Neural activation and connectivity during response inhibition in adolescents with ADHD

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Tijdschr Psychiatr. 2015;57(12):917-22.

Abstract
BACKGROUND:
We studied the neural correlates of response inhibition in a large cohort of adolescents with adhd, their unaffected siblings and controls. Response inhibition is a key executive function deficit of attentiondeficit/hyperactivity disorder (adhd).

AIM:
To obtain new insight into the biological nature of response inhibition deficits in adolescents with adhd.

METHOD:
We studied the neural correlates of response inhibition in a large cohort of adolescents with adhd (n = 185), their siblings unaffected by adhd (n = 111) and controls (n = 126). We took fmri measurement while the subjects performed the stop-task; this allowed us to investigate neural activation and neural connectivity.

RESULTS:
Our results indicate that adolescents with adhd show reduced brain activation and reduced connectivity in their response inhibition network. Our neural measurements correlated with subjects' performance on the stop-task and with the number of adhd symptoms in the adolescents with adhd. Unaffected siblings showed similar but less severe neural deviations but no cognitive deficits; unaffected siblings also showed unique patterns of compensatory connectivity.

CONCLUSION:
These results provide new insights into the biological background of response inhibition and of adhd. Neural measurements can give us a better understanding of the familial patterns of biological alterations, even if no behavioral deficits could be detected in the unaffected siblings. These neural correlates can also help to explain part of the adhd phenotype.