Objectives. The Val158-allele of the catechol-O-methyltransferase (COMT) Val158Met (rs4680) functional polymorphism has been identified as a risk factor for antisocial behaviour in attention-deficit/hyperactivity disorder (ADHD). Here, we used voxel-based morphometry to investigate the effects of Val158Met polymorphism on grey matter (GM) volumes in a sample of 7–13-year-old children.

Methods. MRI and genotype data were obtained for 38 children with combined-type ADHD and 24 typically developing (TD) children. Four regions of interest were identified: striatum, cerebellum, temporal lobe and inferior frontal gyrus (IFG).

Results. When compared to TD children, those with ADHD had a significant decrease of GM volume in the IFG. Volume in this region was negatively correlated with ratings of hyperactivity/impulsivity symptoms. Furthermore, the smaller GM volume in the IFG was attributed to the presence of the Met158-allele, as only children with ADHD carrying a Met158-allele exhibited such decrease in the IFG. Children with ADHD homozygotes for the Val158-allele presented increased GM volume in the caudate nucleus when compared with TD children.

Conclusions. This study provides the first evidence of a modulation of ADHD-related GM volume alterations by Val158Met in two key regions, possibly mediating the relationship between Val158Met polymorphism and antisocial behaviour in children with ADHD.