

OSCILLATORY BRAIN ACTIVITY DURING WORD CONSTRUCTION

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The study aimed to examine changes in oscillatory brain activity during word construction in healthy adult participants.

Methods. Fourteen healthy right-handed subjects (13 f) aged from 20 to 34 participated in the study. Subjects were constructing nouns ($n = 9$) from 6-letter sets in each of five experimental series (five different days). 40 seconds were given to construct one word. In the control series, subjects were looking at 6-letter words (one at a time) for 30 seconds, memorized them, and named them later. 19-channel EEG (0.53–30 Hz) was recorded during task solving and control sessions. EEG spectral power was calculated in five bands: theta (4–7.5 Hz), alpha1 (7.5–9.5 Hz), alpha2 (9.5–12.5 Hz), beta1 (12.5–18 Hz) and beta2 (18–30 Hz). The spectral power before and after the solution and in the control condition were averaged for each person and compared using the Friedman test.

Results. The general effect of absolute spectral power decreasing in alpha and beta EEG bands was shown

during word construction. Absolute alpha1 and alpha2 bands power in posterior sites was significantly lower before the answer than after the answer and in control ($\chi^2(14.3) > 18.7$, corrected $p < 0.03$). The absolute power of beta1 and beta2 bands was significantly lower before the answer in all the sites, except C3 and F3 ($\chi^2(14.3) > 20.6$, $p < 0.02$). Theta band power did not differ in all the sites, except Fz, where absolute theta power was higher during the task solving ($\chi^2(14.3) = 17.7$, $p = 0.047$). Relative power (band/total spectrum power) of alpha & beta bands didn't significantly differ in all conditions, while theta increased in all the sites ($\chi^2(14.3) > 19.1$, $p < 0.03$), as well as theta/beta ratio ($\chi^2(14.3) > 17.9$, $p < 0.05$).

Conclusion. Rearranging letters to construct the word reflected in a general decrease of total spectrum power and increase of relative theta band power, as well as theta/beta ration.

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