Objective: Deficits in response inhibition figure prominently in models of ADHD; however, attentional deficiencies may better explain previous findings of impaired response inhibition in ADHD. We tested this hypothesis at the neurophysiological level.

Method: Dense array ERPs (event-related potentials) were obtained for 46 children with ADHD and 51 controls using the stop-signal task (SST). Early and late components were compared between groups. N2 and P3 components were localized with LAURA distributed linear inverse solution.

Results: A success-related N1 modulation was only apparent in the ADHD group. N2 and P3 amplitudes were reduced in ADHD. During the successful inhibition N2, the ADHD group showed reduced activation in right inferior frontal gyrus (rIFG), supplementary motor area (SMA), and right temporoparietal junction (rTPJ), and during failed inhibition in the rIFG. During the successful inhibition P3, reduced activation was found in anterior cingulate cortex (ACC) and SMA.

Conclusion: Impairments in the ventral attention network contribute to the psychopathology of ADHD and challenge the dominant view that ADHD is underpinned by impaired inhibitory control.