
Abstract: Premature birth is associated with an increased risk of cognitive performance deficits that are dependent on working memory (WM) load in childhood. Less clear is whether preterm-born adults show similar WM impairments, or develop compensatory brain mechanisms that help to overcome prematurity-related functional deficits, for example, by a workload-dependent over-recruitment of WM-typical areas, and/or engagement of alternative brain networks. In this functional magnetic resonance imaging study, 73 adults born very preterm and/or with very low birth weight (VP/VLBW) and 73 term-born controls (CON, mean age: 26.5 years) performed a verbal N-Back paradigm with varying workload (0-back, 1-back, 2-back). Generally, both groups showed similar performance accuracy and task-typical patterns of brain activations (especially in fronto-cingulo-parietal, thalamic, and cerebellar areas) and deactivations (especially in mesial frontal and parietal aspects of the default mode network [DMN]). However, VP/VLBW adults showed significantly stronger deactivations (P 2-back) in the parahippocampal/cerebellar cluster also presented a greater slowing of response latencies with increasing WM load (2-back> 1-back), indicative of higher effort. In conclusion,
VP/VLBW adults recruited similar anatomical networks as controls during N-back performance, but showed an enhanced suppression of posterior DMN regions during higher workload, which may reflect a temporary suppression of stimulus-independent thoughts that helps to maintain adequate task performance with increasing attentional demands.