A novel perspective on interference control and distraction in ADHD

ADHD is a neurodevelopmental disorder, characterized by age-inappropriate symptoms of inattention and/or hyperactivity-impulsivity. Distractibility is a major behavioural manifestation of ADHD. Disrupted interference control has been implicated as one of the core neurocognitive deficits in ADHD. Goal of this thesis was to study the effects of distracting and interfering information in ADHD on both performance and neurophysiological measures.

Our meta-analysis in Chapter 2 showed that interference effects in ADHD as measured with the Stroop Colour-Word task were small. Furthermore, we showed that the differences between ADHD groups and normal control groups were larger and more consistent for the baseline conditions, colour naming and word reading, than for the interference score. In Chapter 3, the incongruent conditions elicited interference (slower responses and more errors) in both the auditory and the visual domain. However, no differences between children with ADHD and their normal peers were found in interference control. We have reported on the neurophysiological correlates of auditory interference control in children with ADHD and their normal peers in Chapter 4. The difference between the incongruent and congruent condition was absent in the ADHD group in the 460-540 milliseconds time window. In addition, the conflict sustained potential was found frontally in the ADHD group, but parietally in the normal control group. In Chapter 5, we showed that children with ADHD have an increased neurophysiological orienting response (late P3a) after a novel sound compared with a standard tone. Interestingly, novel sounds resulted in a reduced rate of omission errors in the ADHD group.

This thesis suggests that interference control is normal in the majority of children with ADHD at the performance level. Abnormalities in neurophysiological processes related to interference control may reflect disruptions in the evaluation of conflict and neurophysiological differences in response selection. Furthermore, although novel information elicits a larger neurophysiological orienting response in ADHD, it has a beneficial effect on the omission rate, possibly by increasing their arousal temporarily.