ELECTROPHYSIOLOGICAL PATTERNS DISTINGUISH MULTIPLE- FROM SINGLE-DOMAIN AMNESTIC MILD COGNITIVE IMPAIRMENT AT RETRIEVAL, BUT NOT AT ENCODING

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Introduction: Amnestic mild cognitive impairment (MCI) is characterized by memory deficits alone (single-domain) or with other cognitive impairments (multiple-domain). Patterns of electroencephalographic (EEG) activation may differ between these two subgroups, reflecting early changes of corresponding neural networks.

Aim: To assess early differences in EEG processes related to stimulus encoding and retrieval in a short-term memory paradigm between single- and multiple-domain amnestic MCI.

Methods: 79 elderly subjects (64.7 ± 5.9 years) underwent complete neuropsychological assessment and were classified as controls (CTL, N=36), single-domain (S-MCI, N=16), and multiple-domain (M-MCI, N=27) amnestic MCI. Continuous EEG was recorded using 32 surface electrodes during sequential presentation of two faces and two letters in random order, followed by a delayed face probe. Subjects attended faces while ignoring letters, deciding if the probe belonged to the presented set. Event-related alpha desynchronization/synchronization (ERD/ERS) and probe-evoked responses were analyzed during successful encoding and retrieval, respectively.

Results: At encoding, attended faces elicited parietal activation (alpha ERD), whereas ignored letters were associated with inhibition at central sites (alpha ERS). This inhibition was significantly reduced in M-MCI compared to CTL, showing intermediate level in S-MCI. At retrieval, the N250 component usually observed by subtracting non-target from target face responses was absent in M-MCI as compared to S-MCI.

Conclusions: M-MCI showed EEG inhibition deficit for distracting letters during face encoding and altered EEG activation during face retrieval. In contrast, S-MCI displayed preserved EEG activation at retrieval counteracting the subtle alteration of inhibitory activity observed at encoding.