

Welcome to **FENS** Forum 2022



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ON THE IMPORTANCE OF HIPPOCAMPAL SEGMENTATION FOR THE NEURAL MAPPING OF MEMORY: EVIDENCE FROM A LARGE-SCALE STUDY OF NEURAL ARCHITECTURE IN HEALTHY ADULTS

POSTER SESSION 07 - SECTION: SPACE AND MEMORY

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The hippocampus (HC) is traditionally considered the key neuroanatomical hub responsible for memory. However, previous MRI studies that aimed to relate volumetric hippocampal measures to associative memory (AM) performance have yielded mixed results. In the current study, we aimed to reevaluate these findings in a large sample of young healthy participants ($N = 246$; age $M = 24.95$, $SD = 4.58$; 56% female). Participants were scanned with 3T MAGNETOM Prisma using a 64-channel head coil, followed by the AM assessment in the lab setting. To maximize the scope of AM assessment, we employed four paired-associate tasks of various stimuli modalities (faces, words, scenes) and outcome measure types (recognition, recall). Synthetic T1-weighted images were produced out of relaxometry parameter maps, after which volumetric measures were calculated using FreeSurfer. The whole HC volume showed no correlation with any of the memory measures. However, further segmentation of HC into its functional and anatomical subfields (Parasubiculum, Presubiculum, Subiculum, CA1, CA2/3, CA4, GC-DG, HATA, Fimbria, Molecular layer, Hippocampal fissure, Hippocampal tail) showed scattered yet consistent patterns of significant correlations between different subfield volumes and memory outcomes. The results suggest that distinctive contributions of HC subfields may lead to a null effect when the whole HC volume is considered, thus demonstrating that drawing conclusions based on the volumetric measures of neural macrostructures can be misleading. The results highlight the importance of in-depth segmentation for neural mapping.