

INDIVIDUAL FACTORS ASSOCIATED WITH DREAM RECALL AND CONTENT: EXPLOITING SOMNIEVE, A LARGE MULTIMODAL DREAM DATABASE

Valentina Elce¹, Bianca Pedreschi¹, Giorgia Bontempi¹, Damiana Bergamo¹,
Giulia Avvenuti¹, Michele Bellesi², Giacomo Handjaras¹ & Giulio Bernardi¹

¹MoMiLab Research Unit, IMT School for Advanced Studies Lucca, Italy; ²School of
Bioscience and Veterinary Medicine, University of Camerino, Italy

Grant 91/20

Background: The study of dreams represents a crucial intersection between philosophical, psychological, neuroscientific, and clinical interests. Given the high cost of sleep and dream research in terms of human effort and funding, open science will constitute a key to significant advances in the field. Based on these premises, we created Somnieve, a multimodal, open-source database collecting dream reports along with demographic information and psychometric, cognitive, and electroencephalographic measures obtained from a representative sample of the healthy Italian adult population.

Aims: Here, we exploited the Somnieve database to investigate the individual determinants of physiological dream content and recall frequency (DRF).

Method: Analyses were carried out on 1324 dream reports obtained from 161 subjects (66M, 18-65y). Participants were asked to wear an actigraph and to record a report of their last dream experience each morning upon awakening for 14 days. Moreover, they completed a battery of questionnaires and cognitive tests. A multiple regression analysis was used to investigate the individual determinants of DRF. To quantify and analyze dream content, we trained an LSTM recurrent neural network on a subset of dreams (n=823), which were scored by 4 raters on 15 semantic dimensions of interest. A cluster analysis was then performed on the whole database and correlations between dream features and individual factors were explored.

Preliminary results: DRF was predicted by age, attitude toward dreaming, interference control, verbal memory, and mind wandering ($p < 0.05$, FDR corrected). However, the effect of age was largely explained by changes in sleep-wake patterns as measured by actigraphy. The analysis of dream content allowed us to map the relationships between the selected semantic features but did not reveal any clear dream clusterization: dream features appeared to change along a continuum only partially explained by word count. We found that higher trait anxiety levels were associated with more negative dream emotional valence, while lower subjective sleep quality was associated with higher dream bizarreness ($p < 0.05$, FDR corrected).

Conclusions: Open, multimodal databases like Somnieve will be crucial to improve reproducibility in dream research and thus identify the individual determinants of dream content and DRF in physiological conditions, as well as quantify their possible pathological alterations.

Keywords: Sleep, Dream, Sleep mentation, Natural language processing

E-mail contact: giulio.bernardi@imtlucca.it