

NEURAL MECHANISMS OF DREAM RECALL: ELECTROPHYSIOLOGICAL DIFFERENCES BETWEEN YOUNG AND OLDER ADULTS

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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.

Aims: 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 results partly replicated the previous evidence in young individuals 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. Moreover, our results did not confirm a greater presence of the theta activity in healthy aging. Differently, we found a greater amount of rhythmic theta and alpha activity in young than older subjects. We underline that the theta oscillations detected are related to cognitive functioning and that the oscillatory theta should be distinguished from the non-rhythmic theta activity found in relation to other phenomena such as (a) sleepiness and hypoarousal conditions during wakefulness and (b) cortical slowing, an EEG alteration in clinical conditions.

Keywords: Dream recall, Dreaming, Sleep, Older adults, Theta

Publications:

Full papers

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. doi: 10.2147/NSS.S135762

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*, 10:985. doi:[10.3389/fneur.2019.00985](https://doi.org/10.3389/fneur.2019.00985)

Proceedings

Scarpelli S., D'Atri A., Gorgoni M., Mangiaruga A., Lauri G., Truglia I., Bartolacci C., Ferrara M., De Gennaro L. Aging and dreaming: EEG oscillations predict dream recall. *Sleep Medicine* 2017; 40: e294, World Sleep Congress, October 7-11 2017. doi:10.1016/j.sleep.2017.11.862

Scarpelli S, D'Atri A., Mangiaruga A., Bartolacci C., De Gennaro L. Predicting dream recall across lifespan: A comparison of oscillatory EEG activity between young and older subjects. XXVI Congresso della Società Italiana di Psicofisiologia e Neuroscienze Cognitive SIPP, n°12, p.16. Torino 15-17 november, 2018.

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