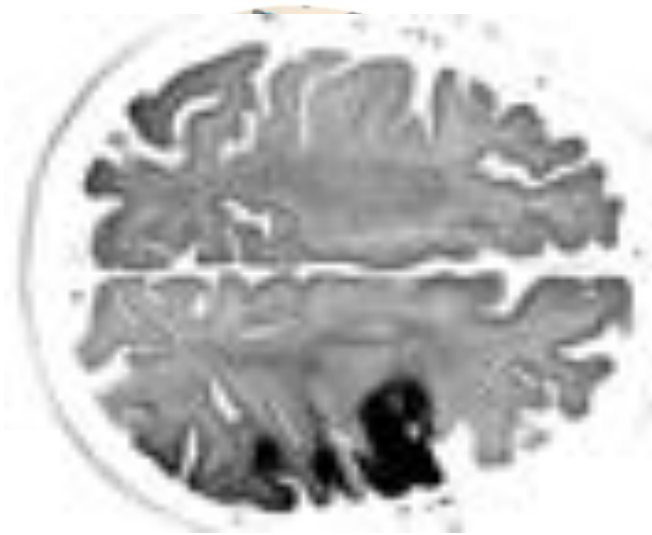


The Functional Neurophysiology of Sustained Non-Selective Attention

VISUAL TRIALS ONLY



Evolution temporelle de la diaschisis



(Baronnet et al., in prep.)