

## Lecturas recomendadas

Friedman, L. A., & Rapoport, J. A. (2015). Brain development in ADHD. *Current Opinion in Neurobiology*, 30, 106–111.

<http://dx.doi.org/10.1016/j.conb.2014.11.007>

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder with underlying brain anatomical and functional measures, as well as familial/genetic factors that are major foci of neuropsychiatric research. Advances in imaging technology have shown structural and functional brain differences between individuals with and without ADHD. Longitudinal studies have enabled the elucidation of differences in developmental course. Studies comparing persisting and remitting cases of ADHD are particularly promising. Therapeutic doses of psychostimulants normalize many measures of brain anatomy and function.

Hudec, K. L., Alderson, M. R., Patros, H. G., Lea, S. E., Tarle, S. J., & Kasper, L. (2015). Hyperactivity in boys with attention-deficit/hyperactivity disorder (ADHD): The role of executive and non-executive functions. *Research in Developmental Disabilities*, 45, 103-109.

<http://dx.doi.org/10.1016/j.ridd.2015.07.012>

### Abstract

Motor activity of boys (age 8–12 years) with (n = 19) and without (n = 18) ADHD was objectively measured with actigraphy across experimental conditions that varied with regard to demands on executive functions. Activity exhibited during two n-back (1-back, 2-back) working memory tasks was compared to activity during a choice-reaction time (CRT) task that placed relatively fewer demands on executive processes and during a simple reaction time (SRT) task that required mostly automatic processing with minimal executive demands. Results indicated that children in the ADHD group exhibited greater activity compared to children in the non-ADHD group. Further, both groups exhibited the greatest activity during conditions with high working memory demands, followed by the reaction time and control task conditions, respectively. The findings indicate that large-magnitude increases in motor activity are predominantly associated with increased demands on working memory, though demands on non-executive processes are sufficient to elicit small to moderate increases in motor activity as well.

Franx et al. (2015). The executive control network and symptomatic improvement in attention-deficit/hyperactivity disorder. *Cortex*, 73, 62-72.

<http://dx.doi.org/10.1016/j.cortex.2015.08.012>

### Abstract

### Background

One neurodevelopmental theory hypothesizes remission of attention-deficit/hyperactivity disorder (ADHD) to result from improved prefrontal top-down control, while ADHD,

independent of the current diagnosis, is characterized by stable non-cortical deficits (Halperin & Schulz, 2006). We tested this theory using resting state functional MRI (fMRI) data in a large sample of adolescents with remitting ADHD, persistent ADHD, and healthy controls.

## Methods

Participants in this follow-up study were 100 healthy controls and 129 adolescents with ADHD combined type at baseline (mean age at baseline 11.8 years; at follow-up 17.5 years). Diagnostic information was collected twice and augmented with magnetic resonance imaging (MRI) scanning at follow-up. We used resting state functional connectivity (RSFC) of the executive control network to investigate whether improved prefrontal top-down control was related to a developmental decrease in ADHD symptoms. In addition, we tested whether non-cortical RSFC, i.e., cerebellar and striatal RSFC, was aberrant in persistent and/or remittent ADHD compared to controls.

## Results

Higher connectivity within frontal regions (anterior cingulate cortex) of the executive control network was related to decreases in ADHD symptoms. This association was driven by change in hyperactive/impulsive symptoms and not by change in inattention. Participants with remitting ADHD showed stronger RSFC than controls within this network, while persistent ADHD cases exhibited RSFC strengths intermediate to remittent ADHD cases and controls. Cerebellar and subcortical RSFC did not differ between participants with ADHD and controls.

## Conclusions

In line with the neurodevelopmental theory, symptom recovery in ADHD was related to stronger integration of prefrontal regions in the executive control network. The pattern of RSFC strength across remittent ADHD, persistent ADHD, and healthy controls potentially reflects the presence of compensatory neural mechanisms that aid symptomatic remission.

Sjöwalla, D., Bohlinb, G., Rydellb, A-M., & Thorella, L. B. (2015). Neuropsychological deficits in preschool as predictors of ADHD symptoms and academic achievement in late adolescence. *Child Neuropsychology: A Journal on Normal and Abnormal Development in Childhood and Adolescence*, 8, 1-12.

<http://dx.doi.org/10.1080/09297049.2015.1063595>

## Abstract

High levels of ADHD symptoms are related to severe negative outcomes, which underscore the importance of identifying early markers of these behavior problems. The main aim of the present study was therefore to investigate whether neuropsychological deficits in preschool are related to later ADHD symptoms and academic achievement, over and above the influence of early ADHD symptom levels. The present study is unique because it includes a broader range of predictors compared to previous studies and the participants are followed over time for as long as 13 years (i.e., ages 5–18 years). Preschool data included measures of executive functioning and reaction time variability as well as emotional reactivity and emotion regulation of both positive and negative emotions. When controlling for early ADHD symptom levels, working memory, reaction time variability, and regulation of happiness/exuberance were significantly related to inattention whereas regulation of happiness/exuberance and anger

reactivity were significantly related to hyperactivity/impulsivity. Furthermore, working memory and reaction time variability in preschool were significantly related to academic achievement in late adolescence beyond the influence of early ADHD symptoms. These findings could suggest that it is possible to screen for early neuropsychological deficits and thereby identify children who are at risk of negative outcomes. Furthermore, our results suggest that interventions need to look beyond executive functioning deficits in ADHD and also target the role of emotional functioning and reaction time variability. The importance of including both the positive and negative aspects of emotional functioning and distinguishing between emotion regulation and emotional reactivity was also demonstrated.

Duff, C. T., & Sulla, E. M. (2015). Measuring Executive Function in the Differential Diagnosis of Attention-Deficit/Hyperactivity Disorder: Does It Really Tell Us Anything? *Applied Neuropsychology: Child*, 3, 188-196.

<http://dx.doi.org/10.1080/21622965.2013.848329>

#### Abstract

Research initially supported the theory that deficits in executive function (EF) underlie the core neuropsychological sequelae of attention-deficit/hyperactivity disorder (ADHD), particularly deficits in working memory and inhibitory control arising from dysfunction in the prefrontal cortex. Consequently, neuropsychologists commonly employ measures of EF or prefrontal cortex dysfunction in the differential diagnosis of ADHD and its subtypes in children. However, recent findings have called the EF deficit theory of ADHD into question, and research on the specificity of both direct and indirect measures of EF has not yielded promising results. This article presents a brief, critical review of the past and current research on neuropsychological assessment of EF and ADHD and suggests how EF measures can, in light of the most current science, still remain a useful part of a neuropsychological test battery.

Dustin E. Sarver, D., Rapport, M., Kofler, M., Raiker, J., & Friedman, L. (2015). Hyperactivity in Attention-Deficit/Hyperactivity Disorder (ADHD): Impairing Deficit or Compensatory Behavior? *Journal of Abnormal Child Psychology*, 43, 1219-1232.

<http://dx.doi.org/10.1007/s10802-015-0011-1>

#### Abstract

Excess gross motor activity (hyperactivity) is considered a core diagnostic feature of childhood ADHD that impedes learning. This view has been challenged, however, by recent models that conceptualize excess motor activity as a compensatory mechanism that facilitates neurocognitive functioning in children with ADHD. The current study investigated competing model predictions regarding activity level's relation with working memory (WM) performance and attention in boys aged 8–12 years ( $M = 9.64$ ,  $SD = 1.26$ ) with ADHD ( $n = 29$ ) and typically developing children (TD;  $n = 23$ ). Children's phonological WM and attentive behavior were objectively assessed during four counterbalanced WM tasks administered across four separate sessions. These data were then sequenced hierarchically based on behavioral observations of each child's gross motor activity during each task. Analysis of the relations among intra-individual changes in observed activity level, attention, and performance revealed that higher

rates of activity level predicted significantly better, but not normalized WM performance for children with ADHD. Conversely, higher rates of activity level predicted somewhat lower WM performance for TD children. Variations in movement did not predict changes in attention for either group. At the individual level, children with ADHD and TD children were more likely to be classified as reliably improved and deteriorated, respectively, when comparing their WM performance at their highest versus lowest observed activity level. These findings appear most consistent with models ascribing a functional role to hyperactivity in ADHD, with implications for selecting behavioral treatment targets to avoid overcorrecting gross motor activity during academic tasks that rely on phonological WM.

Shalev, L., Luria, R., Saar, K., Nesterovsky, I., Styr, B., Mevorach, C., Balaban, H., & Azulai, O. (2015). Executive attention in adults with and without ADHD - an ERP study. *Journal of Vision, 15*, 742.

<http://dx.doi.org/10.1167/15.12.742>.

#### Abstract

The present study investigated executive attention in adults with ADHD. A typically developed adults group and an ADHD group performed a location-direction Strooplike task, while EEG was recorded. The task induced either a low conflict (location judgment blocks) or a high conflict (direction judgments blocks).

The results indicated that the ADHD group showed an overall behavioral impairment. In addition, it was found that participants without ADHD performed the low-conflict task significantly better compared to the high-conflict task. This difference was substantially smaller in participants with ADHD. Moreover, we analyzed the slow potential (SP), an ERP component whose amplitude is sensitive to degree of conflict in such tasks.

In the control group the SP amplitude, measured across parietal and occipital electrodes, was more positive in the high conflict- relative to the low conflict-condition. However, in the ADHD group no such sensitivity was found. Importantly, the degree of conflict resolution as indicated by the SP amplitude difference between the high and low conflict conditions, correlated significantly with the severity of ADHD symptoms ( $r = -.531$ ,  $p < .005$ ).

These findings may pinpoint to the neural mechanism that underlies one of the most frequent difficulties of individuals with ADHD, namely, the suppression of irrelevant information. We suggest that when facing a complex stimulus adults with ADHD are prone to process both the relevant and the irrelevant information and as a result they are less effective in processing complex stimuli not just in the context of neuropsychological tasks but rather in everyday functioning.

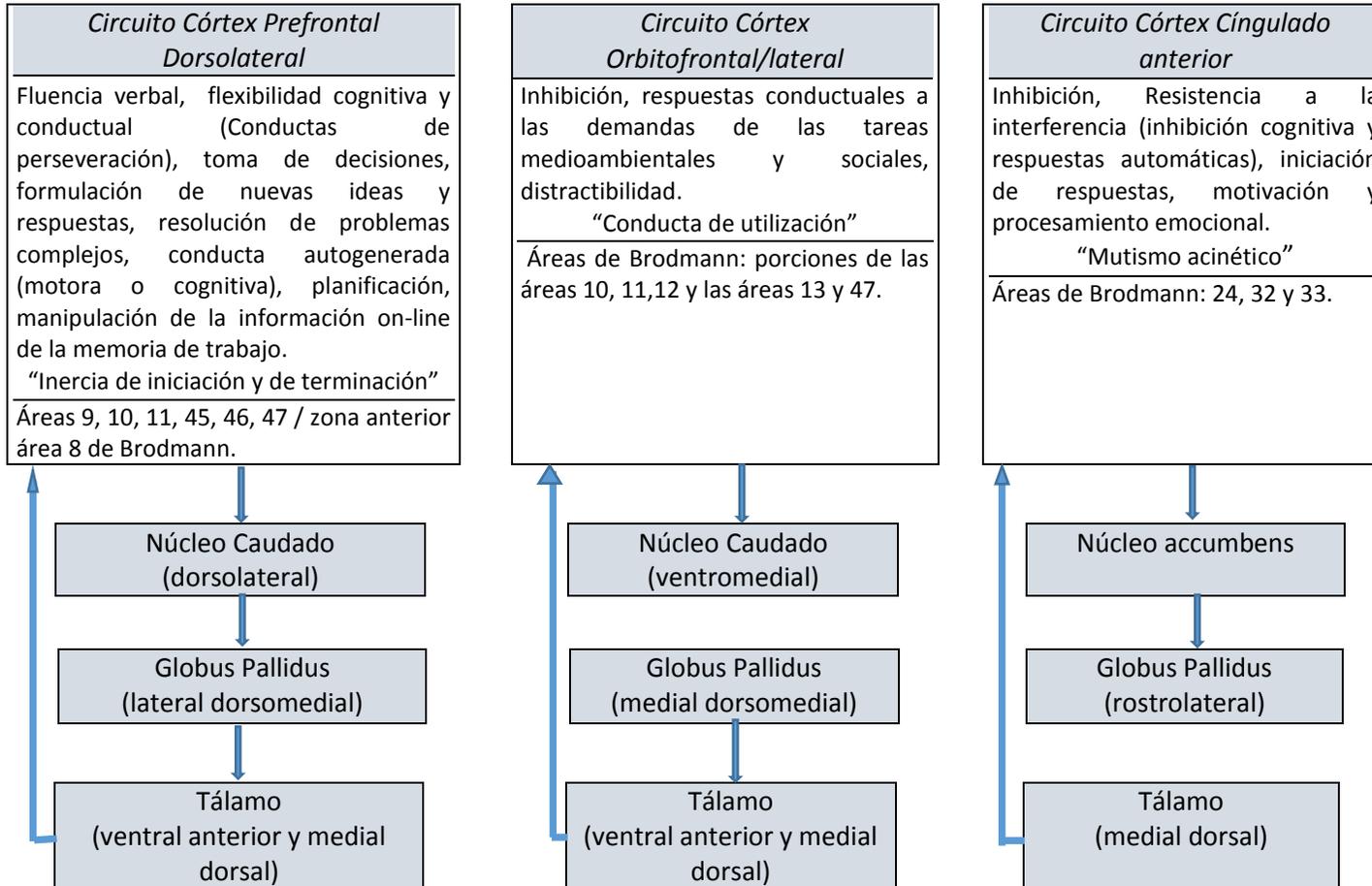
Martinussen, R., & Mackenzie, G. (2015). Reading comprehension in adolescents with ADHD: Exploring the poor comprehender profile and individual differences in vocabulary and executive functions. *Research in Developmental Disabilities, 38*, 329–337.

<http://dx.doi.org/10.1016/j.ridd.2014.12.007>

#### Abstract

The overall objective of this study was to investigate reading comprehension in youth with and without a prior diagnosis of attention-deficit hyperactivity disorder (ADHD). The first goal was to determine whether youth with and without ADHD matched in word reading ability exhibited differences in reading comprehension proficiency. The next goal was to determine whether good and poor comprehenders within the ADHD subgroup differed from each other on language and academic achievement measures. The third objective was to examine whether word recognition or oral vocabulary knowledge mediated the effect of ADHD symptoms on reading comprehension performance. Youth with ADHD scored significantly lower than the comparison youth on a standardized measure of reading comprehension. Relative to good comprehenders with ADHD, poor comprehenders with ADHD exhibited weaknesses in expressive vocabulary, mathematical reasoning, written expression, and exhibited more executive function (EF) difficulties as reported by the teacher. Expressive vocabulary and word reading, but not teacher EF ratings, accounted for unique variance in reading comprehension performance and mediated the relationship between ADHD symptoms and reading comprehension. Implications for further research and educational practice are discussed

### Los tres principales circuitos del córtex prefrontal



Nota. Adaptado de “Executive Function and Its Assessment”, by G. Kinsella, E. Storey, and J. R. Crawford, 2007, *Neurology and Clinical Neuroscience*, p. 85. Copyright 2007 by MOSBY Elsevier.