

## **Poster P25**

### **Comparative analysis of brain imaging data in mental calculation with visually and acoustically presented instructions**

The issue of how arithmetic operations are represented in the brain has been addressed in numerous studies. Lesion studies suggest that a network of different brain areas (e.g. the left and/or right parietal lobe, frontal cortex, and basal ganglia) is involved in mental calculation processes. Neuroimaging studies reported inferior parietal and lateral frontal activations during mental arithmetics using tasks with different complexity and different operators. Indeed, few is known about the comparability of brain activation due to processing of different operators and due to different presentation modalities. The present study investigated fMRI-BOLD activity during addition, subtraction, multiplication and division performance in tasks of different complexity. Tasks were presented both acoustically and visually in two different runs within one session. Results showed activation patterns in prominently right frontal, parietal and central regions when contrasting complex and simple calculation tasks. The modality of stimulus presentation resulted in a substantial degree of distinct activation patterns. It is suggested that different arithmetic operations should be analysed independently of each other. Task presentation modalities might have remarkable influence on the mobilization of regional neuronal networks (especially in left frontal regions) required for mental calculation processes.