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Neural correlates of mental attention in adolescents: a cross-sectional fMRI study

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Abstract

Mental attention, a maturational component of working memory, develops significantly during adolescence, yet its neural correlates remain unclear (Arsalidou et al., 2010). This study used fMRI to examine brain activity in adolescents (13–16 years, n = 28) performing a blocked-design Color Matching Task with increasing difficulty. Results revealed consistent activation in frontoparietal regions, including the dorsolateral prefrontal cortex, superior parietal lobule, and cerebellum, across easy and moderate difficulty levels. Higher task demands recruited additional regions, such as the middle frontal gyrus and dorsal anterior cingulate cortex, with lateralization patterns varying by difficulty and age. Whole-brain analyses highlighted distinct recruitment of attentional networks across difficulty levels. Findings align with working memory research, emphasizing the protracted maturation of the prefrontal cortex and functional reorganization of mental-attentional networks during adolescence. This study advances our understanding of cognitive development and contributes to models of working memory and attentional control in developing brains.

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