Секция «Психофизиология, когнитивные нейронауки и искусственный интеллект»

The Effects of Top-Down Predictive Information on Conscious Processing: An EEG Study

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Research in Neural Correlates of Consciousness (NCC) remains among the most challenging fields in Neuroscience. Recent neurophysiological findings suggest two important markers for visual awareness [2]: An early negativity over posterior areas (i.e. visual awareness negativity, VAN), and a late positivity over parietal areas in the P300 range (i.e. late positivity, LP). There is an ongoing debate with mixed empirical findings about whether these markers are true correlates of conscious activity, or that they simply reflect other cognitive phenomena[1] such as attention, context updating, reportability, etc. [2,5]. Using a novel visual identification task, we aim to clarify the role of these neurophysiological components. Participants recorded by EEG attended visual stimuli containing a face/house item under different session: 1) passive observation (no response); 2) active recognition (response); 3) active recognition item coupled to a visual cue. Through these three sessions, we tested how (top-down) predictive contextual information about the (bottom-up) stimuli, affects how the brain processes conscious information. Preliminary results on four subjects suggest a statistically significant difference between the report and no-report conditions, a possible role for predictive processing in awareness and a top-down association influence on early bottom-up processes (i.e. Cognitive Penetration) [3,4].

We thank Maria Falikman for her feedback on conceptual aspects and design of the experiment. We also thank Tommaso Fedele for his feedback on the analysis and building the task.

References

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