EEG functional connectivity in post-hypnotic amnesia

ABSTRACT:

Objectives
Hypnotic amnesia (HA) presents an opportunity to uncover the mechanisms of dissociation and similar phenomena found in many psychological conditions. Dissociation, considered as the temporary unavailability of information from one neuropsychological process to another, may arise from many mechanisms. Here we test the proposal that dynamic changes in topographic patterns of cortical oscillations in the upper-alpha band (Uα: 10-12Hz) may underlie the selective inhibition of recall during HA, by blocking the availability of processed information at specific points in the retrieval process.

Method
Participants were nine high (>9) and seven low (<3) susceptibles, doubly screened with the HGSHS:A and SHSS:C scales. Following hypnotic induction participants were presented with a series of 60 face stimuli and identified their affective expression. Later participants received a HA suggestion for these faces. They were then presented with a mixed set of 30 old and 30 new faces and identified each as new or old. HA suggestion was lifted and participants tested again using the remaining 30 old faces and another 30 new faces. 64 channel EEG was recorded on a Biosemi system at the University of Edinburgh. eLORETA source analysis is reported on highs showing reversible amnesia response to old faces.

Results & Conclusions
For old faces wrongly identified (OW) compared to new faces correctly identified, late evoked Uα is significantly higher in OW in right (R) BA7, a region independently implicated in top down executive control to assist recall of visual information. Lagged nonlinear connectivity analysis of Uα in the same condition shows significantly increased connectivity in Uα between R BA34 (parahippocampal gyrus) and R BAs 7, 20 and 22 respectively. The integration of information between these functional regions is essential for successful recall of recent faces. In HA response spatial and temporal coordination of Uα appears to suppress the integrated functioning of these regions (and hence recall). These patterns were not found after reversal of HA suggestion.

Keywords
Hypnotic amnesia, Upper alpha, Dissociation

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