

Differences between Dyscalculic children, Typical Children and Adults during a Visuo-Spatial and Addition task.

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Children with Developmental Dyscalculia (DD) often show both impaired numerical and spatial abilities, accompanied by diminished activation in neural networks for calculation and visuo-spatial working memory (VSWM), including the parietal cortex (Rourke, 1993; Kucian et al. 2006). Providing a visual guide in the form of a grid during a VSWM-task can increase accuracy and reduce reaction times, argued to be due to an alleviation of fronto-parietal resources (Martin et al., 2008). In the current study, an attempt was made to elucidate the differences in network-activation in Children with DD, control children and adults by manipulating such a grid.

10 children with DD were compared to 10 control children and 10 adults with no learning deficits in an event-related fMRI-Experiment containing both a VSWM-task and an addition task. During half the trials, a 4x4 grid was present to function as a visual aid for the VSWM-Condition. Both control-children and dyscalculic children (as well as adults?) displayed significantly faster reaction-times in the VSWM-task when aided by a grid, whereas the addition task revealed no differences. Conversely, accuracy only improved significantly for typically developing children (and adults?).

Even though the influence of grid-manipulation currently eludes the imaging results, a significant activation of the intraparietal sulcus was found during the VSWM-task, overlapping with numerical activations induced by calculation. Current results point towards a lesser recruitment of parietal resources in children and even less in dyscalculics, but further analyses are required before a difference on executive functioning between the experimental groups during aforementioned tasks can be confirmed.

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