

# **Cognitive Science Seminar**

Thursday, Dec. 5th (17:00), Institute of Psychology, 6 Ingardena St., room 2.15

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## **Listening in on consciousness.**

### **Discriminating states of consciousness with responses to periodic auditory and texture stimulation**

Assessing the exact level of consciousness in prolonged disorders of consciousness (PDOC) is difficult as patients are typically unable to communicate. Two methods were based on auditory stimulation: 1) complex spectrotemporal sounds of natural auditory textures and 2) low- and medium rate auditory steady-state responses (ASSR) comprised of simple sounds in 4—40 Hz amplitude modulation range. EEG responses were recorded from groups ranging from conscious to unconscious (responding, passive, deep sleep) and next the PDOC patients, who were divided into unresponsive wakefulness syndrome (UWS) and minimally conscious state (MCS). The change detection signal in natural auditory textures was identified as parieto-occipital potential at the scalp. However, the signal complexity differentiated conscious and unconscious subjects in a better way. Relative Power and Phase Coherence of ASSR discriminated awake from asleep controls and UWS from MCS patients. Both methods positively were correlated with the clinical behavioural assessment of PDOC. Summing up, the stimulation in auditory domain in combination with specific measures of brain activity could provide an objective criterion for differentiating states of consciousness towards a cost-effective tool to estimate level of neural dysfunction in PDOC patients.