

Poster presentation

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## EEG correlates of successful semantic encoding during wakefulness

Silvia Frey<sup>\*1</sup>, Christina Schmidt<sup>2,3</sup>, Marcel Hofstetter<sup>1</sup>, Philippe Peigneux<sup>2,4</sup> and Christian Cajochen<sup>1</sup>

Address: <sup>1</sup>Centre for Chronobiology, Psychiatric University Clinics, CH-4025 Basel, Switzerland, <sup>2</sup>Cyclotron Research Centre, University of Liège, B-4000 Liège, Belgium, <sup>3</sup>Department of Cognitive Psychology, University of Liège, B-4000 Liège, Belgium and <sup>4</sup>Faculty of Psychological Sciences, ULB - Université Libre de Bruxelles, B-1000 Bruxelles, Belgium

\* Corresponding author

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### Background

Event-related brain potential (ERP) studies have demonstrated that encoding of subsequently recalled items elicit a more positive response than non-recalled items, an effect known as the “difference due to subsequent memory” (Dm-effect) [1]. We studied whether specific ERP characteristics during declarative learning of unrelated word pairs correlate with subsequent successful memory recall.

### Materials and methods

Thirteen healthy young males (21–28 y) learned 154 unrelated word pairs, which were recalled later. EEG (F3, F4, C3, C4, P3, P4, O1, O2) was continuously recorded during encoding and recall. Stimulus-locked ERPs during the encoding session were averaged separately for successfully recalled and non-recalled word pairs and then subjected to a four way rANOVA with factors ‘condition’ (recall vs. not-recalled), ‘laterality’ (left vs. right), ‘antero-Posterior-site’ (frontal vs. occipital), and ‘time’ (0.2–1.9 s after stimulus onset).

### Results

Results disclosed a main effect for the factors ‘condition’, ‘antero-Posterior-site’ and ‘time’ ( $p < 0.05$ ), and interaction effects for ‘condition’ $\times$ ‘time’ ( $p < 0.05$ ), ‘laterality’ $\times$ ‘time’ ( $p < 0.001$ ), ‘antero-Posterior-site’ $\times$ ‘time’ ( $p < 0.01$ ) and ‘laterality’ $\times$ ‘antero-Posterior-site’ $\times$ ‘time’ ( $p < 0.01$ ). Post-hoc analyses revealed significantly higher ERPs between 0.35 and 1.1 s after stimulus onset for suc-

cessfully recalled than non-recalled word pairs. Furthermore, negative correlations were found between mean ERP-activity in the 0.35–1.1-s range in the left hemisphere at learning and the number of subsequently recalled word pairs ( $r = -0.59$  to  $-0.72$ ;  $p < 0.05$ ).

### Conclusions

Our data indicate a Dm-effect within a wide time window of the ERP in a verbal memory task, and that less positive mean ERP-activity in left cortical areas relates to enhanced success during subsequent semantic recall.

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