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COMPARISON OF MANUAL AND AUTOMATIC METHODS OF HIPPOCAMPUS SEGMENTATION

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Introduction: Psychiatric Patients show abnormalities in volumes of several subcortical structures. Recently wider usage of automated segmentation methods in research of these abnormalities based on MR images has become possible. However manual segmentation is still considered to be the gold standard.

Objectives: To compare differences in hippocampus volumes between manual segmentation and 2 packages for automatic segmentation (FSL and FreeSurfer).

Aim: To explore the overlap and differences between different segmentation methods used for segmentation of subcortical structures.

Methods: Structural MR brain scans were aquired from 98 subjects (53 schizophrenia patients, 45 controls). Volumes of left and right hippocampus were measured after manual, FreeSurfer and FSL segmentations. Differences between volumes from different methods were tested by the t-test (using R). In addition percent volume differences, Pearson correlations, Bland-Altman plots and Cronbach´s alpha were computed.

Results: Both automatic methods yielded significantly larger hippocampal volumes than the manual segmentation. FreeSurfer volumes showed a higher correlation and lower percent volume difference with manual segmentation than FSL. Bland-Altman plots and Cronbach´s alpha showed only limited agreement between manual and both automatic methods.

Conclusions: Although volumes acquired by FreeSurfer appeared to be more related to manual segmentation, clear superiority of either of automatic methods could not be demonstrated. Therefore, all three methods seem to measure other aspects of hippocampus volume. An useful approach would be to compare effect-size of the difference between patients and healthy controls using different segmentation methods. We are currently pursuing this in a larger sample.