



ADHD

ATTENTION DEFICIT HYPERACTIVITY DISORDER


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Consultant. 2008;48.

ADHD in adults: How to recognize and treat.

Anthshel K, Faraone SV, Kunwar A.

Inattention and hyperactivity/impulsivity are the defining features of attention-deficit/hyperactivity disorder (ADHD) in both children and adults; however, several core symptoms (eg, hyperactivity) mollify over time in adults. This has led to some diagnostic confusion and possibly underdiagnosis. Significant functional impairment in educational, marital, interpersonal, and occupational realms and in motor vehicle operation is common among adults with ADHD. Moreover, the disorder is associated with comorbid mood, anxiety, and substance use disorders. The same pharmacological agents that are effective in children and adolescents with ADHD (stimulants and atomoxetine) are also effective in adults. A psychosocial treatment component, such as cognitive-behavioral therapy, is generally recommended in addition to pharmacotherapy.

CNS Spectr. 2010 Apr;15:248-56.

Assessing effects of treatment with lisdexamfetamine dimesylate for pediatric ADHD using a parental survey.

Antonucci D, Kunins C, Manos M, et al.

INTRODUCTION: Lisdexamfetamine dimesylate (LDX) is a prodrug stimulant approved for the treatment of attention-deficit/hyperactivity disorder (ADHD) in adults and children 6-12 years of age. Parent surveys provide valuable information regarding the impact of ADHD treatments.

METHODS: Parents of children with ADHD beginning treatment with LDX voluntarily completed surveys through an automated telephone system or the Internet before and 6 weeks after LDX treatment initiation. Prescribing physicians received individual reports of the responses for each survey completed by their patients' parents. All patients whose parents completed both baseline and 6 week surveys were included in the analyses. Subgroup analyses were conducted for those previously treated with medications to treat ADHD, including mixed amphetamine salts-extended release.

RESULTS: LDX treatment was associated with a significant decrease in ADHD symptom interference with school activities, family interactions, homework, and social interactions ($P < .01$; $N = 11,576$). Parents rated satisfaction with LDX as significantly higher than with their child's previous treatment ($P < .01$). On average, global improvement, tolerability, convenience, and satisfaction with LDX were all highly rated.

CONCLUSION: Patients treated with LDX showed significant symptom improvement and parents reported significantly greater satisfaction than with prior treatment

J Fam Pract. 2010 Apr;59:234-35.

Clinical inquiries. Do dietary interventions improve ADHD symptoms in children?

Ballard W, Hall MN, Kaufmann L.

Per la ricerca degli articoli pubblicati nella letteratura scientifica nel mese in esame sono state consultate le banche dati Medline, Embase, PsycINFO e PsycArticle utilizzando le seguenti parole chiave (o i loro sinonimi): 'Attention deficit disorder', 'Attention deficit hyperactivity disorder', 'Infant', 'Child', 'Adolescent', 'Human'. Sono qui riportate le referenze considerate rilevanti e pertinenti.

Journal of Attention Disorders. 2010 May;13:573-83.

The importance of ADHD subtype classification for educational applications of DSM-V.

Barnard L, Stevens T, To YM, et al.

An examination of the academic achievement of children with ADHD by stimulant treatment status must consider this heterogeneity of the disorder. With the dissemination of the final wave of data, the Special Education Elementary Longitudinal Study presents an opportunity to examine the academic achievement of students with ADHD using a large, community-based, and nationally representative sample over 4 years.

Method: In Study 1, the association between stimulant treatment and academic achievement is examined over 4 years. In Study 2, the association between stimulant treatment and academic achievement is examined acknowledging the influence of subtype symptoms of ADHD using growth mixture modeling.

Results: Results indicate significant differences in academic achievement according to long-term stimulant treatment status within each subtype symptom class.

Conclusion: Research should acknowledge the influence of subtype symptoms when examining outcomes such as academic achievement. The upcoming DSM-V should consider the results as indicating the educational relevance of ADHD subtype classification.

J Psychophysiol. 2009;23:157-73.

Spontaneous EEG oscillations in children, adolescents, and adults: Typical development, and pathological aspects in relation to AD/HD.

Barry RJ, Clarke AR.

Data are presented on EEG activity in typically developing controls, focusing on the traditional delta, theta, alpha, and beta bands through childhood, with some extensions into adolescence and adults. Both eyes-closed and eyes-open resting state data are discussed. These reflections of typical development provide a framework for illustrating EEG differences in people with attention deficit/hyperactivity disorder (AD/HD), and its main diagnostic types, from children to adults. Comorbidity effects in the EEG of children with AD/HD, particularly comorbid reading disabilities and conduct disorders, are also described. Some recent explorations of the links between arousal/activation and EEG activity may contribute to our understanding of the functional nature of brain oscillations in this context. Other aspects of oscillatory brain activity, coherence and event-related potentials, are also briefly discussed within this framework.

Cell Mol Neurobiol. 2010;30:265-74.

Study on DBH genetic polymorphisms and plasma activity in attention deficit hyperactivity disorder patients from eastern India.

Bhaduri N, Sarkar K, Sinha S, et al.

Dysfunctions in the norepinephric pathway have been speculated in the etiology of attention deficit hyperactivity disorder (ADHD), a common problem for children. Synthesis of norepinephrine from dopamine is catalyzed by the enzyme dopamine (beta)-hydroxylase and numerous polymorphisms in the DBH gene have been found to exert their direct influence on the enzyme activity independently. In the present study association of ADHD with four genetic polymorphisms, DBH-STR, rs1611115, rs1108580, and rs2519152, was examined in subjects belonging to eastern India. ADHD subjects (n = 111) were recruited following DSM-IV criteria. Peripheral blood samples were collected from nuclear families with ADHD probands. A group of ethnically matched healthy volunteers (n = 130) was also recruited. Genomic DNA was analyzed by PCR amplification followed by restriction digestion and genotyping. Data obtained were subjected to both family-based as well as population-based statistical analyses. Plasma D(beta)H activity was measured using a photometric assay and its correlation with the genetic polymorphisms was analyzed using analysis of variance. Case-control analysis revealed no significant differences in allelic frequencies; however, significant paternal over-transmission (P = 0.02) of the rs2519152 'G' allele to ADHD probands was noticed. A haplotype, composed of 12R-C-G-G, also showed biased transmission. Strong correlation was observed between enzyme activity and rs1611115, rs1108580, and rs2519152 (P = 1.51E-6, 0.04, and 0.003, respectively). The present study hints toward the fact that DBH gene polymorphisms have some role in the etiology of ADHD in eastern Indian population and their study could be useful for therapeutic intervention.

Psychiatry Res. 2010;177:299-304.

How persistent is ADHD? A controlled 10-year follow-up study of boys with ADHD.

Biederman J, Petty CR, Evans M, et al.

The main aim of this study was to examine the age-dependent persistence of attention-deficit hyperactivity disorder (ADHD) in boys transitioning from adolescence into early adulthood attending to different definitions of persistence. We conducted a 10-year follow-up study (mean follow-up time=11. years) of 110 boys with ADHD and 105 non-ADHD controls. Both groups were 6-17. years of age at ascertainment. ADHD was considered persistent at follow-up if subjects met full or subthreshold (more than half of the symptoms required for a full diagnosis) Diagnostic and Statistical Manual of Mental Disorders, fourth edition, (DSM-IV) diagnostic criteria, failed to attain functional remission (Global Assessment of Functioning, GAF score (less than or equal to) 60) or were receiving treatment for ADHD. While 65% of children with ADHD no longer met full DSM-IV criteria for ADHD at the 10-year follow-up, 78% of subjects met at least one of our definitions of persistence. Persistence as described above was associated with more psychiatric co-morbidity, more familiarity with mood disorders and higher levels of educational and interpersonal impairments than controls. This 10-year longitudinal follow-up study shows that the majority of ADHD boys experience persistent symptoms and functional impairments into early adulthood. Persistence of ADHD is associated with greater psychiatric comorbidity, familiarity and functional impairments.

Pediatrics. 2010;125:e1270-e1277.

Attention-deficit/hyperactivity disorder and urinary metabolites of organophosphate pesticides.

Bouchard MF, Bellinger DC, Wright RO, et al.

OBJECTIVE: The goal was to examine the association between urinary concentrations of dialkyl phosphate metabolites of organophosphates and attention-deficit/hyperactivity disorder (ADHD) in children 8 to 15 years of age.

METHODS: Cross-sectional data from the National Health and Nutrition Examination Survey (2000-2004) were available for 1139 children, who were representative of the general US population. A structured interview with a parent was used to ascertain ADHD diagnostic status, on the basis of slightly modified criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

RESULTS: One hundred nineteen children met the diagnostic criteria for ADHD. Children with higher urinary dialkyl phosphate concentrations, especially dimethyl alkylphosphate (DMAP) concentrations, were more likely to be diagnosed as having ADHD. A 10-fold increase in DMAP concentration was associated with an odds ratio of 1.55 (95% confidence interval: 1.14-2.10), with adjustment for gender, age, race/ethnicity, poverty/income ratio, fasting duration, and urinary creatinine concentration. For the most-commonly detected DMAP metabolite, dimethyl thiophosphate, children with levels higher than the median of detectable concentrations had twice the odds of ADHD (adjusted odds ratio: 1.93 [95% confidence interval: 1.23-3.02]), compared with children with undetectable levels.

CONCLUSIONS: These findings support the hypothesis that organophosphate exposure, at levels common among US children, may contribute to ADHD prevalence. Prospective studies are needed to establish whether this association is causal.

Altern Med Rev. 2010 Apr;15:15-32.

Biomarker-guided interventions of clinically relevant conditions associated with autism spectrum disorders and attention deficit hyperactivity disorder.

Bradstreet JJ, Smith S, Baral M, et al.

Autism spectrum disorders (ASD) and attention-deficit hyperactivity disorder (ADHD) are common and complex neurodevelopmental conditions. Diagnostic criteria for these conditions have traditionally relied solely on behavioral criteria without consideration for potential biomedical underpinnings. Newer evidence, however, reveals that ASDs are associated with: oxidative stress; decreased methylation capacity; limited production of glutathione; mitochondrial dysfunction; intestinal dysbiosis; increased toxic metal burden; immune dysregulation, characterized by a unique inflammatory bowel disease and immune activation of neuroglial cells; and ongoing brain hypoperfusion. Many of these same problems are common features in children with ADHD. These medical conditions, whether co-morbidities or etiopathogenic, would be expected to have synergistically negative effects on the development, cognition, focus, and attention of affected children. It is likely these biological abnormalities contribute significantly to the behavioral symptoms intrinsic

in these diagnoses. However, treatment for these underlying medical disorders is clinically justified, even if no clear immediate behavioral improvements are observed. This article reviews the medical literature and discusses the authors' clinical experience using various biomarkers for measuring oxidative stress, methylation capacity and transsulfuration, immune function, gastrointestinal problems, and toxic metal burden. These biomarkers provide useful guides for selection, efficacy, and sufficiency of biomedical interventions. The use of these biomarkers is of great importance in young children with ADHD or individuals of any age with ASD, because typically they cannot adequately communicate regarding their symptoms.

J Am Acad Child Adolesc Psychiatry. 2010;49:595-605.

Adolescent Outcomes of Childhood Attention-Deficit/Hyperactivity Disorder in a Diverse Community Sample.

Bussing R, Mason DM, Bell L, et al.

Objective: To describe adolescent outcomes of childhood attention-deficit/hyperactivity disorder (ADHD) in a diverse community sample.

Method: ADHD screening of a school district sample of 1,615 students aged 5 to 11 years was followed by a case-control study 8 years later. High-risk youths meeting full ($n = 94$) and subthreshold ($n = 75$) DSM-IV ADHD criteria were matched with demographically similar low-risk peers ($n = 163$). Outcomes domains included symptom, functional impairment, quality of life, substance use, educational outcomes, and juvenile justice involvement.

Results: In all, 44% of youths with childhood ADHD had not experienced remission. Compared with unaffected peers, adolescents with childhood ADHD were more likely to display oppositional defiant disorder (odds ratio [OR] = 12.9, 95% confidence interval [CI] 5.6-30.0), anxiety/depression (OR = 10.3, 95% CI 2.7-39.3), significant functional impairment (OR = 3.4, 95% CI 1.7-6.9), reduced quality of life (OR = 2.5, 95% CI 1.3-4.7), and involvement with the juvenile justice system (OR = 3.1, 95% CI 1.0-9.1). Subthreshold ADHD, but not full ADHD, increased the risk of grade retention, whereas both conditions increased the risk of graduation failure. Oppositional defiant disorder (ODD), but not childhood ADHD, increased the risk of cannabis and alcohol use. None of the adolescent outcomes of childhood ADHD were moderated by gender, race or poverty.

Conclusions: ADHD heralds persistence of ADHD and comorbid symptoms into adolescence, as well as significant risks for functional impairment and juvenile justice involvement. Subthreshold ADHD symptoms typically do not qualify affected students for special educational interventions, yet increase the risk for adverse educational outcomes. Findings stress the importance of early ADHD recognition, especially its comorbid presentation with ODD, for prevention and intervention strategies.

The International Journal of Psychoanalysis. 2010 Apr;91:395-98.

Convergences and divergences in treatments of so-called ADHD children.

Bürgin D, Leuzinger-Bohleber M, Sugarman A, et al.

Marianne Leuzinger-Bohleber introduced the panel by noting the increasing interest in ADHD, particularly from a psychoanalytic perspective. Several reasons for this were postulated. One was the recent dialogue between psychoanalysis and contemporary neurobiology that promises to expand the ability to understand and treat psychopathology that has some neurobiological contributor. Others involve new developments from within psychoanalysis. For example, infant attachment and memory research have fostered alternative models and therapeutic techniques to treat early disturbances of affect regulation, symbolization, and mentalization—all central dysfunctions in ADHD. The last reason for the growing discussion about ADHD in psychoanalytic circles was thought to be an effort by self-critical psychoanalysts to respond to competition with other treatment modalities, most prominently, cognitive-behavioral and psychopharmacological ones. She emphasized that psychoanalytic concepts offer the possibility of shedding light on the complex and multiple determinants of ADHD, thereby allowing for more differentiated diagnoses and treatment strategies that accept the likelihood of different psychodynamic subgroupings of children who might all receive the same descriptive diagnosis of ADHD.

Journal of Attention Disorders. 2010 May;13:658-67.

Maternal anxiety and attention problems in children at 5 and 14 years.

Clavarino AM, Mamun AA, O'Callaghan M, et al.

Objective: This study examines the association between maternal anxiety from pregnancy to 5 years and child attention problems at 5 and 14 years.

Method: Birth cohort of 3,982 individuals born in Brisbane between 1981 and 1983 are assessed. Self-reported measures of maternal anxiety are assessed at four time points. Maternal reports of child attention problems using Achenbach's Child Behavior Checklist are assessed at 5 and 14 years.

Results: Children of mothers experiencing anxiety during or after pregnancy are at greater risk of experiencing attention problems at 5 and 14 years. After adjusting for maternal age and child's gender, antenatal anxiety is strongly associated with persistent attention problems (OR = 3.65, 95% CI = 2.19, 6.07). Children with chronically anxious mothers are 5.67 (95% CI = 3.56, 9.03) times more likely to have persistent attention problems. These associations remain consistent after adjusting for potential confounders.

Conclusions: Maternal anxiety appears to increase the rate of child attention problems and identifies a need for treatment programs to have a dual focus—the mother and her child.

Klin Psikofarmakol Bul. 2009;19:365-72.

Immediate effects of methylphenidate on vocal acoustic parameters in children with attention deficit hyperactivity disorder.

Congologlu MA, Turkbay T, Ciyiltepe M, et al.

Objective: The children with attention deficit hyperactivity disorder are more talkative and aloud than typical children. Children with attention deficit hyperactivity disorder might abuse their voice more often than others and this might be a risk factor for childhood dysphonia, and hyperfunctional vocal behaviors negatively influence their communications. The studies about vocal acoustic variables in children with attention deficit hyperactivity disorder are very limited; moreover possible effects of the stimulants on vocal acoustic variables are unknown. The purpose of the present study was to evaluate possible vocal acoustic changes following methylphenidate administration in children with attention deficit hyperactivity disorder.

Method: The study samples included 22 prepubertal boys that diagnosed to have attention deficit hyperactivity disorder according to the Diagnostic and Statistical Manual of Mental Disorders IV criteria, and have been treated with methylphenidate for at least one year. The voice samples were recorded and analyzed using the Multi Dimensional Voice Program (MDVP) advanced software with MXL stereo medium digital microphone both during baseline (drug free) and after methylphenidate administration. The following acoustic parameters were taken into consideration: s/z ratio, fundamental frequency, jitter, pitch perturbation quotient, shimmer, amplitude perturbation quotient, and noise-to-harmony ratio.

Results: Baseline fundamental frequency decreased significantly following methylphenidate administration ($p < 0.001$). Absolute jitter increased significantly at methylphenidate administration period compare to that of baseline session ($p = 0.039$). There were no statistically significant differences in s/z ratio and the rest of acoustic variables between the baseline and the drug period.

Discussion: We suggested that methylphenidate change the resonance of speech production by lowering the fundamental frequency. Thus, methylphenidate would maintain regularization of loudness by controlling motor speech centrally.

Food Addit Contam Part A Chem Anal Control Expo Risk Assess. 2010 Apr;27:447-56.

Pattern of intake of food additives associated with hyperactivity in Irish children and teenagers.

C Connolly A, Hearty A, Nugent A, et al.

A double-blind randomized intervention study has previously shown that a significant relationship exists between the consumption of various mixes of seven target additives by children and the onset of hyperactive behaviour. The present study set out to ascertain the pattern of intake of two mixes (A and B) of these seven target additives in Irish children and teenagers using the Irish national food consumption databases for children ($n = 594$) and teenagers ($n = 441$) and the National Food Ingredient Database. The majority of additive-containing foods consumed by both the children and teenagers contained one of the target additives. No food consumed by either the children or teenagers contained all seven of the target food additives. For each additive intake, estimates for every individual were made assuming that the additive was present at the maximum legal permitted level in those foods identified as containing it. For both groups, mean intakes of the food additives among consumers only were far below the doses used in the previous

study on hyperactivity. Intakes at the 97.5th percentile of all food colours fell below the doses used in Mix B, while intakes for four of the six food colours were also below the doses used in Mix A. However, in the case of the preservative sodium benzoate, it exceeded the previously used dose in both children and teenagers. No child or teenager achieved the overall intakes used in the study linking food additives with hyperactivity.

Pediatr Neurol. 2010;42:325-30.

Epilepsy in Children With Attention-Deficit/Hyperactivity Disorder.

Davis SM, Katusic SK, Barbaresi WJ, et al.

Previous studies have suggested a higher incidence of symptoms of attention-deficit/hyperactivity disorder (ADHD) in children with epilepsy, but few have investigated epilepsy in children with ADHD. The objective here was to compare the incidence and characteristics of epilepsy among population-based, research identified cohorts of children with (n = 358) and without ADHD (n=728), based on medical record review to age 20 years. Data abstracted included characteristics of seizures, testing, and treatment. Cases were 2.7 times more likely than controls to have epilepsy (95% CI=0.94-7.76; P=0.066), had earlier seizure onset (median age, 5.5 vs 15 years; P=0.020), and exhibited a trend toward more frequent seizures (more than monthly, 63% vs 17%). Among children who met the research criteria for ADHD, those with epilepsy tended to be less likely to have received a clinical diagnosis of ADHD (63% vs 89%; P=0.052) or to be treated with stimulants (50% vs 85%; P = 0.025). The findings suggest a strong trend toward a higher incidence of epilepsy among children with ADHD than among children without ADHD. Epilepsy in children with ADHD appears to be more severe than in those without. Finally, there appears to be a reluctance to diagnose and initiate treatment for ADHD in children with epilepsy.

Child Neuropsychol. 2010 Mar;16:145-61.

Decision making with uncertain reinforcement in children with attention deficit/hyperactivity disorder (ADHD).

Drechsler R, Rizzo P, Steinhausen HC.

Reward-related processes are impaired in children with ADHD. Whether these deficits can be ascribed to an aversion to delay or to an altered responsiveness to magnitude, frequency, valence, or the probability of rewards still needs to be explored. In the present study, children with ADHD and normal controls aged 7 to 10 years performed a simple probabilistic discounting task. They had to choose between alternatives where the magnitude of rewards was inversely related to the probability of outcomes. As a result, children with ADHD opted more frequently for less likely but larger rewards than normal controls. Shifts of the response category after positive or negative feedback, however, occurred as often in children with ADHD as in control children. In children with ADHD, the frequency of risky choices was correlated with neuropsychological measures of response time variability but unrelated to measures of inhibitory control. It is concluded that the tendency to select less likely but larger rewards possibly represents a separate facet of dysfunctional reward processing, independent of delay aversion or altered responsiveness to feedback.

Rev Mex Neuroceinc. 2010;11:15-19.

Prevalence of the upheaval by attention deficit and hyperactivity in students of three populations of the state of Jalisco.

Eleazar CAL, Azucena RH, Faviola GPM, et al.

To determine the prevalence of school-age children, bearers of attention deficit disorder with hyperactivity (ADHD) living in three villages in South Los Altos de Jalisco. We performed a descriptive cross-sectional study. With the participation of children attending the first and second grade, whose ages ranged between 6 and 8 years, both genders, parents and teachers of the children selected at random, we applied the Conners' questionnaire, the It consists of two scales, one for parents and another school, the Cronbach alpha reliability in the Mexican population is 0.8941 for the first in school and for 0.928, this questionnaire is a series of questions that give a score, and is considered a higher overall score of 34 in children and more than 39 in girls, suggest that ADHD children carry also targeted children were observed in their behavior. Once identified children with high scores were evaluated by the psychology and neurology services, applying new Conners questionnaire, test of WISC, medical history with complete neurological examination, in order to

confirm or refute the diagnosis of attention deficit disorder, meeting the recommended criteria in the DSM IV TR. The study involved 220 children, but only 198 children met the inclusion criteria, 116 male and 82 female, with an average age of 7.26% years. The prevalence with attention deficit disorder and hyperactivity, found in this patient group was 14.6% of children, with a clear predominance of male over females 3:1. The results show no statistically significant differences with those reported by other authors.

Mol Psychiatry. 2010;15:637-46.

Rare structural variants found in attention-deficit hyperactivity disorder are preferentially associated with neurodevelopmental genes.

Elia J, Gai X, Xie HM, et al.

Attention-deficit/hyperactivity disorder (ADHD) is a common and highly heritable disorder, but specific genetic factors underlying risk remain elusive. To assess the role of structural variation in ADHD, we identified 222 inherited copy number variations (CNVs) within 335 ADHD patients and their parents that were not detected in 2026 unrelated healthy individuals. Although no excess CNVs, either deletions or duplications, were found in the ADHD cohort relative to controls, the inherited rare CNV-associated gene set was significantly enriched for genes reported as candidates in studies of autism, schizophrenia and Tourette syndrome, including A2BP1, AUTS2, CNTNAP2 and IMMP2L. The ADHD CNV gene set was also significantly enriched for genes known to be important for psychological and neurological functions, including learning, behavior, synaptic transmission and central nervous system development. Four independent deletions were located within the protein tyrosine phosphatase gene, PTPRD, recently implicated as a candidate gene for restless legs syndrome, which frequently presents with ADHD. A deletion within the glutamate receptor gene, GRM5, was found in an affected parent and all three affected offspring whose ADHD phenotypes closely resembled those of the GRM5 null mouse. Together, these results suggest that rare inherited structural variations play an important role in ADHD development and indicate a set of putative candidate genes for further study in the etiology of ADHD.

Acta Pediatr Esp. 2010;68:227-34.

Attention-deficit hyperactivity disorder.

Fernandez-Mayoralas DM, Fernandez-Jaen A.

Attention-deficit hyperactivity disorder (ADHD) is a disorder of inattention, impulsivity, and hyperactivity that affects 3-7% of children. Although the rate of ADHD diminishes with age, some of the children with the disorder will have impairing symptoms during adulthood. Genetic and molecular genetic studies show ADHD to be highly heritable, and other findings have recorded psychosocial adversity as predisposing risk factors. Converging evidence from animal and human studies implicates a neurobiological affectation of the frontal-subcortical-cerebellar catecholaminergic circuits in the pathophysiology of ADHD. Clinically the disorder is characterized by an executive diffusion. Studies during the past decade have shown the safety and effectiveness of new non-stimulant drugs (atomoxetine) and long-acting methylphenidate formulations. Other investigations have also clarified the appropriate role of targeted psychosocial treatments in the context of ongoing pharmacotherapy.

J Sleep Res. 2010;19:366-73.

The sleep of children with attention deficit hyperactivity disorder on and off methylphenidate: A matched case-control study.

Galland BC, Tripp EG, Taylor BJ.

In the present study, we assessed the effects of regular use of methylphenidate medication in children diagnosed with attention deficit hyperactivity disorder (ADHD) on sleep timing, duration and sleep architecture. Twenty-seven children aged 6-12 years meeting diagnostic criteria for Diagnostic and Statistical Manual version IV ADHD and 27 control children matched for age ((plus or minus)3 months) and gender. Two nights of standard polysomnographic (PSG) recordings were conducted. ADHD children were allocated randomly to an on- or 48 h off-methylphenidate protocol for first or second recordings. Control children's recordings were matched for night, but no medication was used. Mixed modelling was employed in the analyses so that the full data set was used to determine the degree of medication effects. Methylphenidate in

ADHD children prolonged sleep onset by an average of 29 min [confidence interval (CI) 11.6, 46.7], reduced sleep efficiency by 6.5% (CI 2.6, 10.3) and shortened sleep by 1.2 h (CI 0.65, 1.9). Arousal indices were preserved. Relative amounts of stages 1, 2 and slow wave sleep were unchanged by medication. Rapid eye movement sleep was reduced (-2.4%) on the medication night, an effect that became non-significant when control data were incorporated in the analyses. PSG data from ADHD children off-medication were similar to control data. Our findings suggest that methylphenidate reduces sleep quantity but does not alter sleep architecture in children diagnosed with ADHD. An adequate amount of sleep is integral to good daytime functioning, thus the sleep side effects of methylphenidate may affect adversely the daytime symptoms the drug is targeted to control.

Journal of Attention Disorders. 2010 May;13:649-57.

Is the inattentive subtype of ADHD different from the combined/hyperactive subtype?

Grizenko N, Paci M, Joober R.

Objective: To compare the ADHD combined/hyperactive subtype (ADHD/CH) to the ADHD inattentive subtype (ADHD/I) on the level of comorbidity, treatment response, and possible etiological factors.

Method: A total of 371 clinically referred children diagnosed with ADHD aged between 6 and 12 years are recruited for a double-blind, placebo-controlled trial of methylphenidate. Comorbidity, treatment response, and stress during pregnancy are assessed for each participant. Genotyping is done for the DAT, DRD4, and 5-HTT genes. Mothers report smoking or alcohol consumption during their pregnancy and their child's birth weight.

Results: The ADHD/CH children show both a higher frequency of conduct disorder and good response to treatment, are exposed to more moderate stress during their mothers' pregnancy, and show a higher frequency of L/L genotype for the 5-HTT-linked polymorphic region.

Conclusion: The significant differences found between the ADHD/CH and the ADHD/I subtypes raise the possibility that the two may be separate disorders.

J Psychiatr Res. 2010;44:605-15.

ADHD familial loading and abnormal EEG alpha asymmetry in children with ADHD.

Hale TS, Smalley SL, Dang J, et al.

Objective: Abnormal brain laterality (ABL) is indicated in ADHD. ADHD and brain laterality are heritable. Genetic factors contributing to lateralization of brain function may contribute to ADHD. If so, increased ADHD family loading should be associated with greater ABL. Previous studies have shown increased rightward alpha asymmetry in ADHD. We tested whether this was more pronounced in ADHD children with increased ADHD family loading.

Methods: We compared EEG alpha asymmetry at rest and during the Conner's Continuous Performance Test (CPT) in ADHD children with and without ADHD affected parents, and replicated our findings in a second larger sample. The replication study additionally stratified the parent-affected sample by parental persistent versus non-persistent ADHD status, increased spatial resolution of EEG measures, and assessed low versus high-alpha.

Results: Study-1: the parent-affected group showed increased rightward asymmetry across frontal and central regions and reduced rightward parietal asymmetry during an eyes closed (EC) condition, as well as increasing rightward parietal asymmetry with advancing age during the CPT. Study-2 replicated these findings and further delineated influences of low versus high-alpha, recording site, and effects of parental persistent versus non-persistent ADHD status.

Conclusion: Increased ADHD familial loading was associated with increased rightward frontal asymmetry. In contrast, increased rightward parietal asymmetry was associated with reduced ADHD family loading. Frontal results are consistent with an ADHD endophenotype. Parietal results suggest an ADHD adaptive trait prevalent with less ADHD family loading. Age effects indicate a unique developmental course among ADHD children whose parents have non-persistent ADHD.

J Clin Psychopharmacol. 2010;30:190-92.

Oral (Delta)9-tetrahydrocannabinol improved refractory Gilles de la Tourette syndrome in an adolescent by increasing intracortical inhibition: A case report .

Hasan A, Rothenberger A, Munchau A, et al.

Objective: To describe the clinical course of the (Delta)9- tetrahydrocannabinol ((Delta)9-THC) treatment of a boy with Gilles de la Tourette Syndrome (TS) and comorbid attention-deficit/hyperactivity disorder (ADHD) in relation to (Delta)9-THC plasma levels and intracortical inhibition measured by transcranial magnetic stimulation.

Methods: The clinical course and pharmacological and neurophysiological measures are reported in a 15-year-old boy with treatment refractory TS plus ADHD leading to severe physical and psychosocial impairment.

Results: Administration of (Delta)9-THC improved tics considerably without adverse effects, allowing parallel stimulant treatment of comorbid ADHD. Along with the (Delta)9-THC treatment, intracortical inhibition was increased, reflected in the enhanced short-interval intracortical inhibition and the prolongation of the cortical silent period.

Conclusions: Our observation suggests that (Delta)9-THC might be a successful alternative in patients with severe TS refractory to classic treatment. Particularly in the case of stimulant-induced exacerbation of tics, (Delta)9-THC might enable successful treatment of comorbid ADHD. The enhancement of intracortical inhibition might be mediated by modulating release of several neurotransmitters including dopamine and (gamma)-aminobutyric acid. Further studies are needed to substantiate our findings.

Acta Paediatr Int J Paediatr. 2010;99:920-24.

Social adversity predicts ADHD-medication in school children - A national cohort study.

Hjern A, Weitoff GR, Lindblad F.

Aims: To test the hypothesis that psychosocial adversity in the family predicts medicated ADHD in school children.

Method: ADHD-medication during 2006 was identified in the Swedish Prescribed Drug Register in national birth cohorts of 1.1 million 6-19 year olds. Logistic regression models adjusted for parental psychiatric disorders were used to test our hypothesis.

Results: There was a clear gradient for ADHD medication with level of maternal education, with an adjusted odds ratio of 2.20 (2.04-2.38) for the lowest compared with the highest level. Lone parenthood and reception of social welfare also implied higher risks of ADHD-medication with adjusted ORs of 1.45 (1.38-1.52) and 2.06 (1.92-2.21) respectively. Low maternal education predicted 33% of cases with medicated ADHD and single parenthood 14%.

Conclusions: Social adversity in the family predicts a considerable proportion of ADHD-medication in school children in Sweden.

Pediatrics. 2010;125:e1510-e1513.

Eosinophilic hepatitis in an adolescent during lisdexamfetamine dimesylate treatment for ADHD.

Hood B, Nowicki MJ.

We describe here the case of an adolescent who developed eosinophilic hepatitis during treatment for attention-deficit/hyperactivity disorder with lisdexamfetamine dimesylate (Vyvanse [Shire US Inc, Wayne, PA]). A 14-year-old boy presented to his primary care provider with abdominal pain and worsening jaundice. A diagnosis of hepatitis was made with biochemical markers, but evaluation failed to provide an etiology. Worsening hepatitis prompted hospitalization and initiation of steroids for presumed autoimmune hepatitis. A subsequent liver biopsy showed evidence of eosinophilic hepatitis. Known causes of eosinophilic hepatitis were ruled out, and a presumptive diagnosis of reaction to lisdexamfetamine dimesylate was made. Discontinuation of the medication led to resolution of the hepatitis and normalization of the liver biopsy. To our knowledge, this is the first report of hepatic injury attributed to lisdexamfetamine dimesylate.

Int J Psychophysiol. 2010;76:174-85.

Varying required effort during interference control in children with AD/HD: Task performance and ERPs.

Johnstone SJ, Watt AJ, Dimoska A.

Prominent models of attention-deficit/hyperactivity disorder (AD/HD) contend that disinhibition is the core deficit, or that any inhibition deficits that exist are secondary to dysfunctional energetic regulation (i.e. effort and arousal). This study tested these models by investigating the influence of task-directed effort, as manipulated by stimulus degradation, on interference control deficits in children with AD/HD. Twenty children with AD/HD aged between 7 and 14. years were matched in age to 20 controls and performed a modified visual Eriksen flanker task, while EEG and skin conductance level (SCL) were recorded. Participants completed the task under three conditions varying in stimulus degradation: none, 30% or 60%. Results revealed a quadratic effect with improved task performance in the 30% degradation condition, relative to the other conditions. Overall, children with AD/HD showed a tendency towards increased errors and more variable responding, although this did not differ between conditions. Importantly, children with AD/HD showed no deficits in interference control at a behavioural level. SCL revealed reduced activity in the AD/HD group during the non-degraded condition which normalised to control levels in the highest degradation condition. ERPs revealed two functionally distinct N2 components, one of which, along with the P3, was larger to incongruent stimuli, consistent with previous studies linking this component to inhibitory processing. Atypical activation of these components was evident in children with AD/HD and occurred as a function of degradation condition. Taken together these findings suggest the role of other factors such as state regulation as underlying deficits in AD/HD.

Journal of Attention Disorders. 2010 May;13:592-600.

Ethnicity as a moderator of treatment effects on parent-child interaction for children with ADHD.

Jones HA, Epstein JN, Hinshaw SP, et al.

Objective: To examine ethnic differences in observed parenting and child behavior and the moderating effects of ethnicity on the relationship between treatment and parent and child behavior.

Method: Observations of 508 children with ADHD (ages 7–9) and their caregivers, collected during the Multimodal Treatment Study of ADHD, were analyzed using univariate and mixed-model ANOVAs.

Results: Although baseline parenting practices differed by ethnic group, ethnicity did not moderate the relationship between treatment and either parenting or child behavior.

Conclusion: Consistent with data from normative samples, parents of children with ADHD differed by ethnicity in their utilization of certain parenting strategies. However, different ethnic groups did not differ on benefit received from treatments for ADHD, measured by parent and child behavior. Although ethnicity did not emerge as a moderator, ethnic minority family engagement in treatment may be increased by recognizing different parenting strategies and modifying interventions accordingly.

Emotional & Behavioural Difficulties. 2010 Mar;15.

Review of 'Children's mental health problems'.

Knowles B.

Reviews the book, "Children's mental health problems" by Sami Timimi (2009). In this book, the author rails against current inclinations to apply a 'medical model' to our notions of mental health and cautions against the use of concepts such as diagnosis and treatment. According to the reviewer, the book is both provocative and considerable. Attention-Deficit Hyperactivity Disorder (ADHD) receives particular attention. The book is short, accessible, and nice to handle and this reviewer recommends it to all practitioners working with children and young people.

Duzce Med J. 2010;12:94-97.

Neurofibromatosis and attention deficit.

Kocer E, Yanik ME, Eryilmaz M, et al.

Neurofibromatosis type VI, a disease characterized by the presence of cafe-au-lait spots without the presence of neurofibromas typically present in neurofibromatosis, as well as cognitive function and speech

problems, often shows neurological involvement. We describe a case of a 14-year-old child who has speech problems and isolated cafe-au-lait macules. We performed an IQ test on him and he scored 70 points. His problems started when he was approximately 5 years old (school age). He was diagnosed with attention deficit disorder syndrome without hyperactivity after neuropsychiatric investigation. We reported this case to improve recognition of NF VI in children who have cognitive function problems.

Journal of Child and Family Studies. 2010 Jun;19:270-77.

Maternal symptoms of attention-deficit/hyperactivity disorder and maternal language: Implications for infant language development.

Kryski KR, Mash EJ, Ninowski JE, et al.

The relationship between maternal ADHD symptoms and maternal language was examined in a community sample of 50 mothers of infants age 3–12 months. It was hypothesized that higher maternal symptoms of ADHD would be related to lower quality of maternal language use. Recordings of mothers' speech were coded for complexity and elaboration of speech and vocabulary diversity during an interview with an adult and during mother–infant play interactions in the home. Hierarchical regression analysis revealed that maternal ADHD symptoms were significantly related to mothers' lower mean length of utterances during the interview and during mother–infant play interactions. Maternal ADHD symptoms were not related to maternal vocabulary use in either of these situations. Our findings suggest that mothers with higher ADHD symptoms may display exiguous language behaviors when interacting with their infants and with adults. In addition, findings suggest one reason why current parent-management programs for children with ADHD, which are verbally based and rely heavily on the parent's communication skills, are relatively ineffective when ADHD may be present in the parent.

Infant Mental Health Journal. 2010 Mar;31:141-58.

Parenting of 7-month-old infants at familial risk for attention deficit/hyperactivity disorder.

Landau R, Avital M, Berger A, et al.

Patterns of interaction between parents and 7-month-old boys at familial risk for attention deficit/hyperactivity disorder (ADHD) and a comparison group were studied during a warm-up and two play episodes. The sample included 78 (47 at-risk, 31 comparison) mother-child and 45 (27 at-risk, 18 comparison) father-child dyads. A coding system developed by G. Kochanska (1997, 1998) was used. Infants in the risk group did not differ from the comparison group in the rate of emission of infant-related events. However, they received less adequate responsivity from both their fathers and their mothers to these events, and specifically to negative emotions or distress, than did the comparison group. Maternal psychopathology did not account for these findings. Mothers were more adequately responsive than were fathers, especially for physiological needs. The association between nonoptimal interaction in infancy and the development of ADHD is discussed.

Psychiatry Res. 2010 Apr;176:143-49.

Disentangling the attentional deficit in schizophrenia: pointers from schizotypy.

Le Pelley ME, Schmidt-Hansen M, Harris NJ, et al.

It has been argued that schizophrenia is associated with abnormalities in the allocation of attention, and that such abnormalities extend to members of the healthy population who are high in schizotypy; however, alternative interpretations of previous experimental evidence relating to this issue are possible. We present a learned irrelevance paradigm that provides a less equivocal measure of attentional processing during learning, and demonstrate a reliable reduction in learned irrelevance among healthy participants with high scores on a dimension of schizotypy corresponding to the positive symptoms of schizophrenia. These results support the suggestion that high schizotypy (and, by extension, schizophrenia) is associated with deficits in the appropriate allocation of attention.

Child Neuropsychol. 2010 Mar;16:182-201.

Psychometric support for an abbreviated version of the Behavior Rating Inventory of Executive Function (BRIEF) Parent Form.

LeJeune B, Beebe D, Noll J, et al.

The objectives of this study were to systematically develop and evaluate the psychometric properties of an abbreviated version of the Behavior Rating Inventory of Executive Function (BRIEF) Parent Report; a questionnaire widely used by pediatric neuropsychologists. A total of 24 items from the original BRIEF Parent Form were selected for the short-form, which was then evaluated in three complementary samples, according to six a priori psychometric criteria. The short-form generally demonstrated appropriate psychometric qualities, with convincing evidence for the reliability and validity of the three composite indices: Behavioral Regulation, Metacognition, and the Global Executive Composite. Potential clinical applications include screening at-risk children in medical clinics to facilitate appropriate referrals for further psychological consultation. In research settings, the short-form can be easily integrated into studies involving mass collection of data (e.g., large-scale epidemiological research), facilitating advancements in the scientific understanding of neuropsychological morbidity in medically involved populations.

Nicotine Tob Res. 2010 Apr;12:408-15.

ADHD after fetal exposure to maternal smoking.

Lindblad F, Hjern A.

INTRODUCTION: Smoking during pregnancy has been reported to be associated with a twofold to fourfold increased risk of attention-deficit hyperactivity disorder (ADHD) in the offspring. Genetic and socioeconomic confounders may contribute to this association. The aim of this study was to investigate the association between fetal exposure to maternal smoking during pregnancy and ADHD, taking such potential confounders into consideration.

METHODS: A register study in a population of 982,856 children, 6-19 years of age, born at term, and residents in Sweden in 2006 was conducted. Logistic regression was used to calculate odds ratios (ORs) of maternal smoking habits during pregnancy on ADHD medication in the 927,007 study subjects where maternal smoking habits were available from the Medical Birth Register in the presence of socioeconomic and parental psychiatric morbidity confounders. To adjust the analysis also for genetic confounding, we used a within-mother between-pregnancy approach in offspring of 26,292 mothers with inconsistent smoking habits (smoking/non-smoking) between pregnancies.

RESULTS: The OR for ADHD medication in offspring of mothers who smoked ≥ 10 cigarettes/day was 2.86 (2.66-3.07) in the entire study population after adjustment for sex and age, while this same exposure yielded an OR of only 1.26 (0.95-1.58) when two pregnancies of the same mother were analyzed in a within-subjects design.

DISCUSSION: Smoking during pregnancy has a strong association with ADHD in the offspring in the general Swedish population, but this risk is primarily explained by genetic and socioeconomic confounding.

J Abnorm Child Psychol. 2010 Apr;38:315-26.

Does childhood executive function predict adolescent functional outcomes in girls with ADHD?

Miller M, Hinshaw SP.

We prospectively followed an ethnically and socioeconomically diverse sample of preadolescent girls with ADHD ($n=140$) and matched comparison girls ($n=88$) over a period of 5 years, from middle childhood through early/mid-adolescence. Our aim was to examine the ability of measures of childhood executive function (EF) to predict functional outcomes in adolescence. Measures of neuropsychological functioning comprised the childhood predictors, with academic, social, and global functioning serving as adolescent criterion measures. Results indicated that childhood EF predicted (a) academic achievement and social functioning across our entire sample (independent of diagnostic group status) and (b) global functioning only in girls with ADHD (independent of IQ). These results highlight the non-specificity of EF deficits and suggest the importance of assessing and developing interventions that target EF impairments, particularly in those at high-risk for negative outcomes, in order to prevent long-term difficulties across a range of important functional domains.

Conn Med. 2010 Apr;74:229-36.

Can we prevent smoking in children with ADHD: a review of the literature.

Modesto-Lowe V, Danforth JS, Neering C, et al.

Cigarette smokers pose public health challenges and are over-represented among individuals with attention deficit hyperactivity disorder (ADHD). This article reviews the link between ADHD and smoking across various developmental stages with an emphasis on factors that interact with ADHD (e.g., comorbidity with conduct disorder) to modify risk for nicotine dependence from childhood through adulthood.

METHOD: A literature review was conducted for 2000-2009 using key words ADHD, smoking, adolescents, adulthood.

RESULTS: Childhood, adolescent and adult ADHD all increase risk for smoking. Childhood ADHD increases risk for early smoking during adolescence, particularly if untreated and in combination with conduct disorder (CD). Attention deficit hyperactivity disorder in adolescence increases the risk of daily smoking in adulthood. These findings underscore the importance of smoking prevention for children and adolescents with ADHD and other risk factors (e.g., CD). Pharmacotherapy for ADHD offers promise to lower the risk of smoking during adolescence. Preventing the development of conduct disorder (CD) or controlling the symptoms of CD is also possible and may reduce smoking and associated outcomes.

Arch Pediatr Adolesc Med. 2010 May;164:499.

Advice for patients. Attention-deficit/hyperactivity disorder.

Moreno MA.

Journal of Attention Disorders. 2010 May;13:618-28.

Atomoxetine's effect on societal costs in Sweden.

Myrén KJ, Thernlund G, Nylén Å, et al.

Objective: To compare societal costs between patients treated with atomoxetine and placebo in Sweden.

Method: Ninety nine pediatric ADHD patients were randomized to a 10-week double-blind treatment with atomoxetine (n=49) or placebo (n=50). All parents received four sessions of psycho-education. Parents filled out a resource utilization questionnaire covering the 10 weeks prior to treatment and the 10-week on-treatment period. Published unit costs/prices were used to calculate costs.

Results: Mean on-treatment costs in the atomoxetine group (SEK [Swedish Krona] 4,558) were significantly lower compared with placebo (SEK 7,684) after adjusting for baseline costs and site ($p = .007$). All 99 patients entered an open atomoxetine extension phase. Both groups had numerical reductions in direct and indirect costs while on atomoxetine treatment during the extension phase. The atomoxetine medication costs were offset by the reductions in direct nonmedical and indirect costs.

Conclusions: These data provide preliminary evidence that atomoxetine together with parental psycho education reduces nonmedication costs associated with ADHD in Sweden.

Eur Psychiatry. 2010;25:214-15.

First preliminary results of a single case report: Duloxetine might improve some symptoms of attention-deficit hyperactivity disorder.

Niederhofer H.

Behav Brain Funct. 2010;6.

Gene null environment interactions for ADHD: Synergistic effect of 5HTTLPR genotype and youth appraisals of inter-parental conflict.

Nikolas M, Friderici K, Waldman I, et al.

Background: Serotonin genes have been hypothesized to play a role in the etiology of attention-deficit hyperactivity disorder (ADHD); prior work suggests that serotonin may interact with psychosocial stressors in

ADHD, perhaps via mechanisms involved in emotional dysregulation. Because the development of behavioral and emotional regulation depends heavily both on the child's experience within the family context and the child's construals of that experience, children's appraisals of inter-parental conflict are a compelling candidate potentiator of the effects of variation within the serotonin transporter gene promoter polymorphism (5HTTLPR) on liability for ADHD.

Method: 304 youth from the local community underwent a multi-informant diagnostic assessment procedure to identify ADHD cases and non-ADHD controls. Youth also completed the Children's Perception of Inter-Parental Conflict (CPIC) scale to assess appraisals of self-blame in relation to their parents' marital disputes. The triallelic configuration of 5HTTLPR (long/short polymorphism with A> G substitution) was genotyped and participants were assigned as having high (La/La N=78), intermediate (La/Lg, La/short, N=137), or low (Lg/Lg, Lg/short, short/short, N=89) serotonin transporter activity genotypes. Teacher reported behavior problems were examined as the target outcome to avoid informant overlap for moderator and outcome measures.

Results: Hierarchical linear regression analyses indicated significant 5HTTLPR null self-blame interactions for ADHD symptoms. Examination of the interactions indicated positive relations between reports of self-blame and ADHD symptoms for those with the high and low serotonin activity genotypes. There was no relation between self-blame and ADHD for those with intermediate activity 5HTTLPR genotypes.

Conclusion: Both high and low serotonergic activity may exert risk for ADHD when coupled with psychosocial distress such as children's self-blame in relation to inter-parental conflict. Results are discussed in relation to the role of serotonin in the etiology of the ADHD and related externalizing behaviors.

Behav Brain Funct. 2010 Apr;6.

Gene x environment interactions for ADHD: Synergistic effect of 5HTTLPR genotype and youth appraisals of inter-parental conflict.

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Conclusion: Both high and low serotonergic activity may exert risk for ADHD when coupled with psychosocial distress such as children's self-blame in relation to inter-parental conflict. Results are discussed in relation to the role of serotonin in the etiology of the ADHD and related externalizing behaviors.

Schizophr Bull. 2010;36:557-65.

Neurocognitive decline in early-onset schizophrenia compared with ADHD and normal controls: Evidence from a 13-year follow-up study.

Oie M, Sundet K, Rund BR.

The issue of neurodegeneration in schizophrenia is controversial. Although most studies indicate that neurocognitive deficits are relatively stable over the course of the illness, conclusions are limited by relatively short follow-up periods and absence of age-matched control groups. Furthermore, nearly all studies deal

with adult-onset schizophrenia, and few studies have considered the possible effect of age of onset. The current study represents the first attempt to compare groups of adolescents with schizophrenia, attention deficit/hyperactivity disorder (ADHD), and normal controls on a comprehensive neurocognitive test battery in a longitudinal design over 13 years. In the baseline study, adolescents with schizophrenia were examined with a broad battery of neurocognitive tests. The comparison groups consisted of adolescents with ADHD and adolescents without a psychiatric diagnosis, between 12 and 18 years of age. In the follow-up study, the schizophrenia group consisted of 15 of the initial 19 individuals, the ADHD group of 19 of the 20 individuals, and the normal comparison group of all 30 individuals. They were reevaluated with the neurocognitive test battery and clinical measures. Subjects with schizophrenia showed a significant decline or arrest in neurocognitive functioning compared with the other 2 groups, particularly in verbal memory, attention, and processing speed. The impairments may be specific to early-onset schizophrenia due to interaction between ongoing brain maturation during adolescence and disease-related mechanisms and/or secondary to neuroleptic treatment in young age and/or social isolation.

J Child Neurol. 2010;25:689-93.

The human figure drawing as related to attention-deficit hyperactivity disorder (ADHD).

Perets-Dubrovsky S, Kaveh M, Deutsh-Castel T, et al.

To assess the reliability and validity of the human figure drawing test among children with attention-deficit hyperactivity disorder (ADHD) and/or learning disability, boys (n = 136) between the ages of 8 and 10 years, with either or both ADHD and learning disability, were included. Two drawings were used: person and house, tree and person. The drawings were analyzed using the Koppitz emotional and developmental scales. Conners teacher and parent rating scales and the Matching Familiar Figure Test were administered. High intertest reliability for the emotional scale and a significant negative correlation between the 2 scales were found. The reported anxiety and learning were significantly correlated with the cognitive score. A combination of cognitive and emotional items resulted in 67% correct classification of ADHD and learning disability. This test can be used as part of the assessment of ADHD/learning disability.

Journal of Attention Disorders. 2010 May;13:584-91.

Ethnic differences in parental beliefs of attention-deficit/hyperactivity disorder and treatment.

Pham AV, Carlson JS, Kosciulek JF.

Objective: A survey study was conducted to explore ethnic differences in parental beliefs about the causes and treatments of ADHD and whether these beliefs predicted treatment preference.

Method: Ethnically diverse parents of 5- to 12-year-old children with ADHD (n=58) and without ADHD (n=61) completed a questionnaire developed by the authors that asked them to rate statements about biological and psychological causes of ADHD and their beliefs about medication and behavioral treatment.

Results: There were no significant ethnic differences in how parents viewed causes of ADHD. Beliefs about behavioral treatment revealed significant group differences, as ethnic minority (e.g., African American, Latino) parents rated behavioral treatments more positively than did Caucasian parents. Beliefs about biological causes predicted medication treatment and combined treatment use.

Conclusion: Dissemination of information regarding evidence-based treatments should be given special attention as it may influence parents' decisions to pursue specific treatments based on their beliefs.

CNS Spectr. 2010;15:125-30.

Methylphenidate effect in children with ADHD can be measured by an ecologically valid continuous performance test embedded in virtual reality.

Pollak Y, Shomaly HB, Weiss PL, et al.

Background: Continuous performance tasks (CPTs) embedded in a virtual reality (VR) classroom environment have been shown to be a sensitive and user-friendly assessment tool to detect cognitive deficits related to attention-deficit/hyperactivity disorder (ADHD). The aim of the current study was to compare the performance of children with ADHD on a VR-CPT while on and off treatment with methylphenidate (MPH) and to compare the VR-CPT to a currently used CPT, Test of Variables of Attention (TOVA).

Methods: Twenty-seven children with ADHD underwent the VR-CPT, the same CPT without VR (no VR-CPT), and the TOVA, 1 hour after the ingestion of either placebo or 0.3 mg/kg MPH, in a double-blind, placebo-controlled, crossover design. Immediately following CPT, subjects described their subjective experiences on the Short Feedback Questionnaire.

Results: MPH reduced omission errors to a greater extent on the VR-CPT compared to the no VR-CPT and the TOVA, and decreased other CPT measures on all types of CPT to a similar degree. Children rated the VR-CPT as more enjoyable compared to the other types of CPT.

Conclusions: It is concluded that the VR-CPT is a sensitive and user-friendly assessment tool in measuring the response to MPH in children with ADHD.

Brain Cogn. 2010 Apr;72:355-61.

Visual field asymmetries in attention vary with self-reported attention deficits.

Poynter W, Ingram P, Minor S.

The purpose of this study was to determine whether an index of self-reported attention deficits predicts the pattern of visual field asymmetries observed in behavioral measures of attention. Studies of "normal" subjects do not present a consistent pattern of asymmetry in attention functions, with some studies showing better left visual field (LVF) performance, others showing no asymmetry or even a right visual field (RVF) advantage. Here we found that a participant variable (a measure of self-reported attention problems) may help to explain these inconsistencies. We used Conners' Adult ADHD Rating Scales to measure self-reported attention problems in a group of 36 normal (non-ADHD) subjects, and we used two behavioral tasks to directly measure their attentional abilities: a lateralized Attention Network Task (ANT) and a visual search task. Comparing subjects with relatively Low versus High scores on the attention-deficit (AD) scale, we found that subjects with High scores were less efficient in orienting attention to the left visual field. When LVF targets were preceded by a valid spatial cue, response times were positively correlated with AD scores, indicating slower covert-attention shifts as attention-deficit scores increased. Right visual field data showed a different pattern of results. Subjects with High AD scores were at least as efficient as those with Low AD scores in orienting attention to the RVF. This study provides evidence that visual field asymmetries in orienting attention vary across individuals, and that level of self-reported attention problems correlates with behavioral deficiencies in orienting attention to the left visual field.

Child Neuropsychol. 2010 Mar;16:134-44.

Working memory control deficit in kindergarten ADHD children.

Re A, De Franchis V, Cornoldi C.

The present study tests the hypothesis that a working memory deficit is also found in children with attention deficit/hyperactivity disorder (ADHD) symptoms as young as 5 and is related to the control of interfering information. One group of 23 kindergarten children identified by the presence of ADHD symptoms and one group of 23 children matched for gender, age, and socioeconomic status were administered a visuospatial working memory task that required the selective recall of information. Children with ADHD symptoms performed more poorly than controls and were affected to a particularly high extent by intrusion errors (i.e., recalling of information initially encoded but that needed to be consequently suppressed during the task).

Rev Mex Neurocienc. 2008;9:14-19.

Vital signs in children exposed to methylphenidate.

Resendiz Aparicio JC, Saavedra MY, Rodriguez Rodriguez E, et al.

Introduction: Methylphenidate (MPH) is one of the most widely used medications to treat Attention Deficit Hyperactivity Disorder (ADHD) in children; its potential side effects have been a permanent concern.

Methods: Along a year we surveyed blood pressure, heart rate, cranial circumference, body height and weight of ADHD patients treated with MPH. Individual data were compared with percentile growth charts for age and gender.

Results: Fifty six patients were included, ages 4 to 17 years, 82% males. Forty three patients were taking short action MPH and 13 sustained release MPH (OROS). Eighteen patients had ADHD alone and the rest of them had a comorbid ADHD, 16 with epilepsy and 7 had mild mental retardation. Nineteen patients take

an antiepileptic drug, 8 a neuroleptic drug and 3 an antidepressive drug. In five patients blood pressure was under normal (3rd centile) without clinical manifestations. Any patient had abnormal heart rates, 15 patients had microcephaly and one had macrocephaly. Four patients had short stature and 3 were above centile 97.

Conclusions: We found no significant changes in cardiovascular parameters, patients with low blood pressure were clinically asymptomatic. Weight and height were not affected through the year of follow-up, growth velocity remained normal in all cases. However, we suggest a permanent follow-up in patients under chronic drug treatment.

J For Psychol Prac. 2010;10:177-200.

A comparison of psychopathy, attention deficit hyperactivity disorder, and brain dysfunction among sex offenders.

Ron L, Curnoe S.

This study examines the relationship of Hare's psychopathy scores (PCL-R) with attention deficit hyperactivity disorder (ADHD) diagnosis and brain dysfunction measures in a sample of 1,695 adult male sexual, violent, and nonviolent offenders. ADHD and brain dysfunction were significantly more common among psychopaths than non-psychopaths. Psychopaths showed more neurological disorders and early problems with learning disorders. Although psychopathy is characteristically considered to be an untreatable and dangerous condition, its significant association with ADHD and brain dysfunction indicates that there are important treatment paths that should be explored and that early treatment should be an important consideration in prevention of adult criminal behavior.

J Med Genet. 2010;47:332-41.

Recurrent reciprocal 16p11.2 rearrangements associated with global developmental delay, behavioural problems, dysmorphism, epilepsy, and abnormal head size.

Shinawi M, Liu P, Kang SHL, et al.

Background: Deletion and the reciprocal duplication in 16p11.2 were recently associated with autism and developmental delay.

Method: We identified 27 deletions and 18 duplications of 16p11.2 were identified in 0.6% of all samples submitted for clinical array-CGH (comparative genomic hybridisation) analysis. Detailed molecular and phenotypic characterisations were performed on 17 deletion subjects and ten subjects with the duplication.

Results: The most common clinical manifestations in 17 deletion and 10 duplication subjects were speech/language delay and cognitive impairment. Other phenotypes in the deletion patients included motor delay (50%), seizures (~40%), behavioural problems (~40%), congenital anomalies (~30%), and autism (~20%). The phenotypes among duplication patients included motor delay (6/10), behavioural problems (especially attention deficit hyperactivity disorder (ADHD)) (6/10), congenital anomalies (5/10), and seizures (3/10). Patients with the 16p11.2 deletion had statistically significant macrocephaly ($p < 0.0017$) and 6 of the 10 patients with the duplication had microcephaly. One subject with the deletion was asymptomatic and another with the duplication had a normal cognitive and behavioural phenotype. Genomic analyses revealed additional complexity to the 16p11.2 region with mechanistic implications. The chromosomal rearrangement was de novo in all but 2 of the 10 deletion cases in which parental studies were available. Additionally, 2 de novo cases were apparently mosaic for the deletion in the analysed blood sample. Three de novo and 2 inherited cases were observed in the 5 of 10 duplication patients where data were available.

Conclusions: Recurrent reciprocal 16p11.2 deletion and duplication are characterised by a spectrum of primarily neurocognitive phenotypes that are subject to incomplete penetrance and variable expressivity. The autism and macrocephaly observed with deletion and ADHD and microcephaly seen in duplication patients support a diametric model of autism spectrum and psychotic spectrum behavioural phenotypes in genomic sister disorders.

J Psychopathol Behav Assess. 2010 Jun;32:193-202.

Social cognition and interpersonal impairment in young adolescents with ADHD.

Sibley MH, Evans SW, Serpell ZN.

The purpose of this study is twofold. First, it aims to examine whether the impairment in peer functioning and social-cognitive deficits (i.e., hostile attribution bias, social comprehension, social problem-solving) found in elementary school aged children with ADHD also occur in adolescence. Second, it aims to provide evidence for a predictive relationship between these social-cognitive deficits and an adolescent's functional impairment in the social domain. To address these aims, several social-cognitive tasks were administered to a small sample of young adolescents with ADHD (N = 27) and a comparison sample without an ADHD diagnosis (N = 18). Parent report of functional impairment and peer sociometric data were also gathered. Comparisons of both parent and peer report of adolescent social functioning suggest that individuals with ADHD continue to experience difficulties with peers into the adolescent years and data from the social-cognitive tasks show evidence of social comprehension and problem-solving deficits. Further analyses indicated a significant link between functional impairment and social cognition. Findings herein are discussed in the context of both the developmental changes that arise during adolescence and consideration of the importance of social cognition for understanding the impaired social functioning experienced by adolescents with ADHD.

Cochrane Database Syst Rev. 2009.

Polyunsaturated fatty acids (PUFAs) for attention deficit hyperactivity disorder in children and adolescents.

Sinn JKH, Gillies D, Ross MJ, et al.

S Afr Fam Pract. 2010;52:161-62.

Complementary and alternative medicine for attention deficit/hyperactivity disorder: An Eastern Cape study.

Snyman S, Truter I.

Journal of the American Academy of Child & Adolescent Psychiatry. 2010 Apr;49:345-55.

Beyond the dual pathway model: Evidence for the dissociation of timing, inhibitory, and delay-related impairments in attention-deficit/hyperactivity disorder.

Sonuga-Barke E, Bitsakou P, Thompson M.

Objective: The dual pathway model explains neuro-psychological heterogeneity in Attention Deficit/Hyperactivity Disorder (ADHD) in terms of dissociable cognitive and motivational deficits each affecting some but not other patients. We explore whether deficits in temporal processing might constitute a third dissociable neuropsychological component of ADHD.

Method: Nine tasks designed to tap three domains (inhibitory control, delay aversion and temporal processing) were administered to ADHD probands (n=71; ages 6 to 17 years), their siblings (n=71; 65 unaffected by ADHD) and a group of non-ADHD controls (n=50). IQ and working memory were measured.

Results: Temporal processing, inhibitory control and delay-related deficits represented independent neuropsychological components. ADHD children differed from controls on all factors. For ADHD patients, the co-occurrence of inhibitory, temporal processing and delay-related deficits was no greater than expected by chance with substantial groups of patients showing only one problem. Domain-specific patterns of familial co-segregation provided evidence for the validity of neuropsychological subgroupings.

Conclusion: The current results illustrate the neuropsychological heterogeneity in ADHD and initial support for a triple pathway model. The findings need to be replicated in larger samples.

Nervenheilkunde. 2010;29:44-51.

SAVE - A cognitive-behavioural group therapy intervention for youths with ADHD: A pilot study.

Sprober N, Grieb J, Ludolph A, et al.

Objective: Aim of the pilot study was the development and evaluation of a cognitive behavioural training program for adolescent ADHD patients. Furthermore, specific improvements were assumed after exposure to the program "SAVE" (reduction of ADHD-symptoms, improvement of knowledge about ADHD, compliance for medication and quality of life).

Material and methods: A pre-/post-test design without a control group was chosen for this study. Participants were n = 12 psychiatric ADHD patients at the age of 13 to 18 years. Sessions were evaluated weekly, changes were assessed by using self- and parents' ratings.

Results: Results showed high acceptance and a satisfying practicability and feasibility. Adolescent ADHD patients reported a significant reduction of ADHD symptoms.

Discussion and clinical relevance: This pilot study shows a high acceptance and good feasibility and practicability of the program "SAVE"; ADHD symptoms were reduced.

Journal of Attention Disorders. 2010 May;13:668-76.

Short-term effects of playing computer games on attention.

Tahiroglu AY, Celik GG, Avci A, et al.

Objective: The main aim of the present study is to investigate the short-term cognitive effects of computer games in children with different psychiatric disorders and normal controls.

Method: One hundred one children are recruited for the study (aged between 9 and 12 years). All participants played a motor-racing game on the computer for 1 hour. The TBAG form of the Stroop task was administered to all participants twice, before playing and immediately after playing the game.

Results: Participants with improved posttest scores, compared to their pretest scores, used the computer on average 0.67 ± 1.1 hr/day, while the average administered was measured at 1.6 ± 1.4 hr/day and 1.3 ± 0.9 hr/day computer use for participants with worse or unaltered scores, respectively. According to the regression model, male gender, younger ages, duration of daily computer use, and ADHD inattention type were found to be independent risk factors for worsened posttest scores.

Conclusion: Time spent playing computer games can exert a short-term effect on attention as measured by the Stroop test.

Can J Psychiatry. 2010;55:305-12.

Clinical response to methylphenidate in children diagnosed with attention-deficit hyperactivity disorder and comorbid psychiatric disorders.

Ter-Stepanian M, Grizenko N, Zappitelli M, et al.

Methods: Children (n=267) aged 6 to 12 years diagnosed with ADHD participated in a double-blind, placebo-controlled, 2-week medication trial of MPH. Children were assessed using parent and teacher ratings and laboratory measures. Clinical response to MPH was determined by integrating all obtained measures.

Results: Meeting criteria for conduct disorder (CD) was 27.7% of children, 40.8% for oppositional defiant (ODD), 47.2% for anxiety, and 7.9% for depressive disorders. The presence of CD or ODD was associated with good response to MPH. In contrast, children diagnosed with only comorbid anxiety were more likely to receive poor response rating independent of age, sex, or socioeconomic status. Low family income was found to be predictive of good response to MPH.

Conclusions: The response to MPH in children with ADHD may be dependent on the type of comorbid disorder present. Clinical Trial Registration Number: NCT00483106

J Am Acad Child Adolesc Psychiatry. 2010;49:573-82.

Randomized, Controlled Trial of Atomoxetine for Attention-Deficit/Hyperactivity Disorder in Adolescents With Substance Use Disorder.

Thurstone C, Riggs PD, Salomonsen-Sautel S, et al.

Objective: To evaluate the effect of atomoxetine hydrochloride versus placebo on attention-deficit/hyperactivity disorder (ADHD) and substance use disorder (SUD) in adolescents receiving motivational interviewing/cognitive behavioral therapy (MI/CBT) for SUD.

Method: This single-site, randomized, controlled trial was conducted between December 2005 and February 2008. Seventy adolescents (13 through 19 years of age) with Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV) ADHD, a DSM-IV ADHD checklist score greater than or equal to 22, and at least one nontobacco SUD were recruited from the community. All subjects received 12 weeks of atomoxetine hydrochloride + MI/CBT versus placebo + MI/CBT. The main outcome measure for ADHD was self-report DSM-IV ADHD checklist score. For SUD, the main outcome was self-report number of days used nontobacco substances in the past 28 days using the Timeline Followback interview.

Results: Change in ADHD scores did not differ between atomoxetine + MI/CBT and placebo + MI/CBT ($F_{4,191} = 1.23$, $p = .2975$). Change in days used nonnicotine substances in the last 28 days did not differ between groups ($F_{3,100} = 2.06$, $p = .1103$).

Conclusions: There was no significant difference between the atomoxetine + MI/CBT and placebo + MI/CBT groups in ADHD or substance use change. The MI/CBT and/or a placebo effect may have contributed to a large treatment response in the placebo group. Clinical Trials Registry Information-A Randomized, Placebo-Controlled Trial of Atomoxetine for Attention-Deficit/Hyperactivity Disorder in Adolescents with Substance Use Disorder. URL: <http://www.clinicaltrials.gov>. Unique identifier: NCT00399763.

Am J Med Genet Part A. 2010;152:1420-27.

Treatment with valproic acid ameliorates ADHD symptoms in fragile X syndrome boys.

Torrioli M, Vernacotola S, Setini C, et al.

Fragile X syndrome (FXS) is the leading cause of inherited mental retardation, due to expansion and methylation of the CGG sequence at the 5' UTR of the FMR1 gene. Around 90% of affected boys present with attention deficit hyperactivity disorder (ADHD), while this percentage is lower in FXS girls (35-47%). Treatment of these behavioral symptoms is critical for many families. In an attempt at identifying drugs capable of restoring the activity of the FMR1 gene, we investigated the use of valproic acid (VPA), a well-known antiepileptic drug, also used as mood stabilizer and in migraine therapy. It is described as an inhibitor of histone deacetylase (HDAC) and, possibly, as a DNA demethylating agent. In an in vitro study we observed that treatment of lymphoblastoid cells from FXS patients with VPA caused a modest reactivation of FMR1 transcription and increased levels of histone acetylation, confirming the histone hyperacetylating effect, but not its putative DNA demethylating activity. On the basis of these findings, we decided to evaluate the in vivo efficacy of VPA on ADHD symptoms in FXS patients. We observed an improvement in the adaptive behavior, defined as the performance of daily activities required for personal and social competence, due to a significant reduction in hyperactivity after VPA treatment. This treatment could be considered as an alternative to that with stimulants, whose efficacy in patients with FXS needs to be confirmed by further studies.

J Psychophysiol. 2009;23:235-46.

Differences in neurophysiological markers of inhibitory and temporal processing deficits in children and adults with ADHD.

Valko L, Doehnert M, Muller UC, et al.

We compared ADHD-related temporal processing and response inhibition deficits in children and adults using event-related potentials (ERPs) during cued continuous performance tasks (CPT, O-X-version, plus a more demanding flanker version). ERP markers of temporal processing (Cue CNV) and inhibition (NoGo P300) were obtained in matched groups of children (32 with ADHD, mean age 11.2 years, and 31 controls, mean age 11.1 years) and adults (22 ADHD, mean age 42.7 years, and 22 controls, mean age 44.0 years). ERP markers and performance reflected both age and ADHD status. Performance was poorer, and Cue CNV and NoGo P300 were weaker in ADHD children and adults compared to their matched controls. ADHD-related ERP differences in children were more prominent at posterior scalp sites but more pronounced at

anterior scalp sites in adults, paralleling the prominent topographic changes of both ERP markers with development. The fact that differences in the same test and the same processing period appear in both children and adults, but that they present in different aspects of performance and different scalp topographies, leads to the conclusion that some ADHD-related deficits persist into adulthood despite alterations of their qualitative aspects.

Biol Psychol. 2010;84:176-85.

Error monitoring in children with ADHD or reading disorder: An event-related potential study.

Van De Voorde S, Roeyers H, Wiersema JR.

This study compared children with ADHD, reading disorder (RD), ADHD + RD, and control children on behavioural (post-error slowing and post-error accuracy) and event-related potential (Ne and Pe) measures of error monitoring. Children with ADHD did not differ from children without ADHD in post-error slowing but showed less post-error accuracy enhancement, as evidenced by a higher proportion of double-errors. We found a smaller Ne but normal Pe amplitude in children with RD, and a smaller Pe but normal Ne amplitude in children with ADHD. Children from the comorbid group showed both a smaller Ne and a smaller Pe amplitude, which suggests that they showed the additive combination of the deficits found in both separate disorders. The results of the present study suggest that it might be important to control for the presence of comorbid RD when examining error monitoring in ADHD and that various measures of post-error adaptation should be included.

Nervenheilkunde. 2010;29:221-24.

ADHD in children and adolescents with epilepsy.

Waltz S.

Attention deficit hyperactivity disorder (ADHD) has serious prognostic implications concerning academic and social achievement. ADHD is more frequent in children with epilepsy than in the general population. This has been shown not only for children with neurological deficits or symptomatic epilepsy but also for children with idiopathic epilepsies. ADHD in children with epilepsy is predominantly characterized by the inattentive variant and may antedate the onset of seizures in the majority of children. This finding may indicate that both ADHD and epilepsy may be related to the same neurodevelopmental abnormality. Physicians treating children with epilepsy should regularly ask for symptoms indicative of ADHD. In case of behavioural or learning problems a thorough diagnostic has to be undertaken. Treatment of ADHD in children with epilepsy is essentially the same as in otherwise healthy children. Methylphenidate is considered safe and effective for children with well-controlled epilepsy.

Exp Brain Res. 2010;203:233-39.

Learning efficacy of explicit visuomotor sequences in children with attention-deficit/hyperactivity disorder and Asperger syndrome.

Watanabe K, Ikeda H, Miyao M.

Developmental disorders such as attention-deficit/hyperactivity disorder (ADHD) and Asperger syndrome (AS) are often associated with learning disabilities. This study investigated the explicit learning of visuomotor sequences in 17 ADHD children (mean age 12.1), 21 AS children (mean age 12.7), and 15 typically developing children (mean age: 12.3). The participants were required to explore a hidden sequence of button presses by trial and error and elaborate the learned sequence (2 null 10 task: Hikosaka et al. 1996). The results indicated that although ADHD and AS children had a tendency of repeating the same errors and took longer to complete a sequence, both showed a degree and pattern of improvement in accuracy and speed similar to that of typically developing children. These results suggest that the explicit learning of visuomotor sequence in ADHD and AS patients is largely unimpaired.

J Clin Psychiatry. 2010 May;71:548-56.

A controlled trial of the methylphenidate transdermal system on before-school functioning in children with attention-deficit/hyperactivity disorder.

Wilens TE, Hammerness P, Martelon M, et al.

OBJECTIVE: Children with attention-deficit/hyperactivity disorder (ADHD) frequently manifest behavioral difficulties in the morning prior to school. Our aim was to examine the effects of the methylphenidate transdermal system (MTS) on before-school ADHD symptoms and functioning in children with ADHD.

METHOD: In this randomized crossover study, conducted from May 2007 until December 2008, 6- to 12-year-old subjects with DSM-IV-defined ADHD received either MTS or a placebo transdermal system (PTS) at 10 mg for 1 week and then 20 mg for 1 week. Subjects were then crossed over directly to the other treatment for the remaining 2 weeks. The primary efficacy measure was the ADHD Rating Scale. All analyses were intent to treat, with the last observation carried forward.

RESULTS: Thirty subjects completed at least 1 week of treatment, and 26 subjects completed the entire protocol. The sample was primarily male, with a mean +/- SD age of 9.17 +/- 1.84 years. Compared to PTS, there were significant reductions with MTS in the ADHD Rating Scale score ($P < .001$). Adverse effects of MTS during the active (versus PTS) phase were similar to those seen in other controlled trials of MTS.

CONCLUSIONS: These results show that MTS is effective not only for morning ADHD symptoms, but also in improving associated activities and functioning that occur before school in children with ADHD. TRIAL REGISTRATION: clinicaltrials.gov Identifier: NCT00586157

Zh Nevrologii Psihatrii im S S Korsakova. 2009;109:53-57.

Attention deficit hyperactivity disorder: The role of parent and teacher questionnaire in the assessment of patient's social-psychological adaptation.

Zavadenko NN, Levedeva TV, Schasnaya OV, et al.

Parents and teachers of 342 school children, aged from 7 to 11 years, were questioned with the <<Strengths and Difficulties Questionnaire>> (SDQ) using non-randomized method. The following comparative analysis of SDQ items measured in parents and teachers of children with ADHD and age-matched controls was carried out. It has been shown that the spectrum of disturbances characteristic of ADHD is not confined only to main symptoms of ADHD. The results of questionnaire of both parents and teachers indicated the marked intensity of emotional disturbances, behavioral problems and difficulties in interactions with peers as well as the underdevelopment of social trends in behavior in children with ADHD compared to the controls. The data obtained confirm the necessity of treatment extension beyond the core symptoms with considering more general parameters of the patients quality of life.

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