

## **Neural mechanisms of dream recall: Electrophysiological differences between young and older adults**

### **ABSTRACT:**

#### **Background**

Neural correlates of dream recall (DR) in elderly people are still largely unknown. Previous studies in older adults found a general decrease in DR and with the notable exception of Chellappa et al. (2009) no investigations have been carried out on EEG correlates of DR in aging.

#### **Aim**

Our study aimed to investigate whether specific EEG patterns during sleep in elderly predict a subsequent DR.

#### **Method**

40 healthy older and 40 young adults were recorded with polysomnography: 21 older subjects were awakened from REM sleep and 19 older subjects from stage 2 NREM sleep; 20 young subjects were awakened from REM sleep and 20 young subjects from stage 2. DRs were collected upon morning awakening from both stages. EEG power spectra of the total sleep and of the last 5 min were calculated by Fast Fourier Transform (FFT). The algorithm to detect oscillatory activity was applied on the last 5 min of sleep.

#### **Results**

The two-way ANOVAs *Recall X Age* performed on the EEG power bands showed no main effect of *Recall* neither significant interaction for REM sleep as well as NREM sleep. Only a significant main effect of *Age* was observed both for total sleep and the last 5 min, during REM and NREM sleep. The analysis of oscillatory activity revealed that frontal theta oscillations during the last 5 min of REM sleep are related to DR, without any age-effect.

#### **Conclusions**

Our result replicated the previous evidence in young subjects and it is completely new for older individuals, showing that the theta oscillations play a pivotal role in the retrieval of dreaming also in this population. The findings are in line with the *Continuity Hypothesis* between waking and sleep mental functioning from a neurobiological viewpoint.

#### **Keywords**

Dream recall, Dreaming, EEG, Older adults, REM sleep, NREM sleep, Theta oscillations

### **Published Work:**

D'Atri, A., Scarpelli, S., Schiappa, C., Pizza, F., Vandi, S., Ferrara, M., Cipolli, C., Plazzi, G., & De Gennaro, L. (2019). Cortical activation during sleep predicts dream experience in narcolepsy. *Annals of Clinical and Translational Neurology*, 6(3), 445-455. doi: 10.1002/acn3.718

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Mangiaruga, A., Scarpelli, S., Bartolacci, C., & De Gennaro, L. (2018). Spotlight on dream recall: the ages of dreams. *Nature and Science of Sleep*, 10:1-12.

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Scarpelli, S., D'Atri, A., Bartolacci, C., Mangiaruga, A., Gorgoni, M., & De Gennaro, L. (2019). Oscillatory EEG activity during REM sleep in elderly people predicts subsequent dream recall after awakening. *Frontiers in Neurology*. doi: 10.3389/fneur.2019.00985

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