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BIBLIOGRAFIA ADHD giugno 2016

Acta Psychiatr Scand. 2016.

BDNF VAL66MET POLYMORPHISM AND PERIPHERAL PROTEIN LEVELS IN PEDIATRIC BIPOLAR DISORDER AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Zeni CP, Tramontina S, Aguiar BW, et al.

Objective: Frontiers between pediatric bipolar disorder (PBD) and attention-deficit/hyperactivity disorder (ADHD) are not well defined. Few studies have addressed potentially different neurobiological factors between the two disorders. Brain-derived neurotrophic factor (BDNF) has been increasingly recognized for its etiologic and prognostic role in adult bipolar disorder (BD) studies. This study aimed to examine the BDNF gene polymorphism and potential alterations in BDNF serum levels in the pediatric ADHD patients with or without comorbid BD illness.

Method: We assessed the non-synonymous single-nucleotide polymorphism in the BDNF gene (rs6265/Val66Met) and its serum levels in children and adolescents with BD comorbid with ADHD (BD + ADHD) and ADHD alone. Children and adolescents were assessed for psychiatric diagnoses using the Kiddie-Sads-Present and Lifetime Version (K-SADS-PL).

Results: Using Analysis of covariance (ancova) we detected a significant group effect (patients with BD + ADHD had higher serum levels than those with ADHD - $F_{80,3} = 8.73$, $P = 0.005$).

Conclusion: Although the Val66Met polymorphism at the BDNF gene does not seem to play a significant role in children and adolescents with BD or ADHD, BDNF serum levels deserve further attention in future research on neurobiological aspects of BD and ADHD

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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.

ADHD Atten Deficit Hyperact Disord. 2016;1-13.

EMOTIONAL DYSREGULATION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

van Stralen J.

Emotional dysregulation is increasingly recognized as a core feature of attention-deficit/hyperactivity disorder (ADHD). The purpose of the present systematic literature review was to identify published data related to the neuropsychology of emotional dysregulation in children with ADHD. The literature obtained is discussed in the contexts of deficits in emotional control, impairments in executive function, the emotional components of comorbidities, neurophysiological and autonomic correlates of emotional dysregulation, and the significance of multiple neuropsychological pathways of ADHD on emotional dysregulation. These various lines of evidence are used to create a patient-oriented conceptual model framework of the pathway from stimulus to inappropriate internalized (sadness, moodiness) or externalized (anger, aggressiveness) emotional responses. The article concludes by calling for continued research into the development of reliable and universally accepted measures of emotional dysregulation in order to provide children affected with ADHD, and their caregivers, some explanation for their emotional lability and, ultimately, to be used as tools to evaluate potential treatments

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Allergol Immunopathol. 2016.

PSYCHIATRIC DISORDERS AND SYMPTOMS SEVERITY IN PRE-SCHOOL CHILDREN WITH COW'S MILK ALLERGY.

Topal E, Catal F, Soylu N, et al.

Background: Psychiatric disorders are seen frequently in atopic diseases. The present study aims to evaluate the frequency of psychiatric disorders and the severity of psychiatric symptoms in pre-school children with cow's milk allergy.

Methods: The parents of the pre-school children with cow's milk allergy were interviewed in person and asked to fill out the Early Childhood Inventory-4 form.

Results: The cow's milk allergy group included 40 children (27 male, 13 female) with mean age, 44.5. -]. 14.7 months, and the control group included 41 children (25 male, 16 female) with mean age, 47.6. -]. 15.2 months. It was established that 65% of the group with cow's milk allergy received at least one psychiatric diagnosis, while 36.6% of the control group received at least one psychiatric diagnosis, with a statistically significant difference ($p = 0.02$). Within the psychiatric disorders, attention deficit hyperactivity disorders (odds ratio: 4.9, 95% CI: 1.472-16.856, $p = 0.006$), oppositional defiant disorder (odds ratio: 5.6, 95% CI: 1.139-28.128, $p = 0.026$), and attachment disorder (odds ratio: 4.8, 95% CI: 1.747-13.506, $p = 0.004$) were found significantly higher compared with the healthy control group. When the groups were compared in terms of psychiatric symptom severity scores, calculated by using the Early Childhood Inventory-4 form, attention deficit hyperactivity disorders severity ($p = 0.006$) and oppositional defiant disorder severity ($p = 0.037$) were found to be higher in the cow's milk allergy group.

Conclusion: Psychiatric disorders are frequent and severe in pre-school children with cow's milk allergy

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Am J Med Genet Part B Neuropsychiatr Genet. 2016;171:573-88.

GENE-SET AND MULTIVARIATE GENOME-WIDE ASSOCIATION ANALYSIS OF OPPOSITIONAL DEFIANT BEHAVIOR SUBTYPES IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Aebi M, van Donkelaar MMJ, Poelmans G, et al.

Oppositional defiant disorder (ODD) is a frequent psychiatric disorder seen in children and adolescents with attention-deficit-hyperactivity disorder (ADHD). ODD is also a common antecedent to both affective disorders and aggressive behaviors. Although the heritability of ODD has been estimated to be around 0.60, there has been little research into the molecular genetics of ODD. The present study examined the association of irritable and defiant/vindictive dimensions and categorical subtypes of ODD (based on latent class analyses) with previously described specific polymorphisms (DRD4 exon3 VNTR, 5-HTTLPR, and seven OXTR SNPs) as well as with dopamine, serotonin, and oxytocin genes and pathways in a clinical sample of children and adolescents with ADHD. In addition, we performed a multivariate genome-wide association study (GWAS)

of the aforementioned ODD dimensions and subtypes. Apart from adjusting the analyses for age and sex, we controlled for "parental ability to cope with disruptive behavior." None of the hypothesis-driven analyses revealed a significant association with ODD dimensions and subtypes. Inadequate parenting behavior was significantly associated with all ODD dimensions and subtypes, most strongly with defiant/vindictive behaviors. In addition, the GWAS did not result in genome-wide significant findings but bioinformatics and literature analyses revealed that the proteins encoded by 28 of the 53 top-ranked genes functionally interact in a molecular landscape centered around Beta-catenin signaling and involved in the regulation of neurite outgrowth. Our findings provide new insights into the molecular basis of ODD and inform future genetic studies of oppositional behavior

Am J Med Genet Part B Neuropsychiatr Genet. 2016.

TESTING FOR THE MEDIATING ROLE OF ENDOPHENOTYPES USING MOLECULAR GENETIC DATA IN A TWIN STUDY OF ADHD TRAITS.

Pinto R, Asherson P, Iliott N, et al.

Family and twin studies have identified endophenotypes that capture familial and genetic risk in attention-deficit/hyperactivity disorder (ADHD), but it remains unclear if they lie on the causal pathway. Here, we illustrate a stepwise approach to identifying intermediate phenotypes. First, we use previous quantitative genetic findings to delineate the expected pattern of genetically correlated phenotypes. Second, we identify overlapping genetic associations with ADHD-related quantitative traits. Finally, we test for the mediating role of associated endophenotypes. We applied this approach to a sample of 1,312 twins aged 7-10. Based on previous twin model-fitting analyses, we selected hyperactivity-impulsivity, inattention, reading difficulties (RD), reaction time variability (RTV) and commission errors (CE), and tested for association with selected ADHD risk alleles. For nominally significant associations with both a symptom and a cognitive variable, matching the expected pattern based on previous genetic correlations, we performed mediation analysis to distinguish pleiotropic from mediating effects. The strongest association was observed for the rs7984966 SNP in the serotonin receptor gene (HTR2A), and RTV ($P=0.007$; unadjusted for multiple testing). Mediation analysis suggested that CE (38%) and RTV (44%) substantially mediated the association between inattention and the T-allele of SNP rs3785157 in the norepinephrine transporter gene (SLC6A2) and the T-allele of SNP rs7984966 in HTR2A, respectively. The SNPs tag risk-haplotypes but are not thought to be functionally significant. While these exploratory findings are preliminary, requiring replication, this study demonstrates the value of this approach that can be adapted to the investigation of multiple genetic markers and polygenic risk scores

American Journal of Rhinology and Allergy. 2016;30:209-14.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER-RELATED SYMPTOMS IMPROVED WITH ALLERGIC RHINITIS TREATMENT IN CHILDREN.

Yang MT, Chen CC, Lee WT, et al.

Background: Increased prevalence of attention-deficit/hyperactivity disorder (ADHD) in children with allergic rhinitis (AR) has been reported. Our previous study showed that children with untreated AR had higher ADHD scores than did the controls.

Objective: This prospective follow-up study aimed to investigate whether elevated ADHD scores in children with AR could be decreased by AR treatment.

Methods: Sixty-eight children with AR (age range, 6-14 years) and who were drug naive were enrolled and evaluated by AR symptom score, ADHD symptom scores, and computerized continuous performance test, before and after AR therapy, which included nonpharmacologic intervention, oral antihistamines, and topical steroids. Thirty-one age-matched controls and 13 children with pure ADHD were also enrolled for comparison. The relationship between the AR and ADHD score change was analyzed by a partial correlation test, and univariate and multivariate linear regression models were applied to investigate possible predictors for the improvement of ADHD scores by AR treatment.

Results: AR symptom scores in children with AR decreased significantly after treatment ($p < 0.001$), and their ADHD scores also decreased significantly ($p < 0.001$). An improved AR symptom score was positively correlated with improved detectability ($r_p = 0.617$, $p = 0.001$) and commission error ($r_p = 0.511$, $p = 0.011$). Significant predictors for the improvement of ADHD scores included age, AR drugs, AR subtypes, and multiple atopic diseases ($p_s < 0.05$).

Conclusion: Higher ADHD scores in children with AR compared with healthy controls decreased significantly with AR treatment. For children with AR and borderline ADHD symptoms, who do not meet full ADHD diagnostic criteria, we recommend initially treating their AR and monitoring improvement of ADHD symptoms

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Anadolu Psikiyatr Derg. 2016;17:223-30.

ANGER AND AGGRESSION LEVEL IN PARENTS OF CHILDREN WITH ATTENTION DEFICIT AND HYPERACTIVITY DISORDER.
Kara K, Durukan, Koparan C, et al.

Objective: In this study we aimed to assess the aggression and trait anger-anger expression levels in parents of children with attention deficit and hyperactivity disorder (ADHD) and to investigate the relationship between symptoms of ADHD/oppositional defiant disorder and aggression and anger levels of parents.

Methods: The study sample consisted parents of 58 children diagnosed with ADHD between 6-14 ages. The healthy control group consisted of 54 healthy children's parents. Both ADHD and healthy group were assessed with Sociodemographic Data Form, Buss-Perry Aggression Questionnaire and Trait Anger Expression Inventory. Symptoms of ADHD in children were evaluated with the DSM-IV Based Behavior Disorders Screening and Rating Scale.

Results: We found that trait anger level of mothers was higher in ADHD group than the control group. Anger control scores of ADHD parents was lower than the control group. Buss-Perry Aggression Questionnaire total aggression score and hostility sub-scale score was found to be higher in ADHD group than healthy control group. Additionally, attention deficit and oppositional defiant symptom levels of ADHD children were in relation with hostility level of parents and trait anger level of mothers.

Conclusion: In our study trait anger and total aggression levels of mothers were found to be higher in ADHD group than healthy control group. Anger control levels of parents of ADHD group were lower than the control group. Parents of children with ADHD should be aware of their emotion and behavior related to anger and aggression during the treatment of child

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Anadolu Psikiyatr Derg. 2016;17:231-39.

FACTORS PREDICTING AGGRESSIVE BEHAVIORS IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.
Ayaz AB, Güler EE, Yildirim B, et al.

Objectives: Aggressive behaviors are an important associated developmental feature of Attention-Deficit/Hyperactivity Disorder (ADHD) and affect long term prognosis of ADHD. In this study, it's aimed to investigate the impact of sociodemographic variables, and variables related with the child such as verbal skills, the ability to decode facial expressions, social reciprocity skills and anxiety levels, on aggressive behaviors in children with ADHD.

Methods: The study group consisted of 116 children between 7 and 11 year-old, who referred to a child psychiatry clinic, and were diagnosed with ADHD for the first time. A sociodemographic form, Turgay DSM-IV-Based Child and Adolescent Disruptive Behavioral Disorders Screening and Rating Scale (T-DSM-IV-Scale)-parent form, Social Reciprocity Scale (SRS), Child Behavior Checklist (CBCL), Screen for Child Anxiety Related Emotional Disorders (SCARED)-parent form, Reading Mind in the Eyes Test were used for assessment. Diagnoses were established based on clinical interview, and supported by the Kiddie Schedule for Affective Disorders and Schizophrenia.

Results: The mean age of children were 9.65 ± 2.01 . The CBCL aggressive behavior subscale score was correlated with the SCARED-parent form total score, SRS total score, and T-DSM-IV-Scale-parent form hyperactivity/impulsivity (H/I) subscale score. In multiple linear regression analysis, the three control measures were found to be the predictive factors of aggressive behavior severity, with the mean score of T-

DSM-IV-S H/I subscale recording a higher beta value than the SCARED Parent Form score, and SRS total score.

Discussion: In children with ADHD, it's supposed that investigating the predictive factors, and implementing the preventive interventions before the appearance of aggressive behaviors will improve the prognosis of disorder

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ANAE Approche Neuropsychol Apprentiss Enfant. 2016;28:79-84.

MOTOR DISORDERS IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADD/ADHD).

Kaiser ML, Albaret JM.

More than one half of children with attention deficit hyperactivity disorder (ADD/ADHD) present global or specific motor disorders varying in intensity from mild to severe. Children with ADD are at greater risk of presenting impaired fine motor skills than a child with predominantly hyperactive ADHD, indicating a probable link between motor skills and attention. The authors conducted an exploratory study designed to analyse the relationship between attention and motor skills in 9 children with ADD/ADHD, 7 children with developmental coordination disorder and 13 children with no disorders. All children completed part of the attention assessment test and the movement assessment battery for children -2. A significant relationship was demonstrated between the variance of the reaction time and manual dexterity in children with ADD/ADHD, but not in the other children. A study needs to be conducted on a larger cohort in order to confirm these results and to more clearly understand these links

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ANAE Approche Neuropsychol Apprentiss Enfant. 2016;28:85-92.

ADD/ADHD CHILDREN AND VIDEO GAMES: BETWEEN EXCESSIVE CONSUMPTION AND POSITIVE VIDEO GAME USE.

Bioulac S.

The consequences of video games are the subject of a real debate. Using the example of ADD/ADHD, this article tries to illustrate these two patterns of behaviours, excessive use and positive use of video games in the light of two exploratory studies conducted in ADD/ADHD and control children, one investigating video games use based on questionnaires, and the other based on observation of the video game performances of these children. Pathological video game use could constitute a riskfactor for the subsequent development of other addictive behaviours. Nevertheless, in a playful and motivating context, ADD/ADHD children are able to mobilize their attentional capacities and achieve equivalent performances to those of control subjects ADHD children manage to mobilize their attentional abilities and get equivalent performance with control subjects

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Anais Brasileiros de Dermatologia. 2016;91:250-52.

RELATIONSHIP BETWEEN ACNE VULGARIS AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN A CLINICAL SAMPLE OF WOMEN.

Bilgic A, Bilgic Ö, Çolak RS, et al.

Acne vulgaris has recently been reported to be associated with elevated rates of attention deficit/hyperactivity disorder in epidemiological studies. This report examines childhood and current attention-deficit/hyperactivity disorder symptoms in a clinical sample of female adults. Ninety-one women with acne vulgaris and 53 controls were included in this study. The aforementioned symptoms were measured in participants. No significant differences were found between patients and controls in any of the measurements. Contrary to the findings of epidemiological studies, this study did not uncover a link between acne vulgaris and attention-deficit/ hyperactivity disorder

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Archives of Sexual Behavior. 2016 May;45:791-92.

COMORBID GENDER DYSPHORIA IN A PREADOLESCENT BOY WITH FRAGILE X SYNDROME.

Türkoglu S, Türkoglu G.

This article describes a preadolescent boy with both fragile X syndrome (FXS) and gender dysphoria/gender identity disorder (GD/GID). An 11-year-old boy was referred to a Child Psychiatry Clinic from the pediatrician with complaints of behavior problems and poor social skills. Major complaint of mother and father was the feminine behavior of the child. At age 7, he had genetic testing and was diagnosed with fragile X syndrome. Based on these symptoms, we diagnosed him as having GD, mild intellectual disability, and attention-deficit/hyperactivity disorder (ADHD) in accordance with the DSM-5 criteria. FMRI is likely to play an important role in the process of synaptic remodeling. It has been reported that a spectrum of neurodevelopmental disorders are commonly experienced by individuals with FXS, such as autism spectrum disorder, intellectual disability, ADHD, and seizures, because of the neurobiological processes underlying CNS dysfunction. Therefore, GID is acceptable as neurodevelopmental condition. Probably, GID is more common in individuals with a FXS and other neurodevelopmental disorders. Further research is required to determine the frequency and clarify the relationship

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Aust New Zealand J Psychiatry. 2015;50:557-65.

DOES COLLATERAL RETROSPECTIVE INFORMATION ABOUT CHILDHOOD ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS ASSIST IN THE DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN ADULTS? FINDINGS FROM A LARGE CLINICAL SAMPLE.

Breda V, Rovaris DL, Vitola ES, et al.

Objectives: In accordance with consolidated clinical practice, Diagnostic and Statistical Manual of Mental Disorders, 5th edition suggests a key role of collateral information in the evaluation of retrospective childhood attention-deficit/hyperactivity disorder symptoms in adults despite poor evidence supporting its use. This study aims to assess the incremental value of collateral information on the presence of childhood attention-deficit/hyperactivity disorder symptoms when evaluating adults with attention-deficit/hyperactivity disorder.

Methods: Adult patients with attention-deficit/hyperactivity disorder (n = 449) and non-attention-deficit/hyperactivity disorder subjects (n = 143) underwent an extensive clinical assessment based on Diagnostic and Statistical Manual of Mental Disorders, 4th edition criteria. For patients, retrospective collateral information regarding childhood attention-deficit/hyperactivity disorder was obtained and used to sort them into two groups: agreement (n = 277) and disagreement (n = 172) between self- and collateral reports. We compared demographic, clinical and response to treatment profiles among groups to test the relevance of collateral information on the specific issue of childhood attention-deficit/hyperactivity disorder symptoms.

Results: Both attention-deficit/hyperactivity disorder groups had higher rates of several comorbidities (oppositional defiant, conduct, substance use and bipolar disorders; all p < 0.001) and impairments than controls. Disagreement between self- and collateral reports on childhood attention-deficit/hyperactivity disorder symptoms occurred in 38% of patients. Overall, attention-deficit/hyperactivity disorder disagreement and agreement groups had similar profiles in response to treatment and comorbidity, and the few differences detected in impairment measures were of small magnitude ($\eta^2 < 0.05$).

Conclusion: Although collateral report has an important role for diagnosing attention-deficit/hyperactivity disorder in children, it has no incremental value in the evaluation of childhood attention-deficit/hyperactivity disorder symptoms in adults with a self-reported history of attention-deficit/hyperactivity disorder assessed in clinical settings

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Aust New Zealand J Psychiatry. 2015;50:548-56.

PSYCHIATRIC COMORBIDITIES OF ADULTS WITH EARLY- AND LATE-ONSET ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Lin YJ, Yang LK, Gau SSF.

Objective: We evaluated the psychiatric comorbidities in adults who were diagnosed with Diagnostic and Statistical Manual of Mental disorders, 5th edition attention-deficit/hyperactivity disorder as a function of recalled symptom onset before and after the age of 7 years and whether the childhood attention-deficit/hyperactivity disorder symptoms were associated with psychiatric comorbidities.

Method: In all, 214 adults who were diagnosed with Diagnostic and Statistical Manual of Mental disorders, 5th edition attention-deficit/hyperactivity disorder and 174 non-attention-deficit/hyperactivity disorder controls (aged 17-40 years) received psychiatric interviews to confirm their previous and current attention-deficit/hyperactivity disorder status and other psychiatric diagnoses. Demographics and risks of lifetime psychiatric disorders were compared among three groups: (1) attention-deficit/hyperactivity disorder, onset <7 years (early-onset); (2) attention-deficit/hyperactivity disorder, onset between 7 and 12 years (late-onset) and (3) non-attention-deficit/hyperactivity disorder controls. We also tested the effects of attention-deficit/hyperactivity disorder symptoms on the risk of later psychiatric comorbidities by Cox regression analyses.

Results: Regardless of the age of onset, attention-deficit/hyperactivity disorder was significantly associated with a wide range of psychiatric comorbidities. There were similar comorbid patterns between early- and late-onset attention-deficit/hyperactivity disorder. Regardless of attention-deficit/hyperactivity disorder diagnosis, increased severity of attention-deficit/hyperactivity disorder symptoms was associated with higher risks of oppositional defiant disorder, conduct disorder, dysthymia and sleep disorder but not major depression, which was associated with the attention-deficit/hyperactivity disorder diagnosis.

Conclusion: Our findings suggest that elevating the threshold of age of onset to 12 years in Diagnostic and Statistical Manual of Mental disorders, 5th edition would not over-diagnose attention-deficit/hyperactivity disorder in the adult population. Recalled childhood attention-deficit/hyperactivity disorder symptom severity was correlated with conduct disorder, oppositional defiant disorder, dysthymia and sleep disorders

Behavior Analysis in Practice. 2016 Jun;9:174-78.

EFFECTS OF RESPONSE EFFORT ON RESURGENCE.

Wilson AN, Glassford TS, Koerkenmeier SM.

The present study examined response effort during resurgence tests. Six children were trained to place balls in baskets that were placed either close (.0254 m) or far away (1.829 m or .9 m). Resurgence was assessed using a linear strip design, where responses were reinforced on a variable-interval 10-s schedule or put on extinction. During resurgence tests, minimal to low rates of resurgence associated with the greater response effort (i.e., placing a ball in the basket further way) were observed across all six participants, regardless of distance

Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 2016;1:353-63.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS COINCIDE WITH ALTERED STRIATAL CONNECTIVITY.

Oldehinkel M, Beckmann CF, Pruim RHR, et al.

Background Corticostriatal network dysfunction in attention-deficit/hyperactivity disorder (ADHD) is generally investigated by comparing functional connectivity of the main striatal subregions (i.e., putamen, caudate, and nucleus accumbens) between an ADHD group and a control group. However, dimensional analyses based on continuous symptom measures might help to parse the high phenotypic heterogeneity in ADHD. Here, we focus on functional segregation of regions in the striatum and investigate corticostriatal networks using both categorical and dimensional measures of ADHD.

Methods We computed whole-brain functional connectivity for six striatal subregions that resulted from a novel functional parcellation technique. We compared functional connectivity maps between adolescents

with ADHD (n = 169) and healthy controls (n = 122), and investigated dimensional ADHD-related measures by relating striatal connectivity to ADHD symptom scores (N = 444). Finally, we examined whether altered connectivity of striatal subregions was related to motor and cognitive performance.

Results We observed no case-control differences in functional connectivity patterns of the six striatal networks. In contrast, inattention and hyperactivity/impulsivity symptom scores were associated with increases in functional connectivity in the networks of posterior putamen and ventral caudate. Increased connectivity of posterior putamen with motor cortex and cerebellum was associated with decreased motor performance.

Conclusions Our findings support hypotheses of corticostriatal network dysfunction in ADHD by demonstrating that dimensional symptom measures are associated with changes in functional connectivity. These changes were not detected by categorical ADHD versus control group analyses, which highlights the important contribution of dimensional analyses to investigating the neurobiology of ADHD

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Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. 2016;1:372-80.

ATTENTIONAL SELECTION AND SUPPRESSION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Wang E, Sun L, Sun M, et al.

Background Attention-deficit/hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder with prominent impairments in directing and sustaining attention. The aim of this study was to identify the neurophysiologic bases of attention deficits in ADHD, focusing on electroencephalography markers of attentional selection (posterior contralateral N2 [N2pc]) and suppression (distractor positivity [PD]).

Methods The electroencephalography data were collected from 135 children 9-15 years old with and without ADHD while they searched for a shape target in either the absence (experiment 1) or the presence (experiment 2) of a salient but irrelevant color distractor.

Results In experiment 1, the shape target elicited a smaller N2pc in children with ADHD (n = 38) compared with typically developing children (n = 36). The smaller N2pc amplitude predicted higher levels of inattentive symptoms in children with ADHD. Moreover, the target-elicited N2pc was followed by a positivity in typically developing children but not in children with ADHD. In experiment 2, the salient but irrelevant color distractor elicited a smaller PD component in children with ADHD (n = 32) compared with typically developing children (n = 29). The smaller PD predicted higher inattentive symptom severity as well as lower behavioral accuracy in children with ADHD.

Conclusions The correlation between N2pc/PD amplitudes and ADHD symptom severity suggests that these signals of attentional selection and suppression may serve as potential candidates for neurophysiologic markers of ADHD. Our findings provide a neurophysiologic basis for the subjective reports of attention deficits in children with ADHD and highlight the importance of spatial attention impairments in ADHD

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BMC Psychiatry. 2016;16.

PERSONALITY DISORDERS AND AXIS I COMORBIDITY IN ADOLESCENT OUTPATIENTS WITH ADHD.

Korsgaard HO, Torgersen S, Wentzel-Larsen T, et al.

Background: Attention deficit hyperactivity disorder (ADHD) is a lifelong condition which carries great cost to society and has an extensive comorbidity. It has been assumed that ADHD is 2 to 5 times more frequent in boys than in girls. Several studies have suggested developmental trajectories that link ADHD and certain personality disorders. The present study investigated the prevalence of ADHD, common Axis I disorders, and their gender differences in a sample of adolescent outpatients. We also wanted to investigate the relationship between ADHD and personality disorders (PDs), as well as how this relationship was influenced by adjustment for Axis I disorders, age and gender.

Methods: We used a sample consisting of 153 adolescents, aged 14 to 17 years, who were referred to a non-specialized mental health outpatient clinic with a defined catchment area. ADHD, conduct disorder (CD) and other Axis I conditions were assessed using the Mini International Neuropsychiatric Interview (MINI). PDs were assessed using the Structured Interview for DSM-IV Personality (SIDP-IV).

Results: 13.7 % of the adolescents met diagnostic criteria for ADHD, with no significant gender difference. 21.6 % had at least one PD, 17.6 % had CD, and 4.6 % had both ADHD and a PD. There was a significantly elevated number of PD symptoms in adolescents with an ADHD diagnosis ($p = 0.001$), and this relationship was not significantly weakened when adjusted for age, gender and other Axis I disorders ($p = 0.026$). Antisocial ($\chi^2(2) = 21.18, p = 0.002$) and borderline ($\chi^2(2) = 6.15, p = 0.042$) PDs were significantly more frequent in girls than in boys with ADHD.

Conclusions: We found no significant gender difference in the prevalence of ADHD in a sample of adolescents referred to a general mental health outpatient clinic. Adolescent girls with ADHD had more PDs than boys, with antisocial and borderline PDs significantly different. The present study suggests that ADHD in girls in a general outpatient population may be more prevalent than previously assumed. It especially highlights the importance of assessing antisocial and borderline personality pathology in adolescent girls presenting with ADHD symptoms

BMJ (Online). 2016;353.

CARDIOVASCULAR SAFETY OF METHYLPHENIDATE AMONG CHILDREN AND YOUNG PEOPLE WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD): NATIONWIDE SELF CONTROLLED CASE SERIES STUDY.

Shin JY, Roughead EE, Park BJ, et al.

To determine whether treatment with methylphenidate in children and young people with attention-deficit/hyperactivity disorder (ADHD) was associated with cardiovascular events. Design Self controlled case series analysis. Setting Nationwide health insurance database, 1 January 2008 to 31 December 2011, in South Korea. Participants 1224 patients aged 7–17 who had experienced an incident cardiovascular event and had had at least one incident prescription for methylphenidate. Main outcome measures A recorded diagnosis (either a primary or secondary cause) of any of the following cardiovascular adverse events: arrhythmias (ICD-10 (international classification of diseases, 10th revision) codes I44, I45, I47, I48, I49), hypertension (codes I10-I15), myocardial infarction (code I21), ischemic stroke (code I63), or heart failure (code I50). Incidence rate ratios were calculated with conditional Poisson regression and adjusted for time varying comorbidity and comedication. Results Increased risk of arrhythmia was observed in all exposed time periods—that is, periods of treatment with methylphenidate—(incidence rate ratio 1.61, 95% confidence interval 1.48 to 1.74), and the risk was highest in the children who had congenital heart disease. No significant risk of myocardial infarction was observed for all exposed time periods (1.33, 0.90 to 1.98), though risk was higher in the early risk periods between eight and 56 days after the start of treatment with methylphenidate. No significant increased risk was observed for hypertension, ischemic stroke, or heart failure. Conclusion The relative risk of myocardial infarction and arrhythmias is increased in the early period after the start of methylphenidate treatment for ADHD in children and young people. Though the absolute risk is likely to be low, the risk-benefit balance of methylphenidate should be carefully considered, particularly in children with mild ADHD

BMJ Open. 2016;6.

PROSPECTIVE OBSERVATIONAL STUDY PROTOCOL TO INVESTIGATE LONG-TERM ADVERSE EFFECTS OF METHYLPHENIDATE IN CHILDREN AND ADOLESCENTS WITH ADHD: THE ATTENTION DEFICIT HYPERACTIVITY DISORDER DRUGS USE CHRONIC EFFECTS (ADDUCE) STUDY.

Inglis SK, Carucci S, Garas P, et al.

Introduction: Methylphenidate is the most frequently used medication for the treatment of attention-deficit/hyperactivity disorder (ADHD) in Europe. Following concerns about its safety, the European Commission called for research into the long-term effects of methylphenidate on children and adolescents with ADHD. The Attention Deficit Hyperactivity Disorder Drugs Use Chronic Effects (ADDUCE) research programme was designed to address this call. At the heart of this programme is a 2-year longitudinal naturalistic pharmacovigilance study being conducted in 27 European sites.

Methods and analysis: 3 cohorts of children and adolescents (aged 6-17) living in the UK, Germany, Italy and Hungary are being recruited: Group 1 (Medicated ADHD): 800 ADHD medication-naïve children and adolescents with a clinical diagnosis of ADHD about to start methylphenidate treatment for the first time. Group 2 (Unmedicated ADHD): 400 children and adolescents with a clinical diagnosis of ADHD who have never been treated with ADHD medication and have no intention of beginning medication. Group 3 (Non-ADHD): 400 children and adolescents without ADHD who are siblings of individuals in either group 1 or 2. All participants will be assessed 5 times during their 2-year follow-up period for growth and development, psychiatric, neurological and cardiovascular health. The primary outcome measure will be the height velocity SD score.

Ethics and dissemination: Ethical approval for the study has been granted by the East of Scotland Research Ethics Service. Following this approval, patient information leaflets and consent forms were translated as necessary and submissions made by lead sites in each of the other 3 countries to their own ethics committees. Following ethical approval in each country, local ethical permissions at each site were sought and obtained as needed. The study's website (<http://www.adhd-adduce.org/page/view/2/Home>) provides information for researchers, participants and the general public

Br J Psychiatry. 2016;208:548-55.

COGNITIVE AND NEUROPHYSIOLOGICAL MARKERS OF ADHD PERSISTENCE AND REMISSION.

Cheung CHM, Rijdsdijk F, McLoughlin G, et al.

Background Attention-deficit hyperactivity disorder (ADHD) persists in around two-thirds of individuals in adolescence and early adulthood. Aims To examine the cognitive and neurophysiological processes underlying the persistence or remission of ADHD.

Method Follow-up data were obtained from 110 young people with childhood ADHD and 169 controls on cognitive, electroencephalogram frequency, event-related potential (ERP) and actigraph movement measures after 6 years.

Results ADHD persisters differed from remitters on preparation/vigilance measures (contingent negative variation, delta activity, reaction time variability and omission errors), IQ and actigraph count, but not on executive control measures of inhibition or working memory (nogo-P3 amplitudes, commission errors and digit span backwards).

Conclusions Preparation-vigilance measures were markers of remission, improving concurrently with ADHD symptoms, whereas executive control measures were not sensitive to ADHD persistence/remission. For IQ, the present and previous results combined suggest a role in moderating ADHD outcome. These findings fit with previously identified aetiological separation of the cognitive impairments in ADHD. The strongest candidates for the development of nonpharmacological interventions involving cognitive training and neurofeedback are the preparation-vigilance processes that were markers of ADHD remission

Canadian Journal of Physiology and Pharmacology. 2016;94:579-87.

SYMBOLIC DYNAMICS OF HEART RATE VARIABILITY - A PROMISING TOOL TO INVESTIGATE CARDIAC SYMPATHOVAGAL CONTROL IN ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD)?

Tonhajzerova I, Farsky I, Mestanik M, et al.

We aimed to evaluate complex cardiac sympathovagal control in attention deficit/hyperactivity disorder (ADHD) by using heart rate variability (HRV) nonlinear analysis - symbolic dynamics. We examined 29 boys with untreated ADHD and 25 healthy boys (age 8-13 years). ADHD symptoms were evaluated by ADHD-RS-IV scale. ECG was recorded in 3 positions: baseline supine position, orthostasis, and clinostasis. Symbolic dynamics indices were used for the assessment of complex cardiac sympathovagal regulation: normalised complexity index (NCI), normalised unpredictability index (NUPI), and pattern classification measures (0V%, 1V%, 2LV%, 2UV%). The results showed that HRV complexity was significantly reduced at rest (NUPI) and during standing position (NCI, NUPI) in ADHD group compared to controls. Cardiac-linked sympathetic index 0V% was significantly higher during all posture positions and cardiovagal index 2LV% was significantly lower

to standing in boys suffering from ADHD. Importantly, ADHD symptom inattention positively correlated with 0V%, and negatively correlated with NCI, NUPI. Concluding, symbolic dynamics revealed impaired complex neurocardiac control characterised by potential cardiac beta-adrenergic overactivity and vagal deficiency at rest and to posture changes in boys suffering from ADHD that is correlated with inattention. We suggest that symbolic dynamics indices could represent promising cardiac biomarkers in ADHD

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Child Psychiatry Hum Dev. 2016 Jun;47:440-58.

THE ASSOCIATION BETWEEN SOCIOECONOMIC DISADVANTAGE AND ATTENTION DEFICIT/HYPERACTIVITY DISORDER (ADHD): A SYSTEMATIC REVIEW.

Russell AE, Ford T, Williams R, et al.

This systematic review examines associations between parental socioeconomic disadvantage and childhood attention deficit/hyperactivity disorder (ADHD). Socioeconomic status (SES) was measured by parental income, education, occupation and marital status. Results were mixed by measure of SES with no one aspect being differentially related to ADHD. 42 studies were included in the review, of which 35 found a significant univariate association between socioeconomic disadvantage and ADHD. Meta-analyses of dimensions of SES and their association with ADHD indicate that children in families of low SES are on average 1.85–2.21 more likely to have ADHD than their peers in high SES families. In spite of substantial between-study heterogeneity, there is evidence for an association between socioeconomic disadvantage and risk of ADHD measured in different ways. This is likely mediated by factors linked to low SES such as parental mental health and maternal smoking during pregnancy

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Child Psychiatry Hum Dev. 2016 Jun;47:518-26.

EFFECT OF TREATING ANXIETY DISORDERS ON COGNITIVE DEFICITS AND BEHAVIORS ASSOCIATED WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A PRELIMINARY STUDY.

Denis I, Guay MC, Foldes-Busque G, et al.

Twenty-five percent of children with ADHD also have an anxiety disorder (AD). As per Quay and in light of Barkley's model, anxiety may have a protective effect on cognitive deficits and behaviors associated with ADHD. This study aimed to evaluate the effect of treating AD on cognitive deficits and behaviors associated with ADHD in children with both disorders. Twenty-four children with ADHD and AD were divided into two groups: treatment for AD, and wait list. Participants were assessed at pre-treatment, post-treatment, and 6-month follow-up with the ADIS-C, the CBCL, and neuropsychological measures. The results revealed a significant improvement in automatic response inhibition and flexibility, and a decrease in inattention/hyperactivity behaviors following the treatment for AD. No significant differences were observed in motor response inhibition, working memory, or attention deficits. The results do not seem to support Quay's hypothesis: treating AD did not exacerbate cognitive deficits and behaviors associated with ADHD in our sample

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Child Psychiatry Hum Dev. 2016 Jun;47:407-16.

USING A BRIEF PARENT-REPORT MEASURE TO TRACK OUTCOMES FOR CHILDREN AND TEENS WITH ADHD.

McCarthy A, Asghar S, Wilens T, et al.

The Pediatric Symptom Checklist (PSC) is a widely used, parent-completed measure of children's emotional and behavioral functioning. Previous research has shown that the PSC and its subscales are responsive to patient progress over the course of psychiatric treatment. In this naturalistic study, parents and clinicians of 1736 patients aged 17 or younger completed standardized measures at intake and 3-month follow-up appointments. We assessed the 5-item PSC Attention Subscale (PSC-AS) as a longitudinal measure of attention-related symptoms in routine outpatient psychiatry treatment. Secondly, we compared PSC-AS scores with clinician-reported diagnoses, psychomotor excitation symptoms, and overall functioning. Change

scores on the PSC–AS were larger among patients with ADHD diagnoses than those with non-ADHD diagnoses. Comparisons between PSC–AS scores and clinician reports also showed acceptable levels of agreement. Given its effectiveness in tracking attention-related symptoms, the PSC may be particularly useful as a quality assurance or treatment outcome measure for clinicians treating ADHD

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CNS Neurosci Ther. 2016.

SLEEP-RELATED DISORDERS IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER: PRELIMINARY RESULTS OF A FULL SLEEP ASSESSMENT STUDY.

Miano S, Esposito M, Foderaro G, et al.

Background and methods: We present the preliminary results of a prospective case-control sleep study in children with a diagnosis of attention-deficit hyperactivity disorder (ADHD). A deep sleep assessment including sleep questionnaires, sleep habits, a video-polysomnographic recording with full high-density electroencephalography (EEG) and cardiorespiratory polygraphy, multiple sleep latency test, and 1-week actigraphic recording were performed to verify whether children with ADHD may be classified into one of the following five phenotypes: (1) hypoarousal state, resembling narcolepsy, which may be considered a "primary" form of ADHD; (2) delayed sleep onset insomnia; (3) sleep-disordered breathing; (4) restless legs syndrome and/or periodic limb movements; and (5) sleep epilepsy and/or EEG interictal epileptiform discharges.

Results: Fifteen consecutive outpatients with ADHD were recruited (two female, mean age 10.6 -| 2.2, age range 8-13.7 years) over 6 months. The narcolepsy-like sleep phenotype was observed in three children, the sleep onset insomnia phenotype was observed in one child, mild obstructive sleep apnea was observed in three children, sleep hyperkinesia and/or PLMs were observed in five children, while IEDs and or nocturnal epilepsy were observed in three children. Depending on the sleep phenotype, children received melatonin, iron supplementation, antiepileptic drugs, or stimulants.

Conclusions: Our study further highlights the need to design an efficient sleep diagnostic algorithm for children with ADHD, thereby more accurately identifying cases in which a full sleep assessment is indicated

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Cochrane Database Syst Rev. 2016;2:CD009996.

AMPHETAMINES FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) IN CHILDREN AND ADOLESCENTS.

Punja S, Shamseer L, Hartling L, et al.

BACKGROUND: Attention deficit hyperactivity disorder (ADHD) is one of the most common psychiatric conditions affecting children and adolescents. Amphetamines are among the most commonly prescribed medications to manage ADHD. There are three main classes of amphetamines: dexamphetamine, lisdexamphetamine and mixed amphetamine salts, which can be further broken down into short- and long-acting formulations. A systematic review assessing their efficacy and safety in this population has never been conducted.

OBJECTIVES: To assess the efficacy and safety of amphetamines for ADHD in children and adolescents.

SEARCH METHODS: In August 2015 we searched CENTRAL, Ovid MEDLINE, Embase, PsycINFO, ProQuest Dissertation and Theses, and the Networked Digital Library of Theses and Dissertations. We also searched ClinicalTrials.gov, and checked the reference lists of relevant studies and reviews identified by the searches. No language or date restrictions were applied.

SELECTION CRITERIA: Parallel-group and cross-over randomized controlled trials (RCTs) comparing amphetamine derivatives against placebo in a pediatric population (< 18 years) with ADHD.

DATA COLLECTION AND ANALYSIS: Two authors independently extracted data on participants, settings, interventions, methodology, and outcomes for each included study. For continuous outcomes, we calculated the standardized mean difference (SMD) and for dichotomous outcomes we calculated the risk ratio (RR). Where possible, we conducted meta-analyses using a random-effects model. We also performed a meta-analysis of the most commonly reported adverse events in the primary studies.

MAIN RESULTS: We included 23 trials (8 parallel-group and 15 cross-over trials), with 2675 children aged three years to 17 years. All studies compared amphetamines to placebo. Study durations ranged from 14 days to 365 days, with the majority lasting less than six months. Most studies were conducted in the United States; three studies were conducted across Europe. We judged 11 included studies to be at a high risk of bias due to insufficient blinding methods, failing to account for dropouts and exclusions from the analysis, and failing to report on all outcomes defined a priori. We judged the remaining 12 studies to be at unclear risk of bias due to inadequate reporting. Amphetamines improved total ADHD core symptom severity according to parent ratings (SMD -0.57; 95% confidence interval (CI) -0.86 to -0.27; 7 studies; 1247 children/adolescents; very low quality evidence), teacher ratings (SMD -0.55; 95% CI -0.83 to -0.27; 5 studies; 745 children/adolescents; low quality evidence), and clinician ratings (SMD -0.84; 95% CI -1.32 to -0.36; 3 studies; 813 children/adolescents; very low quality evidence). In addition, the proportion of responders as rated by the Clinical Global Impression - Improvement (CGI-I) scale was higher when children were taking amphetamines (RR 3.36; 95% CI 2.48 to 4.55; 9 studies; 2207 children/adolescents; very low quality evidence). The most commonly reported adverse events included decreased appetite, insomnia/trouble sleeping, abdominal pain, nausea/vomiting, headaches, and anxiety. Amphetamines were associated with a higher proportion of participants experiencing decreased appetite (RR 6.31; 95% CI 2.58 to 15.46; 11 studies; 2467 children/adolescents), insomnia (RR 3.80; 95% CI 2.12 to 6.83; 10 studies; 2429 children/adolescents), and abdominal pain (RR 1.44; 95% CI 1.03 to 2.00; 10 studies; 2155 children/adolescents). In addition, the proportion of children who experienced at least one adverse event was higher in the amphetamine group (RR 1.30; 95% CI 1.18 to 1.44; 6 studies; 1742 children/adolescents; low quality evidence). We performed subgroup analyses for amphetamine preparation (dexamphetamine, lisdexamphetamine, mixed amphetamine salts), amphetamine release formulation (long acting versus short acting), and funding source (industry versus non industry). Between-group differences were observed for proportion of participants experiencing decreased appetite in both the amphetamine preparation ($P < 0.00001$) and amphetamine release formulation (P value = 0.008) subgroups, as well as for retention in the amphetamine release formulation subgroup (P value = 0.03).

AUTHORS' CONCLUSIONS: Most of the included studies were at high risk of bias and the overall quality of the evidence ranged from low to very low on most outcomes. Although amphetamines seem efficacious at reducing the core symptoms of ADHD in the short term, they were associated with a number of adverse events. This review found no evidence that supports any one amphetamine derivative over another, and does not reveal any differences between long-acting and short-acting amphetamine preparations. Future trials should be longer in duration (i.e. more than 12 months), include more psychosocial outcomes (e.g. quality of life and parent stress), and be transparently reported

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Cortex. 2016;82:1-10.

CORTICAL MORPHOMETRY IN ATTENTION DEFICIT/HYPERACTIVITY DISORDER: CONTRIBUTION OF THICKNESS AND SURFACE AREA TO VOLUME.

Silk TJ, Beare R, Malpas C, et al.

Although lower brain volume is a consistent neuroimaging finding in attention deficit hyperactivity disorder (ADHD), we lack an understanding of whether this effect is driven by changes in cortical thickness or surface area, which are governed by distinct neurodevelopmental processes. This study examined ADHD-control differences in cortical thickness, surface area and volume, and tests whether thickness and surface area mediates any observed volume differences. Magnetic resonance imaging (MRI) data was collected from 35 males with ADHD-combined type and 35 typically developing control participants aged 9-17 years. Morphometric measures were examined for between group differences and the specific contribution of surface area and thickness to group differences in volume tested using mediation analysis. Individuals with ADHD had smaller total cortical volume (7.3%), surface area (4.3%), and mean cortical thickness (2.8%) compared to controls. Differences were pronounced in frontal and parietal lobes. Variance in volume as a function of ADHD diagnosis was accounted for at least in part by the relationship between diagnosis and each of cortical thickness and surface area, with regional variation in the relative contributions of these measures. The surface area of the precuneus was a major driver of volume differences, attesting to the potential relevance of this region for neurodevelopment in ADHD. Both surface area and cortical thickness

play a significant mediating role in determining diagnostic differences in volume, with regional variation in the contribution of thickness and surface area to those volume differences, highlighting the importance of examining both cortical thickness and surface area in examining ADHD

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Curr Opin Pediatr. 2016.

ATTENTION DEFICIT HYPERACTIVITY DISORDER MEDICATIONS IN CHILDREN WITH HEART DISEASE.

Berger S.

PURPOSE OF REVIEW: Attention deficit hyperactivity disorder (ADHD) is quite common in the general pediatric population, Its incidence is thought to be even higher in the population of patients with congenital heart disease, especially in those patients with complex disease and who have had cardiac surgical interventions early in life. There has been controversy as to the safety of ADHD medications, especially in the latter population of patients. This compendium is meant to review the effects of the ADHD medications and the safety of these medications in patients with either known or undiagnosed congenital heart disease.

RECENT FINDINGS: The concern with regard to the use of ADHD medications has been as a result of the reports of sudden unexpected deaths among patients taking stimulant drugs for ADHD. Therefore, the question of whether or not stimulant drugs increase the risk of adverse cardiovascular events has led to a discussion of the appropriate use of these drugs in patients with known cardiovascular disease, as well as a discussion as to the appropriate evaluation in order to identify undiagnosed 'at-risk' patients with congenital heart disease or arrhythmias. This article will review and amplify these discussions, as well as the conclusions that have come forth as a result of these discussions.

SUMMARY: Currently available data suggest that there is no evidence for serious adverse cardiovascular complications in children with known cardiovascular diseases including patients of congenital heart disease who are treated with stimulant medications. Despite this, if the patient does have known cardiac disease, or if the history and physical examination is suggestive of cardiac disease, it is suggested that consultation/evaluation with a pediatric cardiologist occur. It is extremely unlikely that stimulant medications would be contraindicated in almost any condition that falls under this category. However, a few specific cardiac conditions might tailor the choice of the specific ADHD medication. There fore the coordination of care between the primary care physician, the ADHD medication-prescribing physician, and the pediatric cardiologist may be very important in this circumstance

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Dev Neurorehabilitation. 2016;1-6.

THE PRAGMATIC LANGUAGE, COMMUNICATION SKILLS, PARENT'S CHILD RELATIONSHIPS, AND SYMPTOMS OF CHILDREN WITH ADHD AND THEIR PLAYMATES 18-MONTHS AFTER A PARENT-DELIVERED PLAY-BASED INTERVENTION.

Wilkes-Gillan S, Cantrill A, Parsons L, et al.

Objective: This study examined the communication skills, pragmatic language, parent's child relationships, and attention deficit hyperactivity disorder (ADHD) symptoms of children with ADHD and their playmates 18-months after a pilot parent-delivered intervention for improving social play skills and pragmatic language.

Methods: Participants were five children with ADHD, their parents, and five typically-developing playmates. Outcomes were measured immediately post and 18-months following the intervention. Parent-rated norm-based assessments and an observational measure were used. Differences within and between the ADHD and playmate groups were examined.

Results: Children maintained all skills gained 18-months following the intervention. Compared to a normative sample, children with ADHD remained below the average range on aspects of communication skills, parent's child relationships, and ADHD symptom levels 18-months following intervention.

Conclusions: After intervention, children with ADHD still experienced pragmatic language skills below those of their peers on norm-based assessments that measure their skills across contexts. School-based interventions are needed to facilitate ongoing skill development and generalization

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Environ Health Perspect. 2016;124:868-74.

CHILDHOOD BLOOD LEAD LEVELS AND SYMPTOMS OF ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD): A CROSS-SECTIONAL STUDY OF MEXICAN CHILDREN.

Huang S, Hu H, Sánchez BN, et al.

BACKGROUND: Previous studies suggest that blood lead levels are positively associated with attention deficit/hyperactivity disorder (ADHD) and ADHD-symptoms in children. However, the associations between lead exposure and ADHD subtypes are inconsistent and understudied.

OBJECTIVE: The objective of this study was to explore the association of low-level concurrent lead exposure with subtypes of ADHD symptoms in 578 Mexican children 6-13 years of age.

METHODS: We measured concurrent blood lead levels using inductively coupled plasma mass spectrometry (ICPMS). We administered the Conners' Rating Scales-Revised (CRS-R) to mothers to evaluate their children's ADHD symptoms. We used imputation to fill missing values in blood lead levels and used segmented regression models adjusted for relevant covariates to model the nonlinear relationship between blood lead and ADHD symptoms.

RESULTS: Mean \pm SD blood lead levels were 3.4 ± 2.9 $\mu\text{g/dL}$. In adjusted models, a 1- $\mu\text{g/dL}$ increase in blood lead was positively associated with Hyperactivity and Restless-Impulsivity scores on the CRS-R scale and Hyperactivity-Impulsivity scores on the CRS-R scale of the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, but only in children with blood lead level ≤ 5 $\mu\text{g/dL}$. Blood lead was not associated with Inattentive symptoms or overall ADHD behavior.

CONCLUSIONS: In this population of Mexican children, current blood lead level among children with low exposure (≤ 5 $\mu\text{g/dL}$) was positively associated with hyperactive/impulsive behaviors, but not with inattentiveness. These results add to the existing evidence of lead-associated neurodevelopmental deficits at low levels of exposure.

CITATION: Huang S, Hu H, Sánchez BN, Peterson KE, Ettinger AS, Lamadrid-Figueroa H, Schnaas L, Mercado-García A, Wright RO, Basu N, Cantonwine DE, Hernández-Avila M, Téllez-Rojo MM. 2016. Childhood blood lead levels and symptoms of attention deficit hyperactivity disorder (ADHD): a cross-sectional study of Mexican children. Environ Health Perspect 124:868-874; <http://dx.doi.org/10.1289/ehp.1510067>

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Environ Res. 2016;150:112-18.

ASSOCIATION OF BISPHENOL A EXPOSURE AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN A NATIONAL SAMPLE OF U.S. CHILDREN.

Tewar S, Auinger P, Braun JM, et al.

Background: Bisphenol A (BPA) has been linked to changes in the dopamine system and development of an Attention-Deficit/Hyperactivity Disorder (ADHD) phenotype in animal models, with differing effects in males compared to females. We examined the association between urinary BPA concentrations and ADHD in a national sample of U.S. children, and whether this association differs by child sex.

Methods: We used data from the 2003-2004 National Health and Nutrition Examination Survey, a cross-sectional, nationally representative sample of the U.S. population. Participants were 8-15 years of age (N=460). Using a diagnostic interview to ascertain the presence of ADHD in the past year, multivariable logistic regression examined the link between concurrent urinary BPA concentrations and ADHD status.

Results: Of the 460 participants, 7.1% [95% CI: 4.4-11.3] met Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (DSM-IV) criteria for ADHD. Children who had BPA concentrations at or above the median of the sample had higher prevalence of meeting criteria for ADHD (11.2% [95% CI: 6.8-17.8]) than those with BPA concentrations below the median (2.9% [95% CI: 1.1-7.2]). Higher urinary BPA

concentrations were associated with ADHD (adjusted odds ratio [aOR]: 5.68 [95% CI: 1.6-19.8] for BPA concentrations above vs. below the median). In sex-stratified analyses, these associations were stronger in boys (aOR=10.9 [95% CI: 1.4-86.0]) than in girls (aOR=2.8 [95% CI: 0.4-21.3]), although the BPA by sex interaction term was not significant ($p=0.25$).

Conclusion: We found evidence that higher urinary BPA concentrations were associated with ADHD in U.S. children; these associations were stronger in boys than in girls. Considering the widespread use of BPA and growing literature on neurobehavioral effects of BPA in children, further study is warranted to determine if reducing exposure to BPA may represent an important avenue for ADHD prevention

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Eur Arch Psychiatry Clin Neurosci. 2016;266:359-66.

MAP1B AND NOS1 GENES ARE ASSOCIATED WITH WORKING MEMORY IN YOUTHS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Salatino-Oliveira A, Wagner F, Akutagava-Martins GC, et al.

Diverse efforts have been done to improve the etiologic understanding of mental disorders, such as attention-deficit/hyperactivity disorder (ADHD). It becomes clear that research in mental disorders needs to move beyond descriptive syndromes. Several studies support recent theoretical models implicating working memory (WM) deficits in ADHD complex neuropsychology. The aim of this study was to examine the association between rs2199161 and rs478597 polymorphisms at MAP1B and NOS1 genes with verbal working memory in children and adolescents with ADHD. A total of 253 unrelated ADHD children/adolescents were included. The sample was diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders-4th edition criteria. Digit Span from the Wechsler Intelligence Scale for Children-Third Edition was used to assess verbal WM. The raw scores from both forward and backward conditions of Digit Span were summed and converted into scaled scores according to age. The means of scaled Digit Span were compared according to genotypes by ANOVA. Significant differences in Digit Span scores between MAP1B genotype groups (rs2199161: $F = 5.676$; $p = 0.018$) and NOS1 (rs478597: $F = 6.833$; $p = 0.009$) genes were detected. For both polymorphisms, the CC genotype carriers showed a worse performance in WM task. Our findings suggest possible roles of NOS1 and MAP1B genes in WM performance in ADHD patients, replicating previous results with NOS1 gene in this cognitive domain in ADHD children

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Eur Child Adolesc Psychiatry. 2016;1-14.

RATES OF PEER VICTIMIZATION IN YOUNG ADOLESCENTS WITH ADHD AND ASSOCIATIONS WITH INTERNALIZING SYMPTOMS AND SELF-ESTEEM.

Becker SP, Mehari KR, Langberg JM, et al.

The purposes of the present study were to: (1) describe rates of peer victimization in young adolescents with attention-deficit/hyperactivity disorder, (2) evaluate the association between types of peer victimization (i.e., physical, relational, and reputational) and internalizing problems (i.e., anxiety, depression, and self-esteem), and (3) examine whether associations between victimization and internalizing problems differ for males or females. Participants were 131 middle-school students (ages 11-15 years, 73 % male, 76 % White) diagnosed with ADHD who completed ratings of victimization, anxiety, depression, and self-esteem. Over half of the participants (57 %) reported experiencing at least one victimization behavior at a rate of once per week or more, with higher rates of relational victimization (51 %) than reputational victimization (17 %) or physical victimization (14 %). Males reported experiencing more physical victimization than females, but males and females did not differ in rates of relational or reputational victimization. Whereas relational and physical victimization were both uniquely associated with greater anxiety for both males and females, relational victimization was associated with greater depressive symptoms and lower self-esteem for males but not females. These findings indicate that young adolescents with ADHD frequently experience peer

victimization and that the association between victimization and internalizing problems among young adolescents with ADHD differs as a result of victimization type, internalizing domain, and sex

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European Journal of Drug Metabolism and Pharmacokinetics. 2016;1-13.

METHYLPHENIDATE FOR TREATING ADHD: A NATURALISTIC CLINICAL STUDY OF METHYLPHENIDATE BLOOD CONCENTRATIONS IN CHILDREN AND ADULTS WITH OPTIMIZED DOSAGE.

Chermá MD, Josefsson M, Rydberg I, et al.

Background: Methylphenidate (MPH), along with behavioral and psychosocial interventions, is the first-line medication to treat attention-deficit hyperactivity disorder (ADHD) in Sweden. The dose of MPH for good symptom control differs between patients. However, studies of MPH concentration measurement in ADHD treatment are limited.

Objective: To describe blood and oral fluid (OF) concentrations of MPH after administration of medication in patients with well-adjusted MPH treatment for ADHD, and to identify the most suitable matrix for accurate MPH concentration during treatment.

Methods: Patients were recruited from Child and Adolescent Psychiatry (CAP), General Psychiatry (GP), and the Department of Dependency (DD). Blood and OF samples were collected in the morning before MPH administration as well as 1 and 6 h after administration of the prescribed morning dose of MPH.

Results: Fifty-nine patients aged between 9 and 69 years, 76 % males. The daily dose of MPH varied from 18 to 180 mg, but the median daily dose per body weight was similar, approximately 1.0 mg/kg body weight. The median MPH concentration in blood 1 and 6 h after the morning dose was 5.4 and 9.3 ng/mL, respectively. Highly variable OF-to-blood ratios for MPH were found at all time points for all three groups.

Conclusions: Weight is a reliable clinical parameter for optimal dose titration. Otherwise, MPH blood concentration might be used for individual dose optimization and for monitoring of the prescribed dose. Relying only on the outcome in OF cannot be recommended for evaluation of accurate MPH concentrations for treatment monitoring

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Eur Psychiatry. 2016 May;35:16-24.

THE VALIDITY AND RELIABILITY OF THE DIAGNOSIS OF HYPERKINETIC DISORDERS IN THE DANISH PSYCHIATRIC CENTRAL RESEARCH REGISTRY.

Mohr-Jensen C, Koch SV, Lauritsen MB, et al.

Objective: To validate the diagnosis of hyperkinetic disorders (HD) in the Danish Psychiatric Central Research Registry (DPCRR) for children and adolescents aged 4 to 15 given in the years 1995 to 2005.

Method: From a total of 4568 participants, a representative random subsample of n = 387 patients were used to validate the diagnosis. Patient files were systematically scored for the presence of ICD-10 criteria for HD and oppositional defiant disorder/conduct disorder (ODD/CD; F91). Further to this, an inter-rater reliability study was also conducted, whereby two experienced child and adolescent psychiatrists who were blind to patients discharge diagnoses, rated a random subsample of n = 101 participants.

Results: Information was available for 372 out of 387 patients. Out of n = 372 available files, n = 324 (86.8%) were evaluated to fulfil diagnostic criteria for HD. Due to missing information it was not possible to reach a conclusion for 5.1% of the cases, 3.8% of the diagnoses were registration errors, and in 4.3% of the files the diagnosis had to be rejected. Inter-rater agreement was high ($\kappa = 0.83$, $z = 10.9$, $P < .001$). The validity of hyperkinetic disorders, unspecified (F90.9) was lower and comorbid CD/ODD were under-diagnosed in the sample. All participants fulfilling HD criteria also fulfilled DSM-5-criteria for ADHD.

Conclusion: The risk of misclassification of patients with HD in the DPCRR is relatively low, with the exception of the diagnosis of hyperkinetic disorders, unspecified (F90.9)

Expert Opin Pharmacother. 2016;17:1171-78.

METHYLPHENIDATE HCL FOR THE TREATMENT OF ADHD IN CHILDREN AND ADOLESCENTS.

Childress AC.

Introduction: Since Ritalin (methylphenidate immediate-release or MPH IR) was first marketed in 1955, it has been a mainstay of treatment for Attention-Deficit/Hyperactivity Disorder (ADHD).

Areas covered: The postulated mechanism of action, adverse events and efficacy of MPH are examined. MPH formulations that are currently on the market in the United States and those that will soon be available are considered. Various products are examined by comparing onset of effect and duration of action.

Expert opinion: MPH has a well-known efficacy and safety profile. The development of extended-release (MPH-ER) was a significant advance in ADHD treatment. Recent products offer convenience in terms of dosing and timing of drug administration to improve symptom control, but efficacy is similar among all MPH-ER products. One formulation may be more appropriate for an individual patient, but no product offers significant advantages over all others. Since MPH is only effective in about 80% of patients, identifying factors that predict drug response is an active area of research. Although MPH is not effective for every patient, until there is a better understanding of the genetic contributions and nuances of functioning of central nervous system pathways, MPH will be a first choice for the treatment of ADHD

FASEB J. 2016;30.

THE ASSOCIATION OF DIETARY GLYCINE AND GLUTAMATE WITH ADHD.

Holton KF, Johnstone J, Nigg JT.

The objective of this research was to examine the relation of the dietary amino acids: aspartate, glutamate, and glycine, to Attention Deficit Hyperactive Disorder (ADHD). These amino acids function as key neurotransmitters in the nervous system, and could potentially modulate symptoms in ADHD. Parents of a small sample of children from the Oregon ADHD cohort (23 with ADHD and 22 without) were given three 24-hr recalls to estimate nutrient intake. The two groups did not differ by age and sex, but the group without ADHD had a higher IQ ($p=0.01$). Univariate analyses of each amino acid (in grams) did not differ between groups; however, percent intake of aspartate was significantly higher, percent glutamate was significantly lower, and percent glycine was marginally higher in those with ADHD as compared to controls. Multivariable logistic regression, modeling ADHD as the outcome, demonstrated significant effects of glutamate and glycine when modeled together and adjusted for age, sex and IQ. Greater intake of glycine was associated with an increased likelihood of ADHD, (OR (95% CI) = 8.02 (1.30-49.53), $p=0.03$) and greater intake dietary glutamate was associated with a reduced likelihood of ADHD (OR (95% CI) = 0.66 (0.44-1.01), $p=0.05$). These results are limited by the small sample size; however, they suggest that future research is needed to further evaluate the association of dietary glycine and glutamate with ADHD

Frontiers in Neuroscience. 2016;10.

POSTURAL INSTABILITY IN CHILDREN WITH ADHD IS IMPROVED BY METHYLPHENIDATE.

Bucci MP, Stordeur C, Acquaviva E, et al.

HIGHLIGHTS Both spatial and temporal analyses of the Center of Pressure demonstrate that children with ADHD have poorer postural control than typically developing sex-, age-, and IQ-matched children. Poor sensory integration in postural control could partially explained the deficits in postural stability in children with ADHD. MPH treatment improves postural performance in both spatial and temporal domains in children with ADHD. MPH improves postural control specifically when visual and proprioceptive inputs are misleading. Such improvement could be due to MPH effects on neurons, facilitating cerebellar processing of postural control. The aim of this study was to examine postural control in children with ADHD and explore the effect of methylphenidate (MPH), using spatial and temporal analyses of the center of pressure (CoP). Thirty-eight children with ADHD (mean age 9.82 ± 0.37 years) and 38 sex- age- and IQ-matched children with typically development were examined. Postural stability was evaluated using the Multitest Equilibre machine (Framiral®) at inclusion and after 1 month of MPH in children with ADHD. Postural stability was

assessed by recording under several conditions: with eyes open and fixed on a target, with eyes closed and with vision perturbed by optokinetic stimulation, on stable and unstable platforms. At inclusion, we observed poor spatial and temporal postural stability in children with ADHD. The spectral power index was higher in children with ADHD than in controls. Canceling time was shorter at low and medium frequencies of oscillation and longer at higher frequencies in children with ADHD. After 1 month of MPH, the surface area and mean velocity of the CoP decreased significantly under the most complex conditions (unstable platform in the absence of proprioceptive and visual inputs). The spectral power index decreased significantly after MPH while the canceling time did not change. Poor postural control in children with ADHD supports the hypothesis of cerebellar dysfunction in this disorder. Postural control could be improved by a more efficient processing of sensory inputs (a high-level process), as suggested by the decrease in spectral power index after MPH without changes in the canceling time (a low-level process)

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Hosp Pediatr. 2016 Mar;6:126-34.

EXAMINATION OF THE COMORBIDITY OF MENTAL ILLNESS AND SOMATIC CONDITIONS IN HOSPITALIZED CHILDREN IN THE UNITED STATES USING THE KIDS' INPATIENT DATABASE, 2009.

Sztein DM, Lane WG.

OBJECTIVE: To examine the associations between mental and physical illness in hospitalized children.

METHODS: The data for this analysis came from the 2009 Kids' Inpatient Database (KID). Any child with an International Classification of Diseases, Ninth Revision code indicative of depressive, anxiety, or bipolar disorders or a diagnosis of sickle cell disease, diabetes mellitus type 1 or 2, asthma, or attention-deficit/hyperactivity disorder (ADHD) were included. Using SAS software, we performed chi(2) tests and multivariable logistic regression to determine degrees of association.

RESULTS: Children discharged with sickle cell disease, asthma, diabetes mellitus type 1, diabetes mellitus type 2, and ADHD were 0.94, 2.76, 3.50, 6.37, and 38.39 times more likely to have a comorbid anxiety, depression, or bipolar disorder diagnosis than other hospitalized children, respectively.

CONCLUSIONS: Children with several chronic physical illnesses (asthma, diabetes mellitus type 1, diabetes mellitus type 2) and mental illnesses (ADHD) have higher odds of being discharged from the hospital with a comorbid mood or anxiety disorder compared with other children discharged from the hospital. It is therefore important to screen children hospitalized with chronic medical conditions for comorbid mental illness to ensure optimal clinical care, to improve overall health and long-term outcomes for these children

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Int J Epidemiol. 2016;45:532-42.

OBSTETRIC MODE OF DELIVERY AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A SIBLING-MATCHED STUDY.

Curran EA, Khashan AS, Dalman C, et al.

Background: It has been suggested that birth by caesarean section (CS) may affect psychological development through changes in microbiota or stress response. We assessed the impact of mode of delivery, specifically CS, on the development of attention-deficit/hyperactivity disorder (ADHD), using a large, population-based cohort.

Methods: The study cohort consisted of all singleton live births in Sweden from 1990 to 2008 using data from Swedish national registers.

Mode of delivery included: Unassisted vaginal delivery (VD), assisted VD, elective CS or emergency CS. ADHD was determined using International Classification of Diseases version 10 (F90 or F98.8), or prescription for ADHD medication. We used Cox regression to assess the association between birth by CS and ADHD in the total study population, adjusting for perinatal and sociodemographic factors, then stratified Cox regression analysis on maternal identification number to assess the association among siblings.

Results: Our cohort consisted of 1 722 548 children, and among these 47 778 cases of ADHD. The hazard ratio (HR) of the association between elective CS, compared with unassisted VD, and ADHD was 1.15 [95% confidence interval (CI): 1.11-1.20] in the cohort, and 1.05 (95% CI: 0.93-1.18) in the stratified analysis. The

HR of the association between emergency CS and ADHD was 1.16 (95% CI: 1.12-1.20] in the cohort and 1.13 (95% CI: 1.01-1.26) in the stratified analysis.

Conclusion: Birth by CS is associated with a small increased risk of ADHD. However among siblings the association only remained for emergency CS. If this were a causal effect by CS, the association would be expected to persist for both types of CS, suggesting the observed association is due to confounding

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JAMA. 2016 May;315:1953-55.

QUANTIFYING THE BENEFITS AND RISKS OF METHYLPHENIDATE AS TREATMENT FOR CHILDHOOD ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Shaw P.

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JAMA Psychiatry. 2016;73:481-89.

GROWTH CHARTING OF BRAIN CONNECTIVITY NETWORKS AND THE IDENTIFICATION OF ATTENTION IMPAIRMENT IN YOUTH.

Kessler D, Angstadt M, Sripada C.

IMPORTANCE: Intrinsic connectivity networks (ICNs), important units of brain functional organization, demonstrate substantial maturation during youth. In addition, interrelationships between ICNs have been reliably implicated in attention performance. It is unknown whether alterations in ICN maturational profiles can reliably detect impaired attention functioning in youth.

OBJECTIVE: To use a network growth charting approach to investigate the association between alterations in ICN maturation and attention performance.

DESIGN, SETTING, AND PARTICIPANTS: Data were obtained from the publicly available Philadelphia Neurodevelopmental Cohort, a prospective, population-based sample of 9498 youths who underwent genomic testing, neurocognitive assessment, and neuroimaging. Data collection was conducted at an academic and children's hospital health care network between November 1, 2009, and November 30, 2011, and data analysis was conducted between February 1, 2015, and January 15, 2016.

MAIN OUTCOMES AND MEASURES: Statistical associations between deviations from normative network growth were assessed as well as 2 main outcome measures: accuracy during the Penn Continuous Performance Test and diagnosis with attention-deficit/hyperactivity disorder.

RESULTS: Of the 9498 individuals identified, 1000 youths aged 8 to 22 years underwent brain imaging. A sample of 519 youths who met quality control criteria entered analysis, of whom 25 (4.8%) met criteria for attention-deficit/hyperactivity disorder. The mean (SD) age of the youth was 15.7 (3.1) years, and 223 (43.0%) were male. Participants' patterns of deviations from normative maturational trajectories were indicative of sustained attention functioning ($R^2 = 24\%$; $F_{6,512} = 26.89$; $P < 2.2 \times 10^{-16}$). Moreover, these patterns were found to be a reliable biomarker of severe attention impairment (peak receiver operating characteristic curve measured by area under the curve, 79.3%). In particular, a down-shifted pattern of ICN maturation (shallow maturation), rather than a right-shifted pattern (lagged maturation), was implicated in reduced attention performance (Akaike information criterion relative likelihood, 3.22×10^{26}). Finally, parallel associations between ICN dysmaturation and diagnosis of attention-deficit/hyperactivity disorder were identified.

CONCLUSIONS AND RELEVANCE: Growth charting methods are widely used to assess the development of physical or other biometric characteristics, such as weight and head circumference. To date, this is the first demonstration that this method can be extended to development of functional brain networks to identify clinically relevant conditions, such as dysfunction of sustained attention

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J Abnorm Psychol. 2015;124:1027-42.

DEVELOPMENTAL TRAJECTORIES OF AGGRESSION, PROSOCIAL BEHAVIOR, AND SOCIAL-COGNITIVE PROBLEM SOLVING IN EMERGING ADOLESCENTS WITH CLINICALLY ELEVATED ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS.

Kofler MJ, Larsen R, Sarver DE, et al.

Middle school is a critical yet understudied period of social behavioral risks and opportunities that may be particularly difficult for emerging adolescents with attention-deficit/hyperactivity disorder (ADHD) given their childhood social difficulties. Relatively few ADHD studies have examined social behavior and social-cognitive problem solving beyond the elementary years, or examined aspects of positive (prosocial) behavior. The current study examined how middle school students with clinically elevated ADHD symptoms differ from their non-ADHD peers on baseline (6th grade) and age-related changes in prosocial and aggressive behavior, and the extent to which social-cognitive problem solving strategies mediate these relations. Emerging adolescents with ($n = 178$) and without ($n = 3,806$) clinically elevated, teacher-reported ADHD-combined symptoms were compared longitudinally across 6th through 8th grades using parallel process latent growth curve modeling, accounting for student demographic characteristics, oppositional-defiant disorder (ODD) symptoms, deviant peer association, school climate, and parental monitoring. Sixth graders with elevated ADHD symptoms engaged in somewhat fewer prosocial behaviors ($d = 0.44$) and more aggressive behavior ($d = 0.20$) relative to their peers. These small social behavioral deficits decreased but were not normalized across the middle school years. Contrary to hypotheses, social-cognitive problem solving was not impaired in the ADHD group after accounting for co-occurring ODD symptoms and did not mediate the association between ADHD and social behavior during the middle school years. ADHD and social-cognitive problem solving contributed independently to social behavior, both in 6th grade and across the middle school years; the influence of social-cognitive problem solving on social behavior was highly similar for the ADHD and non-ADHD groups

Journal of Attention Disorders. 2016 Jun;20:519-29.

CONSTRUCT VALIDITY AND DIAGNOSTIC UTILITY OF THE COGNITIVE ASSESSMENT SYSTEM FOR ADHD.

Canivez GL, Gaboury AR.

Objective: The Das–Naglieri Cognitive Assessment System (CAS) is a test of cognitive abilities based on the Planning, Attention, Simultaneous, and Successive Theory (PASS). Studies of CAS performance by children with ADHD typically show lowest performance on Planning and deficits on Attention, but normal Simultaneous and Successive processing. Such distinct group differences studies support construct validity and are necessary, but not sufficient, for establishing diagnostic utility.

Method: Students meeting Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR) criteria for ADHD ($n = 20$) and matched controls ($n = 20$) were assessed with the CAS to examine distinct group differences and diagnostic utility of CAS in correctly classifying the individuals from both groups.

Results: CAS PASS scores were significantly related to ADHD characteristics demonstrating both distinct group differences (with medium to large effect sizes) and diagnostic utility (with medium effect sizes).

Conclusion: Support was observed for CAS PASS score characteristics previously observed among students with ADHD, and this is the first study to report on the diagnostic utility of CAS PASS scores. Given the small sample, additional large-scale studies and cross-validation is needed

Journal of Attention Disorders. 2016 Jun;20:478-86.

ADHD DIAGNOSIS: AS SIMPLE AS ADMINISTERING A QUESTIONNAIRE OR A COMPLEX DIAGNOSTIC PROCESS?

Parker A, Corkum P.

Objective: The present study investigated the validity of using the Conners' Teacher and Parent Rating Scales (CTRS/CPRS) or semistructured diagnostic interviews (Parent Interview for Child Symptoms and Teacher Telephone Interview) to predict a best-practices clinical diagnosis of ADHD.

Method: A total of 279 children received a clinical diagnosis based on a best-practices comprehensive assessment (including diagnostic parent and teacher interviews, collection of historical information, rating scales, classroom observations, and a psychoeducational assessment) at a specialty ADHD Clinic in Truro, Nova Scotia, Canada. Sensitivity and specificity with clinical diagnosis were determined for the ratings scales and diagnostic interviews.

Results: Sensitivity and specificity values were high for the diagnostic interviews (91.8% and 70.7%, respectively). However, while sensitivity of the CTRS/CPRS was relatively high (83.5%), specificity was poor (35.7%).

Conclusion: The low specificity of the CPRS/CTRS is not sufficient to be used alone to diagnose ADHD

Journal of Attention Disorders. 2016 Jun;20:542-68.

AULA—ADVANCED VIRTUAL REALITY TOOL FOR THE ASSESSMENT OF ATTENTION: NORMATIVE STUDY IN SPAIN.

Iriarte Y, Diaz-Orueta U, Cueto E, et al.

Objective: The present study describes the obtention of normative data for the AULA test, a virtual reality tool designed to evaluate attention problems, especially in children and adolescents. **Method:** The normative sample comprised 1,272 participants (48.2% female) with an age range from 6 to 16 years ($M = 10.25$, $SD = 2.83$). The AULA test administered to them shows both visual and auditory stimuli, while randomized distractors of ecological nature appear progressively. **Results:** Variables provided by AULA were clustered in different categories for their posterior analysis. Differences by age and gender were analyzed, resulting in 14 groups, 7 per sex group. Differences between visual and auditory attention were also obtained. **Conclusion:** Obtained normative data are relevant for the use of AULA for evaluating attention in Spanish children and adolescents in a more ecological way. Further studies will be needed to determine sensitivity and specificity of AULA to measure attention in different clinical populations

Journal of Attention Disorders. 2016 Apr;20:353-67.

NO EVIDENCE FOR INHIBITORY DEFICITS OR ALTERED REWARD PROCESSING IN ADHD: DATA FROM A NEW INTEGRATED MONETARY INCENTIVE DELAY GO/NO-GO TASK.

Demurie E, Roeyers H, Wiersma JR, et al.

Objective: Cognitive and motivational factors differentially affect individuals with mental health problems such as ADHD. Here we introduce a new task to disentangle the relative contribution of inhibitory control and reward anticipation on task performance in children with ADHD and/or autism spectrum disorders (ASD).

Method: Typically developing children, children with ADHD, ASD, or both disorders worked during separate sessions for monetary or social rewards in go/no-go tasks with varying inhibitory load levels. Participants also completed a monetary temporal discounting (TD) task.

Results: As predicted, task performance was sensitive to both the effects of anticipated reward amount and inhibitory load. Reward amount had different effects depending on inhibitory load level. TD correlated with inhibitory control in the ADHD group.

Conclusion: The integration of the monetary incentive delay and go/no-go paradigms was successful. Surprisingly, there was no evidence of inhibitory control deficits or altered reward anticipation in the clinical groups

J Child Adolesc Psychopharmacol. 2016;26:354-61.

SWITCH IN THERAPY FROM METHYLPHENIDATE TO ATOMOXETINE IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: AN ANALYSIS OF PATIENT RECORDS.

Warrer P, Thomsen PH, Dalsgaard S, et al.

Objective: The purpose of this study was to investigate therapy switching from methylphenidate (MPH) to atomoxetine (ATX) in a clinical sample of Danish children and adolescents with attention-deficit/hyperactivity

disorder (ADHD); specifically, to determine the duration of MPH treatment before switching to ATX, and the reasons leading to a switch in therapy.

Methods: We included 55 patients with ADHD who switched from first-line MPH to second-line ATX during January 01, 2012 and May 15, 2014. Patient and treatment characteristics along with clinical reasons for switching therapy were extracted from individual patients' records.

Results: Mean duration of MPH treatment until switch to ATX was 11.2 months (range = 0.3-28.5 months); 36% of the patients switched within the first 6 months, 56% within the first year, and 76% within 1.5 years of initiating MPH; 24% continued MPH treatment for up to 2.5 years prior to switching. Most common reasons for switching were "adverse events" (AEs) (78%), "wish for more optimal day coverage" (24%), and "lack of efficacy" (16%). Other reasons for switching included "patient/parental request" (13%) and "noncompliance" (2%). Most common AEs leading to switch were psychiatric disorders (insomnia, aggression, tic, depression, anxiety) and decreased appetite.

Conclusions: Our findings highlight the importance of continuous evaluation of the need for prescription switch to ATX in children and adolescents treated with MPH, taking into consideration various factors including potential AEs, non-optimal day coverage, lack of efficacy, patient/parental preferences, and noncompliance. These factors should be considered, not only at the initial stage of MPH treatment but throughout the whole treatment course

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J Child Adolesc Psychopharmacol. 2016 May;26:344-53.

A RANDOMIZED CONTROLLED TRIAL INVESTIGATING THE EFFECTS OF NEUROFEEDBACK, METHYLPHENIDATE, AND PHYSICAL ACTIVITY ON EVENT-RELATED POTENTIALS IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Janssen TWP, Bink M, Geladé K, et al.

Objective: Electroencephalographic (EEG) neurofeedback (NF) is considered a nonpharmacological alternative for medication in attention-deficit/hyperactivity disorder (ADHD). Comparisons of the behavioral efficacy of NF and medication have produced inconsistent results. EEG measures can provide insight into treatment mechanisms, but have received little consideration. In this randomized controlled trial (RCT), effects of NF were compared with methylphenidate (MPH), and physical activity (PA) in children with ADHD on event-related potential (ERP) indices of response inhibition, which are involved in ADHD psychopathology.

Methods: Using a multicenter three way parallel group RCT design, 112 children with a Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV) (American Psychiatric Association 1994) diagnosis of ADHD, between 7 and 13 years of age, were initially included. NF training consisted of 30 sessions of theta/beta training at Cz over a 10 week period. PA training was a semiactive control group, matched in frequency and duration. MPH was titrated using a double-blind placebo controlled procedure in 6 weeks, followed by a stable dose for 4 weeks. ERP measures of response inhibition, N2 and P3, were available for 81 children at pre- and postintervention (n = 32 NF, n = 25 MPH, n = 24 PA).

Results: Only the medication group showed a specific increase in P3 amplitude compared with NF (partial eta-squared [η^2] = 0.121) and PA (η^2 = 0.283), which was related to improved response inhibition. Source localization of medication effects on P3 amplitude indicated increased activation primarily in thalamic and striatal nuclei.

Conclusions: This is the first study that simultaneously compared NF with stimulant treatment and a semiactive control group. Only stimulant treatment demonstrated specific improvements in brain function related to response inhibition. These results are in line with recent doubts on the efficacy and specificity of NF as treatment for ADHD

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J Child Adolesc Psychopharmacol. 2016 May;26:335-43.

TREATMENT OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN PRESCHOOL-AGE CHILDREN: CHILD AND ADOLESCENT PSYCHIATRISTS' ADHERENCE TO CLINICAL PRACTICE GUIDELINES.

Chung J, Tchaconas A, Meryash D, et al.

Objectives: To compare child and adolescent psychiatrists' (CAPs) practices in the treatment of preschool children with attention-deficit/hyperactivity disorder (P-ADHD) with published guidelines, and to determine which clinical factors most influence physicians' decisions to initiate pharmacotherapy for P-ADHD.

Methods: We developed and mailed the Preschool ADHD Treatment Questionnaire (PATQ) to a randomly selected national sample of ~2200 CAPs trained in the management of ADHD. The PATQ asked CAPs about their approach to clinical management of children ages 4–5 years with ADHD—specifically, how often they recommend parent training in behavior management, medication as a first- or second-line treatment, and which medication they typically choose first. CAPs also rated the perceived importance of 19 different clinical factors in their decision to initiate pharmacotherapy. These 19 factors reflected five child-centered areas of concern: ADHD risk factors, education concerns, social issues (SI), emotional stress, and physical safety (PS). The physicians were asked to rate each factor on a 4-point Likert scale from "not important" to "very important."

Results: The final sample consisted of 339 board-certified CAPs. When adherence to the Academy of Child and Adolescent Psychiatry (AACAP) guidelines was defined as initial treatment with behavior management (not medication) and pharmacotherapy specifically with methylphenidate as second-line treatment, only 7.4% of CAPs followed clinical guidelines. Most physicians identified PS as an important or very important factor when initiating pharmacotherapy for P-ADHD (93.4%), followed by educational concerns (EC) (79.9%), emotional stress (69.6%), SI (52.8%), and the presence of risk factors for ADHD (32.7%).

Conclusions: The overwhelming majority of CAPs do not follow current AACAP guidelines for treatment of P-ADHD, especially regarding medication initiation and selection. When deciding whether to prescribe medication for P-ADHD, safety and EC were the most important and historical risk factors for ADHD were the least important clinical factors

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J Child Neurol. 2015;31:918-24.

TRANSCRANIAL DIRECT CURRENT STIMULATION IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD).

Bandeira ID, Guimarães RSQ, Jagersbacher JG, et al.

Studies investigating the possible benefits of transcranial direct current stimulation on left dorsolateral prefrontal cortex in children and adolescents with attention-deficit hyperactivity disorder (ADHD) have not been performed. This study assesses the effect of transcranial direct current stimulation in children and adolescents with ADHD on neuropsychological tests of visual attention, visual and verbal working memory, and inhibitory control. An auto-matched clinical trial was performed involving transcranial direct current stimulation in children and adolescents with ADHD, using SNAP-IV and subtests Vocabulary and Cubes of the Wechsler Intelligence Scale for Children III (WISC-III). Subjects were assessed before and after transcranial direct current stimulation sessions with the Digit Span subtest of the WISC-III, inhibitory control subtest of the NEPSY-II, Corsi cubes, and the Visual Attention Test (TAVIS-3). There were 9 individuals with ADHD according to Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) criteria. There was statistically significant difference in some aspects of TAVIS-3 tests and the inhibitory control subtest of NEPSY-II. Transcranial direct current stimulation can be related to a more efficient processing speed, improved detection of stimuli, and improved ability to switch between an ongoing activity and a new one

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J Child Neurol. 2016 Jun;31:918-24.

TRANSCRANIAL DIRECT CURRENT STIMULATION IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD): A PILOT STUDY.

Bandeira ID, Guimarães RSQ, Jagersbacher JG, et al.

Studies investigating the possible benefits of transcranial direct current stimulation on left dorsolateral prefrontal cortex in children and adolescents with attention-deficit hyperactivity disorder (ADHD) have not been performed. This study assesses the effect of transcranial direct current stimulation in children and adolescents with ADHD on neuropsychological tests of visual attention, visual and verbal working memory, and inhibitory control. An auto-matched clinical trial was performed involving transcranial direct current stimulation in children and adolescents with ADHD, using SNAP-IV and subtests Vocabulary and Cubes of the Wechsler Intelligence Scale for Children III (WISC-III). Subjects were assessed before and after transcranial direct current stimulation sessions with the Digit Span subtest of the WISC-III, inhibitory control subtest of the NEPSY-II, Corsi cubes, and the Visual Attention Test (TAVIS-3). There were 9 individuals with ADHD according to Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) criteria. There was statistically significant difference in some aspects of TAVIS-3 tests and the inhibitory control subtest of NEPSY-II. Transcranial direct current stimulation can be related to a more efficient processing speed, improved detection of stimuli, and improved ability to switch between an ongoing activity and a new one

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Journal of Child Psychology and Psychiatry. 2016 Jun;57:676-84.

IS THERE AN ASSOCIATION BETWEEN EATING BEHAVIOUR AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN PRESCHOOL CHILDREN?

Leventakou V, Micali N, Georgiou V, et al.

Background: There is some evidence that aberrant eating behaviours and obesity co-occur with attention-deficit/hyperactivity disorder (ADHD) symptoms. The present study is the first that aims to investigate the association between eating behaviours and ADHD symptoms in early childhood in a population-based cohort.

Methods: We included 471 preschool children from the Rhea mother-child cohort in Crete, Greece. Parents completed the Children's Eating Behaviour Questionnaire to assess children's eating behaviour and the 36-item ADHD test (ADHDT) to evaluate ADHD symptoms at 4 years of age. Multivariable linear regression models were used to examine the association of eating behaviours with ADHD symptoms.

Results: Regarding children's food approach eating behaviours, we observed a positive association between food responsiveness and total ADHD index, as well as impulsivity, inattention and hyperactivity subscale, separately. Similarly, there was a significant positive association between emotional overeating and ADHD symptoms. With regard to children's food avoidant behaviours, food fussiness was found to be significantly associated with the impulsivity subscale. A dose-response association between the food approach behaviours and ADHD symptoms was also observed. Children on the medium and highest tertile of the food responsiveness subscale had increased scores on the ADHD total scale, as compared to those on the lowest tertile. As regards emotional overeating, children in the highest tertile of the scale had higher scores on ADHD total and hyperactivity.

Conclusions: Our findings provide evidence that food approach eating behaviours such as food responsiveness and emotional overeating are associated with the increased ADHD symptoms in preschool children. Future studies to better understand this overlap will enhance potential interventions.

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Journal of Child Psychology and Psychiatry. 2016 Jun;57:706-16.

ACTIGRAPH MEASURES DISCRIMINATE PEDIATRIC BIPOLAR DISORDER FROM ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND TYPICALLY DEVELOPING CONTROLS.

Faedda GL, Ohashi K, Hernandez M, et al.

Background: Distinguishing pediatric bipolar disorder (BD) from attention-deficit hyperactivity disorder (ADHD) can be challenging. Hyperactivity is a core feature of both disorders, but severely disturbed sleep and circadian dysregulation are more characteristic of BD, at least in adults. We tested the hypothesis that

objective measures of activity, sleep, and circadian rhythms would help differentiate pediatric subjects with BD from ADHD and typically developing controls.

Methods: Unmedicated youths (N = 155, 97 males, age 5–18) were diagnosed using DSM-IV criteria with Kiddie-SADS PL/E. BD youths (n = 48) were compared to typically developing controls (n = 42) and children with ADHD (n = 44) or ADHD plus comorbid depressive disorders (n = 21). Three-to-five days of minute-to-minute belt-worn actigraph data (Ambulatory Monitoring Inc.), collected during the school week, were processed to yield 28 metrics per subject, and assessed for group differences with analysis of covariance. Cross-validated machine learning algorithms were used to determine the predictive accuracy of a four-parameter model, with measures reflecting sleep, hyperactivity, and circadian dysregulation, plus Indic's bipolar vulnerability index (VI).

Results There were prominent group differences in several activity measures, notably mean 5 lowest hours of activity, skewness of diurnal activity, relative circadian amplitude, and VI. A predictive support vector machine model discriminated bipolar from non-bipolar with mean accuracy of $83.1 \pm 5.4\%$, ROC area of 0.781 ± 0.071 , kappa of 0.587 ± 0.136 , specificity of $91.7 \pm 5.3\%$, and sensitivity of $64.4 \pm 13.6\%$.

Conclusions Objective measures of sleep, circadian rhythmicity, and hyperactivity were abnormal in BD. Wearable sensor technology may provide bio-behavioral markers that can help differentiate children with BD from ADHD and healthy controls

Journal of Child Psychology and Psychiatry. 2016 Jun;57:717-28.

EXTENDED-RELEASE GUANFACINE HYDROCHLORIDE IN 6–17-YEAR OLDS WITH ADHD: A RANDOMISED-WITHDRAWAL MAINTENANCE OF EFFICACY STUDY.

Newcorn JH, Harpin V, Huss M, et al.

Background: Extended-release guanfacine hydrochloride (GXR), a selective α_2A -adrenergic agonist, is a nonstimulant medication for attention-deficit/hyperactivity disorder (ADHD). This phase 3, double-blind, placebo-controlled, randomised-withdrawal study evaluated the long-term maintenance of GXR efficacy in children/adolescents with ADHD.

Methods: Children/adolescents (6–17 years) with ADHD received open-label GXR (1–7 mg/day). After 13 weeks, responders were randomised to GXR or placebo in the 26-week, double-blind, randomised-withdrawal phase (RWP). The primary endpoint was the percentage of treatment failure (= 50% increase in ADHD Rating Scale version IV total score and =2-point increase in Clinical Global Impression-Severity compared with RWP baseline, at two consecutive visits). The key secondary endpoint was time to treatment failure (TTF). Trial registration: ClinicalTrials.gov identifier NCT01081145; EudraCT 2009-018161-12.

Results: A total of 528 participants enrolled; 316 (59.8%) entered the RWP. Treatment failure occurred in 49.3% of the GXR and 64.9% of the placebo group ($p = 0.006$). TTF was significantly longer in GXR versus placebo ($p = 0.003$). GXR was well tolerated.

Conclusions: Guanfacine hydrochloride demonstrated long-term maintenance of efficacy compared with placebo in children/adolescents with ADHD. Implications of the placebo substitution design and findings with different ADHD medications are discussed

Journal of Child Psychology and Psychiatry. 2016 Jun;57:697-705.

ABERRANT LOCAL STRIATAL FUNCTIONAL CONNECTIVITY IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

von Rhein D, Oldehinkel M, Beckmann CF, et al.

Background: Task-based and resting-state functional Magnetic Resonance Imaging (fMRI) studies report attention-deficit/hyperactivity disorder (ADHD)-related alterations in brain regions implicated in cortico-striatal networks. We assessed whether ADHD is associated with changes in the brain's global cortico-striatal functional architecture, or whether ADHD-related alterations are limited to local, intrastriatal functional connections.

Methods: We included a cohort of adolescents with ADHD (N = 181) and healthy controls (N = 140) and assessed functional connectivity of nucleus accumbens, caudate nucleus, anterior putamen, and posterior

putamen. To assess global cortico-striatal functional architecture we computed whole-brain functional connectivity by including all regions of interest in one multivariate analysis. We assessed local striatal functional connectivity using partial correlations between the time series of the striatal regions.

Results: Diagnostic status did not influence global cortico-striatal functional architecture. However, compared to controls, participants with ADHD exhibited significantly increased local functional connectivity between anterior and posterior putamen ($p = .0003$; ADHD: $z = .30$, controls: $z = .24$). Results were not affected by medication use or comorbid oppositional defiant disorder and conduct disorder.

Conclusions: Our results do not support hypotheses that ADHD is associated with alterations in cortico-striatal networks, but suggest changes in local striatal functional connectivity. We interpret our findings as aberrant development of local functional connectivity of the putamen, potentially leading to decreased functional segregation between anterior and posterior putamen in ADHD

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J Dev Behav Pediatr. 2016 May;37:285-97.

ANTECEDENTS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN CHILDREN BORN EXTREMELY PRETERM.

Johnson S, Kochhar P, Hennessy E, et al.

Objective: To investigate antecedents of attention-deficit/hyperactivity disorder (ADHD) symptoms in children born extremely preterm (EP; < 26-wk gestation).

Method: The EPICure study recruited all babies born EP in the United Kingdom and Ireland in March-December 1995. Neurodevelopmental outcomes were assessed at 2.5 ($n = 283$; 90%), 6 ($n = 160$; 78%), and 11 ($n = 219$; 71%) years of age. Parents and teachers completed the DuPaul Rating Scale IV to assess inattention and hyperactivity/impulsivity symptoms at 11 years. Regression analyses were used to explore the association of neonatal, neurodevelopmental, and behavioral outcomes to 6 years with ADHD symptoms at 11 years.

Results: Extremely preterm (EP) children had significantly more inattention (mean difference, 1.2 SD; 95% CI, 0.9–1.5) and hyperactivity/impulsivity (mean difference, 0.5 SD; 95% CI, 0.2–0.7) than controls, with a significantly greater effect size for inattention than hyperactivity/impulsivity. Significant independent predictors of inattention at 11 years included smaller head circumference, lower intelligence quotient (IQ), and pervasive peer relationship problems at 6 years, and motor development at 2.5 years. In contrast, significant independent predictors of hyperactivity/impulsivity included lower IQ, pervasive conduct problems and ADHD symptoms at 6 years, externalizing problems at 2.5 years, and non-white maternal ethnicity.

Conclusions: Extremely preterm children are at increased risk for ADHD symptoms, predominantly inattention, for which the antecedents differ by symptom domain. Attention deficits after EP birth were associated with poor brain growth and neurological function. Cognitive and behavioral assessments in early and middle childhood to identify neurodevelopmental and peer relationship problems may be beneficial for identifying EP children at risk for inattention

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J Neural Transm. 2016;1-7.

ASSOCIATION OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER WITH GAMBLING DISORDER.

Retz W, Ringling J, Retz-Junginger P, et al.

Attention-deficit/hyperactivity disorder (ADHD) is a frequent mental disorder with childhood onset and high persistence into adulthood. There is much evidence that ADHD increases the risk for the development of other psychiatric disorders and functional problems in several domains of everyday life. In this study, the association of ADHD with gambling disorder (GD) was investigated. 163 adult subjects suffering from GD were examined for childhood and current ADHD according to DSM-5 as well as co-morbid psychiatric disorders. Moreover, characteristics of gambling behavior have been evaluated. The prevalence of lifetime ADHD was 28.8 %, with 25.2 % of the study population presenting ADHD as a full syndrome according to DSM-5. The prevalence of co-morbid substance use disorders and adjustment disorders and cluster B personality disorders was higher in GD patients with current ADHD than in the group without. Also, an

increased rate of suicide attempts was detected in gamblers with ADHD. In contrast with gamblers without ADHD, those with ADHD were reported to spend more time with gambling, a sedative effect of gambling and a faster development of GD. The high prevalence of ADHD in patients with GD indicates that childhood ADHD is a risk factor for the development of GD in later life. Moreover, treatment of patients with GD and ADHD is complicated by a high rate of co-morbid disorders. Regarding therapeutic approaches, it should be considered that functional aspects of gambling differ in GD patients with and without ADHD

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J Pediatr. 2016;173:254-57.

A PATIENT WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER AND HYPERTENSION.

Luebbert J, Gidding SS.

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Journal of School Psychology. 2016 Apr;55:27-38.

LONGITUDINAL EVALUATION OF THE IMPORTANCE OF HOMEWORK ASSIGNMENT COMPLETION FOR THE ACADEMIC PERFORMANCE OF MIDDLE SCHOOL STUDENTS WITH ADHD.

Langberg JM, Dvorsky MR, Molitor SJ, et al.

The primary goal of this study was to longitudinally evaluate the homework assignment completion patterns of middle school age adolescents with ADHD, their associations with academic performance, and malleable predictors of homework assignment completion. Analyses were conducted on a sample of 104 middle school students comprehensively diagnosed with ADHD and followed for 18months. Multiple teachers for each student provided information about the percentage of homework assignments turned in at five separate time points and school grades were collected quarterly. Results showed that agreement between teachers with respect to students assignment completion was high, with an intraclass correlation of .879 at baseline. Students with ADHD were turning in an average of 12% fewer assignments each academic quarter in comparison to teacher-reported classroom averages. Regression analyses revealed a robust association between the percentage of assignments turned in at baseline and school grades 18months later, even after controlling for baseline grades, achievement (reading and math), intelligence, family income, and race. Cross-lag analyses demonstrated that the association between assignment completion and grades was reciprocal, with assignment completion negatively impacting grades and low grades in turn being associated with decreased future homework completion. Parent ratings of homework materials management abilities at baseline significantly predicted the percentage of assignments turned in as reported by teachers 18months later. These findings demonstrate that homework assignment completion problems are persistent across time and an important intervention target for adolescents with ADHD

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Journal of the American Academy of Child & Adolescent Psychiatry. 2016 Jun;55:479-86.

AGE OF ONSET, DURATION, AND TYPE OF MEDICATION THERAPY FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND SUBSTANCE USE DURING ADOLESCENCE: A MULTI-COHORT NATIONAL STUDY.

McCabe SE, Dickinson K, West BT, et al.

Objective: To examine whether age of onset, duration, or type of medication therapy for attention-deficit/hyperactivity disorder (ADHD) is associated with substance use during adolescence.

Method: Nationally representative samples of high school seniors were surveyed via self-administered questionnaires. The sample consisted of 40,358 individuals from 10 independent cohorts (2005–2014) and represented a population that was 52% female, 62% white, 10% African American, 14% Hispanic, and 14% other race/ethnicity. Design-based logistic regression analyses were used to test the associations between age of onset, duration, and type of ADHD medication therapy and recent substance use, controlling for potential confounding factors.

Results: Individuals who initiated stimulant medication therapy for ADHD later (aged 10–14 years and 15 years and older) and for shorter duration (2 years or less and 3–5 years) as well as those who reported only

nonstimulant medication therapy for ADHD had significantly greater odds of substance use in adolescence relative to individuals who initiated stimulant medication therapy for ADHD earlier (aged 9 years or less) and for longer duration (6 or more years). The odds of substance use generally did not differ between population controls (youth without ADHD and unmedicated youth with ADHD) and individuals who initiated stimulant medication for ADHD early (aged 9 years or less) and for longer duration (aged 6 or more years).

Conclusion: Relative to later onset and shorter duration of stimulant treatment for ADHD, early onset and longer duration of stimulant treatment for ADHD was associated with a risk of substance use during adolescence that is lower than and similar to that in the general population

Journal of the American Academy of Child & Adolescent Psychiatry. 2016 Jun;55:504-12.

IS THERE A FEMALE PROTECTIVE EFFECT AGAINST ATTENTION-DEFICIT/HYPERACTIVITY DISORDER? EVIDENCE FROM TWO REPRESENTATIVE TWIN SAMPLES.

Taylor MJ, Lichtenstein P, Larsson H, et al.

Objective: Attention-deficit/hyperactivity disorder (ADHD) is more frequent in males than in females. The “female protective effect” posits that females undergo greater exposure to etiological factors than males in order to develop ADHD, leading to the prediction that relatives of females with ADHD will display more ADHD behaviors. We thus tested whether cotwins of females displaying extreme ADHD traits would display more ADHD traits than cotwins of males displaying extreme ADHD traits.

Method: Parents of approximately 7,000 pairs of nonidentical twins in Sweden, and approximately 4,000 pairs of twins in England and Wales, completed dimensional assessments of ADHD traits. Probands were selected on the basis of scoring within the highest 10% of the distribution in each sample. Dimensional scores of cotwins of probands, as well as the categorical recurrence rate, were investigated by proband sex.

Results: Cotwins of female probands displayed higher mean ADHD trait scores (mean = 0.62-0.79) than cotwins of male probands (mean = 0.38-0.55) in both samples. This trend was significant in the Swedish sample ($p < .01$) and when the 2 samples were merged into a single, larger sample ($p < .001$). When the samples were merged, there was also a significant association between proband sex and cotwin’s categorical status, with more cotwins of female probands also being probands than cotwins of male probands.

Conclusion: These findings support a female protective effect against ADHD behaviors, suggesting that females require greater exposure to genetic and environmental factors associated with ADHD in order to develop the condition

J Can Acad Child Adolesc Psychiatry. 2016;25:87-96.

OMEGA-6 TO OMEGA-3 FATTY ACID RATIO IN PATIENTS WITH ADHD: A META-ANALYSIS.

Lachance L, McKenzie K, Taylor VH, et al.

Objective: Omega-3 and omega-6 fatty acids have been shown to be deficient in individuals with attention deficit/ hyperactivity disorder compared to controls (Hawkey & Nigg, 2014). Clinical trials of omega-3 and omega-6 supplements as treatment for ADHD have demonstrated minimal efficacy (Bloch & Qawasmi, 2011; Gillies, Sinn, Lad, Leach, & Ross, 2011; Hawkey & Nigg, 2014; Puri & Martins, 2014; Sonuga-Barke et al., 2013). Existing trials have analyzed omega-3 and omega-6 separately although the tissue ratio of these fatty acids (n6/n3) may be more important than absolute levels of either. The objective of this study was to determine the relationship between blood n6/n3 and arachidonic acid to eicosapentaenoic acid (AA/EPA), to ADHD symptoms.

Method: A systematic literature review identified original articles measuring blood n6/n3 or AA/EPA ratio in children and youth with ADHD, compared to controls without ADHD. Three databases were searched. Blood n6/n3, and AA/EPA ratios were compared between individuals with ADHD and controls. Results were pooled across studies using quantitative synthesis.

Results: Five articles met inclusion criteria for the meta-analysis. The pooled mean difference between patients with ADHD and controls was 1.97 (0.90-3.04) for n6/n3 (n=5 studies, I² 83%) and 8.25 (5.94-10.56) for AA/EPA (n=3 studies, I² 0%).

Conclusions: Children and youth with ADHD have elevated ratios of both blood n6/n3 and AA/EPA fatty acids compared to controls. Thus an elevated n6/n3, and more specifically AA/EPA, ratio may represent the underlying disturbance in essential fatty acid levels in patients with ADHD. These findings have implications for the development of future interventions using essential fatty acids to treat ADHD, and for the use of these ratios as biomarkers for titrating and monitoring ADHD treatment with essential fatty acids

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Klin Psikofarmakol Bul. 2016;26:126-33.

EFFECTS OF MATERNAL SYMPTOM RATINGS AND OTHER CLINICAL FEATURES ON SHORT-TERM TREATMENT RESPONSE TO OROS METHYLPHENIDATE IN CHILDREN AND ADOLESCENTS WITH ADHD IN A NATURALISTIC CLINICAL SETTING.

Cop E, Oner O, Yurtbasi P, et al.

Objective: To investigate the effect of Attention Deficit Hyperactivity Disorder (ADHD), antisocial behavior and anxiety/depression ratings of mothers, and child and adolescents' age, gender, ADHD subtype, and comorbidity on one-month drug treatment response to OROS methylphenidate in ADHD in a naturalistic setting.

Methods: The analyses included 223 subjects (191 boys, 32 girls; age 6-15 years, mean: 9.4) treated with OROS methylphenidate (18-72 mg/day, mean: 31 mg/d; 0.4-1.4 mg/kg/d) for one-month. Treatment response was defined as larger than 25% or more decrease in pre-treatment the Conners Parent Rating Scale (CPRS) or the Conners Teacher Rating Scale (CTRS) total scores and the Clinical Global Impression improvement with drug treatment 3 (minimally improved) or higher. Maternal ADHD, antisocial behavior and anxiety/ depression ratings were obtained by the Adult Self Rating (ASR). Logistic regression analyses were computed in order to calculate the effects of gender; age; ADHD subtype; comorbid anxiety disorder, learning disorder, oppositional defiant/conduct disorder; maternal ASR Anxiety/Depression, ADHD and Antisocial scores.

Results: 35.2% of subjects had statistically significant 25% or more decrease in pretreatment CPRS total scores and 38.6% of subjects had statistically significant 25% or more decrease in pretreatment CTRS total scores. The subjects with comorbid anxiety disorder had the poorest drug response. Maternal self-reported antisocial and anxiety/depressive symptomatology were statistically significantly associated with worse response to treatment in terms of CPRS (respectively, OR=0.83, 95% CI: 0.75-0.92, p<0.01; OR=0.95, 95% CI: 0.9-0.99, p<0.05) and CTRS total scores (OR=0.9, 95% CI: 0.82-0.99, OR=0.95, 95% CI: 0.91-1, p<0.05). Baseline rating scores were also important predictors of drug treatment response. Effects of age, gender and maternal ADHD were not statistically significant.

Conclusion: ADHD children and adolescents with comorbid anxiety disorders and those whose mothers have more self-reports of antisocial and depressive symptoms showed less favorable short-term response to OROS-MPH. These subjects may require further attention and additional interventions to augment treatment with OROS methylphenidate

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Klin Psikofarmakol Bul. 2016;26:119-25.

ANTIOXIDANT STATUS AND DNA DAMAGE IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER WITH OR WITHOUT COMORBID DISRUPTIVE BEHAVIORAL DISORDERS.

Simsek S, Gencoglan S, Ozaner S, et al.

Objective: The aim of this study is to investigate oxidative stress and DNA damage among children with attention deficit hyperactivity disorder (ADHD) with or without disruptive behavioral disorders (DBD).

Methods: A total of 49 treatment naïve children (M/F: 40/9) who were diagnosed with ADHD according to the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV criteria were included. The patients with ADHD were divided into two groups, those with ADHD alone (n= 25) and ADHD plus DBD (n=24). The control group consisted of 40 age- and sex-similar healthy children. The Schedule for Affective Disorders and Schizophrenia for School Aged Children- Present and Life-time version (K-SADS-PL) was applied to all children. Children's teachers completed the Turgay DSM-IV Based Child and Adolescent Behavior Disorders

Screening and Rating Scale (T-DSM-IV-S). Serum glutathione peroxidase (GPx), coenzyme Q, 8-hydroxy-2-deoxyguanosine (8-OHdG) and superoxide dismutase (SOD) levels were measured by the ELISA method using commercial kits.

Results: There were no significant differences in serum GPx, SOD, CoQ and 8-OHdG levels among the pure ADHD, ADHD plus DBD and the control groups ($p>0.05$). No statistically significant correlations were found between the severity of ADHD symptoms and GPx, SOD, CoQ and 8-OHdG levels.

Conclusion: Our study suggests that oxidative stress may not play a key role in the pathogenesis of pure ADHD and ADHD plus DBD

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Medicine (Baltimore). 2016 Feb;95:e2622.

THE PREVALENCE OF MENTAL DISORDERS AMONG CHILDREN AND ADOLESCENTS IN THE CHILD WELFARE SYSTEM: A SYSTEMATIC REVIEW AND META-ANALYSIS.

Bronsard G, Alessandrini M, Fond G, et al.

It remains unclear whether children and adolescents in the child welfare system (CWS) exhibit a higher prevalence of mental disorders compared with the general population. The objective of this study was to perform a systematic review and meta-analysis to assess the prevalence of mental disorders in the CWS. All of the epidemiological surveys assessing the prevalence of mental disorders in children and adolescents in the CWS were included. The pooled prevalence was estimated with random effect models. Potential sources of heterogeneity were explored using meta-regression analyses. Eight studies provided prevalence estimates that were obtained from 3104 children and adolescents. Nearly 1 child or adolescent of every 2 (49%; 95% confidence interval (CI) 43-54) was identified as meeting criteria for a current mental disorder. The most common mental disorder was disruptive disorder (27%; 95% CI 20-34), including conduct disorder (20%; 95% CI 13-27) and oppositional defiant disorder (12%; 95% CI 10-14). The prevalence of attention-deficit/hyperactivity disorder was estimated to be 11% (95% CI 6-15). The prevalence estimates of anxiety and depressive disorders were 18% (95% CI 12-24) and 11% (95% CI 7-15). Posttraumatic stress disorder had the lowest prevalence (4%; 95% CI 2-6). High prevalences of mental disorders in the CWS were reported, which highlights the need for the provision of qualified service. The substantial heterogeneity of our findings is indicative of the need for accurate epidemiological data to effectively guide public policy

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Medicine. 2016;95.

NATIONAL TRENDS IN OFF-LABEL USE OF ATYPICAL ANTIPSYCHOTICS IN CHILDREN AND ADOLESCENTS IN THE UNITED STATES.

Sohn M, Moga DC, Blumenschein K, et al.

The objectives of the study were as follows: to examine the national trend of pediatric atypical antipsychotic (AAP) use in the United States; to identify primary mental disorders associated with AAPs; to estimate the strength of independent associations between patient/provider characteristics and AAP use. Data are from the National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey. First, average AAP prescription rates among 4 and 18-year-old patients between 1993 and 2010 were estimated. Second, data from 2007 to 2010 were combined and analyzed to identify primary mental disorders related to AAP prescription. Third, a multivariate logistic regression model was developed having the presence of AAP prescription as the dependent variable and patient/provider characteristics as explanatory variables. Adjusted odds ratios (AORs) with associated 95% confidence intervals (CIs) were estimated. Outpatient visits including an AAP prescription among 4 to 18-year-old patients significantly increased between 1993 and 2010 in the United States, and over 65% of those visits did not have diagnoses for US Food and Drug Administration-approved AAP indications. During 2007 to 2010, the most common mental disorder was attention-deficit hyperactivity disorder, accounting for 24% of total pediatric AAP visits. Among visits with attention-deficit hyperactivity disorder diagnosis, those with Medicaid as payer (AOR 1.66, 95% CI 1.01-2.75), comorbid mental disorders (e.g., psychoses AOR 3.34, 95% CI 1.35-8.26), and multiple prescriptions (4 or more prescriptions AOR 4.48, 95% CI 2.08-9.64) were more likely to have an AAP

prescription. The off-label use of AAPs in children and adolescents is prevalent in the United States. Our study raises questions about the potential misuse of AAPs in the population

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Mol Autism. 2016;7:8.

EFFECT OF CO-TWIN GENDER ON NEURODEVELOPMENTAL SYMPTOMS: A TWIN REGISTER STUDY.

Eriksson JM, Lundstrom S, Lichtenstein P, et al.

BACKGROUND: Autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) are neurodevelopmental disorders thought to have both genetic and environmental causes. It has been hypothesized that exposure to elevated levels of prenatal testosterone is associated with elevated traits of ASD and ADHD. Assuming that testosterone levels from a dizygotic male twin fetus may lead to enhanced testosterone exposure of its co-twins, we aimed to test the prenatal testosterone hypothesis by comparing same-sex with opposite-sex dizygotic twins with respect to neurodevelopmental symptoms.

METHODS: Neuropsychiatric traits were assessed in a population-based twin cohort from the Child and Adolescent Twin Study in Sweden (CATSS). Parental interviews were conducted for 16,312 dizygotic twins, 9 and 12 years old, with the Autism-Tics, ADHD, and other Comorbidities inventory (A-TAC).

RESULTS: Girls with a female co-twin had an increased risk of reaching the cut-off score for ADHD compared with girls with a male co-twin. Both boys and girls with a female co-twin displayed a larger number of traits related to attention deficit and repetitive and stereotyped behaviors than those with a male twin. In girls, this also extended to social interaction and the combined measures for ASD and ADHD, however, with small effect sizes.

CONCLUSIONS: Our results are reverse to what would have been expected from the prenatal testosterone hypothesis but consistent with a previous study of ASD and ADHD traits in dizygotic twins. The seemingly protective effect for girls of having a twin brother may be an effect of parent report bias, but may also be an unexpected effect of sharing the intrauterine environment with a male co-twin

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Neuroendocrinol Lett. 2016;37:29-32.

REVERSE ASYMMETRY AND CHANGES IN BRAIN STRUCTURAL VOLUME OF THE BASAL GANGLIA IN ADHD, DEVELOPMENTAL CHANGES AND THE IMPACT OF STIMULANT MEDICATIONS.

Paclt I, Pribilová N, Kollárová P, et al.

We discussed the cross section studies and the meta-analysis of published data in children and adolescents with ADHD (both drug naive and receiving stimulant medications), in comparison with healthy children and adolescents of the same age. In children and adolescents with ADHD the deceleration of the maturation dynamics of discrete CNS structures is found, volume reduction and decreased grey matter in prefrontal and occipital regions, which is accompanied by reverse asymmetry of the basal ganglia volume (putamen, nucleus caudate). The above mentioned developmental characteristics are valid only for the ADHD children, who have not been treated by stimulant medications. The stimulant treatment eliminates the mentioned changes into various extend. These developmental changes of CNS structures volume are missing in girls

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Neuropsychiatrie. 2016;30:63-68.

AN ATTACHMENT RESEARCH PERSPECTIVE ON ADHD.

Kissgen R, Franke S.

Since the beginning of clinical attachment research in the mid-1980s the number of research projects in this area has been continuously increasing. The research questions so far can be allocated to numerous medical disciplines such as psychosomatic medicine, adult psychiatry or child and adolescent psychiatry. Recently, children with ADHD and their families have also become subjects of this branch of research. Their specific behavioral characteristics from early childhood on constitute unique challenges on the parent-child interaction. If these interactions develop in a suboptimal way, children may develop an insecure or even a-

disorganized attachment quality. The latter represents a risk factor for a clinically significant psychopathological development. This article initially presents basic principles of attachment theory and discusses the relevance of the cardinal symptoms of ADHD for clinical attachment research. Subsequently, it outlines and discusses the main results of existing research regarding attachment and ADHD. It concludes with a perspective on research questions that need to be addressed in the future with regard to a transgenerational model that highlights the importance of parental attachment representations to the development of children's attachment quality

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Neuropsychology. 2016 May;30:502-15.

EVALUATING THE CONSEQUENCES OF IMPAIRED MONITORING OF LEARNED BEHAVIOR IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER USING A BAYESIAN HIERARCHICAL MODEL OF CHOICE RESPONSE TIME.

Weigard A, Huang-Pollock C, Brown S.

Objective: Performance monitoring deficits have been proposed as a cognitive marker involved in the development of attention-deficit/hyperactivity disorder (ADHD), but it is unclear whether these deficits cause impairment when established action sequences conflict with environmental demands. The current study applies a novel data-analytic technique to a well-established sequence learning paradigm to investigate reactions to disruption of learned behavior in ADHD.

Method: Children (ages 8–12) with and without ADHD completed a serial reaction time task in which they implicitly learned an 8-item sequence of keypresses over 5 training blocks. The training sequence was replaced with a novel sequence in a transfer block, and returned in 2 subsequent recovery blocks. Response time (RT) data were fit by a Bayesian hierarchical version of the linear ballistic accumulator model, which permitted the dissociation of learning processes from performance monitoring effects on RT.

Results: Sequence-specific learning on the task was reflected in the systematic reduction of the amount of evidence required to initiate a response, and was unimpaired in ADHD. When the novel sequence onset, typically developing children displayed a shift in their attentional state while children with ADHD did not, leading to worse subsequent performance compared to controls.

Conclusions: Children with ADHD are not impaired in learning novel action sequences, but display difficulty monitoring their implementation and engaging top-down control when they become inadequate. These results support theories of ADHD that highlight the interactions between monitoring processes and changing cognitive demands as the cause of self-regulation and information-processing problems in the disorder

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Neurosci Biobehav Rev. 2016 Jun;65:229-63.

AUTISM SPECTRUM DISORDER AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN EARLY CHILDHOOD: A REVIEW OF UNIQUE AND SHARED CHARACTERISTICS AND DEVELOPMENTAL ANTECEDENTS.

Visser JC, Rommelse NNJ, Grevén CU, et al.

Autism spectrum disorder (ASD) and attention-deficit/hyperactivity disorder (ADHD) have overlapping characteristics and etiological factors, but to which extent this applies to infant- and preschool age is less well understood. Comparing the pathways to ASD and ADHD from the earliest possible stages is crucial for understanding how phenotypic overlap emerges and develops. Ultimately, these insights may guide preventative and therapeutic interventions. Here, we review the literature on the core symptoms, temperament and executive function in ASD and ADHD from infancy through preschool age, and draw several conclusions: (1) the co-occurrence of ASD and ADHD increases with age, severity of symptoms and lower IQ, (2) attention problems form a linking pin between early ASD and ADHD, but the behavioral, cognitive and sensory correlates of these attention problems partly diverge between the two conditions, (3) ASD and ADHD share high levels of negative affect, although the underlying motivational and behavioral tendencies seem to differ, and (4) ASD and ADHD share difficulties with control and shifting, but partly opposite behaviors seem to be involved

Obes Facts. 2016;9:208-09.

INCREASED PREVALENCE OF ADHD, AUTISM SPECTRUM DISORDER AND OTHER NEURODEVELOPMENTAL DISORDERS IN OBESE CHILDREN.

Dahlgren J, et al.

Background & Aims: Child obesity has become a global health problem. The younger treatment starts the better outcome, but and few treatment modalities are efficient. An increasing body of evidence shows that children with neurodevelopmental disorders have an increased risk of obesity. Whether obese children have an increased risk of neurodevelopmental disorders with worse treatment outcome is not studied.

Objectives: To investigate the prevalence of ADHD, autism spectrum disorder (ASD) and, other neurodevelopmental disorders in obese children.

Material/Methods: Seventy-six children (37 girls; 39 boys) were recruited at referral to a university outpatient clinic. The parents were interviewed regarding the child's psychiatric morbidity using The development and well-being assessment, and completed parental questionnaires pertaining to ADHD, ASD and other neurodevelopmental disorders. The parents were screened for adult ADHD using the Adult ADHD Self-Report Scale. Anthropometric and metabolic data was collected at the first visit and after one year of conventional life-style treatment.

Results: Twelve percent 1% and 18% of the children were diagnosed with ASD and ADHD respectively. Thirty percent of the children had at least one neurodevelopmental disorder and 20% had a parent who screened positive for adult ADHD. There was statistically significant more obese males with neurodevelopmental disorders ($P < 0.05$). In the total group, mean (SD) body mass index (BMI) was 3.4 (0.6), insulin 31 (18.5) and age 12.4 (3.0), with a range of 2-6 kg/m², 6-110 and 5.1-16.5 years, respectively. There was no statistical difference in mean BMI, insulin, age and other metabolic variables between those obese children with neurodevelopmental disorders and without. No difference was found in treatment outcome after one year between those with neurodevelopmental disorders and without (delta BMI SDS 0.06 (0.36) versus 0.13 (0.33), $P = 0.5$).

Conclusions: Neurodevelopmental disorders are overrepresented in clinical populations of obese children, especially in males. Moreover, many parents share their children's symptoms, which should be taken into account when designing educational materials although we did not find any significant worse BMI outcome in those with neurodevelopmental disorders

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Pediatr Prax. 2016;85:653-62.

DIVING MEDICINE IN CHILDREN AND ADOLESCENTS.

Kretzschmar B.

Scuba diving is practiced by more and more children and adolescents. This article focuses on characteristics of diving in this age group. Specific aspects of diving medicine in children and adolescents are mentioned. Questions of medical aptitude for scuba diving of patients with chronicle illness like ADHD and diabetes mellitus are discussed

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Pediatr Allergy Immunol. 2016.

ASTHMA, HAY FEVER, AND FOOD ALLERGY ARE ASSOCIATED WITH CAREGIVER-REPORTED SPEECH DISORDERS IN US CHILDREN.

Strom MA, Silverberg JI .

Background: Children with asthma, hay fever, and food allergy may have several factors that increase their risk of speech disorder, including allergic inflammation, ADD/ADHD, and sleep disturbance. However, few studies have examined a relationship between asthma, allergic disease, and speech disorder. We sought to determine whether asthma, hay fever, and food allergy are associated with speech disorder in children and whether disease severity, sleep disturbance, or ADD/ADHD modified such associations.

Methods: We analyzed cross-sectional data on 337,285 children aged 2-17 years from 19 US population-based studies, including the 1997-2013 National Health Interview Survey and the 2003/4 and 2007/8 National Survey of Children's Health.

Results: In multivariate models, controlling for age, demographic factors, healthcare utilization, and history of eczema, lifetime history of asthma (odds ratio [95% confidence interval]: 1.18 [1.04-1.34], $p = 0.01$), and one-year history of hay fever (1.44 [1.28-1.62], $p < 0.0001$) and food allergy (1.35 [1.13-1.62], $p = 0.001$) were associated with increased odds of speech disorder. Children with current (1.37 [1.15-1.59] $p = 0.0003$) but not past ($p = 0.06$) asthma had increased risk of speech disorder. In one study that assessed caregiver-reported asthma severity, mild (1.58 [1.20-2.08], $p = 0.001$) and moderate (2.99 [1.54-3.41], $p < 0.0001$) asthma were associated with increased odds of speech disorder; however, severe asthma was associated with the highest odds of speech disorder (5.70 [2.36-13.78], $p = 0.0001$).

Conclusion: Childhood asthma, hay fever, and food allergy are associated with increased risk of speech disorder. Future prospective studies are needed to characterize the associations

PLoS ONE. 2016;11.

THE RELATIONSHIPS BETWEEN WORKAHOLISM AND SYMPTOMS OF PSYCHIATRIC DISORDERS: A LARGE-SCALE CROSS-SECTIONAL STUDY.

Andreassen CS, Griffiths MD, Sinha R, et al.

Despite the many number of studies examining workaholism, large-scale studies have been lacking. The present study utilized an open web-based cross-sectional survey assessing symptoms of psychiatric disorders and workaholism among 16,426 workers (Mage = 37.3 years, SD = 11.4, range = 16-75 years). Participants were administered the Adult ADHD Self-Report Scale, the Obsession-Compulsive Inventory-Revised, the Hospital Anxiety and Depression Scale, and the Bergen Work Addiction Scale, along with additional questions examining demographic and work-related variables. Correlations between workaholism and all psychiatric disorder symptoms were positive and significant. Workaholism comprised the dependent variable in a three-step linear multiple hierarchical regression analysis. Basic demographics (age, gender, relationship status, and education) explained 1.2% of the variance in workaholism, whereas work demographics (work status, position, sector, and annual income) explained an additional 5.4% of the variance. Age (inversely) and managerial positions (positively) were of most importance. The psychiatric symptoms (ADHD, OCD, anxiety, and depression) explained 17.0% of the variance. ADHD and anxiety contributed considerably. The prevalence rate of workaholism status was 7.8% of the present sample. In an adjusted logistic regression analysis, all psychiatric symptoms were positively associated with being a workaholic. The independent variables explained between 6.1% and 14.4% in total of the variance in workaholism cases. Although most effect sizes were relatively small, the study's findings expand our understanding of possible psychiatric predictors of workaholism, and particularly shed new insight into the reality of adult ADHD in work life. The study's implications, strengths, and shortcomings are also discussed

PLoS ONE. 2016;11.

OMEGA-3 AND OMEGA-6 POLYUNSATURATED FATTY ACID LEVELS AND CORRELATIONS WITH SYMPTOMS IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER, AUTISTIC SPECTRUM DISORDER AND TYPICALLY DEVELOPING CONTROLS.

Parletta N, Niyonsenga T, Duff J.

Background: There is evidence that children with Attention Deficit Hyperactivity Disorder (ADHD) and Autistic Spectrum Disorder (ASD) have lower omega-3 polyunsaturated fatty acid (n-3 PUFA) levels compared with controls and conflicting evidence regarding omega-6 (n-6) PUFA levels.

Objectives: This study investigated whether erythrocyte n-3 PUFAs eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) were lower and n-6 PUFA arachidonic acid (AA) higher in children with ADHD, ASD and controls, and whether lower n-3 and higher n-6 PUFAs correlated with poorer scores on the

Australian Twin Behaviour Rating Scale (ATBRS; ADHD symptoms) and Test of Variable Attention (TOVA) in children with ADHD, and Childhood Autism Rating Scale (CARS) in children with ASD.

Methods: Assessments and blood samples of 565 children aged 3-17 years with ADHD (n = 401), ASD (n = 85) or controls (n = 79) were analysed. One-way ANOVAs with Tukey's post-hoc analysis investigated differences in PUFA levels between groups and Pearson's correlations investigated correlations between PUFA levels and ATBRS, TOVA and CARS scores.

Results: Children with ADHD and ASD had lower DHA, EPA and AA, higher AA/EPA ratio and lower n-3/n-6 than controls ($P < 0.001$ except AA between ADHD and controls: $P = 0.047$). Children with ASD had lower DHA, EPA and AA than children with ADHD ($P < 0.001$ for all comparisons). ATBRS scores correlated negatively with EPA ($r = -.294$, $P < 0.001$), DHA ($r = -.424$, $P < 0.001$), n-3/n-6 ($r = -.477$, $P < 0.001$) and positively with AA/EPA ($r = .222$, $P < .01$). TOVA scores correlated positively with DHA ($r = .610$, $P < 0.001$), EPA ($r = .418$, $P < 0.001$) AA ($r = .199$, $P < 0.001$), and n-3/n-6 ($r = .509$, $P < 0.001$) and negatively with AA/EPA ($r = -.243$, $P < 0.001$). CARS scores correlated significantly with DHA ($r = .328$, $P = 0.002$), EPA ($r = -.225$, $P = 0.038$) and AA ($r = .251$, $P = 0.021$).

Conclusions: Children with ADHD and ASD had low levels of EPA, DHA and AA and high ratio of n-6/n-3 PUFAs and these correlated significantly with symptoms. Future research should further investigate abnormal fatty acid metabolism in these disorders

PPmP Psychotherapie Psychosomatik Medizinische Psychologie. 2016;66:187-94.

OPTIMIZING ADHD TREATMENT? RESULTS OF A PILOTSTUDY OF THE ADHD SELECTIVE CONTRACT IN BREMERHAVEN, GERMANY.

Kersting C, Lindemann C, Mikołajczyk R, et al.

Background: The attention deficit hyperactivity disorder (ADHD) is associated with substantial impairment and psychiatric comorbidities. Thus, an optimized treatment is essential. In 2011, a new multidisciplinary treatment strategy (so-called Versorgungsvertrag) was contracted for the model region of Bremerhaven, Germany. This manuscript describes the results of the feasibility testing, focusing on the effects of the Versorgungsvertrag on patients' ADHD symptoms and on the treatment satisfaction of patients' kins.

Material and Methods: Patients with ADHD (4-17 years) were assessed at baseline and at 9 months follow-up. Kins documented the current symptomatology using the FBB-ADHS questionnaire on both occasions, and rated their satisfaction with the Versorgungsvertrag at follow-up. The FBB-ADHS gives information on the severity of the ADHD core symptoms (0=normal, 3=very noticeable).

Results: 69 patients (77 kins) were included. At follow-up, data from 59 patients (67 kins) were available. FBB-ADHS data of both occasions was available for 44 patients. Improvements regarding the ADHD total score (1.27 at follow-up vs. 1.59 at baseline, $p=0.003$) and the subdomains inattention (1.42 vs. 1.81, $p=0.001$) and hyperactivity (0.96 vs. 1.22, $p=0.032$) were documented. In the subgroup of boys ($n=34$), inattention ($p=0.001$), impulsivity ($p=0.019$) and the ADHD total score ($p=0.002$) improved, while no changes were observed in the subgroup of girls ($n=10$). The majority of kins (52.4 to 68.4%) rated the treatment as helpful.

Discussion: Our study shows improvements for the ADHD core symptoms after 9 months and a high satisfaction of kins with the treatment strategy. Due to the lack of a control group from routine care, no certain statement about the additional benefit of the treatment strategy can be made. The null effect in the subgroup of girls might be explained by the underrepresentation of girls, but the gender distribution observed in our study is commonly observed in patients with ADHD. Conclusion: The positive effects during the observation period should be confirmed in further studies including a control group from routine care

Prog Neuro-Psychopharmacol Biol Psychiatry. 2016.

CLINICAL AND NEUROBIOLOGICAL FACTORS IN THE MANAGEMENT OF TREATMENT REFRACTORY ATTENTION-DEFICIT HYPERACTIVITY DISORDER.

Shim SH, Yoon HJ, Bak J, et al.

Attention-deficit/hyperactivity disorder (ADHD) is a highly prevalent mental disorder of childhood, which often continues into adolescence and adulthood. Stimulants such as methylphenidate (MPH) and non-stimulants such as atomoxetine are effective medications for the treatment of ADHD. However, about 30% of patients do not respond to these medications. Pharmacological treatment for ADHD, although highly effective, is associated with marked variabilities in clinical response, optimal dosage needed and tolerability. This article provides an overview of up-to-date knowledge regarding the clinical and neurobiological factors which contribute to and help predict treatment-refractory ADHD. Pharmacogenetic, pharmacogenomics and neuroimaging studies are still controversial with respect to determining the associations between response to medication and genetic factors, thereby resulting in hypotheses that differences in the genetic factors and neuroimaging findings contribute to treatment outcome. Much research on the potential role of genotype in pharmacological effects has focused on the catecholaminergic gene related to executive functions. Many neuroimaging studies have also reported a relationship between treatment response and common patterns of brain structure or activity according to various genetic polymorphisms. When children, adolescents and adults with ADHD do not respond to MPH, we should consider additional pharmacological options, including other classes of psychostimulants, the nonstimulant atomoxetine, bupropion, tricyclic antidepressant, clonidine, guanfacine and lisdexamphetamine. Prudent choice of an appropriate medication and active engagement of children, parents, and teachers in daily management may help to ensure long-term adherence. Therefore, additional research might help to optimize the treatment of children, adolescents and adults with ADHD and to find new options for the treatment of patients who do not respond to stimulants and the other medications. Because these findings should be interpreted cautiously, further studies are needed to elucidate these issues more clearly

Psychiatry Res Neuroimaging. 2016;254:10-17.

NEUROCHEMICAL CORRELATES OF INTERNET GAME PLAY IN ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A PROTON MAGNETIC RESONANCE SPECTROSCOPY (MRS) STUDY.

Bae S, Han DH, Kim SM, et al.

Previous studies have examined the relationship of brain metabolic changes in patients with attention deficit hyperactivity disorder (ADHD) and internet gaming disorder (IGD). However, these studies have been limited by a small number of subjects, a large variance in subject age, and different brain regions of interest. The present study assessed the effects of chronic internet game play in ADHD children. Twenty eight ADHD adolescents with IGD (IGD+ADHD), 27 ADHD adolescents without problematic internet game playing (ADHD only) and 42 healthy comparison adolescents (HC) were included in the study. Magnetic resonance spectroscopy (MRS) was performed on a 3 T MRI scanner. Our results indicate that the levels of NAA in both ADHD groups were lower than those observed in the HC group. The levels of Glu+Gln in the ADHD only group were increased, compared to those observed in the control group. However, Glu+Gln was not increased in the IGD+ADHD group. In addition, the levels of Glu+Gln in the IGD+ADHD group were positively correlated with K-ARS total and inattention scores. ADHD and IGD subjects were both characterized by decreased NAA levels within the frontal lobe, consistent with hypofrontality

Psychiatry Res. 2016;242:288-94.

EVENT-RELATED POTENTIALS REFLECT THE EFFICACY OF PHARMACEUTICAL TREATMENTS IN CHILDREN AND ADOLESCENTS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER.

Yamamuro K, Ota T, Iida J, et al.

Few objective biological measures of pharmacological treatment efficacy exist for attention deficit/hyperactivity disorder (ADHD). Although we have previously demonstrated that event-related

potentials (ERPs) reflect the effects of osmotic-release methylphenidate in treatment of na+»ve pediatric patients with ADHD, whether this is true for the therapeutic effects of atomoxetine (ATX) is unknown. Here, we used the Japanese version of the ADHD rating-scale IV to evaluate 14 patients with ADHD, and compared their ERP data with 14 age- and sex-matched controls. We measured P300 and mismatch negativity (MMN) components during an auditory oddball task before treatment (treatment na+»ve) and after 2 months of ATX treatment. Compared with controls, P300 components at baseline were attenuated and prolonged in the ADHD group at Fz (fronto-central), Cz (centro-parietal), Pz (parietal regions), C3 and C4 electrodes. ATX treatment reduced ADHD symptomology, and after 2 months of treatment, P300 latencies at Fz, Cz, Pz, C3, and C4 electrodes were significantly shorter than those at baseline. Moreover, MMN amplitudes at Cz and C3 electrodes were significantly greater than those at baseline. Thus, ERPs may be useful for evaluating the pharmacological effects of ATX in pediatric and adolescent patients with ADHD

Psychiatry Res. 2016;242:130-36.

CORTISOL LEVELS AT BASELINE AND UNDER STRESS IN ADOLESCENT MALES WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER, WITH OR WITHOUT COMORBID CONDUCT DISORDER.

Northover C, Thapar A, Langley K, et al.

Reported findings on cortisol reactivity to stress in young people with ADHD are very variable. This inconsistency may be explained by high rates of comorbidity with Conduct Disorder (CD). The present study examined cortisol responses to a psychosocial stressor in a large sample of adolescent males with ADHD (n=202), with or without a comorbid diagnosis of Conduct Disorder (CD). Associations between stress reactivity and callous-unemotional traits and internalizing symptoms were also assessed. The ADHD only (n=95) and ADHD+CD (n=107) groups did not differ in baseline cortisol, but the ADHD+CD group showed significantly reduced cortisol stress reactivity relative to the ADHD only group. Regression analyses indicated that ADHD symptom severity predicted reduced baseline cortisol, whereas CD symptom severity predicted increased baseline cortisol (ADHD $\beta=-0.24$, CD $\beta=0.16$, $R=0.26$) and reduced cortisol stress reactivity ($\beta=-0.17$, $R=0.17$). Callous-unemotional traits and internalizing symptoms were not significantly related to baseline or stress-induced cortisol. Impaired cortisol reactivity is hypothesised to reflect fearlessness and is associated with deficient emotion regulation and inhibition of aggressive and antisocial behaviour. Consequently, it may partly explain the greater severity of problems seen in those with comorbid ADHD and CD

Psychiatry Res. 2016;242:251-59.

SLOW SLUGGISH COGNITIVE TEMPO SYMPTOMS ARE ASSOCIATED WITH POORER ACADEMIC PERFORMANCE IN CHILDREN WITH ADHD.

Tamm L, Garner AA, Loren REA, et al.

Sluggish cognitive tempo (SCT) symptoms may confer risk for academic impairment in attention-deficit/hyperactivity disorder (ADHD). We investigated SCT in relation to academic performance and impairment in 252 children (ages 6-12, 67% boys) with ADHD. Parents and teachers completed SCT and academic impairment ratings, and achievement in reading, math, and spelling was assessed. Simultaneous regressions controlling for IQ, ADHD, and comorbidities were conducted. Total SCT predicted parent-rated impairments in writing, mathematics, and overall school but not reading. Parent-rated SCT Slow predicted poorer reading and spelling, but not math achievement. Teacher-rated SCT Slow predicted poorer spelling and math, but not reading achievement. Parent-rated SCT Slow predicted greater academic impairment ratings across all domains, whereas teacher-rated SCT Slow predicted greater impairment in writing only. Age and gender did not moderate these relationships with the exception of math impairment; SCT slow predicted math impairment for younger but not older children. Parent and teacher SCT Sleepy and Daydreamy ratings were not significant predictors. SCT Slow appears to be uniquely related to academic

problems in ADHD, and may be important to assess and potentially target in intervention. More work is needed to better understand the nature of SCT Slow symptoms in relation to inattention and amotivation

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Psychol Med. 2016 Apr;46:1197-209.

THE EFFECTS OF ACUTE FLUOXETINE ADMINISTRATION ON TEMPORAL DISCOUNTING IN YOUTH WITH ADHD.

Carlisi CO, Chantiluke K, Norman L, et al.

Background: Serotonin is under-researched in attention deficit hyperactivity disorder (ADHD), despite accumulating evidence for its involvement in impulsiveness and the disorder. Serotonin further modulates temporal discounting (TD), which is typically abnormal in ADHD relative to healthy subjects, underpinned by reduced fronto-striato-limbic activation. This study tested whether a single acute dose of the selective serotonin reuptake inhibitor (SSRI) fluoxetine up-regulates and normalizes reduced fronto-striato-limbic neurofunctional activation in ADHD during TD.

Method: Twelve boys with ADHD were scanned twice in a placebo-controlled randomized design under either fluoxetine (between 8 and 15 mg, titrated to weight) or placebo while performing an individually adjusted functional magnetic resonance imaging TD task. Twenty healthy controls were scanned once. Brain activation was compared in patients under either drug condition and compared to controls to test for normalization effects.

Results: Repeated-measures whole-brain analysis in patients revealed significant up-regulation with fluoxetine in a large cluster comprising right inferior frontal cortex, insula, premotor cortex and basal ganglia, which further correlated trend-wise with TD performance, which was impaired relative to controls under placebo, but normalized under fluoxetine. Fluoxetine further down-regulated default mode areas of posterior cingulate and precuneus. Comparisons between controls and patients under either drug condition revealed normalization with fluoxetine in right premotor-insular-parietal activation, which was reduced in patients under placebo.

Conclusions: The findings show that a serotonin agonist up-regulates activation in typical ADHD dysfunctional areas in right inferior frontal cortex, insula and striatum as well as down-regulating default mode network regions in the context of impulsivity and TD

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Qualitative Health Research. 2016 Jun;26:935-50.

AN ETHNOGRAPHIC-DISCURSIVE APPROACH TO PARENTAL SELF-HELP GROUPS: THE CASE OF ADHD.

Frigerio A, Montali L.

Mutual aid groups have become a common form of help in the mental health field. Although self-help groups are associated with a range of health and social benefits, they remain poorly understood in terms of the dynamics of their interactions. Adopting an ethnographic-discursive approach, we conducted a 6-month observation of the meetings of a self-help group of parents with children diagnosed with attention deficit/hyperactivity disorder (ADHD) to analyze the discursive dynamics of the interactions that characterized the group. Using a set of discursive strategies and practices, the parents promoted a homogeneity of viewpoints and experiences within the group and constructed a shared and consensual narrative to endorse a specific understanding of ADHD. The production of both homogeneity within the group and a shared narrative served to absolve parents of guilt, helped parents to signify their experience within a blaming social context, and preserved their identities as “good parents”

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Res Dev Disabil. 2016;55:279-86.

THE RELATIONSHIP BETWEEN MOTOR SKILLS, ADHD SYMPTOMS, AND CHILDHOOD BODY WEIGHT.

Gouldins JB, Rigoli D, Piek JP, et al.

Background: Research has suggested an important association between motor proficiency and overweight/obesity. Many children with motor difficulties experience ADHD symptoms which have also been

linked with overweight/obesity. Previous research has not considered both ADHD and motor performance when investigating their relationship with overweight/obesity.

Aims: To investigate the relationships between motor performance, ADHD symptoms, and overweight/obesity in children.

Methods and procedures: A cross-sectional study was conducted involving 189 children aged six to 10 years. Symptoms of ADHD were identified using the SNAP-IV rating scale. Motor impairment (MI) was identified using the Movement Battery Assessment for Children-2. Body composition was estimated from the Body Mass Index (BMI) based on World Health Organization child growth standards.

Outcomes and results: Balance was the only motor skill associated with BMI even after controlling for gender and ADHD. Group comparisons revealed that the proportion of overweight ADHD children was significantly less than the proportion of overweight control children and overweight MI children; the proportion of underweight ADHD children was significantly greater than the proportion of underweight MI children.

Conclusions and implications: The results highlight the importance of taking into consideration both ADHD symptoms and motor difficulties in the assessment and intervention of physical health outcomes in children with ADHD and/or movement problems

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Rev Med Chir Soc Med Nat Iasi. 2016 Jan;120:10-14.

ADHD (ATTENTION DEFICIT HYPERACTIVITY DISORDER)--A TROUBLING ENTITY, SOMETIMES PERPETUATING DURING ADULT LIFE.

Amihaesei IC, Zamfir CL.

Attention deficit hyperactivity disorder (ADHD) is considered a neurologic development disorder resulting in impairment of attention and inhibitory control, manifested as attention deficit, hyperactivity, impulsiveness; symptoms should develop between age six and twelve and have to persist for more than six months. Approximately 30-50% of the diagnosed cases are manifesting the disorder during adulthood and 2.5-5% of the adults are suffering of ADHD. Genetics are important factors in ADHD, being involved in 75% of the cases, as well in the persistence of ADHD during adult life. Three subtypes of ADHD are described--one in which is predominating the attention deficit, one with predominant hyperactivity and impulsiveness and a third combined subtype. Diagnosis criteria in ADHD are established by the American Psychiatric Association (DSM criteria) and by World Health Organization. Differential diagnosis is mainly considering bipolar disorder and borderline personality disorder. Management of ADHD is including behavioral therapies and medication, alone or combined. Stimulant medications such as amphetamine represent the therapy of choice, being effective in 80% of the cases. New data are underlying the need for following up of the cases during adulthood, since the risk for development of psychiatric conditions such as depression, anxiety, as well as the suicidal behavior is higher than in the general population

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Seishin Shinkeigaku Zasshi. 2015;117:768-74.

DIAGNOSIS AND TREATMENT OF ADULT ADHD COMORBID WITH MOOD OR ANXIETY DISORDERS.

Okada T.

Adult ADHD is often comorbid with psychiatric disorders: depressive or bipolar disorders, anxiety disorders, other destructive disorders, or nicotine dependency. Although the pathological backgrounds of these comorbidities are diverse, some of them, except bipolar disorder, are partly secondary to difficulties associated with ADHD. Many adults with ADHD visit psychiatrists with psychiatric symptoms. Focusing on the growth history and difficulties in daily life persisting after the remission of mood or anxiety disorders enables psychiatrists to diagnose adult ADHD. However, the diagnosis of adult ADHD is sometimes difficult, because ADHD symptoms can be regarded as symptoms of psychiatric disorders. There exist, however, slight differences in symptoms of adult ADHD and psychiatric disorders. There is some evidence on psychopharmacological interventions. In adult ADHD comorbid with bipolar disorders, it is important to stabilize mood change before treating ADHD symptoms. On the other hand, in adult ADHD comorbid with depressive disorders, it is acceptable to treat depressive and ADHD symptoms at the same time. In adult

ADHD with anxiety disorders, atomoxetine can reduce anxiety as well as ADHD symptoms. In the diagnosis and treatment of adults, it is essential to assess their history from childhood to adulthood, and examine and intervene multidimensionally, including from the viewpoint of psychosocial aspects

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Sleep. 2016;39:A333-A334.

IS THERE A CONNECTION BETWEEN ADHD-LIKE SYMPTOMS AND DISTURBED SLEEP IN CHILDREN?

Zarei S, Chung SA, Shahid A, et al.

Introduction: The aim of this study was to investigate ADHD-like symptoms in children undergoing sleep assessment.

Methods: Charts of children aged 2 to 18 years and undergoing overnight diagnostic polysomnographic testing were reviewed. Children with a history (confirmed or unconfirmed) of ADHD were excluded. Scores on the SNAP rating scale were used to determine ADHD like symptoms (inattentive, hyperactive/impulsive and combined subtypes). In addition, children were asked to complete the Pediatric Daytime Sleepiness Scale (PDSS), the Centre for Epidemiologic Studies Depression Scale for Children (CES-DC) and the Screen for Child Anxiety Related Disorders (SCARED). To summarize sleep pathology, a 13-item Sleep Composite Scale consisting of sleep architectural variables and the PDSS was developed for this study; a binary score (0 or 1) was assigned based on whether variables were outside the established age-based cutoff.

Results: Charts of 58 children were analyzed: 32.7%, 36.2% and 29.3%, respectively, scored above the cutoffs for inattention, hyperactivity/impulsivity and combined subscales of the SNAP. No single sleep architectural variable was significantly correlated with SNAP scores. However, scores on the Sleep Composite Scale were consistently elevated for those children scoring above versus below the cutoffs for the inattention (6.2 -| 2.2 vs. 6.1 -| 1.8), hyperactivity/impulsivity (6.2 -| 1.6 vs. 6.0 -| 2.1) and combined (6.3 -| 1.8 vs. 6.0 -| 2.0) subscales of the SNAP, although this differences did not reach significance. Of note, 72.4% and 43.1% of the children, respectively, scored above the cutoffs for the CES-DC and SCARED scales.

Conclusion: Our findings suggest that ADHD-like symptoms are common in children with disturbed sleep. It appears that overall greater sleep pathology and no specific sleep architectural variable was linked to greater ADHD-like symptoms. Further, children with sleep problems also had a greater frequency of symptoms of depression and anxiety

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Sleep. 2016;39:A232-A233.

THE USE OF THE SUGGESTED IMMOBILISATION TEST IN CHILDREN WITH ADHD: RELATIONSHIPS WITH PERIODIC LEG MOVEMENTS DURING SLEEP AND NOCTURNAL AWAKENINGS.

Chevrier A, Chicoine M, Tessier M, et al.

Introduction: The Suggested Immobilisation Test (SIT) is used to detect the restless legs syndrome (RLS) in adults. In this study, we administered the SIT in children with ADHD and explored its relationship with periodic leg movements during sleep (PLMS) and during wake (PLMW).

Methods: 54 children (6-17 years, 41 boys) were recruited in a sleep disorder clinic for children and referred to the laboratory for one night of diagnostic polysomnography on the basis of various types of sleep complaints. Before lights out, they were asked to sit in bed with legs outstretched, trying not to move them while surface EMG was recorded from bilateral anterior tibialis muscles during 30-60 minutes. The sleep of 41 additional children (5-17 years, 28 boys) was also recorded without having the SIT. Every child was diagnosed with ADHD and no one had epilepsy or intellectual deficiency. Periodic leg movements during the SIT, PLMS and PLMW were scored according to standard methods. Groups were compared with ANOVAs and the association between the SIT, PLMS and PLMW results was analyzed with Pearson correlations.

Results: 65% of the children tested with the SIT had an index above the clinical cut-off core of 40 (mean index: 137.6). The number of periodic leg movements during SIT in all children combined was positively correlated with both PLMS ($r = 0.271$, $p = 0.048$) and PLMW ($r = 0.372$, $p = 0.006$). The PLMS index was

greater in the total sample of SIT-tested children than those not tested ($p < 0.001$) but the PLMW index was not different. The SIT-positive children showed these same differences but SIT-negative children did not.

Conclusion: This study confirms that the SIT can be used in ADHD children and supports that RLS prevalence is high in this population. It also suggests that the SIT could be used to predict the severity of PLMS and PLMW in children with ADHD

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Sleep. 2016;39:A5.

MULTIVARIATE ANALYSIS OF INSOMNIA SYMPTOMS IN CHILDREN WITH AUTISM SPECTRUM DISORDER REVEALS CONNECTION WITH CONSTIPATION AND ATTENTION DEFICIT DISORDER.

Veatch OJ, Sutcliffe JS, Warren ZE, et al.

Introduction: Insomnia is common in individuals with autism spectrum disorder (ASD), indicating a connection between genes increasing risk for ASD and those involved in sleep regulation. Overwhelming evidence suggests genetic susceptibility factors underlying ASD, and that the wide variability in symptomatology is explained by genetic heterogeneity. Identifying individuals with co-occurring insomnia may detect clinically relevant genetic mechanisms in ASD. Conducting multivariate analyses of sleep in individuals with ASD could identify subgroups expressing insomnia and reveal genetically meaningful connections between insomnia symptoms and ASD.

Methods: Cluster analysis was conducted on five questions specific to insomnia included in the medical histories of 2,708 children with ASD. Input variables included responses related to whether the child had difficulty going to bed, falling asleep, frequent or prolonged night wakings, sleepwalking or frequent nightmares, and/or needed a parent in order to sleep. Differences between mean sleep durations reported for individuals assigned to distinct clusters were then determined. In addition, the proportion of individuals with sleep problems, and other comorbidities were compared between clusters. Finally, the proportion of individuals with exonic mutations in two melatonin pathway genes (ASMT and CYP1A2), implicated in risk for both ASD and insomnia, were compared between clusters.

Results: Clustering identified two distinct groups of individuals with ASD. Cluster 1 included 1,898 individuals and Cluster 2 included 810 individuals. The largest difference between the clusters was related to difficulty falling asleep, followed by whether or not the child needed a parent in order to fall asleep, difficulty going to bed, and frequent or prolonged awakenings. The presence of sleepwalking or nightmares also defined some of the cluster differences; however substantially less than other questions of interest to insomnia. Individuals in Cluster 2 had more sleep problems and shorter sleep durations than those in Cluster 1. Interestingly, more individuals in Cluster 2 had constipation and/or attention deficit disorder (ADD). There was no difference between the proportions of individuals with mutations in either candidate gene between clusters.

Conclusion: Presence of insomnia was related to the presence of two other genetically meaningful comorbidities in ASD, ADD and constipation. While we did not observe a difference in mutations in the two candidate genes assessed, it is possible that these clusters represent genetically distinct ASD subsets. We are currently evaluating potential genetic differences between insomnia and non-insomnia clusters in more genes known to affect sleep patterns

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Southern Medical Journal. 2016;109:331-37.

CLINICAL MANAGEMENT OF ADHD IN A FAMILY MEDICINE RESIDENCY PROGRAM: COMPARISON WITH AAP GUIDELINES.

Skelley JW, Carpenter PC, Morehead MS, et al.

Objectives Attention-deficit/hyperactivity disorder (ADHD) is the most common neurobehavioral disorder. Research has shown that even with the growing incidence of children diagnosed as having ADHD, physicians may find providing optimal care to these patients challenging. Our objective was to contrast existing clinical management of ADHD in a family medicine setting with published American Academy of Pediatrics guidelines and review the literature pertinent to differences.

Methods A report was generated for all visits with "ADHD" or "ADD" (attention-deficit disorder) as a current or past medical problem that had been addressed at the family medicine clinic from July 2012 to June 2014. A total of 60 pediatric patients were identified. A retrospective chart review of clinical practice and management patterns for these patients was completed using a standardized data collection form based on the 2011 ADHD treatment guidelines set by the American Academy of Pediatrics.

Results Fifty-seven (95%) patients had documentation of at least one core symptom of ADHD, and 27 (45%) patients had documentation of these symptoms in more than one setting (clinic/school/home). Only 30 (50%) patients were assessed at the initial ADHD visit for coexisting conditions. Coexisting conditions were found to be present in 20 (33.3%) patients. Of these 20 patients, coexisting conditions were not addressed during the visit in 12 (60%) patients before drug therapy for ADHD was initially prescribed. Behavioral therapy was initiated as first-line monotherapy in one of the nine preschool-age patients (4-5 years old). Fifty-two (86.7%) patients received a preferred initial medication as identified by guidelines, and 41 (78.8%) of those patients received an appropriate initial dose. Fifty-one (85%) patients were assessed for improvement of symptoms, and 39 (65%) were assessed for adverse events. Of 62 documented medication adjustments, 54 (87.1%) adjustments coincided with current practice guidelines. Sixteen (26.7%) patients were referred to mental health specialists.

Conclusions This retrospective review identified areas of strength and weakness for attending physicians and medical residents in the diagnosis, evaluation, and treatment of children with ADHD. A significant need was identified for more physician-focused education on the evaluation of coexisting conditions and long-term management associated with ADHD therapy. Further training in the initiation of behavioral therapy as a first-line treatment above drug therapy and proper medication selection in children aged 4 to 5 years also are recommended

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The Journal of Educational Research. 2016 May;109:325-32.

THE ACCEPTANCE AND REJECTION OF PEERS WITH ADHD AND ASD IN GENERAL SECONDARY EDUCATION.

de Boer A, Pijl SJ.

The authors focused on analyzing (a) peer acceptance and peer rejection of typically developing students, students with attention deficit hyperactivity disorder (ADHD), and students with autism spectrum disorder (ASD) in general secondary education; (b) attitudes of general secondary-aged students toward peers with ADHD and ASD; and (c) the relationship between peer acceptance/rejection and students' attitudes. A cross-sectional study was performed (n = 437 typically developing students, n = 28 students with ADHD/ASD; range = 12–15 years old). Students were asked to indicate with whom they prefer to hang out or preferably not want to hang out (peer acceptance and peer rejection). Attitudes were assessed using the Attitude Survey Toward Inclusive Education. Multilevel analysis showed significant differences between students with ADHD and ASD and typically developing peers on peer acceptance and higher on peer rejection. Second, typically developing peers showed neutral attitudes toward peers with ADHD or ASD. Third, the results showed that students' rejection and attitudes of peers significantly relate to each other

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Tijdschr Psychiatr. 2015;57:881-85.

FORENSIC CHILD, ADOLESCENT AND TRANSITIONAL PSYCHIATRY.

Vermeiren R, Colins OF, Popma A, et al.

BACKGROUND: Over the past 20 years there has been a marked increase in research relating to forensic child and adolescent psychiatry. **AIM:** To review briefly and reflect on this research.

METHOD: First of all, we describe the characteristics of forensic psychiatry and consider the consequences of this type of psychiatry for research in forensic settings. Secondly, we highlight several lines of research; these range from neurobiology to the prevalence of psychiatric disorders in persons who have committed specific types of offences.

RESULTS: A majority of young people who have been in contact with the law appeared to have a psychiatric disorder, especially behavioural disorders, ADHD and substance abuse. However, also anxiety and

depressive disorders were found in 10-20% of all delinquent young people. Particularly the existence of more than one disorder showed a connection between the nature and the severity of the delinquent behaviour and the disfunctioning of the adolescent. Current research focuses on stress and HPA axis of young people in relation to proactive and reactive aggression.

CONCLUSION: In the past decades research in forensic child and adolescent psychiatry has taken an enormous flight. One of the challenges for the future will be translating the results of the research into practice

Value Health. 2016;19:A189-A190.

TREATMENT PATTERNS IN ATTENTION DEFICIT HYPERACTIVITY DISORDER AMONG TEXAS MEDICAID PRESCHOOLERS.
Singh RR, Lawson KA, Barner JC, et al.

OBJECTIVES: The goal of the current study was to assess the treatment patterns (adherence, persistence, augmentation, and switching) in preschoolers diagnosed with ADHD using the Texas Medicaid dataset.

METHODS: Texas Medicaid claims between January 01, 2008 and August 01, 2013 was used for the study. The index date was the date of the first ADHD prescription after diagnosis. The study sample included treatment-naïve patients between 2 and <6 years of age at index, with (1) at least one ADHD diagnosis based on ICD-9 codes (314.0x); (2) at least two ADHD medication claims; and (3) continuous enrollment in the index period. The study sample was sub-divided into two groups based on follow-up period therapy: pharmacotherapy only and combination therapy. The dependent variables were: adherence (measured as proportion of days covered); persistence (duration of therapy without a gap of >30 days); augmentation (initiation of a new ADHD medication with a continuous overlap of ≥30 days with the index medication); and switching (prescription claim for an alternative ADHD medication received on or after the index date), before or within 30 days of discontinuation of the index medication. Multivariate analyses were used to assess the treatment patterns among treatment groups.

RESULTS: Of the 8,833 preschoolers identified in the study, pharmacotherapy group patients had 11.1% lower odds of adherence (Odds Ratio [OR] = 0.889; 95% Confidence Interval (CI) = 0.799–0.988; p = 0.03), 26.2% lower odds of augmentation (OR = 0.738; CI = 0.642–0.850; p < 0.0001), and 20.2% lower odds of switching (OR = 0.798; CI = 0.725–0.878; p < 0.0001) compared to combination therapy group patients, while controlling for covariates. Discontinuation of medication therapy did not differ significantly between the treatment groups.

CONCLUSIONS: Comparison of treatments revealed that the combination therapy group had higher adherence, persistence, and augmentation compared to the pharmacotherapy group

Value Health. 2016;19:A187-A188.

TIME-TO-INITIATION, HEALTHCARE UTILIZATION, AND COSTS OF TREATMENT OF ATTENTION DEFICIT HYPERACTIVITY DISORDER AMONG TEXAS MEDICAID PRESCHOOLERS.

Singh RR, Lawson KA, Barner JC, et al.

Objectives: The goal of the current study was to assess the time-to-initiation of treatment, healthcare utilization, and costs in preschoolers diagnosed with ADHD using the Texas Medicaid dataset.

Methods: The study sample included treatment-naïve patients between 2 and < 6 years of age at index enrolled in Texas Medicaid between January 01, 2008 and August 01, 2013, with: (1) at least one ADHD diagnosis based on ICD-9 codes (314.0x); (2) continuous enrollment in the index period; and (3) at least two ADHD medication claims or at least one psychotherapy visit associated with ADHD during the index period. The index date was defined as date of first ADHD diagnosis. The study population was sub-divided into three groups based on type of therapy in the follow-up period: pharmacotherapy only; psychotherapy only; and combination therapy. Descriptive and multivariate analyses were used to assess time-to-initiation, utilization, and costs among the treatment groups. SAS 9.3 was used for statistical analyses.

Results: Of the 10,877 preschoolers included in the study, 66.0% were initiated on pharmacotherapy, followed by 32.3% on psychotherapy, and 1.7% on combination therapy. The hazard rates (HR) for psychotherapy (HR = 1.827; p = < 0.0001) and combination therapy (HR = 1.408; p = < 0.0001) initiators

were 82.7% and 40.8% higher, respectively, as compared to pharmacotherapy initiators. The combination therapy group had significantly higher healthcare utilization ($p < 0.0001$) in all resource categories except ADHD-related prescriptions, other mental health-related office-based, and inpatient visits. Similarly, medical, prescription, and total healthcare costs were also significantly higher in the combination therapy group ($p < 0.0001$) as compared to the pharmacotherapy group except for other mental health-related medical costs.

Conclusions: The results of the current study help identify the more important healthcare utilization and cost categories in order to develop a more targeted intervention approach for patients with ADHD

Value Health. 2016;19:A185.

PREVALENCE AND INCIDENCE OF ATTENTION DEFICIT HYPERACTIVITY DISORDER AMONG TEXAS MEDICAID PRESCHOOLERS.

Singh RR, Lawson KA, Barner JC, et al.

Objectives: The goal of the current study was to assess the treated prevalence and incidence of preschoolers diagnosed with ADHD using the Texas Medicaid dataset.

Methods: Patients < 6 years of age were identified from the Texas Medicaid dataset. The treated prevalence rate of ADHD among preschool children was estimated with the numerator consisting of patients with: (1) a diagnosis of ADHD (ICD-9 code= 314.0x) recorded during a specific year (2008, 2009, 2010, 2011, or 2012); (2) at least two paid claims for an ADHD medication in the same year; and (3) 12 months of continuous enrollment in Medicaid each year. For the treated incidence rate calculations, the numerator included a sub-sample of patients who had no claims associated with ADHD and had continuous enrollment in Medicaid in the previous 12-month period for each year. The denominator for calculating prevalence and incidence was the total number of preschoolers < 6 years of age covered by Medicaid in each year (2008 - 2012). SAS 9.3 was used for data analysis.

Results: The numbers of prevalent ADHD patients were 2,511 (2008), 4,717 (2009), 7,049 (2010), 9,168 (2011), and 10,238 (2012). Prevalence rates for ADHD were estimated at 2.1, 3.9, 5.9, 7.6, and 8.5 per 1,000 enrollees for the years 2008, 2009, 2010, 2011, and 2012, respectively. The numbers of incident ADHD patients were 2,814 (2009), 3,154 (2010), 3,216 (2011), and 2,562 (2012). Incidence rates for ADHD were estimated at 2.4, 2.6, 2.7, and 2.1 per 1,000 enrollees for the years 2009, 2010, 2011, and 2012, respectively.

Conclusions: In summary, the treated prevalence rates of ADHD in preschoolers were on the rise, while the treated incidence rates were stable. Considering that Medicaid/SCHIP enrolled children account for nearly 50% of the total children in the state of Texas, these estimates could be useful to the Texas state government in making policy decisions

World J Biol Psychiatry. 2016;1-15.

RESTING STATE VAGAL TONE IN ATTENTION DEFICIT (HYPERACTIVITY) DISORDER: A META-ANALYSIS.

Koenig J, Rash JA, Kemp AH, et al.

OBJECTIVES: To quantify evidence on resting-state vagal activity in patients with attention deficit hyperactivity disorder (ADHD) relative to controls using meta-analysis.

METHODS: Three electronic databases (PubMed, PsycINFO, CINAHL Plus) were reviewed to identify studies. Studies reporting on any measure of short-term, vagally mediated heart rate variability during resting state in clinically diagnosed ADHD patients as well as non-ADHD healthy controls were eligible for inclusion.

RESULTS: Eight studies reporting on 587 participants met inclusion criteria. Random-effect meta-analysis revealed no significant main effect comparing individuals with ADHD ($n = 317$) and healthy controls ($n = 270$) (Hedges' $g = 0.06$, 95% CI: 0.18-0.29, $Z = 0.48$, $P = 0.63$; $k = 8$). Sub-group analysis showed consistent results among studies in adults ($k = 2$) and children ($k = 6$) with ADHD.

CONCLUSIONS: Unlike a variety of internalising psychiatric disorders, ADHD is not associated with altered short-term measures of resting-state vagal tone

Z Kinder Jugendpsychiatr Psychother. 2016;44:139-47.

GERMAN VALIDATION OF THE CONNERS 3(R) RATING SCALES FOR PARENTS, TEACHERS, AND CHILDREN.

Christiansen H, Hirsch O, Drechsler R, et al.

OBJECTIVE: Attention-deficit/hyperactivity disorder (ADHD) rating scales such as the Conners' Rating Scales (CRS) are valuable adjuncts for diagnosis, since they offer parent, teacher, and self-ratings of children susceptible for ADHD. Even though the scales are widely used internationally, cross-cultural comparability has rarely been verified, and culture and language invariance have only been presumed. The Conners 3((R)) rating scales are the updated version of the CRS, though hardly any studies report the psychometric properties apart from the results published in the test edition itself. To our knowledge there are no studies on the various adaptations of the Conners 3((R)) in other languages.

METHOD: The German translations of the Conners 3((R)) were completed by 745 children, 953 parents, and 741 teachers (children's age range: 6-18 years, mean: 11.74 years of age). Exploratory and confirmatory factor analyses on content scale items were conducted to obtain the factor structure for the German version and to replicate the factor structure of the original American models. Cronbach's alpha was calculated to establish internal consistency.

RESULTS: The exploratory analyses for the German model resulted in factor structures globally different from the American model, though confirmatory analyses revealed very good model fits with highly satisfying Cronbach's alphas. We were able to provide empirical evidence for the subscale Inattention which had only hypothetically been derived by Conners (2008).

CONCLUSIONS: Even though the exploratory analyses resulted in different factor structures, the confirmatory analyses have such excellent psychometric properties that use of the German adaptation of the Conners 3((R)) is justified in international multicenter studies

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Z Kinder- Jugendpsychiatr Psychother. 2016;44:231-39.

EFFECTIVENESS OF THE PREVENTION PROGRAM FOR EXTERNALIZING PROBLEM BEHAVIOR (PEP) IN PRESCHOOLERS WITH SEVERE AND NO OR MILD ADHD SYMPTOMS.

Eichelberger I, Plücker J, Hautmann C, et al.

Objective: The prevention program for externalizing problem behavior (PEP), developed for parents and teachers of preschool children, showed the effectiveness of both modules (PEP-PA and PEP-TE) under routine care conditions in two separate studies. This secondary analysis examined the effects of both modules on preschool children with severe attention deficit/hyperactivity disorder (ADHD) symptoms compared with children with no or mild ADHD symptoms.

Methods: In the within-subject control group, design changes in child symptoms and problem behavior in specific situations at home and school during the waiting period were compared with changes during the intervention period (3 months each).

Results: For children with severe ADHD, parent training reduced specific problem situations at home (HSQ-D [please provide full name here]), and teacher training showed significant effects on oppositional-aggressive behavior as well as the total problem score of the Caregiver Teacher Report Form (C-TRF). Children with no or mild ADHD benefited from parent training on the HSQ-D score, oppositional-aggressive behavior and the total problem score of the Child Behavior Checklist (CBCL), while teacher training had significant effects on all outcomes assessed.

Conclusion: Our results suggest that parent training reduces mainly specific behavior problems at home in children with severe ADHD symptoms and with no/mild ADHD symptoms, while teacher training reduces ADHD symptoms and ODD [please provide full name here] symptoms including specific behavior problems in the kindergarten in children with no/mild ADHD symptoms. However, in children with severe ADHD only overall problems and ODD symptoms were significantly reduced by teacher training

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Zhonghua Yi Xue Za Zhi. 2015 Oct;95:3184-89.

MULTI-DIMENSIONAL EXPLORATION OF THE CHARACTERISTICS OF EMOTIONAL REGULATION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Yu X, Liu L, Sun L, et al.

OBJECTIVE: To explore the characteristics of emotional regulation in children with attention-deficit/hyperactivity disorder (ADHD).

METHODS: Two hundred and eighty-two children who were diagnosed as ADHD according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) were recruited from the child psychiatric clinic of Peking University Sixth Hospital/Institute of Mental Health from August 2012 to April 2014. And 260 normal children from the local primary schools were selected as the healthy control group. The emotional factors or items of Conners' Parent Rating Scale, Behavior Rating Inventory of Executive Function (BRIEF), Achenbach's Child Behavior Checklist (CBCL) and Rutter Children Behavior Questionnaire were used to assess the characteristics of emotional regulation multi-dimensionally.

RESULTS: After controlling for the effects of age, sex and intelligence quotient (IQ), in Conner scale, the emotional lability (EL) scores of ADHD group were significantly higher than that of healthy control group [(4.3±2.6) vs (1.4±1.5), P<0.001]. In BRIEF scale, the emotional control (ECTRL) scores of ADHD group were significantly higher than that of control group [(16.1±4.4) vs (12.0±2.5), P<0.001]. In CBCL scale, the deficient emotional self-regulation (DESR) scores of ADHD group were significantly higher than that of control group [(26.8±11.0) vs (6.6±6.8), P<0.001]. In Rutter questionnaire, the emotional symptoms (ES) scores of ADHD group were significantly higher than that of control group [(2.7±2.0) vs (1.7±1.5), P<0.001]. Based on the receiver operating characteristics (ROC) curve, the area under the curve (AUC) of EL was 0.84 with 95% Confidence Intervals (CI) 0.81-0.87. The AUC of ECTRL was 0.81 with 95%CI 0.77-0.84. The AUC of DESR was 0.95 with 95%CI 0.93-0.97. The AUC of ES was 0.66 with 95%CI 0.61-0.70.

CONCLUSIONS: The study multi-dimensionally indicated that children with ADHD displayed significant deficient emotional regulation

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Sleep-Related Disorders in Children with Attention-Deficit Hyperactivity Disorder: Preliminary Results of a Full Sleep Assessment Study

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Keywords

Attention; Children; Epilepsy; Hyperactivity; Sleep.

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Received 22 January 2016; revision 10 April 2016; accepted 5 May 2016

doi: 10.1111/cns.12573

SUMMARY

Background and methods: We present the preliminary results of a prospective case-control sleep study in children with a diagnosis of attention-deficit hyperactivity disorder (ADHD). A deep sleep assessment including sleep questionnaires, sleep habits, a video-poly-somnographic recording with full high-density electroencephalography (EEG) and cardiorespiratory polygraphy, multiple sleep latency test, and 1-week actigraphic recording were performed to verify whether children with ADHD may be classified into one of the following five phenotypes: (1) hypoarousal state, resembling narcolepsy, which may be considered a “primary” form of ADHD; (2) delayed sleep onset insomnia; (3) sleep-disordered breathing; (4) restless legs syndrome and/or periodic limb movements; and (5) sleep epilepsy and/or EEG interictal epileptiform discharges. **Results:** Fifteen consecutive outpatients with ADHD were recruited (two female, mean age 10.6 ± 2.2 , age range 8–13.7 years) over 6 months. The narcolepsy-like sleep phenotype was observed in three children, the sleep onset insomnia phenotype was observed in one child, mild obstructive sleep apnea was observed in three children, sleep hyperkinesia and/or PLMs were observed in five children, while IEDs and or nocturnal epilepsy were observed in three children. Depending on the sleep phenotype, children received melatonin, iron supplementation, antiepileptic drugs, or stimulants. **Conclusions:** Our study further highlights the need to design an efficient sleep diagnostic algorithm for children with ADHD, thereby more accurately identifying cases in which a full sleep assessment is indicated.

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the early childhood neuropsychiatric conditions with the highest prevalence and longest duration, with an onset at around 3/4 years of age, although it is identified at school age, with peak referrals between 6/10 years of age [1–3]. The diagnostic criteria for ADHD are based on clinical observations and include two sets of symptoms: difficulty in maintaining attention and hyperactive-impulsive behavior (Diagnostic and Statistical Manual for Mental Disorders—5th edition; DSM-V; American Psychiatric Association, 2013) [4]. Children with ADHD display a high rate of psychiatric comorbidities, such as mood disorders (depressive disorder and pediatric bipolar disorder), oppositional defiant disorder, conduct disorder, and learning disabilities [5]. Although the pathogenesis of ADHD is still unclear, there is solid evidence supporting a genetic predisposition in ADHD: dopaminergic receptor genes as

well as dopamine transporter genes appear to be implicated [2,6]. Brain imaging studies have demonstrated a dysfunction of the dopamine and noradrenergic pathways involved in attention, executive function, motivation, and reward [7]. Hypoactivation has been observed in systems involved in executive function (frontoparietal network) and attention (ventral attentional network), while hyperactivation has been observed in the default, ventral attention (involving the midcingulate cortex), and somatomotor networks [7].

Sleep deprivation is widely known to affect various aspects of diurnal performance, reducing attention, vigilance, decision-making ability, and memory functions [8]. Sleep disturbances are so intrinsically linked to ADHD as to be included in the diagnostic criteria for ADHD in the DSM—third edition [9]. Approximately 25–50% of children and adolescents with ADHD experience sleep problems [10]. Sleep disturbances can lead to behavioral and cognitive consequences that may mimic ADHD and may even

originate from the same biochemical dysfunctions responsible for deficits in executive function and attention [11]. Neuroimaging and EEG studies in children with ADHD have demonstrated a low degree of arousability in frontal, central, and midline regions [10,12]. Cognitive impairment and performance deficits induced by sleep disorders may reflect the occurrence of cortical and sub-cortical local “islands of sleep” in subjects who are behaviorally fully awake (so-called local sleep). The existence of these “islands of sleep” during wakefulness in ADHD is supported by both EEG and neuroimaging studies. Abnormal electrocortical high slow oscillatory activity (i.e., theta) and reduced fast oscillatory activity (i.e., alpha and beta) during the resting wake state, as well hypoactivation of systems involved in executive function (frontoparietal network) and attention (ventral attentional network), as detected by functional MRI, have been observed in ADHD patients [13].

According to the literature, the overall complexity of the relationship between ADHD and sleep has been summed up in five sleep phenotypes associated with either an increased or decreased level of arousal [13].

The first sleep phenotype is characterized by a hypoarousal state that may be considered a “primary” form of ADHD (i.e., without the interference of other sleep disorders). According to this theory, the motor hyperactivity observed in children with ADHD, who are significantly sleepier than healthy subjects during the day, may be considered an attempt to counteract a primary form of hypersomnolence, as happens in children with narcolepsy [14,15]. An arousal mechanism dysfunction, consisting mainly of a reduction in the arousal slow components, has been demonstrated during non rapid eye movement sleep in adults and children with narcolepsy [16,17]. The same dysfunction was found in a cohort of children with ADHD whose inclusion was based on the absence of other sleep disorders and who were considered to be affected by a “primary form of ADHD” [18].

The second ADHD-related sleep phenotype is linked to the delayed sleep phase syndrome, which is one of the circadian disorders. Indeed, sleep onset insomnia is the most common sleep disorder in children with ADHD (approx. 30% of cases). The difficulty in falling asleep that characterizes this syndrome appears to reflect a delayed sleep–wake cycle as opposed to a simple disorder related to initiating and maintaining sleep [19]. The difficulty in regulating and organizing the sleep–wake rhythms in this phenotype might determine the aforementioned irregularity of the arousal levels [20].

The third phenotype is related to sleep-disordered breathing (SDB), from snoring to obstructive sleep apnea (OSA). Children with ADHD may indeed have a mild form of SDB, disclosed by polysomnography, while children with SDB may have diurnal neurobehavioral problems that resemble those that occur in ADHD [21]. The neurocognitive phenotype of pediatric OSA may reflect a dysfunction in the prefrontal cortex (PFC), whose severity is related to the degree of intermittent hypoxia and sleep fragmentation sustained as a result of the higher number of arousals [22–24]. A recent meta-analysis demonstrated that ADHD symptoms improve after adenotonsillectomy in children with OSA [22].

The fourth phenotype postulates a relationship between restless legs syndrome (RLS) and/or periodic limb movements

(PLMs) and ADHD. Children with PLMs and/or RLS, like those with OSA, suffer from daytime inattention, hyperactivity, and a low school performance. A comorbidity with RLS/PLMs has been reported in approximately 12% of children with ADHD, with a positive correlation emerging between RLS/PLMs and hyperactivity/opposition scores [25]. PLMs are associated with a greater sympathetic influence and increased sleep arousability [26,27].

The last phenotype consists of the association between ADHD and sleep epilepsy and/or EEG interictal epileptic discharges. A robust body of evidence in the literature points to a pathogenetic relationship between interictal epileptiform discharges (IEDs) during sleep and neuropsychological dysfunctions in children with ADHD. When explored by means of prolonged sleep and sleep-deprived recordings [25,28], the prevalence of IEDs and seizures rises to 50% in children with ADHD, whose EEG features contain IEDs that resemble those observed in benign centro-temporal spike epilepsy (BCTE). Interestingly, a reduced arousability similar to that found in primary ADHD and in narcolepsy has been reported in children with BCTE [29].

Here, we present the preliminary data of a cross-sectional case-control study conducted on children with ADHD. All the subjects underwent a complete sleep assessment to verify whether it may be possible to classify children with ADHD according to the five aforementioned sleep phenotypes.

Materials and Methods

Fifteen consecutive outpatients with ADHD were recruited at the local Paediatric Department (two females, mean age 10.6 ± 2.2 , age range 8–13.7 years) from April 2015 to October 2015. Children were referred to the Paediatric Department for suspected ADHD by pediatricians and teachers. The diagnosis of ADHD was based on the DSM-V criteria [4]. Both children and parents separately received a semi-structured psychiatric interview, that is, the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version (K-SADS-PL) [30]. The K-SADS-PL is a structured interview designed to explore the presence of cardinal symptoms of a number of psychiatric syndromes. The ADHD-Rating Scale (ADHD-RS), adapted for the Italian population [31], was filled out by parents and school teachers. The neurocognitive assessment was performed by means of the Wechsler Intelligence Scale for Children-Revised (WISC-R) [32] (all children with an intelligence quotient (IQ) <70 were excluded); lastly, the standardized neuropsychological battery for children was administered (NEPSY-II) [33]. Medical history and neurological and physical examinations were used to exclude comorbid medical and neurological conditions. The assessment of familial psychiatric disorders was based on careful historical information provided by both parents.

Any children with a comorbid diagnosis of autistic spectrum disorder or who had previously been treated with stimulants or other drugs for ADHD were excluded. The local ethics committee approved the study protocol and all the children’s parents gave their informed consent to the procedures.

Children underwent a complete sleep assessment at the Sleep Centre of our Neurological Department, which included

standardized sleep questionnaires and scales, a wrist actigraphic recording for 1 week, an attended nocturnal video-polysomnographic recording (PSG), and a multiple sleep latency test (MSLT) the day after the PSG.

Sleep Questionnaires and Scales

Parents filled out the Children's Sleep Habits Questionnaire [34] and the sleep clinical record for the screening of SDB [35]; thereafter, each child was interviewed by the principal investigator (SM), who also filled out the pediatric daytime sleepiness scale [36]. The sleep questionnaires and scales were administered on the day of the MSLT recording.

Wrist Actigraphic Recording for One Week

The sleep-wake cycle was continuously recorded by a wrist accelerometer (actigraph), which was worn on the nondominant hand throughout the week (except during bathing or swimming), to collect information regarding the duration and quality of sleep and the level of physical activity. A sleep diary was kept by the parents throughout the week. The actigraphic recording was performed either the week before or after the PSG and MSLT.

Nocturnal Video-Polysomnographic Recording

Each participant underwent one full-night video-PSG performed in a standard sleep laboratory with attenuated sound (noise level to a maximum of 30 dB). Light-out time was calculated according to the sleep log and reflected each child's habitual sleep onset. Children were allowed to sleep until they awoke spontaneously in the morning.

Recordings included high-density scalp EEG (up to 256), electro-oculogram (electrodes placed 1 cm above the right outer canthus and 1 cm below the left outer canthus and referred to A1), submental electromyogram (EMG), electrocardiogram (one derivation), EMG of the right and left tibialis anterior muscles. Chest and abdomen movements were measured by strain gauges, while oronasal airflow was recorded by means of both thermistor and nasal cannula pressure. Arterial oxygen saturation was monitored using a digital pulse oximeter, while a microphone was used to detect snoring and other sounds. Sleep was subdivided into 30-s epochs, and sleep stages, leg movements, arousals, and respiratory parameters were scored according to standardized guidelines [37].

After the PSG study, all the children underwent a MSLT, which consists of the recordings of five naps scheduled at 2-h intervals starting at 09:00 h. Sleep was recorded and scored according to standard methods [37].

Diagnostic Criteria for Sleep Phenotypes

1. Primary hypoarousal state: excessive daytime sleepiness was diagnosed according to the international criteria for central disorders of hypersomnolence [38]. In particular, narcolepsy may be suspected if the MSLT detects a mean sleep latency of ≤ 8 min and two or more sleep onset REM periods

(SOREMPs). A SOREMP within 15 min of sleep onset on the preceding nocturnal polysomnogram may replace one of the SOREMPs in the MSLT.

2. Sleep onset delay insomnia/advanced sleep phase disorder: delayed sleep phase syndrome was diagnosed according to international criteria on the basis of the anamnestic and actigraphic data [38].
3. Central, obstructive, and mixed apnea and limb movement events were assessed according to the criteria of the American Academy of Sleep Medicine [37,38]. The apnea/hypopnea index (AHI) is defined as the average number of apneas, hypopneas per hour. The diagnosis of OSA is confirmed when the PSG reveals an obstructive AHI >1 , or primary snoring is diagnosed in children with a history of habitual snoring, an AHI <1 and microphone-detected snoring.
4. Periodic limb movements were identified as sequences of four or more LMs, lasting from 0.5 to 10 seconds in duration and separated by at least 5 seconds but no more than 90 seconds. A PLM index (number of PLMs per hour of sleep) higher than five was considered as clinically significant [39]. Restless legs syndrome was diagnosed according to international criteria [40].
5. The presence of spikes (transient, clearly distinguishable from background activity, lasting 20–70 ms) and sharp waves (same as spikes, but lasting 70–200 ms), either alone or accompanied by slow waves (the slow wave being of a higher amplitude than the spike or the sharp wave) occurring in isolation or in bursts, was considered representative of IEDs, according to the definitions of the International Federation of Societies for Clinical Neurophysiology [41].

When more than one sleep disorder was diagnosed in a child, the most evident disorder was used to classify each sleep phenotype.

Results

To date, 15 children have been recruited with a diagnosis of ADHD (10 with combined type, 4 inattentive type, 1 hyperactive type). Table 1 shows the demographic and clinical data, Table 2 shows the sleep questionnaires and actigraphic data, Table 3 shows the sleep polysomnographic and MSLT results, while Table 4 shows the final classification according to each sleep phenotype.

After all the sleep objective and subjective measures and clinical data were considered, children were included in one of the five sleep phenotypes and received melatonin, iron supplementation, antiepileptic drugs, or stimulants accordingly (see Table 4). The narcolepsy-like sleep phenotype was observed in three children, the sleep onset insomnia phenotype was observed in one child, mild OSA was observed in three children, sleep hyperkinesia and/or PLMs were observed in five children, while IEDs and/or nocturnal epilepsy were observed in three children. Table 4 also shows other sleep phenotypes associated with the most clinically relevant signs.

The actigraphic recording revealed a low sleep efficiency ($<90\%$) in all the children, with sleep onset delay being found in eight children (sleep latency longer than 30 min), multiple night awakenings and sleep hyperkinesias in nine, and a reduced time

Table 1 Demographic and clinical data of children with attention-deficit hyperactivity disorder (ADHD)

Case	Age, years	Sex	Sleep Disorders	Medical history*	Family history	Ferritin $\mu\text{g/L}$	ADHD type\$	Psychiatric disorder	LD type+	Neurological examination
1	12.1	M	Snoring, sleep hyperkinesia	Migraine	No	41	1	No	2,3	Normal
2	8.3	M	Snoring, sleep hyperkinesia	No	Snoring	12	2	No	2	MNS, dyspraxia, OD
3	11.5	F	Snoring, sleep hyperkinesia, apnea, bruxism	Adenotonsillar hypertrophy, liver pathology, hypoferritin	Snoring, bipolar disorder	28	1	No	0	MNS
4	8	M	Arousal disorders, snoring, enuresis, bruxism	Adenotonsillar hypertrophy	No	33	1	No	0	MNS
5	8.1	M	Arousal disorder, enuresis	Encopresis	Obstructive sleep apnea, SIDS, epilepsy	25	3	ODD	0	Normal
6	8.9	M	Sleep onset insomnia	Respiratory allergy, streptococci infections beta type a	Snoring, obsessive compulsive disorder	33	1	No	1,3	MNS
7	8.1	M	No	No	LD	17	1	No	0	MNS
8	13.5	M	Snoring, arousal disorder	Streptococci infections beta type a	Snoring, epilepsy	37	2	No	1	MNS
9	9.2	M	Sleep onset insomnia	Otitis	LD, abuse, alcohol addiction disorder	54	1	No	0	MNS
10	10.5	M	Snoring, sleep hyperkinesia	No	Somnamb.	43	1	No	1,2	Dyspraxia, OD
11	8.5	M	Sleep hyperkinesia, legs paresthesia falling asleep	Bronchodysplasia	Sleep central apnea	22	1	No	1,3	MNS, OD
12	12.4	M	Apnea	No	LD	12	1	No	1,2,3	MNS
13	13.8	M	Sleep onset insomnia	Adenotonsillar hypertrophy, IEDs, milk intolerance	No	12	2	No	2	MNS
14	13.7	F	Sleep onset insomnia	None	Epilepsy, respiratory allergy, psychomotor delay	11.7	2	No	2	Normal
15	13.1	F	Snoring, sleep hyperkinesia	Food and respiratory allergy, laryngospasm	No	42	1	No	0	MNS, OD

IED, interictal epileptiform discharges; LD, learning disability; SIDS, sudden infant death syndrome, MNS, minimal neurological signs, OD, ocular dyspraxia, *no past history of epilepsy, +LD type 1 = dyslexia, 2 = dyscalculia, 3 = dysgraphia, 0 = no, \$ADHD type, 1 = both, 2 = disattentive 3 = hyperactivity.

Table 2 Sleep questionnaire and scale, and actigraphic parameters

Case	Age, years	Sex	CSHQ	PDSS	SCR	Time in bed	Time light out	Sleep latency, min	Time light on	Total sleep time	Sleep efficiency, %	Actigraphic diagnosis*
1	12.1	M	42	8	3	9 h 43 min	22 h 15 min	11.31	7 h 57 min	7 h 25 min	75.68	2
2	8.3	M	50	14	10	10 h 16 min	21 h 06 min	48.43	7 h 23 min	6 h 10 min	60.13	1,2
3	11.5	F	55	17	8	9 h 27 min	23 h 09 min	7.86	8 h 36 min	8 h 27 min	89.4	0
4	8	M	49	5	7	10 h 21 min	21 h 10 min	36.79	7 h 31 min	8 h 17 min	80.1	0
5	8.1	M	61	15	13	9 h 43 min	22 h 01 min	4.75	7 h 43 min	7 h 54 min	81.45	2
6	8.9	M	53	6	5	10 h 41 min	20 h 25 min	46.07	7 h 07 min	8 h 04 min	75.65	1
7	8.1	M	53	25	6	9 h 51 min	21 h 15 min	22.31	7 h 06 min	7 h 50 min	79.71	1,2
8	13.5	M	46	16	7	8 h 44 min	22 h 25 min	30.44	7 h 10 min	7 h 05 min	81.12	1,5
9	9.2	M	65	22	5	10 h 21 min	21 h 36 min	11.93	7 h 57 min	8 h 38 min	83.15	0
10	10.5	M	56	2	9	8 h 05 min	21 h 55 min	38.57	5 h 59 min	6 h 44 min	83.67	1,2,5
11	8.5	M	48	16	4	10 h 26 min	22 h 03 min	15	8 h 28 min	7 h 43 min	74.32	2,5
12	12.4	M	47	9	6	8 h 55 min	21 h 50 min	30.88	6 h 46 min	7 h 36 min	85.26	1,3,5
13	13.8	M	60	22	7	8 h 26 min	23 h 30 min	11.9	7 h 57 min	7 h 06 min	84.82	1,2,3,5
14	13.7	F	43	8	4	9 h 04 min	22 h 07 min	32.06	7 h 12 min	7 h 23 min	81.66	2
15	12.1	F	48	9	9	9 h 05 min	22 h 12 min	20.86	7 h 17 min	7 h 43 min	84.93	1,2

CSHQ, Children's Sleep Habits Questionnaire, PDSS, pediatric daytime sleepiness scale, SCR, sleep clinical record, SOD, sleep onset insomnia, MNA, multiple night awakenings, D, diurnal, ETIB, excessive time in bed, RTIB, reduced time in bed, *actigraphic diagnosis SOD = 1, MNA = 2, DNAPS = 3, ETIB = 4, RTIB = 5, normal = 0.

in bed (less than 9 h) in five. The polysomnographic recording revealed SDB (from mild-to-moderate OSA) in five children, primary insomnia in one child (who displayed sleep hyperkinesia at the actigraphic recording), and a mild form of PLMs in two children. Sleep IEDs without nocturnal seizures were found in four children, subcontinuous centro-temporal IEDs or continuous spike and waves during sleep in two children, and nocturnal epilepsy with temporal or fronto-temporal IEDs in two children (in one of whom the diagnosis was "probable"). More than three SOREMPs were found in three children (with a mean MSLT of 13.2 min, 10.6 min, 8.1 min, respectively), although only one met the criteria for a strong suspicion of narcolepsy (three SOREMPs and a mean sleep latency of 8.1 min).

A comorbid diagnosis of oppositional defiant disorder (ODD) was established in one child and of learning disabilities in eight children. One patient had displayed sleep IEDs over the centro-temporal regions in a standard sleep electroencephalographic recording at preschool age, while none had previously received a past diagnosis of epilepsy or had had seizures. After a complete neuropsychological evaluation, a further two children received a comorbid diagnosis of ODD, while learning disability (LD) was confirmed in three children. Seven children were found to have a past history of snoring, one child had sleep apnea, three children had a history of sleep onset insomnia, while six children had sleep hyperkinesias (see Table 1).

The neurological examination revealed minimal neurological signs and dyspraxia or oculomotor dyspraxia in the majority of children. A familial history of learning disabilities, sleep disorders, psychiatric disorder, and epilepsy was also found. A blood sample showed a low serum ferritin level in most of the children, with ferritin levels below 20 $\mu\text{g/L}$ in four children. All the children scored higher than 41 (which is considered a cutoff for sleep disorders) at the CSHQ, while a pediatric daytime sleepiness scale (PDSS) score over 20 (indicating severe daytime sleepiness) was observed in three children, and a SCR score over 6.25 was found in eight children (Table 2).

Discussion

The study presents the preliminary results of a thorough investigation of sleep and sleep disorders in a sample of consecutively recruited drug-free children with ADHD. Notwithstanding, the limited number of children recruited so far, this preliminary study confirms the validity of a sleep phenotype classification of ADHD [13]. According to the sleep phenotypes of ADHD, treatment for each underlying sleep disorder (primary form, sleep onset insomnia, RLS, and/or PLMs during sleep, OSA, continuous spikes and waves during slow-wave sleep, or nocturnal epilepsy) should be tailored so as to improve alertness during daytime and reduce the interference of sleep disorders on the severity of ADHD.

One of the most surprising findings that emerges from this study is the association between ADHD and IEDs, either with or without nocturnal seizures, which confirms that epilepsy and IEDs are frequent in ADHD and may have an impact on sleep structure, potentially interfering with the attention network [42]. Our study confirms previous reports of a frequent association between the occurrence of IEDs during sleep (prevalently frontal, centro-temporal, and rolandic spikes) and neuropsychological dysfunctions

Table 3 Sleep parameters and diagnosis

Case	Total sleep time, min	Sleep period time, min	Sleep efficiency	Sleep latency, min	REM latency, min	N1, %	N2, %	N3, %	REM, %	WASO, %	WASO, min	Awake index, n/h	Arousal index, n/h
1	224	436.6	44	72	250	18.3	15.6	52.7	13.4	48.7	212.6	19	8.8
2	464.7	471.7	85.9	69	74	3.7	42.6	24.6	29.1	1.5	7	6	7.8
3	458.5	466.8	96.2	9.7	67	4.6	45	40.7	9.7	1.8	8.3	9	4.7
4	339	476.6	67.7	23.9	88.5	11.8	33.9	38.3	15.9	28.9	137.6	7	19
5	392.3	408.3	73.5	125.5	110.5	3.6	54.5	23.4	18.5	3.9	16	8	3.8
6	458.6	481.1	90.5	25.5	82	9.2	47.7	28.1	15	4.7	22.5	5	10.6
7	495.5	498.2	89.7	54	23.1	4	42.6	30.3	23.1	0.5	2.7	2	7.5
8	450.5	458.3	91.9	32.1	96.5	6.9	50.7	27.5	14.9	1.7	7.8	8	6.4
9	470	480.2	91.4	34.2	124.5	4.6	46.7	25.9	22.9	2.1	10.2	3	8.6
10	417.9	480.4	79.5	45.2	148.5	12.7	38.6	30	18.6	13	62.5	12	4.5
11	435.5	458.7	79.2	91.5	89	10.6	42.3	31.2	16	5.1	23.2	6	6.8
12	387.5	508.3	71	37.6	163	3.7	50.7	29.5	16	23.8	120.8	12	4.6
13	469.5	474.2	97.7	6.5	68.5	4.7	55.3	30.9	9.2	1	4.7	2	2.8
14	451.5	477.4	91.6	15.2	168	6.8	37.7	28.7	26.9	5.4	25.9	9	13.2
15	454.3	458.8	82.9	89	88	3.4	50.6	19.4	26.6	1	4.5	4	5

Case	Apnea hypopnea index (AHI n/h)	AHI supine, n/h	AHI REM n/h	Mean SaO2	Minimal SaO2	ODI	ODI supine	LMS index n/h	PLMS index n/h	MSL ⁵ mean latency	SOREMP, n	PSG diagnosis
1	3.5	3.5	6	96.3	90	1.3	3.8	12.9	0.8	11	0	3
2	3.2	4.2	6.7	96.3	82	1.2	0.6	12.3	3.1	12.9	1	1,5,6
3	2.8	1.4	1.3	98.1	95	0.1	0.4	1.4	0	16.2	1	1,4
4	6.9	2.1	5.6	96.6	93	0.4	0	12.1	2.8	20	0	1,2
5	1.2	2.4	0.8	97.8	94	0.6	0	4.1	0	15.8	0	1
6	4.7	7.6	1.1	97.5	90	0.7	0.8	11.5	3	20	0	1
7	1.2	0	0.5	97.1	90	0.4	4.5	12.8	2.9	13.2	3	2
8	3.7	2.6	2.7	98.4	91	0.7	1.4	13.5	5.2	12.5	1	7
9	0.3	1	1	96.9	94	0	0.5	10.1	0	20	0	5
10	2.3	1.5	5.4	97.3	92	0.7	1.8	14.5	6.2	12.5	0	7
11	3.1	3.1	13.3	96.3	90	1.4	0.8	7.3	0	16.1	0	1
12	1.1	0.8	1	98.4	0	0	0	15.5	6.7	19.9	0	2,7
13	1.3	0	2.8	97.8	94	0	0.4	7.7	1.8	12.2	1	4
14	2.8	3.1	5.5	98	89	0.1	1	4.9	0	10.6	3	0
15	0.3	1	1	98	89	0.1	1	0.5	9.9	8.1	3	2,8

PSG diagnosis: 1 = obstructive sleep apnea, 2 = interictal epileptiform discharges (IEDs), 3 = primary insomnia, 4 = continuous spike and waves during sleep or focal subcontinuous IEDs, 5 = nocturnal epilepsy, 6 = arousal disorder, 7 = periodic limb movements (PLMs), 8 = bruxism 0 = normal, ODI, oxygen desaturation index, SaO2, overnight oxygen saturation, SOREMP, sleep onset REM sleep period.

Table 4 Final diagnosis of sleep phenotypes (bold indicate the most relevant values) and comorbidity

Case	Age, years	Sex	Comorbidity	Therapy	Sleep phenotype: 1 = narcoleptic type, 2 = SOL, 3 = OSA, 4 = PLMs and or sleep hyperkinesia, 5: sleep IEDs, epilepsy
1	12.1	M	None	Atomoxetine, iron supplementation	4
2	8.3	M	None	Lamotrigine	3, 5
3	11.5	F	None	Lamotrigine	3, 5
4	8	M	Oppositional defiant disorder (ODD)	No	3
5	8.1	M	ODD, arousal disorder	Iron supplementation	3,4
6	8.9	M	Learning disability (LD), tics	No	3
7	8.1	M	None	Methylphenidate	1,2
8	13.5	M	ODD	Iron supplementation	4
9	9.2	M	None	Melatonin	2, 4, 5
10	10.5	M	LD	Iron supplementation	4
11	8.5	M	None	None	3
12	12.4	M	LD	Lamotrigine	5
13	13.8	M	None	Iron supplementation	4
14	13.7	F	ODD	Methylphenidate, iron supplementation	1,4
15	12.4	F	None	Atomoxetine, melatonin	1,2,5

in children with ADHD [25]. The prevalence of interictal or ictal IEDs is known to be higher in children with ADHD if evaluated via sleep and sleep-deprived recordings [27], with values rising to as much as 53% when children are evaluated by means of a full-night video-PSG [24]. Furthermore, video-PSG allows nocturnal seizures, which may escape detection, to be diagnosed [25]. Although the prevalence of ADHD in childhood epilepsy is between 12 and 17% [43], the literature available on the relationship between these two disorders is limited, with few uncontrolled studies, conducted on small samples of children with ADHD and IEDs, reporting a positive effect of antiepileptic drugs on sleep quality [44,45]. Almost 40% of children with epilepsy also present behavioral deficits, including ADHD, autism, anxiety, as well as general learning and memory impairment. However, the precise role of IEDs in cognition remains unclear [46]. The association between frequently generalized early life seizures and hippocampal-dependent cognition has been thoroughly investigated in studies on rodent models, which support the theory that epileptic discharges disrupt the normal development of hippocampal networks [47]. In addition, many children with epilepsy might rarely experience seizures despite the occurrence of frequent focal neocortical interictal spikes associated with serious cognitive and behavioral impairments, for example, children with continuous spike-waves during sleep [46]. A recent study analyzed the effects of microinjections of bicuculline, a competitive GABA-A antagonist, in the PFC to induce an inhibitory/excitatory network imbalance leading to focal IEDs in adolescent rats. The results of that study showed that prefrontal IEDs during development are associated with both long-lasting alterations in short-term synaptic plasticity and deficits in attention and sociability in rodents [46]. The body of literature investigating whether PFC damage induced by IEDs is reversible, or is irreversible and consequently causes high cognitive dysfunction (such as attention, learning, and working memory process impairments), in this sleep phenotype of ADHD is still small but is growing. With the exception of cognitive

disabilities, children in our sample did not display any risk factors suggesting sleep IEDs or epilepsy. Moreover, the data that emerged from the anamnestic clinical reports and questionnaires revealed unspecific sleep disorders related to initiating and maintaining sleep, or snoring and witnessed apnea, although no other signs that might raise suspicions. Although the majority of the children were placed on antiepileptic therapy after the study ended, the efficacy of this treatment still needs to be followed up. For all these reasons, prospective studies based on larger sample sizes as well as neuroimaging are warranted to ascertain the clinical benefits of antiepileptic drugs in this category of patients [45].

As shown in Table 4, three cases belonged to the first sleep phenotype, which is considered “a primary form of ADHD” that resembles narcolepsy. Three SOREMPs were detected at the MSLT in these children; moreover, their results at the mean sleep latency test were borderline, with only one satisfying the criteria for strong suspicion of narcolepsy (three SOREMPs and a mean sleep latency of 8.1 min). These children received treatment with methylphenidate or atomoxetine. We are not yet able to determine whether they suffer from narcolepsy or a primary form of hypersomnia, although a more thorough diagnostic characterization is expected in the future follow-up examinations. A recent retrospective study found that a positive history of childhood ADHD symptomatology was common in adult narcoleptic patients, particularly among those with a lower MSLT score. Future research is warranted on adult narcoleptics to verify this relationship [48]. To investigate ADHD symptoms in pediatric narcolepsy, one study gathered cross-sectional data from a large cohort of children and adolescents with type 1 and 2 narcolepsy, nearly all whom were receiving modafinil; additional treatments included methylphenidate in approximately 50% of the subjects [49]. The authors found that pediatric patients with narcolepsy display approximately twice as many ADHD symptoms as controls and that ADHD symptoms, unlike narcolepsy symptoms, are largely unresponsive to psychostimulant therapy [49].

A low level of serum ferritin was found in most of our sample, in whom it was associated with sleep hyperkinesias and/or PLMS during sleep. These patients received oral iron supplementation. Sleep hyperkinesias remained an unspecific symptom and sign, not associated with clear criteria for a diagnosis of pediatric RLS. The role of iron deficiency in ADHD remains unclear. A systematic review [50] reported that one MRI study detected significantly lower thalamic iron indices in ADHD than in control subjects; two trials, one of which was open-label and the other a pilot randomized placebo-controlled study, found that ADHD symptoms improved following iron supplementation; three studies showed that children with ADHD plus sleep disorders, and in particular RLS, are at risk of iron deficiency; lastly, two studies suggested that iron deficiency might decrease the effectiveness of psychostimulant treatment.

Actigraphic recordings help to discriminate children with pure sleep onset insomnia, with restricted time in bed and consequent sleep deprivation, from children with sleep fragmentation and sleep maintenance insomnia, which are more likely to be related to a major sleep disorder. The actigraphic recording could not obviously help to discriminate children with IEDs or nocturnal epilepsy from children with other sleep disorders. These children received melatonin at an appropriate hour on the basis of the actigraphic recording [51].

Our preliminary results confirm the high prevalence of SDB in children with ADHD. Interestingly, the children in our sample had a mild form of OSA, a past history of snoring, sleep apnea,

and adenotonsillar hypertrophy, and displayed craniofacial risk factors, as demonstrated by the sleep clinical record. In keeping with data in the literature, according to which children with ADHD usually have a mild form of OSA [22], our results might be influenced by the age at which the children are investigated: bearing in mind that the onset of pediatric OSA peaks at the pre-school age, school-aged children with ADHD may come to the pediatrician's attention many years after the onset of OSA, which might by then have been treated or have spontaneously improved [22,52].

Our study highlights the need to establish a structured sleep diagnostic algorithm in children with ADHD, particularly in view of the considerable cost of a complete instrumental sleep assessment. We suggest that sleep disorders in ADHD children be screened by means of sleep questionnaire scales and actigraphic recordings. The aim of the preliminary screening is to identify those children that are likely to benefit from a full V-PSG recording with large EEG montage, and in particular in children with suspected OSA. In the remaining children, we strongly recommend a standard sleep EEG as a screening tool to detect IEDs or seizures in "asymptomatic" children with ADHD. A diagnosis of nocturnal epilepsy or of sleep IEDs is important not only to prescribe the most appropriate treatment, but also to make an accurate prognosis. We should bear in mind that active sleep IEDs might reflect an epileptic encephalopathy due to focal cortical dysplasia in frontal and extra-frontal nocturnal epilepsy [53].

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An Ethnographic-Discursive Approach to Parental Self-Help Groups: The Case of ADHD

Qualitative Health Research
2016, Vol. 26(7) 935–950
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/1049732315586553
qhr.sagepub.com


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Abstract

Mutual aid groups have become a common form of help in the mental health field. Although self-help groups are associated with a range of health and social benefits, they remain poorly understood in terms of the dynamics of their interactions. Adopting an ethnographic-discursive approach, we conducted a 6-month observation of the meetings of a self-help group of parents with children diagnosed with attention deficit/hyperactivity disorder (ADHD) to analyze the discursive dynamics of the interactions that characterized the group. Using a set of discursive strategies and practices, the parents promoted a homogeneity of viewpoints and experiences within the group and constructed a shared and consensual narrative to endorse a specific understanding of ADHD. The production of both homogeneity within the group and a shared narrative served to absolve parents of guilt, helped parents to signify their experience within a blaming social context, and preserved their identities as “good parents.”

Keywords

attention deficit/hyperactivity disorder (ADHD); discourse analysis; ethnography; group interaction; knowledge construction; self-help; qualitative; Italy

Mutual aid groups have become common forms of help in the mental health field (Bull, 2003; Chamak, 2008; Law, King, Stewart, & King, 2001). These groups are voluntary associations formed by people to address their shared difficulties (Wituk, Ealey, Brown, Shepherd, & Meissen, 2005).

In this case study, we analyze the discursive dynamics of a self-help group of parents with children diagnosed with attention deficit/hyperactivity disorder (ADHD), a psychiatric diagnosis whose behavioral spectrum includes hyperactivity, impulsivity, and inattention (American Psychiatric Association [APA], 2013). Although self-help groups are associated with a range of health and social benefits, they remain poorly understood in terms of the dynamics of their interactions and functioning (Kerr & McIntosh, 2000; Munn Giddings & McVicar, 2007). In addition, the literature on parental peer support is small (Shilling et al., 2013).

Self-Help Groups in the Context of ADHD

Uncertainty, Guilt, and Blame in the Parents' Experiences of ADHD

Parents of children diagnosed with ADHD must address several specific issues related to the controversial nature

of their children's condition. These include uncertainty, conflicting relations with experts and schools, dilemmas related to drug use difficulties, social blame, and stigma (Frigerio, Montali, & Fine, 2013a, 2013b).

Parents face uncertainty because ADHD is at the center of a scientific and public controversy between two primary discourses: the neurobiological discourse and the environmental discourse (McLeod, Fettes, Jensen, Pescosolido, & Martin, 2007). Thus, the ADHD diagnosis always implies some responsibility in terms of parental biology or parental educational practices (Brunton, McVittie, Ellison, & Willock, 2014).

According to the literature, parents' experiences of ADHD are characterized by social rejection and a sense of guilt. Parents, especially mothers, report feeling blamed for their children's behaviors by professionals, family members, and society (Harborne, Wolpert, & Clare, 2004; Horton-Salway, 2011; Malacrida, 2004). Therefore, ADHD is associated with high levels of stigma and blame (Frigerio et al., 2013a; C. Edwards & Howlett, 2013). In this regard, Brunton et al. (2014) argued that

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parents use various strategies to negotiate their identities and legitimize their parenting within a scrutinizing context. According to Singh (2004), the pathologizing of parenthood, particularly motherhood, in relation to ADHD has increased pressure on families to accept medication to treat their children.

Self-Help Groups as a Resource for Parents' Subjectivity and Social Action

According to Brown (2000), a social group "exists when two or more people define themselves as members of it and when its existence is recognized by at least one other" (p. 17). Support groups are social groups that can help people find resources to counter stigma associated with specific mental health conditions (Harwood & L'Abate, 2010). Diverse authors have found that social stigma surrounding specific conditions is correlated with affiliation with self-help groups (Davison, Pennebaker, & Dickerson, 2000). Chamak (2008) emphasized that the adoption of an injustice frame, that is, shifting from a self-blaming to a system-blaming interpretation of certain problematic conditions, is central to parental self-help movements.

According to Borkman (1999), the benefits of these groups arise from the development of collective knowledge that affects members' ways of (re)conceptualizing the issues they face. Rappaport (1993) described mutual help organizations and related self-help groups as "normative narrative communities where identity transformation takes place" (p. 239). The stories that people share contribute to a group narrative that shapes people's subjectivities and, thus, affects the social context (Ryan & Cole, 2009).

A number of authors (Conrad, 2008; Mayes, Bagwell, & Erkulwater, 2008) have traced the role of parents' self-help groups and parental associations to the production and spread of knowledge about ADHD. More generally, lay groups reclaim and promote their experiential knowledge and embodied expertise (Barker, 2008). Therefore, the activities of patient and relative organizations entail a transformation of the field of biopolitics (Foucault, 1978). Indeed, this field between biology and politics is now shaped by political and scientific authorities together with individuals who work to transform their personal experiences into social and political issues (P. Brown et al., 2004; Landzelius, 2006).

The Italian Context

In Italy, parental ADHD associations have been prominent voices in the debate and have fought to promote the neurodevelopmental status of ADHD and educate the public, professionals, and teachers about this diagnosis. In a 2007 article, Frazzetto and colleagues stated that the

majority of Italian child psychiatrists and psychologists did not recognize ADHD as a legitimate diagnosis. The actions of parental associations have contributed to countering critical perspectives on ADHD and to popularizing this diagnosis, which is now a widely recognized disorder among professionals and lay people.

Moreover, social policies and legislation with respect to ADHD have significantly changed in relatively recent years. The Italian Drug Regulatory Agency introduced methylphenidate, the medication used to treat ADHD, to the Italian pharmaceutical market in 2007. In conjunction with this, a National ADHD Registry was created to evaluate the effects of drugs used to treat ADHD, and national guidelines have been published by the Italian National Institute of Health to homogenize assessment procedures and treatment. ADHD is primarily diagnosed by child psychiatrists and in some cases by psychologists who work in public service or as private practitioners; according to legislation, drugs can be administered only by the ADHD Regional Reference Centers, which must define a multimodal therapy.

The relative newness of ADHD to the Italian context might also have influenced the social discourses surrounding ADHD, centered on the issues of risk, blame, and legitimation (Frigerio et al., 2013a, 2013b).

Theoretical Framework

We adopted the critical health psychology (CHP) framework (Fox, Prilleltensky, & Austin, 2009) because it enables us to address the processes of symbolic signification of health and illness that are mediated by groups and collectives (Lester & Paulus, 2012). A critical psychological orientation emphasizes the role of language in both producing and constraining meaning. Phenomena are produced "in the web of meanings created by those persons who engage in dialogue about the problem" (Griffith, Griffith, & Slovik, 1990, p. 23). Therefore, discourses are regarded as forms of social action that contribute to the constitution and transformation of the social world and individual subjectivities (McHoul & Rapley, 2005).

Discursive practices also serve social, ideological, and political interests and produce power relations via the recognition or the delegitimation of specific subjective positions (Parker, 2008). Indeed, subjective positions are characterized by different levels of privilege with respect to possibilities for action and the right to be viewed as a legitimate social agent (Harré, 2005). We view power as a web of changeable and negotiable relations between social actors rather than as a unidirectional force exerted by social structures (Nathan, Stephenson, & Braithwaite, 2014). Within CHP, subjectivity is regarded as a sense of self that derives from the dialectic between individual

agency and social discourse; subjects are not passively produced by psychiatric and medical discourse but are active agents in the construction of knowledge and of their identities (Allen & Hardin, 2001).

Aims

We sought to analyze the discursive dynamics of the interactions that occurred within a self-help group of parents of children diagnosed with ADHD. We focused on the main functions performed by the group for its members, the interactional patterns and discursive practices that were established within the group, and the effects that these practices might have on the subjectivities and identity formations of the participants.

To the best of our knowledge, this is the first study in which the focus is on the interactions of parents that are directed toward signifying ADHD and related problems. The only qualitative research involving the recruitment of participants from organizations that represent the parents of children with ADHD is based on data collected from semi-structured interviews (C. Edwards & Howlett, 2013). Examining the interactional dynamics that occur within a group might illuminate how the group works to provide resources and tools that can aid parents in confronting the problems they must face. In addition, several contributions have shown that fathers of children with ADHD are also affected by a sense of guilt and face issues of parental accountability (Koro-Ljungberg & Bussing, 2009; Singh, 2003). Through the analysis of a self-help group that involves mothers and fathers, we consider the roles of both parents in the construction of ADHD.

Method

Participants

Over a 6-month period, we observed the meetings of a self-help group of parents of children diagnosed with ADHD. We contacted the self-help group of parents through the national association of ADHD families that is an umbrella organization for more than 20 local support groups run by parents across Italy. We chose this group because it was the longest running and best established of the two groups organized in the city where the national organization is based. In this sense, it was typical of the many self-help groups affiliated with the association. The self-help group had no professional mediator; however, two parents, a woman and a man, served as reference figures within the mutual support association, playing the role of facilitators.

In total, 35 parents (20 women and 15 men) participated in at least one of the group's meetings. Between 5

and 16 parents attended the meetings, which were monthly, and each meeting lasted approximately 3 hours. The variation in the number of attendees among the meetings occurred because the group was composed of parents with different levels of engagement. Parents with a high level of involvement participated on a regular basis; in particular, a mother and a couple, composed of a mother and a father, attended all the meetings. The two facilitators were both present at the encounters, except for one meeting when only the female facilitator moderated the group. Other parents attended the group in a more discontinuous way. A couple composed of a mother and a father of a 17-year-old teenager only participated once in the meetings, supposedly because, as they stated during the discussion, they felt that their experience of ADHD was markedly different from the one lived and narrated by the rest of the group, whose members were mostly parents of young children attending primary or secondary school.

The varying number of participants affected the nature of the meetings. When the attendees were greater in number, each parent had less time for talking about his or her own story, and the discussions were more chaotic in terms of conversational exchanges, turn-taking, and number of topic addressed; at the same time, the argumentative character of the communication was enhanced. On the contrary, when the number of participants was lower, each parent had more time to talk, and the conversations were more focused on a few specific topics.

We considered a 6-month observation as a suitable time for developing trust with parents and leading them to feel comfortable with their participation in the research. We decided to stop the observation after 6 months because we found that the discourses of the group were repeated, and we considered that further observation would have not added to the findings.

The format of the meetings was open; following a brief introduction by one of the moderators, parents who were attending the group for the first time presented their stories, and the parents who were already members of the group briefly introduced themselves. Themes of the discussions were not pre-established, but rather emerged from the participants' presentations. The two moderators typically concluded the meetings by summarizing the crucial points that the group addressed. The meeting room was set up in a conversational format, with chairs arranged in a circle and no tables.

Procedure

Permission to propose participation in the research to parents was given by the two facilitators of the self-help group, who were contacted as representatives of the local division of the parental association.

We told prospective participants about the aims of this investigation and asked for their consent to audiotape the meetings. We framed the research as a project exploring parental understanding and views of ADHD, both at the subjective and the group level. We expressed our interest in understanding the main aspects of parental experience in terms of difficulties confronted and solutions adopted. Moreover, we clarified that we aimed at a better understanding of the parental motivations for membership in a mutual support network and how the self-help group could benefit the parents. To mitigate the potential influence of the study aims on the content of parents' discussions, we clarified to parents that we were interested in their own opinions and understanding and that we did not have any evaluative or judgmental purpose. Moreover, the researcher who attended the meetings never interrupted the conversations or interfered in the group's discussions to avoid the risk of influencing the spontaneous articulation of the group's discourses and dynamics.

The group's motivation to participate in the study was linked to the opportunity for parents to see their stories collected by someone who they perceived as a legitimate member of the academic community, in the hope this could be helpful for increasing the social acceptability of ADHD.

A period of acclimatization preceded the 6-month observation and audio recording of meetings. Acclimatization implied a first introductory encounter with the facilitators and two preliminary meetings with the members of the group. During the first meeting, Alessandra Frigerio presented herself, as well as the research background and objectives, and ensured the respect of anonymity. During the second meeting, she answered questions raised by parents. We conducted our observations in 2011 and digitally audiotaped and transcribed all of the meetings. After the study was completed, we returned part of the results to the facilitators of the group, as explained in the "Discussion" section.

Data Collection: The Ethnographic-Discursive Approach

In most studies of mutual support groups, scholars collected data using quantitative surveys (Wituk et al., 2005), interviews (Hodges & Dibb, 2010), or focus groups (Solomon, Pistrang, & Barker, 2001). Thus, aside from some studies in which researchers used observation (King, Stewart, King, & Law, 2000; Middleton, 1996; Mohr, 2004), little is known about the patterns and interactional processes that characterize support group participation (Davison et al., 2000).

We adopted an ethnographic-discursive approach (Galasiński, 2011) to observe the forms of interaction and collaboration exhibited by parents. A combination of

ethnography and discursive analysis also allowed for observation of the evolving nature of participants' interactions and for elucidation of the process of change.

The researcher adopted the position of a silent observer to respect the intimate conversational space constructed by the parents. However, the presence of a psychologist and the use of recording technology might have influenced the parents, perhaps leading them to use justificatory and legitimating strategies or exhibit their knowledge of ADHD. The period of acclimatization that preceded the observation contributed to minimizing these effects (Potter, 1996).

We supplemented the observations of the meetings with materials from notes about informal conversations with members of the group; books, brochures, and materials published by the parents' association; the association's website; and the inclusion of Alessandra Frigerio in the group's mailing list. These data were useful to contextualize the parents' narratives and better appreciate the dynamics enacted within the group. Moreover, they facilitated interpretation of the data coming from observation and permitted triangulation of data referring to the concrete interactions between parents with data substantiating the major discourses adopted by the national association.

Ethics

We conducted the research in compliance with the Italian Psychological Association's Code of Ethics for Research and Teaching (Cubelli & Nicoletti, 2008). Written informed consent for audiotaping was obtained for all participants. The informed consent was asked once to each participant at the beginning of the first meeting he or she attended; none of the parents refused to give consent. During the meetings, the researcher never interfered with the parents' interactions.

We could not collect personal data about the parents because the representatives of the association granted us permission to participate in the self-help group's meetings on the condition that we do not ask members for personal information.

The audio recordings of the meetings were filed in a dedicated digital archive to which only the researchers could have access. In the transcription of the conversations, each parent was identified with a random code not related to any personal characteristic or detail.

Notes from informal conversations prior to or after the group's meetings and data derived from the mailing list were treated in respect of privacy and anonymity; when they were linked to individual members' experiences, they were associated with the same code used for transcription of meetings' conversations. The group invited the primary investigator to join the parents' mailing list,

which was used both to circulate information about meetings, events, and seminars about ADHD, and to share experiences and provide practical advice between parents.

Data Analysis

We integrated two distinct but overlapping approaches: discursive psychology (Potter, 2004) and Foucaultian discourse analysis (Parker, 2005). The first approach concerns the discursive strategies and resources that people use to construct their versions of reality, argue against alternative visions, and present themselves as trustworthy. This approach valorizes the action orientation of discourse, with focus placed on the manner in which people attempt to achieve certain goals in social interactions through their discursive practices. In contrast, the Foucaultian reading of texts links individual discursive productions to broader social structures, socially available discourses, and power issues, focusing on the effects of socio-historical dimensions on the construction of subjectivity.

Within this framework, we focused our analysis on uncovering patterns of mutual influence between members of the self-help group and on how parents constructed ADHD as a shared experience. We articulated the analysis around the mobilization of group consensus and “clashes,” that is, conversational situations in which the parents disagreed or misunderstood one another. We used agreements and conflicts between participants to clarify what the group valued and why, what was accepted as evidence within the group, the underlying assumptions of the parents’ arguments, the factors that influenced changes of opinion, and, more generally, how facts and stories operated in practice within the group to support a particular ideology (Kitzinger, 1994).

Stages of Analysis and Rigor

All the conversations were fully transcribed by Alessandra Frigerio word by word. Two trained researchers with experience in qualitative methods of analysis independently performed a line-by-line coding. They both produced a list of recurring and interesting categories and features of the texts and associated them with the relevant extracts from the transcripts. The quotations were first translated from Italian to English by the primary investigator and then reviewed by a bilingual interpreter to ensure equivalence of meaning.

Second, the researchers compared the results of the first-level analysis discussing similarities and differences. Following a recursive process of coding, discursive dynamics and strategies emerged progressively through several discussions between the authors. Following Parker

(1994), attention has been paid to the “objects” appearing in the text and their multiple significations, as well as the “subjects” populating the participants’ accounts and the rights, duties, and responsibilities associated with each of them. We mapped the diverse discursive strategies and patterns adopted by the group, considering the actions they performed in the conversations, and the subjective positions they made available for speakers and others. We also considered the linguistic features through which accounts and stories were constructed as factual. In this process, we paid attention to the patterns of variation and apparent contradiction within conversations; the role of discursive dynamics and strategies in reproducing or subverting power relationships; the elements of concordance, contradiction, and contrast within and across the different participants; and the potential implications that different strategies and patterns had for the people in the group and the broader environment.

Reliability of the analysis was evaluated in relation to diverse criteria (Morse, Barrett, Mayan, Olson, & Spiers, 2002). First, the level of concordance between the researchers: The findings are the result of a shared and combined analytical process that led to consensual results. Disagreements between researchers were confronted, taking time for individual reflection and joint discussions. Second, triangulation: The use of different research tools—groups’ discussions, notes from informal conversations, brochures, books, parents’ mailing list—contributed to the reliability of findings. Third, readers’ evaluation: Indeed, we asked a restricted number of colleagues for their opinions on a draft of the article. Fourth, the significance of the analysis for participants, to whom we returned the results, as we explain in the “Discussion” section. Fifth, the ability of the analysis to offer new theoretical insights and generate fruitful further questions.

Results: The Discursive Strategies and Functions of the Self-Help Group

In the following two subsections, we present the functions of the self-help group and the related discursive strategies (see Table 1). The first function was “establishing the group as a homogeneous space.” The discursive devices used to accomplish this function were promotion of homogeneity within the group through mirroring and encouragement of mutual identification and promotion of heterogeneity between the group and the outside world, where the former was construed as a safe shelter and the latter as an unsafe place. The establishment of the group as homogeneous enabled a second function, namely, the production of a shared, collective, and consensual narrative that promotes a specific understanding of ADHD. This narrative was established using different discursive strategies: strategies of normalization, strategies based on

Table 1. The Functions of the Self-Help Group and Related Discursive Strategies.

Functions of the Self-Help Group	Discursive Strategies Enacted to Perform the Functions
Setting the scene: The production of a homogeneous space	Homogenizing the “inside space” of the group: Mirroring and mutual identification Marking the difference from the “outside space”: The group as a safe shelter in an unsafe society
The actors in the scene: The production of the perfect narrative for the imperfect child	Strategies of normalization Strategies based on concrete evidence “I have already passed through that” Claiming parents’ choices are responsible Emphasis of the results of treatment Strategies to counter “derailment” from the shared narrative of the mutual aid group Circumscribing Correction Contestation

evidence, and strategies to counter “derailment” from the shared narrative of the mutual aid group. The production of both a homogeneous space and a shared narrative served to absolve the parents of guilt and offered them resources to signify their experiences without blaming themselves and preserve their identities as “good parents.”

Setting the Scene: The Production of a Homogeneous Space

The parents produced the group as internally homogeneous through two discursive strategies, that is, they homogenized the “inside space” and emphasized the extreme differences between that space and the “outside world.”

Homogenizing the “inside space” of the group: Mirroring and mutual identification. The parents exhibited a tendency to construct the experiences of their children as if they were all “the same.” Thus, the parents reconnected the particular experiences of their child to a broader collective by, for example, shifting from the use of the third-person singular form to the third-person plural form: “My husband and I smiled, and then I told him, ‘He is the only one who can do that.’ Only our children can do that” (Mother). Under this generalizing strategy, the parents grouped the children

into a homogeneous category that made it possible to explain the behavior and temperament of each child, as exemplified in the following quotation of one mother: “He was always very stigmatized because of his personality, which is very exuberant, on the one hand, and on the other hand, [he is] very sensitive, hypersensitive, like all of them [the children] are.” The group’s facilitators, too, shifted in the use of pronouns, from “he or she” to “they,” to generalize the personal experience of one child to virtually every child with a diagnosis of ADHD:

Father (F): Our son is protective. If there’s someone there that . . . he [will] protect him, defend him.

Mother (M): Do you wanna know why he does such things? ‘Cause he feels uncomfortable . . . he understands; they are always the ones to understand when someone is in a difficult situation. It’s because they go through difficult situations on a daily basis.

Another way in which parents achieved mutual identification was through the adoption of “It’s the same for all of us” accounts. As illustrated in the next excerpt, one group moderator suggested that the patterns of the children’s development are identical and predictable. This type of statement was repeated at nearly every meeting and thus functioned as a slogan or saying; these slogans might be understood as “key signifiers” (Laclau & Mouffe, 1985, p. 112) in the formative experiences of the parents:

These are all the same paths, reproducible paths. One could just say, “My [child] is 7 years old, how old is yours?” “14.” “Tell me how it went, so I know how it will end.” Our children are typical; their behaviors are typical. You might think of them as photocopies. (Father)

The assertion of extreme similarity characterizing the parents’ stories and experiences is a common pattern among the conversations of the group’s mailing list, where parents give one another emotional support by emphasizing that the difficulties and the feelings that a parent with an ADHD child goes through are the same for all parents. For instance, in the case of a mother who shared with the group the problems she was confronting with her child’s school and her feeling of “going crazy,” many parents on the group’s mailing list replied by stressing that to them it was, or had been, the same: “I have this feeling of getting crazy, too” and “There is a big solidarity among those who suffer the same pain.”

This discursive pattern is also common in the written documents produced by parents. A major document for the association is a published book collecting letters sent by parents to the association’s representatives. In these letters, the narratives are frequently framed through an opposition between an initial phase characterized by feelings of loneliness and rejection, and a new time of hope started with the encounter with other similar stories:

This summer, I found the [association's] website. Reading many other parents' stories so similar to the mine just opened a window of hope in the darkness and loneliness in which I found myself.

Emphasizing the common experiences of parenting a child with a diagnosis of ADHD constitutes a powerful discursive resource for normalizing these experiences and preventing a sense of blame. Indeed, if all of the stories are similar to the point that they are predictable, a child's behavior is unlikely to depend on a specific family context and parenting practices:

F: In the beginning, we saw everything in black and were very pessimistic. Then, we started seeing things maybe not in white, but in gray, when we started attending these kinds of meetings. The first thing we worried about wasn't understanding his problem, but rather what we had done, whether it was our fault he became that way.

F: Sure.

F: Then we heard all of the other people's experiences. You heard one, two, three, four people, and you started wondering, what's the story here?

F: The reproducibility, there is reproducibility.

F: Ultimately, we started thinking that maybe it wasn't all our fault.

The collaborative interactions between the parents did not proceed without incident. The following excerpt exemplifies a moment of conflict, that is, a "clash" that shows the tension created by a mother who was at her first meeting and attributed the "successful" development of her son to the fact that "we [the parents] have worked a lot." Such an assertion individualizes parenting capabilities. Thus, the speaker's assertion was potentially threatening to the identities of the other parents, who might have felt responsible and thus deserving of blame for the difficulties they were experiencing with regard to their children's behavior. Indeed, another mother discursively sanctioned the speaker by explicitly affirming that she has worked "more than a lot":

M: When we took him [the child] to another school, I needed help there. There was a psychologist there. I informed him; and he told the teachers, and they helped with the parent-teacher meetings.

M: You were lucky, very, very lucky.

M: But we worked so hard.

M: I'm sorry, but I have to disagree on this because I helped my son more than a lot. I worked hard.

Overall, the group's dynamics were characterized by echoing, resonance, and mirroring (Burman, 2004) patterns that not only favored the integration and cohesion of the group and promoted mutual identification but also deindividualized and normalized the experiences of the parents by invoking commonality between their situations to demonstrate that the parents had done nothing wrong.

Marking the difference from the "outside space": The group as a safe shelter in an unsafe society. The parents established a clear difference between themselves, who represented a secure space for their children, and the outside society, which, according to the parents, underestimated their children's problems or was unable to understand and correctly address them. Within this dichotomized view, the parents positioned themselves as enterprising subjects who should work to educate the public about ADHD:

When they go out, it's the jungle. No one can understand. Even in school, they are not being understood. And this is the thing that I believe we should be working on as parents: to make people understand how such a thing works. (Father)

The depiction of general society as an unwelcoming space also appears in the book published by the parental association, as exemplified by this quote:

We understood that the world surrounding us was scared by diversity. It rejects different, problematic, or disabled people. It's easier eliminating them, finger-pointing, accusing, being malicious, instead of helping, understanding, accepting, loving, being close, and sympathetic.

The adoption of this vision of society helps parents in giving sense to the blame they experience, as shown by the next extract, from the association's website:

Neither are these children guilty, because they are affected by an organic disorder regarding the cerebral neurotransmitters that control attention, nor are their parents, although they are often pointed out as unable to fulfill their educative role. This pathology is too frequently unrecognized, barely diagnosed, often minimized or trivialized, and thus not properly treated.

In the next excerpt, one of the group's facilitators differentiated the parents' association from movements that are critical of the ADHD diagnosis by characterizing the latter mainly as a powerful group whose members have never experienced parenthood:

Here in Italy, unfortunately, there are movements that are financed by the wealthy. They organize all sorts of smear campaigns against us. I think none of them has a child with ADHD, and I think they probably don't have children at all. (Mother)

This discursive positioning emphasized the group members' full access to the experience of parenthood, in contrast to those who question the validity of ADHD. Parents asserted, by contrast, the independence of their group from powerful institutions, as reported in an official document produced by the association to defend and legitimize the use of medications to treat ADHD:

Clearly, one can exclude any form of pressure on the part of anyone because parents are only interested in the quality of life of their children Because of that, the parental associations have important and essential relations with the scientific world and, more generally, with the research field.

This opposition between the parents (i.e., the “us-group”) and others (i.e., the “them-group”) contributed to a sense of belongingness and functioned to valorize the mission of the parental self-help group and association (King et al., 2000). Indeed, being a member of the parents’ group implied faith in its advocacy mission and in a better future. One father made the following metaphorical claim: “That’s why I started to get in touch with the representatives and the parents of the association, because I have faith, I am optimistic.” Altruism was also used to legitimize the advocacy activities of the mutual support association (Reyes, 2011). In the excerpt below, a father positions the group as having no personal interests in fighting for social recognition of ADHD; rather, he states that the group has been working for the future benefit of other parents: “Someone will be able to benefit from the results of what we’re doing, and some parents will not go through what we’ve been through.” This discursive pattern based on altruism is also adopted by the parental association when presenting the reasons beyond its birth and its history, as well illustrated in their brochures, which emphasize “the value of our activity and the free and voluntary character of our action. In this way, for all of us the action is the service of others, as we try to live it with simplicity and transparency.”

Overall, one of the central rhetorical features of the self-help group was the use of contrast and binary schemes that juxtapose opposites. According to D. Edwards and Potter (1992), this discursive device is used to construct a factual version of reality that opposes an unconvincing and problematic alternative.

The Actors in the Scene: The Production of the Perfect Narrative for the Imperfect Child

The group’s interactions were directed toward the construction of specific ways of talking about ADHD. The parents constructed specific descriptions of the causes and management of ADHD, descriptions that could be transmitted to novices through processes of initiation and negotiation. The focus was on how the parents collaborated in constructing the perfect narrative for a child with ADHD, that is, a narrative that protected parents’ identities and was acceptable to the group.

Strategies of normalization. A trend toward normalization characterized the dynamics of the self-help group (Mohr, 2004). The parents used discourses about disability to promote the need for and right to access mental health services, as shown in this quote extracted from the

association’s website: “If the child fits the clinical criteria well-defined by the scientific world, his or her problem is a real organic pathology that deserves a precise therapy.” At the same time, parents refused these discourses when the goal of the group was to normalize the children’s conditions. For example, parents refused the explicit use of words such as “pathology” and “illness”:

F: I never call it a pathology; I call it a hardship. Let’s call it that.

F: Let’s not call it an illness.

M: Because it’s not an illness.

M: A hardship is something different; the word sounds less harsh.

F: When you speak about an illness, the child is sick. I don’t like the word.

M: There is nothing pathological; it’s not a pathology.

M: It’s not a pathology. It is a hardship with which they coexist and we coexist.

The common use of normalizing strategies is also attested by the next extract, coming from the book collecting parents’ stories. In this quotation, the mother questions the pathological nature of her child’s problem and asks herself whether her child’s behavior could be understood as a peculiar “way of being” that is not accepted because of social imposition of moral and behavioral principles:

Sometimes I ask myself whether it’s fair trying to shape him [the child] according to socially established criteria, maybe at the expense of his talents, like brilliance, creativity, and congeniality Then, facing the cruel reality, I realize that life proposes us norms and conventions. Maybe he doesn’t have a pathology; maybe it’s just his way of being.

Normalization practices were often activated when the controversial and critical topic of using medication to treat ADHD arose. In the next excerpt, ADHD was constructed as a physical condition, and methylphenidate was compared with a vital drug such as insulin:

F: What people don’t understand when they say “he [the child] takes the drug” is that the drug acts chemically through a neurotransmitter that our children lack. It’s like insulin. You don’t have it? The diabetic person takes insulin shots, and no one says anything about it.

F: But insulin is vital!

F: The idea is the same.

The comparison of ADHD and methylphenidate, respectively, with other common physical conditions and therapeutic interventions is also shown in the next extract, from a letter written by a mother included in the parental association’s book:

Why could our children not be treated? Can’t a myopic person wear glasses? Can’t a person with epilepsy take antiepileptic

drugs? WHY CAN'T A CHILD WITH ADHD TAKE RITALIN?

Normalization practices indicate possible discursive shifts, depending on the group's contingent interests. In particular, these discursive patterns serve to avoid associations between ADHD and the stigmatized conditions of disability and madness, which are linked to frightening cultural representations, and to counteract the image of the medication used to treat ADHD as a particularly dangerous drug, an image that might imply a judgmental view of parents' choices.

Strategies based on evidence. The tendency to rely on different types of evidence to demonstrate the validity of ADHD and the utility and safety of drugs was a foundational aspect of the group dynamics.

"I have already passed through that." One of the strategies that the parents' group used to provide evidence of the reality of ADHD and the usefulness of drugs was adoption of the account "I have already passed through that," which is recognized as a common cliché in support groups (Barton, 1999). This discourse is most often used to confront skepticism and to offer the credibility of first-hand experience. The next quote is taken from an interaction between a father participating in his first meeting and another father who was a regular member:

F: As parents, we are not totally cool with the drug, but we also don't know where this thing will go. We don't know if he is going to need it [the drug] in the future.

F: I went to the hospital begging them to give me the drug after I had been against it all the time. I went there to tell them, "Give me the drug." Otherwise, we'll need treatment, too. Now he has super high marks. He's very attentive when taking the drug. He causes no problems.

The experienced member legitimized the couple's ambivalence toward the use of medication by telling them about his own initial skepticism, his subsequent change of heart, and the positive results of his final decision to use the drugs. This strategy is adopted by the parental association in various contexts and constitutes a resource to protect parents' subjectivity. The next extract is from an official statement produced by the association to respond to criticisms of the use of medication:

We, the parents, have experience . . . this protection instinct when the child psychiatrist prescribed them [the children] the methylphenidate. We all remember an initial instinctive rejection. This position of rejection has lasted for many of us for a long time, even years. Only after that, and with a great sense of guilt, we realized that for a long time we denied our children a crucial and often fundamental therapeutic resource.

This discursive strategy served to show that others' fears are accepted, to demonstrate the legitimacy of those fears, and to lead the listener to treat the conclusions as factual rather than as representations of personal interests (Potter, 2004).

Claiming that the parents' choices are responsible and emphasizing the results. Characterizing the parents' choices as responsible choices is another discursive strategy used to confront skepticism toward medications (Reyes, 2011). As the following excerpt illustrates, parents construct their accounts to defend themselves in advance from accusation of naïve willingness to drug children. They present their choice of giving medication to children as the result of a process of deep reflection and themselves as agents of a careful monitoring of effects. Moreover, emphasis is used to present evidence of the positive results of medication and the absence of negative side effects. Emphasis instills certainty in the listeners and leaves no room for doubt. At the same time, reality is constructed as a product of facts rather than of speakers' expectations (Potter, 1996):

F: The drug scares me a lot.

F: We are still scared of using it, but he has been taking it for years, and we have him checked, but no side effects, thank God.

M: Yeah, no side effects in our case, either.

F: So the only side effects it can have, as the list says, are tachycardia—

M: Lack of appetite.

F: . . . lack of appetite, trouble sleeping, and growth problems. It's four things. Does he sleep? Yes, he sleeps a lot. Does he grow? He is growing perfectly . . . Tachycardia? He works out, so we always have him checked. He runs and everything. He's as perfect as it gets.

M: Does he lack appetite?

F: He eats like an animal.

M: Is this a case in a million, or is it the norm?

F: It's the norm.

F: You say that that's the norm, though.

F: I'm sorry, it isn't the norm.

F: No, that's your case.

F: It's my case and the case of many others. The truth is that you won't know until you do it.

Emphasis of the drug's effects also characterizes many letters written by parents about their own stories of ADHD. In these accounts, the drug is presented as a medium of miracle:

Now he's under pharmacological treatment with Ritalin and we [the parents] are amazed, happy, and still incredulous about the improvement. All the symptoms disappeared: he's happy, he thinks, he doesn't talk too much, he's not annoying, he's nicer, and he has such a loving attitude . . . , so he's not

hyperactive anymore, and he's more focused. This is a miracle! We want to address those parents who are still incredulous: the child with the therapy becomes "normal," he's not sedated, he's not crazed, and he's calm.

These discursive strategies of justifying specific courses of action and constructing choices as fact-based serve to reject the negative implications of being parents who drug their children.

Strategies to counter "derailment" from the shared narrative of the mutual aid group. The group used three main discursive strategies in confronting and managing accounts of ADHD that contrast with those favored by the group: circumscribing, correction, and contestation.

Circumscribing. The first strategy was to circumscribe derailing narratives and their potential effects on the group. In contrast to the homogenizing trend, when parents introduced the negative side effects of drugs into the conversation, experienced members of the group emphasized the subjective and unique nature of these effects by referring to examples of different reactions:

- M: Anyway, my daughter got chubbier [because of Ritalin].
 M: My son didn't. That's subjective!
 M: No, I don't know. I feel like she got fatter in the 6 months she's been taking Ritalin.
 M: My son is, I mean, skinnier. He always looked like a stick. My nephew, though, my sister's son, you have to take the plate away from him. I mean, it's subjective.

Thus, the parents appeared to adopt two different accounts, an empiricist account and a contingent account, which diverse authors have discussed in relation to scientists' narratives (Burchell, 2007; Gilbert & Mulkay, 1984). The parents tended to use an empiricist account when presenting the medical understanding of their children's conditions as an objective form of knowledge that made sense of common experiences, but they adopted a contingent account by invoking personal and subjective factors to explain differences and to contain the potential negative effects of certain discourses on group cohesion.

Correction. Accounts that did not fit the group's interpretive framework of ADHD were frequently reformulated via a collaborative act directed toward promoting a neurobiological understanding of the children's behaviors and thus amending accounts that might evoke the role of parents' educational practices in the management of their children. In the excerpt below, the parents collectively opposed the account of a new member who suggested the potential usefulness of physical punishment in

controlling children by invoking the neurological nature of the problem:

- F: Well, back in the day, it was normal to spank kids. A spank was admissible . . . That was the remedy for exuberant kids, and I remember that my dad's slaps were useful to me. They helped me modify my behavior, and that's good.
 F: But it's not about the whipping; it's about you changing.
 F: Yes, but . . .
 M: 'Cause with these kids, there's little you can do. You can slap them as much as you want, but eventually you just get the opposite.
 F: You can rock them, but they don't get it.
 F: Absolutely, it's useless.
 Father: It's useless because it's a neurological thing.
 M: Yes, that's true. It has nothing to do with it. It's about neurotransmission.
 F: Okay. That's why today we need neuroimaging.

The above quote shows a change of heart on the part of a father as a result of the collaborative corrective intervention of the group. Correction frequently intervenes to contest understandings of ADHD that are not exclusively based on neurobiological understanding. Parents tend to counteract critical perspectives by invoking the most recent development in scientific research, as stated on the association website:

Physicians, and in particular child psychiatrists, need to reflect on a certain type of error that has been committed for a long time: an error that is part of a cultural stereotype derived from old-fashioned theories or their bad interpretation . . . the same happened for autism . . . and now goes on with ADHD.

Correction led some parents to shape their narratives in accordance with the group-narrative pattern. For example, a father at his first meeting framed his account according to an emotion-related understanding of his child's condition. In particular, he suggested a connection between the child's behavior and the contingent events of life he went through because of the father's sickness:

He has several aggravating conditions, problems related to false self, emotional problems . . . because he had the problem that his father has been sick for a part of his life. My son was 8 years old, and he lost an essential part of his life because he spent his childhood putting himself in my place because he noticed that I was always sick, etc. . . . and he virtually became the little man of the house. (Father)

The father, at his third encounter, changed his narrative and his self-positioning with respect to his child's problem, illuminating the concrete impact that the group's discursive interactions could have on individuals:

F: Since I discovered that I have ADHD during my first meeting, I'm searching for a psychiatrist because I want him to follow me for Ritalin taking.

F: Are you thinking of taking Ritalin?

F: Yes, because actually when we talked about hereditarianism, my wife and I have thought about it and my wife said, "They are talking about you." Actually, you made me realize that I don't finish many things. I omit many things.

F: But you are adult. You don't need Ritalin.

F: It's never said. If it enhances performance, why not? As long as it doesn't cause him side effects, if it enhances performance . . . how many people take medication in a safe and controlled way to enhance performance?

F: I wanna take the medication safely.

Therefore, in many cases, the parents' responses to their children's problems were influenced by attendance of the group. In the conversation reported above, the group's facilitator agreed with the new account of the father, based on the conceptualization of ADHD as a genetic condition and, contesting the skepticism of another member, pushed him toward a responsible and controlled use of Ritalin in adults.

Contestation. The third way of educating parents about the shared narrative was to contest claims that opposed issues that were of crucial importance to the group. The following quotation details an interpersonal clash between the group's facilitators and a new but experienced participant. A novice mother who had considerable experience with ADHD challenged an implicit norm of the group by suggesting that drugs alone are not effective. One of the group's leaders contested this narrative and deflected criticisms by locating the use of medication specifically within the Italian context:

M: Ritalin, but always with the parents working, 'cause the drug alone does nothing.

M: Well, that's not true.

M: The drug alone doesn't work.

M: I don't agree. It's been 6 years that my son has taken Ritalin . . . I'd just like to specify one thing. Here in Italy, first of all, the drug is a suggested solution only in very serious cases. The drug is proposed, not prescribed, in the worst cases here in Italy, wherever there are problems in managing these kids and therapies don't work. I'm talking about psychotherapy, psychomotor therapy, and so on. Those are therapies that don't work by themselves because they [the children] don't stay still. So they [child psychiatrists] propose the drug. The drug works, 'cause Ritalin immediately works when you give it to them. After 30 minutes, [he's] perfect!

The facilitator sought to neutralize an unacceptable way of talking about ADHD and to regain the position of expert within the group. The new mother involved in this

conversational exchange and her partner never attended the group again. They explicitly manifested some discomfort affirming that their experiences and problems were different from those of the rest of the members because their child was older than the average of the group's children.

Overall, challenges and a lack of conformity to the distinctive dialect of the group were sometimes discouraged and muted within the group, fostering specific (biomedical) accounts of the causes, characteristics, and management of ADHD. Keeping a shared narrative was important for the existence of the group and for the association's ideology. Supposedly, this is the reason why, despite clashes, we did not notice changes in the spirit, approach, and narrative of the group during the course of the meetings.

Discussion

The parents' self-help group managed ADHD in a manner that contributed to mutual identification of the members and the related production of a shared narrative. The group discursively manufactured consent and legitimized certain types of discourse about ADHD through a series of discursive strategies that ranged from homogenization of the internal space of the group via mirroring, mutual identification, and differentiation from the outside world, to normalization, use of various forms of evidence, and correction of "not allowed" accounts.

Our results accord with the literature in highlighting that identification and modeling are processes that characterize the dynamics of support groups (Allsop, Jones, & Baggott, 2004; Mundell, Visser, Makin, Forsyth, & Sikkema, 2012) and that commonality is relevant because parents might feel anxious about interacting with other parents with different experiences (Pain, 1999). Group cohesion is also important because it is related to the political empowerment and advocacy functions of self-help groups (King et al., 2000).

Moreover, our analysis is in line with a study from Munn Giddings and McVicar (2007). The authors explored the reasons why caregivers attend self-help groups and the benefits they gain from membership, identifying the fundamental role of building experiential knowledge within the group. Therefore, the production of experiential knowledge, which in the parental group centered on ADHD takes the form of a consensual narrative to be spread around, is central to the self-help movement.

Law et al. (2001) have highlighted that parents who participate in a support group experience a sense of empowerment derived from sharing goals and advocacy. This echoes the feeling of empowerment characterizing the group that we analyzed, which was related to relief

from social blame, sense of belonging to the group, and commitment to its advocacy mission. Again, the ability of a self-help group to provide a sense of normality for its members, as underlined by Kerr and McIntosh (2000), resonates with the tendency of the group that we analyzed to adopt strategies of normalization.

As discussed in the “Results” section, the group exerted an influence on the subjectivity of its individual members, the parental organization as an active agent, and the social context. This multilevel impact of self-help organizations was already highlighted by Solomon et al. (2001) in a qualitative study on mutual support groups for parents of children with disabilities. The authors identified three main domains of support: the socio-political, related to increased agency; the interpersonal, involving a sense of belonging to a community; and the intra-individual, linked to self-change.

From Troubling Experiences to Credentialed Parenting

The discursive dynamics that occur during parents’ meetings might be regarded as “techniques of the self” (Novas & Rose, 2000, p. 502). Indeed, within the dialogical and interactive setting of the self-help group, participants shape their subjectivity in relation to other social actors. The shared narrative is not only a language with which to narrate what ADHD is and means to parents. It also provides a resource for supporting parents’ subjectivity and a means for parents to reestablish their moral status. Indeed, discussions of the nature of ADHD mainly focus on the location of blame. The group provides a setting in which parents can find recognition of their experiences and authority, free from a scrutinizing social context that leads them to feelings of powerlessness and exclusion. In this regard, commonality of experience converts troubling experiences into credentialed forms of parenting and is a resource for self-legitimization (Rabeharisoa, 2003). To protect their identities from social blame, parents adopt a medicalized version of hyperactivity and inattention and perceive any challenge to this account as a threat to their legitimacy, despite the fact that biomedical constructions of mental illness do not always protect individuals from delegitimation (Lafrance & McKenzie-Mohr, 2013).

Thus, ADHD is simultaneously a constructed and “constructive” object. Participants are engaged in a process not only of constructing ADHD but also of constructing themselves and others, struggling to preserve their identities in relation to the “disturbed” child.

Parents as Lay Experts

The articulation of the local context of the parents’ meetings has implications for the social positioning of the self-help group as a collective and active body. The narrative

of the group, which acquires its legitimacy from its consensual character, represents a means by which the parents can acquire a position that authorizes them to actively enter the social space they inhabit (Allsop et al., 2004). Thus, self-disclosure and sharing of experiences are tools to produce an empowering story that provides parents with access to certain practices, such as the reclamation of specific rights and the assertion of their competence (Ryan & Cole, 2009). In this respect, we can perceive self-help groups as part of a broader social and political movement that aims to penetrate the society “in the name of health” (Landzelius, 2006, p. 530). Indeed, self-help groups are frequently parts of organizations that draw the attention of lay people and medical practitioners to the existence of diseases and the availability of treatments, shape knowledge of particular health conditions, and articulate people’s fears and anxieties into clinically recognizable forms (Rose, 2003).

Thus, the knowledge produced by parents becomes a form of “lay expertise” (Novas & Rose, 2000, p. 488). Indeed, parents validate their realities through the evidence of their personal experiences, and through their associations with one another, they construct a form of authority that is based on experience rather than training or status. Therefore, this self-positioning of parents as lay experts who educate one another implies a reconfiguration of their relationship with professionals and related power dynamics (Rabeharisoa, 2003). In the case that we analyzed, parents reproduced a medicalized version of their children’s problems by mobilizing notions of hereditarianism while contesting and deconstructing medical expertise. In this regard, the practices activated with respect to ADHD are not the effects of medical imperialism; rather, they result from the “interaction of lay and professional claims-makers” (Conrad & Potter, 2000, p. 575).

The interactions that occur within the parents’ group are also significant because they sustain a larger value system, as an integration of micro and macro discursive approaches, respectively, discursive psychology and Foucaultian discourse analysis, can highlight. For example, the discourse of self-help groups is embedded in and reproduces normative patterns and dominant themes in the mental health field of our contemporary therapeutic society (Murdoch, Poland, & Salter, 2010). These normative patterns and themes include the value of parental self-sacrifice for children, the innatist discourse and its determinist view, the legitimacy of using drugs to enhance performance, and the frightening character of disability.

Implications

The dynamics discussed in this analysis can have beneficial effects, such as group cohesion and a relieving sense

of belonging. In addition, the group provides participants with a language to articulate their experiences and sustain their subjectivity within a stigmatizing social context. However, the tendency to maintain and repair the orderliness of the group's interactions could have problematic implications. For example, because the group constructs a narrative that tends to ignore or counteract incongruous information, the group might not value different perspectives, might inhibit the expression of certain opinions, and might emphasize certain aspects of the experience at the expense of others. In this regard, there might be a monologic mode of organization behind the manifest dialogic nature of the group, and the shared storyline might function as a master narrative (Landzelius, 2006).

In this regard, we discussed part of the results and insights provided by the study with the coordinators of the parents' association. The return to participants served not only to acknowledge their contribution to the research project and enhance our interpretation of the findings but also to engage the coordinators in a process of reflection about the dynamics that are established in the group they moderate. To give the feedback in a sensitive manner, we initially asked the facilitators what they thought about the dynamics of the group in terms of both positive and critical aspects. Starting from the opinions of the facilitators, we gradually introduced our feedback in a noncriticizing way. On the contrary, we framed it as suggestions potentially useful to make the group more open to a plurality of parental experiences.

Some of the discursive strategies that we have highlighted might also characterize other self-help groups that have similar features and needs. For instance, emphasizing the commonalities of the parents' experiences and the adoption of a dichotomized vision that contrasts the group with the rest of the society are discursive strategies that might also characterize other self-help groups constituted around psychiatric and health conditions in relation to which people perceive stigmatization and blame from the social context. These groups, indeed, might share both the need to normalize the experiences of the participants and the intention to foster the mission of the group.

Moreover, the construction of narratives that support a specific conceptualization might also characterize other groups that are confronted with an expert institutionalized discourse. Indeed, the construction of a shared and consensual narrative allows a group to produce a form of knowledge whose legitimacy, based on the specificity of the experience, can help in dealing with powerful discourses circulating in the scientific and technocratic fields.

Overall, through this study, we confirm the fruitfulness of the theoretical and methodological framework of CHP and discourse analysis. Indeed, in our analysis, we showed that the discursive interactions enacted within the group,

and the strategic and argumentative use of language might be fundamental resources for a group that perceives itself to be in a disadvantaged or minority position.

In addition, the adoption of this theoretical framework permitted the understanding of members' knowledge and practices as constituted through social interactions within specific socio-cultural and political processes. For what concern the Italian context, the relative newness of the ADHD category and the controversy on its validity and medications' use have rendered the ADHD issue more uncertain and debated, potentially making parents more exposed to blame and, therefore, to the need of producing and circulating a specific version of ADHD.

The focus of the CHP approach on the issue of power also allowed the identification of intragroup and intergroup power dynamics. The intragroup dynamics are related to the interactions between parents with different seniority in the group, like facilitators and experienced members versus novices and new parents. The intergroup dynamics regard the relationship between the group and the expert and institutional discourses. Moreover, CHP and discourse analysis were a useful frame for the analysis of the changeable, multifaced, and multideterminate character of subjectivity, allowing the understanding of the interplay between individual agency and social discourses in the construction of identity.

Limitations

This study has some limitations. Specifically, the self-help group represents a minority of parents. However, the involvement of a self-help group has clarified important dimensions related to new social movements that are organized around psychiatric diagnoses, such as the contributions of these movements to the construction of subjectivity and their social roles.

We also acknowledge that the methodological approach adopted for data collection and analysis leads to a necessarily partial interpretation of data (Burman & Parker, 1993). However, the use of multiple ways of gathering data and the continued comparison between researchers contributed to the validity of findings. We also recognize that the presence of an observer could have led parents to organize their accounts around legitimizing strategies or to focus on presenting themselves as responsible and caring parents. Anyway, our decision to have the researcher adopt the position of a silent observer was made to reduce the possibility of influencing parents' discussions.

Despite these limitations, an ethnographic-discursive approach permitted the examination of the complex, multifaceted meanings constructed by parents through interactions as well as the implications of this discursive construction for the subjectivity of parents and their social contexts. Moreover, in this article, we demonstrated the

utility of qualitative research in understanding self-help groups (King et al., 2000) and contributed to enlarging the qualitative literature on ADHD outside the North American context.

Conclusion

Adopting an ethnographic-discursive approach, we analyzed the functions and the related interactional dynamics and discursive strategies performed by a self-help group of parents of children diagnosed with ADHD. The production of a homogeneous space within the group and the establishment of a shared and consensual narrative concerning ADHD help parents to cope with a controversial issue and to preserve their identities as good parents against a stigmatizing and blaming context. These dynamics have an empowering effect because the parents can signify their experiences of ADHD within a “safe” context and through a common, and thus legitimate, account.

At the same time, the production of homogeneity within the group and the parents’ tendency to construe and preserve a unique account of ADHD might lead to conformity and denial of different individual stories. The dynamics of interaction characterizing the parental self-help group centered on ADHD might also characterize other groups that share similar problems, like uncertainty, blame, and conflicting relationships with other social agents and institutions. Overall, through this study, we have contributed to the literature focused on the parental construction of ADHD, and more specifically, the study sheds new light on the contribution of self-help groups to the parental understanding of ADHD.

Acknowledgment

We thank all the participants in this study.

Authors’ Note

Portions of this article were presented at the Summer Institute in Qualitative research—Putting Theory to Work, July 22 to 26, 2013, in Manchester, United Kingdom.

Declaration of conflicting interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

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Iniziativa nell'ambito del Progetto di Neuropsichiatria dell'Infanzia e dell'Adolescenza
(Delibera n. 406 - 2014 del 04/06/2014 Progetti NPI)
Il Progetto è realizzato con il contributo, parziale, della Regione Lombardia
(in attuazione della D.G. sanità n. 3798 del 08/05/2014 e n. 778 del 05/02/2015)
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