Prefrontal and parietal correlates of cognitive control related to the adult outcome of attention-deficit/hyperactivity disorder diagnosed in childhood.


Abstract

The protracted and highly variable development of prefrontal cortex regions that support cognitive control has been purported to shape the adult outcome of attention-deficit/hyperactivity disorder (ADHD). This neurodevelopmental model was tested in a prospectively followed sample of 27 adult probands who were diagnosed with ADHD in childhood and 28 carefully matched comparison subjects aged 21-28 years. Probands were classified with persistent ADHD or remitted ADHD. Behavioural and neural responses to the Stimulus and Response Conflict Task (SRCT) performed during functional magnetic resonance imaging (fMRI) were compared in probands and comparison subjects and in probands with persistent and remitted ADHD. Response speed and accuracy for stimulus, response, and combined conflicts did not differ across groups. Orbitofrontal, inferior frontal and parietal activation was lower in probands than comparison subjects, but only for combined conflicts, when demand for cognitive control was highest. Reduced activation for combined conflicts in probands was almost wholly attributable to the persistence of ADHD; orbitofrontal, inferior frontal, anterior cingulate and parietal activation was lower in probands with persistent ADHD than both probands with remitted ADHD and comparison subjects but did not differ between probands with remitted ADHD and comparison subjects. These data provide the first evidence that prefrontal and parietal activation during cognitive control parallels the adult outcome of ADHD diagnosed in childhood, with persistence of symptoms linked to reduced activation and symptom recovery associated with activation indistinguishable from adults with no history of ADHD.