



INDICE:

1. Dalle banche dati bibliografiche pag. 2

2. Documenti
 - Kieling RR, et al.
SEARCHING FOR THE BEST APPROACH TO ASSESS TEACHERS' PERCEPTION OF INATTENTION AND HYPERACTIVITY PROBLEMS AT SCHOOL.
 Eur Child Adolesc Psychiatry 2014;23:451-459 pag. 41
 - Frigerio A, et al.
ATTENTION DEFICIT/HYPERACTIVITY DISORDER BLAME GAME: A STUDY ON THE POSITIONING OF PROFESSIONALS, TEACHERS AND PARENTS.
 Health (London) 2013;17(6):584-604. pag. 50
 - Re AM, et al.
SPELLING ERRORS AMONG CHILDREN WITH ADHD SYMPTOMS: THE ROLE OF WORKING MEMORY.
 Res Dev Disabil 2014;35:2199-204. pag. 71

BIBLIOGRAFIA ADHD GIUGNO 2014

ADHD Atten Deficit Hyperact Disord. 2014.

COMORBID MENTAL DISORDERS IN CHILDREN AND ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN A LARGE NATIONWIDE STUDY.

Jensen CM, Steinhausen H-C.

The present study aimed at identifying the full range of mental disorders comorbid to attention-deficit/hyperactivity disorder (ADHD) in children and adolescents (age 4-17) diagnosed in Danish psychiatric hospitals between 1995 and 2010. A total of 14,825 patients were included in the study and comorbid disorders diagnosed concurrent with ADHD were identified. Associations of comorbid disorders with sex, age, and other mental disorders were investigated by logistic regression analysis. In the total sample, 52.0 % of the patients had at least one psychiatric disorder comorbid to ADHD and 26.2 % had two or more comorbid disorders. The most frequent comorbid disorders were disorders of conduct (16.5 %), specific developmental disorders of language, learning and motor development (15.4 %), autism spectrum disorders (12.4 %), and intellectual disability (7.9 %). Male sex was generally associated with an increased risk for neuropsychiatric disorders while female sex was associated more frequently with internalizing disorders. The analysis of associations between the various comorbid disorders identified several clusters highlighting the differential developmental trajectories seen in patients with ADHD. The study provides evidence that comorbidity with mental disorders is developmentally sensitive. Furthermore, the study shows that particular attention should be given to patients with neurodevelopmental disorders such as autism and intellectual disability in future longitudinal analyses. These disorders are very frequent in patients with ADHD, and the affected patients might follow a different course than patients without these disorders.

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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.

Adm Policy Ment Health Ment Health Serv Res. 2014 May;41:401-09.

PARENTAL ETIOLOGICAL EXPLANATIONS AND LONGITUDINAL MEDICATION USE FOR YOUTHS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Yeh M, Aarons GA, Ho J, et al.

Due to the need to increase understanding of factors associated with medication usage for youth with ADHD, this study examined parental explanatory etiologies in relationship to psychotropic medication use in a sample of youth who met criteria for ADHD and utilized outpatient specialty mental health services in the previous year. When examined cross-sectionally, medication usage was positively associated with parental explanatory etiologies related to physical causes and negatively associated with those involving sociological causes. Longitudinal analyses did not show a significant effect of Time 1 parental explanatory etiologies on the slope of medication use, suggesting that the relationship between Time 1 parental explanatory etiologies and medication usage remains stable over time for those who have had past year involvement with outpatient specialty mental health services.

Afr Health Sci. 2014;14:439-45.

SUBCLINICAL IMMUNE REACTIONS TO VIRAL INFECTIONS MAY CORRELATE WITH CHILD AND ADOLESCENT DIAGNOSIS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A PRELIMINARY STUDY FROM TURKEY.

Bekdas M, Tufan AE, Hakyemez IN, et al.

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neuro-developmental disorders of childhood and adolescence. Studies focusing on the relationship of infectious agents and ADHD are scarce. It is also known that cerebellar injury may lead to hyperactive behavior. This study aimed to evaluate the relationship between viral agents of cerebellitis and the diagnosis of ADHD.

Methods: The study group was formed of 60 consecutive ADHD patients and 30 healthy children. IgG levels for VZV; HSV-1, CMV, Measles, Mumps, Rubella and EBV were evaluated.

Results: Males were significantly higher among patients with ADHD (65% vs. 40%, $p=0.025$). Patients with ADHD displayed significantly higher positivity for measles IgG (80% vs. 60%, $p=0.044$). When patients with ADHD were classified according to their pubertal status, adolescents with ADHD displayed higher positivity for mumps (100% vs. 74.4%, $p=0.043$). Most of the patients were diagnosed with ADHD-Combined or Hyperactive/Impulsive Subtypes (56.6%) while 43.3% were diagnosed with ADHD-predominantly inattentive type. When patients with subtypes of ADHD were compared in terms of seropositivity, it was found that patients with ADHD-Combined/ Hyperactive-Impulsive subtypes had significantly elevated reactions for Rubella (100% vs. 88.5%, $p=0.044$).

Conclusion: Although limited to a single center and may be prone to sampling biases, our results may support the notion that immune reactions may be related with ADHD among children and adolescents. Further, prospective studies from multiple centers are needed to support our findings and establish causality.

Alcohol Clin Exp Res. 2014;38:178A.

THE EFFECT OF PRENATAL ALCOHOL EXPOSURE ON READING COMPREHENSION IN ADOLESCENCE IS MEDIATED BY ALCOHOL-RELATED ADHD SYMPTOMS AND PROCESSING SPEED.

Dodge NC, Molteno CD, Sokol RJ, et al.

Previous studies have shown that prenatal alcohol exposure is associated with poorer reading and phonological awareness. We have recently confirmed that prenatal alcohol is associated with poorer reading comprehension in elementary school-aged children in Cape Town, South Africa, and that this effect is mediated by slower reading rate. This finding is consistent with earlier studies demonstrating alcohol-related impairment in information processing speed. 282 adolescents (M age=14.4, SD=0.6), from the Detroit Longitudinal Cohort, whose mothers' alcohol use was ascertained during pregnancy, were administered the reading component of the Wechsler Individual Achievement Test, which is comprised of

the basic reading (phonological processing and single word reading) and reading comprehension scales. IQ was assessed on the Wechsler Intelligence Scale for Children, 3rd Ed (WISC-III); the WISC-III Processing Speed Index was used to measure processing speed. ADHD symptoms were assessed on the Disruptive Behavior Disorders (DBD) scale, which was completed by the parent, classroom teacher, and test examiner. After control for confounders, prenatal alcohol exposure was related to poorer reading comprehension ($b=-0.13$, $p<0.05$) but not to basic reading. The Sobel method was used to determine whether IQ, processing speed, and ADHD symptoms mediated the effect of prenatal alcohol on reading comprehension. Both ADHD symptoms ($z=-2.65$, $p<0.01$) and processing speed ($z=-2.20$, $p<0.05$) were mediators of the relation between prenatal alcohol and reading comprehension, whereas overall intellectual competence (Full Scale IQ) was not ($z=-1.41$, $p=0.157$). We next tested a model in which both processing speed and ADHD symptoms were considered as mediators using a bootstrapped multivariate extension of the Sobel test. Bias-corrected 95% confidence intervals showed that the total indirect effect was significant (CI=-6.89 to -0.81) and that the indirect effects of both mediators (processing speed: CI=-5.37 to -0.37; ADHD symptoms: CI=-2.82 to -0.03) were significant and similar in effect size. Although basic reading skills may have been affected by prenatal alcohol exposure earlier in development, this effect was no longer evident in adolescence. Instead, the alcohol effect on reading comprehension was mediated by alcohol-related increases in ADHD symptomatology and slower processing speed.

Alcohol Clin Exp Res. 2014;38:291A.

COPING, IMPULSIVE ANGER, AND ALCOHOL USE IN ADOLESCENTS WITH CHILDHOOD ADHD.

Harty SC, Pelham WE, Molina BSG.

Attention Deficit Hyperactivity Disorder (ADHD) is characterized by symptoms of inattention and hyperactivity/impulsivity. Previous studies have shown that a diagnosis of ADHD in childhood is associated with adolescent substance use and substance use disorders. While a diagnosis of ADHD has been shown to be a risk factor for adolescent alcohol use, effect sizes have been moderate. Research examining alcohol use within the ADHD population has recently begun to consider putative moderators and mediators beyond simple comorbidity with Conduct Disorder (CD). Negative emotions such as anger and irritability have been previously associated with alcohol and substance use difficulties and have recently become a focus of investigation among ADHD researchers. Low frustration tolerance, susceptibility to temper tantrums and quick anger are features associated with Oppositional Defiant Disorder (ODD), a disorder that frequently co-occurs with ADHD. Past studies have identified an impulsive anger subset of ODD symptoms distinct from the remaining ODD items. To our knowledge, no studies have examined the relationship between this form of emotional dysregulation and alcohol use among individuals diagnosed with ADHD. This study examined the relationship between impulsive anger and adolescent alcohol use (frequency of binge drinking and drunkenness) among 142 adolescents diagnosed with ADHD in childhood and 100 demographically similar comparison youth without ADHD (Mean age 15.2; 94% male; 87% Caucasian). Expanding upon previous research with this sample showing the association of behavioral and cognitive coping skills with cigarette use, we tested the relationship between impulsive anger and alcohol use as moderated by coping skills. Although limited by cross-sectional associations, utilization of parent-reported coping and impulsive anger and adolescent-reported alcohol use were methodological strengths. As expected, childhood ADHD was positively associated with higher impulsive anger and alcohol use. Impulsive anger mediated the association between ADHD and alcohol use. Behavioral, but not cognitive, coping moderated the association between ADHD and impulsive anger; this relationship was strongest when active coping was low. Coping did not moderate the association between impulsive anger and drinking. Increasing active coping strategies among individuals with ADHD histories may reduce impulsive anger and associated vulnerability to alcohol use.

Alcohol Clin Exp Res. 2014;38:287A.

POSITIVE ALCOHOL EXPECTANCIES AND ATTENTION DEFICITS IN YOUNG ADOLESCENTS WITHOUT ALCOHOL EXPERIENCES.

Ruglovsky C, Clark DB.

In adolescents, positive alcohol expectancies have been shown to correlate with delinquent behavior and alcohol use (Meier et al., 2007). Prior research has not specifically examined young teens prior to alcohol experiences and neuropsychological indices. In this study of young adolescents, we examined the relationship between positive alcohol expectancies (PAE) and responses to the Continuous Performance Test II (CPT II: Conners, 2004). The CPT II is a computer administered neuropsychological test providing indices of attention deficits and impulsivity. We focused on young adolescents without significant alcohol use to examine expectations unrelated to intoxication experiences. Methods: The subjects were 142 adolescents, ages 12 to 15 years old, recruited by a random digit dial procedure to obtain a stratified representative sample (53%female; 67% Caucasian, 26%African American). Most of these teens reported never using alcohol (n=116) defined by at least one standard drink, and 26 reported having consumed 1 standard drink or more. PAE (Brown et al., 1987) was measured by 10 true-false items (e.g., nullDrinking alcohol makes people more friendly.null). Attention was measured by the CPT II, including the Clinical Confidence Index (CCI) reflecting ADHD characteristics and other scales. PAE was significantly related to alcohol use history ($t=3.3$, $p=0.002$). Subjects with alcohol use history were removed for subsequent analyses. Results: Among those without alcohol use history (n=116), PAE was not significantly related to age, gender or race. For the CPT II, PAE was significantly correlated with CCI ($r=0.27$, $p=0.005$), Omissions ($r=0.33$, $p<0.001$), Response Time Variability ($r=0.24$, $p=0.01$), and Perseverations ($r=0.19$, $p=0.048$). Discussion: Among young teens without a history of alcohol use, higher PAE scores were significantly associated with CPT II results characteristic of individuals with ADHD, as well as more errors of omission, more variability in reaction time, and greater perseveration. These CPT II dimensions reflect inattentive and impulsive responding. These findings indicate that young teens with a greater tendency toward attention difficulties have expectations that alcohol will have positive effects. For teens with attention difficulties or related disorders, education to reduce PAE may supplement prevention efforts.

Appl Neuropsychol Child. 2014;3:26-30.

PERFORMANCE AND SPECIFICITY RATES IN THE TEST OF MEMORY MALINGERING: AN INVESTIGATION INTO PEDIATRIC CLINICAL POPULATIONS.

Loughan AR, Perna R.

Symptom validity tests are becoming standard as an effort measure during pediatric neuropsychological assessment. An important component of symptom validity test use is understanding limitations of these measures and how select clinical groups may have difficulty with them. Research has begun to clarify the limits of the Test of Memory Malinger (TOMM) with diverse childhood diagnoses. This study compared TOMM scores of children (N = 86) classified with common childhood disorders. Findings suggest that a substantial proportion of children performed below the recommended cutoff score of 45 on Trial 2 and attained varied specificity rates. This included children with conduct disorders (85%), affective disorders (92%), traumatic brain injury (83%), attention-deficit hyperactivity disorder (93%), learning disabilities (100%), and pervasive developmental disorder (88%). The group with the most children scoring below the cutoff was children with intellectual disabilities (76%). This finding is consistent with some of the adult research suggesting that very limited cognitive ability may compromise TOMM performance. Caution may be necessary when drawing conclusions about test-taking effort based on the recommended TOMM cutoff scores when evaluating children with disabilities.

Appl Neuropsychol Child. 2014;3:52-59.

ARE FINE-MOTOR IMPAIRMENTS A DEFINING FEATURE OF NONVERBAL LEARNING DISABILITIES IN CHILDREN?

Wilkinson-Smith A, Semrud-Clikeman M.

The most commonly used model of nonverbal learning disabilities (NVLD) is the Rourke model. This model includes bilateral deficits in psychomotor skills as a primary neuropsychological deficit. Extant studies have identified attentional issues as one of the components seen in many children with NVLD. Forty-five children divided into three groups completed a battery of tests including psychomotor skills. Groups were defined as children with NVLD, children with attention-deficit hyperactivity disorder-Predominantly Inattentive type, and typically developing children. No significant differences were found among the groups on measures of motor speed. Furthermore, the means were not in the expected direction, as children with NVLD actually performed faster than typically developing children. This finding suggests that measures of motor speed should not be solely used to identify children with NVLD and that more research is needed to clearly identify appropriate diagnostic criteria.

Arch Dis Child. 2014 Mar;99:292-96.

DIAGNOSING DEVELOPMENTAL COORDINATION DISORDERS.

Kirby A, Sugden D, Purcell C.

Developmental coordination disorder (DCD) affects around 5% of children and commonly overlaps with other developmental disorders including: attention deficit hyperactivity disorder (ADHD), autism spectrum disorders (ASDs) and specific language impairment (SLI). There is evidence to demonstrate the wide-ranging impact on all areas of functioning including psychiatric and learning domains. There is increasing evidence of the continuing impact into adulthood and the long-term negative effects on relationships and employment. There is a need for early identification and intervention to limit the likelihood of these secondary consequences from emerging. This paper addresses the diagnosis of DCD.

Arts Psychother. 2014.

VALIDATION OF THE FSA AS SCREENING TOOL FOR CHILDREN WITH ADHD.

Kim J, Kim G, Seo S.

The validity of the Face Stimulus Assessment (FSA) (Betts, 2003) as a tool for screening children with attention-deficit/hyperactivity disorder (ADHD) was investigated. The study subjects were 193 children from first to sixth graders in an elementary school located in Busan city, South Korea. Study analysis using the FSA drawings and Korean-ADHD rating scale (K-ARS) revealed the following results. First, in order to examine the reliability of the FSA assessment items, reliability was verified based on internal consistency while inter- and intra-rater consistencies were calculated. The reliability coefficient of assessment items for each FSA drawing was Cronbach's (alpha) = .778, .835 and .831 for the FSA drawing #1, #2 and #3, respectively. Inter-rater consistency of three persons was $r = .801-1.00$ while intra-rater consistency was $r = .830-1.00$. Second, in order to investigate the validity of the FSA as a screening tool for children with ADHD, cross tabulation and discriminant analyses were conducted to examine differences in the characteristics of the responses to the FSA drawings between normal children and children with ADHD. According to the analysis results, the common items that showed differences in the FSA drawing #1, #2 and #3 included color fit, logic, realism, developmental level, details of objects and environment, line quality, perseveration, form, and emotional tone. In other words, compared to normal children, Children with ADHD showed a higher tendency to be unable to use colors properly, were illogical and drew a simple face in the lower level of development. In many cases, the subjects drew a face with insufficient detail in the object and the environment and used shaky or wavering lines with repetitive coloring. In regard to the drawing theme, children with ADHD were more inclined to draw something other than a portrait and something that expressed negative emotions such as sorrow, fright, grotesqueness, fear, and anxiety. Among the aforementioned items of FSA assessment, line quality had the highest explanatory power. Discriminant power, which is the ability to predict normal children and children with ADHD based on the

assessment items of the FSA drawings, was in the range of 79-81.3%. The drawing #3 showed the highest value of 81.3%.

Asia-Pacific Psychiatry. 2014.

CHILD ABUSE, DISRUPTIVE BEHAVIOR DISORDERS, DEPRESSION, AND SALIVARY CORTISOL LEVELS AMONG INSTITUTIONALIZED AND COMMUNITY-RESIDING BOYS IN MONGOLIA.

Kohrt BA, Hruschka DJ, Kohrt HE, et al.

Introduction: Hypothalamic-pituitary-adrenal (HPA) axis activity is related to childhood disruptive behavior disorders and to exposure to abuse and neglect. This study explores the relationship of diurnal salivary cortisol levels with oppositional defiant disorder (ODD) and caregiver attitudes toward physical punishment among boys in Mongolia.

Methods: Salivary cortisol was collected in the home or institution 4 times daily for 4 days from 46 boys, aged 4-10 years, in Ulaanbaatar, Mongolia. Caregivers rated child disruptive behavior symptoms, attitudes toward physical punishment, and community violence exposures. Mixed effects models were used to estimate the association of psychopathology and caregiver attitudes with salivary cortisol levels.

Results: Boys meeting criteria for ODD displayed consistently lower diurnal salivary cortisol levels compared to boys without ODD diagnoses. Controlling for ODD diagnosis, boys with depression showed higher cortisol levels throughout the day. No other diagnosis was associated with cortisol levels. Psychiatric diagnosis accounted for 17% of between individual variations in cortisol levels unexplained by the covariates. In a separate model, caregivers' beliefs regarding physical punishment accounted for 11% of between individual differences: boys with caregivers who stated physical punishment was necessary for discipline displayed hypocortisolism. Institutionalization did not associate with cortisol levels.

Discussion: Salivary cortisol data from a non-Western naturalistic setting support an association of reduced basal HPA activity with disruptive behavior disorders and caregiver attitudes toward discipline. These findings suggest HPA functioning may be a reflection of or mediate disruptive behavior disorders in children across ethnic and cultural settings.

BMJ Case Rep. 2014.

TREATING ENURESIS IN A PATIENT WITH ADHD: APPLICATION OF A NOVEL BEHAVIOURAL MODIFICATION THERAPY.

Tajima-Pozo K, Ruiz-Manrique G, Montanes F.

We report the case of a 6-year-old patient diagnosed with attention-deficit hyperactivity disorder (ADHD) and comorbid enuresis disorder, who was treated with methylphenidate for the past 3 months and a novel behavioural modification therapy by using an application called 'Enuresis Trainer'. This therapeutic application is basically an interactive 'Bedwetting Calendar', based on traditional cognitive behavioural modification therapies and positive reinforcement systems. Enuresis is defined as the failure of voluntary control of the urethral sphincter. The prevalence of enuresis is 15-20% in the child population; however, children with ADHD had a 2.7 times higher incidence of nocturnal enuresis. Bedwetting is a common cause of isolation in children as well as loss of self-esteem and other psychological distress for the child and the family.

Breastfeeding Med. 2014;9:244-50.

BREASTFEEDING AND PARAFUNCTIONAL ORAL HABITS IN CHILDREN WITH AND WITHOUT ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Sabuncuoglu O, Oregul C, Bikmazer A, et al.

Introduction: Although children with attention-deficit/hyperactivity disorder (ADHD) were reported to have insufficient breastfeeding, consequences and oropharyngeal implications of this finding have not been studied. In this case-control study, we aimed to investigate early feeding practices and parafunctional oral

habits in children with ADHD. Subjects and Methods: The study group consisted of 200 children and adolescents, 7-17 years old, diagnosed as having ADHD at Marmara University Child Psychiatry Clinics in Istanbul, Turkey. The Conners Parent and Teacher Rating Scales were used to assess behavioral disturbances. A questionnaire was developed consisting of items pertaining to breastfeeding period, early feeding history, and parafunctional oral habits. The study data were compared with those for 175 healthy schoolchildren after exclusion of possible ADHD cases. Results: The children with ADHD were found to have insufficient exclusive breastfeeding (less than 6 months) ($p=0.0001$). The children with insufficient exclusive breastfeeding were more likely to have a history of bottle feeding, longer duration of bottle feeding, and early introduction of bottle feeding ($p=0.01$). Overall, significant differences were detected on the domains of duration of bottle feeding, introduction of bottle feeding, introduction of pacifier use, variables of nail and toenail biting, as well as pencil biting, bruxism, and snoring between the ADHD group and the control group. Conclusions: The present results indicate that early in life, children with ADHD are subject to insufficient exclusive breastfeeding, different feeding practices, and elevated parafunctional oral habits more often than typically developing children. For all professionals who provide healthcare to children, increased awareness and attention to these factors are suggested.

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Cell Mol Neurobiol. 2014 May;34:549-64.

POTENTIAL CONTRIBUTION OF DOPAMINERGIC GENE VARIANTS IN ADHD CORE TRAITS AND CO-MORBIDITY: A STUDY ON EASTERN INDIAN PROBANDS.

Maitra S, Sarkar K, Ghosh P, et al.

Association of dopaminergic genes, mainly receptors and transporters, with Attention Deficit Hyperactivity Disorder (ADHD) has been investigated throughout the world due to the importance of dopamine (DA) in various physiological functions including attention, cognition and motor activity, traits. However, till date, etiology of ADHD remains unknown. We explored association of functional variants in the DA receptor 2 (rs1799732 and rs6278), receptor 4 (exon 3 VNTR and rs914655), and transporter (rs28363170 and rs3836790) with hyperactivity, cognitive deficit, and co-morbid disorders in eastern Indian probands. Diagnostic and Statistical Manual for Mental Disorders-IV was followed for recruitment of nuclear families with ADHD probands ($N = 160$) and ethnically matched controls ($N = 160$). Cognitive deficit and hyperactive traits were measured using Conner's parents/teachers rating scale. Peripheral blood was collected after obtaining informed written consent and used for genomic DNA isolation. Genetic polymorphisms were analyzed by PCR-based methods followed by population- as well as family-based statistical analyses. Association between genotypes and cognitive/hyperactivity traits and co-morbidities was analyzed by the Multifactor dimensionality reduction (MDR) software. Case-control analysis showed statistically significant difference for rs6278 and rs28363170 ($P = 0.004$ and 1.332×10^{-7} respectively) while family-based analysis exhibited preferential paternal transmission of rs28363170 '9R' allele ($P = 0.04$). MDR analyses revealed independent effects of rs1799732, rs6278, rs914655, and rs3836790 in ADHD. Significant independent effects of different sites on cognitive/hyperactivity traits and co-morbid disorders were also noticed. It can be summarized from the present investigation that these gene variants may influence cognitive/hyperactive traits, thereby affecting the disease etiology and associated co-morbid features.

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Child Neuropsychol. 2014;20:328-42.

AULA VIRTUAL REALITY TEST AS AN ATTENTION MEASURE: CONVERGENT VALIDITY WITH CONNERS' CONTINUOUS PERFORMANCE TEST.

Díaz-Orueta U, García-Lopez C, Crespo-Eguilaz N, et al.

The majority of neuropsychological tests used to evaluate attention processes in children lack ecological validity. The AULA Nesplora (AULA) is a continuous performance test, developed in a virtual setting, very similar to a school classroom. The aim of the present study is to analyze the convergent validity between the AULA and the Continuous Performance Test (CPT) of Conners. The AULA and CPT were administered

correlatively to 57 children, aged 6-16 years (26.3% female) with average cognitive ability (IQ mean = 100.56, SD=10.38) who had a diagnosis of attention deficit/hyperactivity disorder (ADHD) according to DSM-IV-TR criteria. Spearman correlations analyses were conducted among the different variables. Significant correlations were observed between both tests in all the analyzed variables (omissions, commissions, reaction time, and variability of reaction time), including for those measures of the AULA based on different sensorial modalities, presentation of distractors, and task paradigms. Hence, convergent validity between both tests was confirmed. Moreover, the AULA showed differences by gender and correlation to Perceptual Reasoning and Working Memory indexes of the WISC-IV, supporting the relevance of IQ measures in the understanding of cognitive performance in ADHD. In addition, the AULA (but not Conners' CPT) was able to differentiate between ADHD children with and without pharmacological treatment for a wide range of measures related to inattention, impulsivity, processing speed, motor activity, and quality of attention focus. Additional measures and advantages of the AULA versus Conners' CPT are discussed.

Child Neuropsychol. 2014 Mar;20:230-44.

ATTENTION DEFICIT/HYPERACTIVITY AND COMORBID SYMPTOMS IN PRESCHOOLERS: DIFFERENCES BETWEEN SUBGROUPS IN NEUROPSYCHOLOGICAL BASIC DEFICITS.

Pauli-Pott U, Dalir S, Mingebach T, et al.

BACKGROUND: There is wide agreement on the heterogeneity of attention deficit/hyperactivity disorder (ADHD). Subgroups with specific comorbid problems, neuropsychological deficits, and developmental trajectories that start in preschool years have been assumed. We analyze whether corresponding subgroups at risk for ADHD development can be identified in a preschool sample and whether these subgroups show the assumed neuropsychological deficits.

METHODS: The study sample consisted in 141 preschool children (3-6 years; 68 boys), including 41 children at risk for ADHD development (because of high ADHD symptoms or first-degree relatives with an ADHD diagnosis). Parent- and teacher-reported symptoms of ADHD, ODD/CD, and anxiety/depression were assessed. Cluster analyses were conducted on the continuous symptom scores. Inhibitory control and delay aversion were measured by six neuropsychological tasks.

RESULTS: Cluster analyses resulted in four groups. Two of these groups showed high ADHD symptoms - one showing multiple comorbid symptoms, one showing hardly any further symptoms. The other two groups were characterized by no problems and by some sensorimotor deficits. A priori contrasts revealed that the "high comorbidity" cluster showed the worst inhibitory control performance while the "pure ADHD symptoms" cluster showed the highest delay aversion.

CONCLUSION: The ADHD-symptom clusters matched types that have been proposed in recent models. This description might help to identify different ADHD-related pathways in future longitudinal research.

Child Neuropsychol. 2014;20:106-26.

CONNERS' CONTINUOUS PERFORMANCE TEST (CCPT-II) IN CHILDREN WITH ADHD, ODD, OR A COMBINED ADHD/ODD DIAGNOSIS.

Munkvold LH, Manger T, Lundervold AJ.

The current study investigated if results on the Conners' Continuous Performance Test (CCPT-II) could discriminate between children with ADHD (n = 59), ODD (n=10), ADHD+ODD (n=15), and normal controls (n=160), and how the results are associated with and explained by the intellectual function of the child. The sample was derived from the Bergen Child Study (BCS), a longitudinal, ongoing, population-based study of children's development and mental health. CCPT-II performance did not differentiate between the three diagnostic groups (i.e., ADHD, ODD, and ADHD+ODD). Children with ODD (with or without comorbid ADHD) did not differ from children in the control group on any CCPT-II parameters. Children with ADHD made statistically significant more errors of omissions and showed a more variable response time to targets than the control group. The correlations between CCPT-II measures and IQ were mild to moderate, and

there was a statistically significant group difference in IQ: Children with ADHD, and children with ADHD+ODD, obtained lower IQ scores than normal controls. A hierarchical multiple regression analysis showed that IQ, but not diagnostic group status, was significant predictors of CCPT-II performance. CCPT-II performance should be interpreted with caution when assessing ADHD and/or ODD in children.

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Child Neuropsychol. 2014;20:319-27.

ASSESSMENT OF COGNITIVE DOMAINS DURING TREATMENT WITH OROS METHYLPHENIDATE IN ADOLESCENTS WITH ADHD.

Hammerness P, Fried R, Petty C, et al.

AIM: To psychometrically assess cognitive domains in adolescents with ADHD during long-term open treatment with robust dosing of extended-release methylphenidate (OROS MPH).

METHODS: Data were derived from a prospective clinical study of adolescent ADHD, employing the Cambridge Neuropsychological Test Automated Battery (CANTAB), before and after up to one year of treatment with OROS MPH. In the absence of placebo control, a similar age and gender group of youth without ADHD served as comparators.

RESULTS: During the course of treatment with OROS MPH, ADHD youth's performance significantly improved across multiple CANTAB tasks, including spatial working memory, rapid visual processing, verbal recognition memory, set shifting, and inhibition/vigilance. ADHD subjects' scores in several CANTAB tasks, including spatial working memory, planning, and set shifting, were significantly more impaired at baseline compared to the non-ADHD comparison group; these significant differences were no longer seen at endpoint.

CONCLUSIONS: Statistically significant improvements in multiple cognitive domains were observed in a sample of adolescents with ADHD over the course of 12 months of robust treatment with extended-release methylphenidate. Rigorous, monitored stimulant treatment may be associated with objectively determined cognitive benefits; however, practice effects in this open trial cannot be ruled out. Further study on this important topic is warranted.

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Child Neuropsychol. 2014 Mar;20:196-209.

PRELIMINARY EVIDENCE FOR REDUCED POSTERROR REACTION TIME SLOWING IN HYPERACTIVE/INATTENTIVE PRESCHOOL CHILDREN.

Berwid OG, Halperin JM, Johnson R, Jr., et al.

BACKGROUND: Attention deficit/hyperactivity disorder (ADHD) has been associated with deficits in self-regulatory cognitive processes, some of which are thought to lie at the heart of the disorder. Slowing of reaction times (RTs) for correct responses following errors made during decision tasks has been interpreted as an indication of intact self-regulatory functioning and has been shown to be attenuated in school-aged children with ADHD. This study attempted to examine whether ADHD symptoms are associated with an early-emerging deficit in posterror slowing.

METHOD: A computerized two-choice RT task was administered to an ethnically diverse sample of preschool-aged children classified as either "control" (n=120) or "hyperactive/inattentive" (HI; n=148) using parent- and teacher-rated ADHD symptoms. Analyses were conducted to determine whether HI preschoolers exhibit a deficit in this self-regulatory ability.

RESULTS: HI children exhibited reduced posterror slowing relative to controls on the trials selected for analysis. Supplementary analyses indicated that this may have been due to a reduced proportion of trials following errors on which HI children slowed rather than due to a reduction in the absolute magnitude of slowing on all trials following errors.

CONCLUSIONS: High levels of ADHD symptoms in preschoolers may be associated with a deficit in error processing as indicated by posterror slowing. The results of supplementary analyses suggest that this deficit is perhaps more a result of failures to perceive errors than of difficulties with executive control.

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Child Neuropsychol. 2014 Mar;20:162-81.

FEW DIFFERENCES IN HOT AND COLD EXECUTIVE FUNCTIONS IN CHILDREN AND ADOLESCENTS WITH COMBINED AND INATTENTIVE SUBTYPES OF ADHD.

Skogli EW, Egeland J, Andersen PN, et al.

The aim of the study was to compare executive processes with pronounced (hot) and less pronounced (cold) emotional salience in medication naive children and adolescents with ADHD-combined (ADHD-C) and ADHD-inattentive (ADHD-I) subtypes. Thirty-six subjects with ADHD-C, 44 with ADHD-I, and 50 healthy controls between 8 and 17 years were assessed with laboratory tests and inventory-based scales assessing hot and cold executive functions (EF) (controlled attention, working memory, planning, cognitive flexibility, verbal fluency, hot decision making) and the Behavior Rating Inventory of Executive Function (BRIEF). The ADHD-C group displayed significantly more impairment compared to the ADHD-I group on the cold BRIEF Inhibition and Monitor scales. There were no significant differences between ADHD subtypes on cold and hot laboratory tests. The hot decision-making task did not correlate with the other cold or hot EF measures. Overall, few EF measures were shown to differentiate between ADHD subtypes nor were there any relationships between the hot decision-making task and the other EF measures, which seems to indicate separate developmental trajectories.

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Child Neuropsychol. 2014;20:38-48.

DIFFERENCES IN COGNITIVE CONTROL IN CHILDREN AND ADOLESCENTS WITH COMBINED AND INATTENTIVE SUBTYPES OF ADHD.

Oie M, Skogli EW, Andersen PN, et al.

The aim of the present study was to investigate the ability of children with attention deficit/hyperactivity disorder-combined subtype (ADHD-C) and predominantly inattentive subtype (ADHD-PI) to direct their attention and to exert cognitive control in a forced attention dichotic listening (DL) task. Twenty-nine, medication-naive participants with ADHD-C, 42 with ADHD-PI, and 40 matched healthy controls (HC) between 9 and 16 years were assessed. In the DL task, two different auditory stimuli (syllables) are presented simultaneously, one in each ear. The participants are asked to report the syllable they hear on each trial with no instruction on focus of attention or to explicitly focus attention and to report either the right- or left-ear syllable. The DL procedure is presumed to reflect different cognitive processes: perception (nonforced condition/NF), attention (forced-right condition/FR), and cognitive control (forced-left condition/FL). As expected, all three groups had normal perception and attention. The children and adolescents with ADHD-PI showed a significant right-ear advantage also during the FL condition, while the children and adolescents in the ADHD-C group showed a no-ear advantage and the HC showed a significant left-ear advantage in the FL condition. This suggests that the ADHD subtypes differ in degree of cognitive control impairment. Our results may have implications for further conceptualization, diagnostics, and treatment of ADHD subtypes.

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Clin Neuropsychol. 2014;28:26-48.

INCREMENTAL VALIDITY OF NEUROPSYCHOLOGICAL ASSESSMENT IN THE IDENTIFICATION AND TREATMENT OF YOUTH WITH ADHD.

Pritchard AE, Koriakin T, Jacobson LA, et al.

Comprehensive neuropsychological assessments for youth with ADHD allow for thorough consideration of co-occurring disorders and provide targeted recommendations for treating ADHD and comorbid conditions.

This study offers a preliminary evaluation of the added value (compared to routine care) associated with neuropsychological assessment in the identification and treatment of ADHD in youth ages 3-17 years. First we describe a novel measure developed to evaluate broad-based outcomes for youth with ADHD following neuropsychological assessment. Next we compare parent ratings of child symptoms and quality of life between two groups of youth with ADHD: those who have recently received neuropsychological assessments (NP+), and those who have not (NP-). Participants were surveyed again 5 months after baseline to assess changes in symptoms, quality of life, and service utilization. While both groups experienced significant improvements in behavioral/emotional symptoms, the NP+ group had greater initiation of parent behavior management training and special education services and greater initiation of medication management over the follow-up period, compared with the NP- group. Satisfaction with neuropsychological assessment was high overall but slightly decreased over the course of the follow-up period. The findings offer preliminary support for the incremental efficacy of neuropsychological evaluation in the diagnosis and management of ADHD.

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Dev Neuropsychol. 2014;39:187-204.

FUNCTIONAL IMPAIRMENTS IN ATTENTION DEFICIT HYPERACTIVITY DISORDER: THE MEDIATING ROLE OF NEUROPSYCHOLOGICAL FUNCTIONING.

Sjowall D, Thorell LB.

Attention deficit hyperactivity disorder (ADHD) is associated with multiple neuropsychological deficits and the present study aimed to investigate to what extent these deficits are related to the functional impairments associated with the disorder. The results showed that all executive functioning deficits and reaction time variability acted as mediators in the relation between ADHD and academic achievement. However, only the effect of working memory for language skills, and the effects of reaction time variability and working memory for mathematics, remained significant when studying independent effects. Regulation of anger was a significant mediator for peer problems. Gender or symptoms of oppositional defiant disorder (ODD) or conduct disorder (CD) did not moderate these findings.

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Dev Med Child Neurol. 2014.

ATTENTION-DEFICIT-HYPERACTIVITY DISORDER INCREASES RISK OF BONE FRACTURE: A POPULATION-BASED COHORT STUDY.

Chou I-C, Lin C-C, Sung F-C, et al.

Aim: Attention-deficit-hyperactivity disorder (ADHD) is a disorder that is associated with accidental injuries. The aim of this study was to evaluate the relationship between ADHD and bone fracture in children.

Method: The study cohort comprised 3640 children (2874 males, 766 females; mean age 8y 5mo, SD 3y) with ADHD (International Classification of Diseases, Ninth Revision) who were matched to children without ADHD at a ratio of 1:4 (n=14 560; 11 496 males, 3064 females; mean age 8y 5mo, SD 3y). A Cox proportional hazard regression analysis was conducted to estimate how ADHD affected the risk of bone fracture.

Results: The incidence of fracture among the ADHD cohort was 197.67 per 10 000 person-years, and was 1.3-fold greater than in the comparison cohort (147.54 per 10 000 person-years). The risk in children with ADHD was higher than that in children without ADHD (p value for log-rank test < 0.001). After adjusting for potential confounding factors, the ADHD cohort was 1.32 times more likely to have bone fracture accidents than the comparison cohort (hazard ratio, 1.32; 95% confidence interval 1.17-1.49).

Interpretation: Children with ADHD have a higher risk of experiencing bone fracture accidents than do children without ADHD.

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Dokkyo J Med Sci. 2014;41:53-61.

THE RELATIONSHIP OF ATTENTION DEFICIT HYPERACTIVITY DISORDER AND DEVELOPMENTAL PROGNOSIS OF THE IDIOPATHIC ACQUIRED MICROCEPHALY.

Kita S, Maegaki Y, Ohno K, et al.

Backgrounds: Although their head circumference at birth is normal, children with acquired microcephaly who do not exhibit normal enlargement of head circumference have been observed. We diagnosed children with microcephaly who did not have pathological findings, such as brain malformations, congenital malformations, obvious syndromes, injuries, or inborn errors of metabolism, with idiopathic acquired microcephaly.

Objectives: To clarify the prognosis and development of the complications in these children by examining those without developmental delay in infancy and tracking their development in early and later childhood.

Patients and Methods: We examined 62 patients who were diagnosed with microcephaly, who were born between 1999 and 2012, and who consulted the Division of Child Neurology, Tottori University Hospital. We subdivided the patients into those with idiopathic, familial, syndromic, or symptomatic microcephaly and retrospectively investigated those with idiopathic acquired microcephaly.

Results: Idiopathic acquired microcephaly was most common in the study group, accounting for 31% of the 62 cases of microcephaly and 48.7% of the cases with acquired microcephaly. Nearly half of this group, despite normal development in infancy, exhibited a tendency for complications of attention deficit hyperactivity disorder (ADHD) and intellectual disability.

Conclusions: In the group of acquired microcephaly with the pathological findings, the patients progressively exhibited intellectual disability and the characteristics of ADHD. We would like to suggest that they represents a new disease group. Idiopathic acquired microcephaly is a group of conditions with microcephaly that cause late-onset ADHD and intellectual disability and normal developmental progression in infancy. Thus, these patients are difficult to distinguish in early childhood.

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Epilepsy Behav. 2014;36:102-07.

COMPARING STIMULANT EFFECTS IN YOUTH WITH ADHD SYMPTOMS AND EPILEPSY.

Gonzalez-Heydrich J, Hsin O, Gumlak S, et al.

To retrospectively examine response to stimulant treatment in patients with epilepsy and ADHD symptoms as predicted by seizure freedom for six months, use of methylphenidate (MPH) versus amphetamine (AMP) preparations, cognitive level, and medical records were searched for patients under the age of 18 with epilepsy and ADHD symptoms treated with MPH or AMP (n=36, age=10.4 (plus or minus) 3.5; male=67%). "Responders" had a CGI-improvement score of (less-than or equal to). 2 and did not stop medication because of adverse effects. "Worsened" patients discontinued medication because of agitation/emotional lability. Seizure freedom did not predict treatment response. Lower cognitive level was associated with increased rate of worsening (p= 0.048). No patients who were seizure-free at the start of the medication trial experienced an increase in seizures. Of the patients having seizures at the start of trial, one patient on MPH and two patients on AMP had increased seizures during the trial. Seizures returned to baseline frequency or less after stimulant discontinuation or anticonvulsant adjustment. Methylphenidate was associated with a higher response rate, with 12 of 19 given MPH (0.62 (plus or minus) 0.28. mg/kg/day) compared with 4 of 17 given AMP (0.37 (plus or minus) 0.26. mg/kg/day) responding (p=0.03). Methylphenidate treatment and higher cognitive level were associated with improved treatment outcome, while seizure freedom had no clear effect. Confidence in these findings is limited by the study's small, open-label, and uncontrolled design.

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European Child & Adolescent Psychiatry. 2014.

PREDICTING ADHD IN SCHOOL AGE WHEN USING THE STRENGTHS AND DIFFICULTIES QUESTIONNAIRE IN PRESCHOOL AGE: A LONGITUDINAL GENERAL POPULATION STUDY, CCC2000.

Rimvall MK, Elberling H, Rask CU, et al.

Indicated prevention of ADHD may reduce impairment and need of treatment in youth. The Strengths and Difficulties Questionnaire (SDQ) is a brief questionnaire assessing child mental health, reported to be a valid screening instrument for concurrent ADHD. This study aimed to examine the validity of using the SDQ in preschool age to predict ADHD in school age in a longitudinal design. The study population included 2,315 children from the Copenhagen child cohort 2000 with no prior history of clinically diagnosed ADHD, who were assessed at age 5-7 years by the SDQ completed by parents and preschool teachers. Danish National Registers were used to measure the outcome of any first time ICD-10 diagnosis for hyperkinetic disorder or attention-deficit disorder and/or prescription of central stimulants during years 2005-2012. Screening potentials of the SDQ's predictive algorithms were described, and Cox regression analyses estimated the risk of later ADHD diagnosis for screen-positive children. A total of 2.94 % of the study population were clinically diagnosed and/or were treated with central stimulants for ADHD before age 11-12. Children with possible/probable disorder according to the SDQ hyperactivity/inattention algorithm showed markedly increased risk of a subsequent ADHD diagnosis, hazard ratio 20.65 (CI 95 % 12.71-33.57) and sensitivity 45.6 %. Other domains of psychopathology according to the SDQ were also associated with an increased risk of receiving a subsequent ADHD diagnosis. In summary, we show that the SDQ can identify a group of children with highly increased risk of later being diagnosed and/or treated for ADHD in school age.

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European Child & Adolescent Psychiatry. 2014.

ARE SELF-DIRECTED PARENTING INTERVENTIONS SUFFICIENT FOR EXTERNALISING BEHAVIOUR PROBLEMS IN CHILDHOOD? A SYSTEMATIC REVIEW AND META-ANALYSIS.

Tarver J, Daley D, Lockwood J, et al.

Externalising behaviour in childhood is a prevalent problem in the field of child and adolescent mental health. Parenting interventions are widely accepted as efficacious treatment options for reducing externalising behaviour, yet practical and psychological barriers limit their accessibility. This review aims to establish the evidence base of self-directed (SD) parenting interventions for externalising behaviour problems. Electronic searches of PubMed, Web of Knowledge, Psychinfo, Embase and CENTRAL databases and manual searches of reference lists of relevant reviews identified randomised controlled trials and cluster randomised controlled trials examining the efficacy of SD interventions compared to no-treatment or active control groups. A random-effect meta-analysis estimated pooled standard mean difference (SMD) for SD interventions on measures of externalising child behaviour. Secondary analyses examined their effect on measures of parenting behaviour, parental stress and mood and parenting efficacy. Eleven eligible trials were included in the analyses. SD interventions had a large effect on parent report of externalising child behaviour (SMD = 1.01, 95 % CI: 0.77-1.24); although this effect was not upheld by analyses of observed child behaviour. Secondary analyses revealed effects of small to moderate magnitude on measures of parenting behaviour, parental mood and stress and parenting efficacy. An analysis comparing SD interventions with therapist-led parenting interventions revealed no significant difference on parent-reported measures of externalising child behaviour. SD interventions are associated with improvements in parental perception of externalising child behaviour and parental behaviour and well-being. Future research should further investigate the relative efficacy and cost-effectiveness of SD interventions compared to therapist-led interventions.

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European Child & Adolescent Psychiatry. 2014.

DIFFERENTIAL SUSCEPTIBILITY TO MATERNAL EXPRESSED EMOTION IN CHILDREN WITH ADHD AND THEIR SIBLINGS? INVESTIGATING PLASTICITY GENES, PROSOCIAL AND ANTISOCIAL BEHAVIOUR.

Richards JS, Hartman CA, Franke B, et al.

The differential susceptibility theory states that children differ in their susceptibility towards environmental experiences, partially due to plasticity genes. Individuals carrying specific variants in such genes will be more disadvantaged in negative but, conversely, more advantaged in positive environments. Understanding gene-environment interactions may help unravel the causal mechanisms involved in multifactorial psychiatric disorders such as Attention-Deficit/Hyperactivity Disorder (ADHD). The differential susceptibility theory was examined by investigating the presence of interaction effects between maternal expressed emotion (EE; warmth and criticism) and the solitary and combined effects of plasticity genes (DAT1, DRD4, 5-HTT) on prosocial and antisocial behaviour (measured with parent- and self-reports) in children with ADHD and their siblings (N = 366, M = 17.11 years, 74.9 % male). Maternal warmth was positively associated with prosocial behaviour and negatively with antisocial behaviour, while maternal criticism was positively associated with antisocial behaviour and negatively with prosocial behaviour. No evidence of differential susceptibility was found. The current study found no evidence for differential susceptibility based on the selected plasticity genes, in spite of strong EE-behaviour associations. It is likely that additional factors play a role in the complex relationship between genes, environment and behaviour.

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European Child & Adolescent Psychiatry. 2014.

THE PRESSURE-ACTIVATION-STRESS SCALE IN RELATION TO ADHD AND CORTISOL.

Isaksson J, Nilsson KW, Lindblad F.

The Pressure-Activation-Stress (PAS) scale is a self-report questionnaire for children concerning perceived stress. To explore behavioral and physiological correlates, we investigated if scores discriminate between a group prone to perceive high levels of stress [children with attention-deficit/hyperactivity disorder (ADHD)] and a healthy school sample, and if they are associated with diurnal cortisol levels. The PAS scale was filled in at home by children (11-17 years) with clinically confirmed ADHD (n = 102) and non-affected comparisons (n = 146). Saliva samples were collected four times during a regular school day for radioimmunoassay analysis of cortisol. Subtypes and severity of ADHD symptoms were determined using parental rating scales. Children with ADHD scored higher on the PAS scale than a school sample. The PAS scores were similar over ages in the ADHD group while they increased with age in the healthy group. Female sex was associated with higher stress in both groups but no gender interaction was found. No association was found between PAS scores and cortisol levels in neither group. Children in the ADHD group had a lower ratio of cortisol levels/perceived stress on all sampling occasions, built up both by the higher PAS scores and the lower cortisol levels in children with ADHD. The higher PAS scores in children with ADHD support the validity of the scale. The lack of association between PAS scores and diurnal cortisol levels is intriguing and illustrates the complexity of the stress concept. Stress-related fragility seems to accompany ADHD during childhood.

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Eur Child Adolesc Psychiatry. 2014;23:361-63.

THE POSSIBLE EFFECT OF METHYLPHENIDATE ON KLEPTOMANIA IN A SCHOOL-AGE GIRL WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Yilmaz S, Bilgic A.

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Glob J Health Sci. 2014 Mar;6:47-57.

PREDICT ATTENTION DEFICIT HYPERACTIVITY DISORDER? EVIDENCE -BASED MEDICINE.

Bener A, Kamal M.

BACKGROUND: Attention deficit hyperactivity disorder (ADHD) is the most common behavioral disorders in children and recent studies reported a relationship between low levels of Vitamin D and incidence of ADHD.

AIM: The aim of this study was to investigate the association between vitamin D deficiency and attention deficit hyperactivity disorder (ADHD). Also, to study the impact and role of vitamin D on the development of ADHD in children.

DESIGN: This is a case-control study which was conducted in children below 18 years of age from June 2011 to May 2013 at the School Health and Primary Health care Clinics, Qatar.

METHODS AND SUBJECTS: The study was based on 1,331 cases and 1,331 controls. The data collection instrument included socio-demographic & clinical data, physician diagnosis family history, BMI, and serum 25(OH) vitamin D, calcium, albumin, bilirubin, magnesium, calcium, cholesterol, urea, triglyceride and phosphorus. Descriptive and univariate statistical analysis were performed.

RESULTS: Of the total number of 3470 children surveyed, 1331 of ADHD and 1,331 of healthy children gave their consent to participate in this study. The mean age (+/- SD, in years) for ADHD versus control children was 10.63+/-3.4 vs. 10.77+/-3.4. Overweight (7.7% vs 9.4%) and obesity (4.6% vs 7.7%) were significantly lower in ADHD children compared to their counterparts ($P=0.001$). Vitamin D deficiency was considerably higher in ADHD children compared to healthy children. The mean value of vitamin D in ADHD children was much lower than the normal value and there was a significant difference found in the mean values of vitamin D between ADHD (16.6+/-7.8 with median 16) and control children (23.5+/-9.9) ($p<0.0001$) and with median 23 ($p=0.006$). Mean values of Calcium and phosphorus were significantly higher in control compared to ADHD children ($p<0.001$). 1331 of all ADHD children had 19.1% had severe vitamin D deficiency (<10 ng/ml), 44.9% has moderate insufficient levels (between 10-20 ng/ml), 27.3% has mild insufficient levels (between 20-30 ng/ml) and only 8.1% of ADHD had sufficient serum vitamin D levels (>30 ng/ml). Multivariate logistic regression analysis revealed that household income, poor relationship between parents, mothers' occupation, consanguinity, BMI in percentiles, low duration of time under sun light, physical activity, low serum calcium level and low vitamin D level were considered as the main risk factors associated with the ADHD after adjusting for age, gender and other variables.

CONCLUSION: The study showed that vitamin D deficiency was higher in ADHD children compared to healthy children. Supplementing infants with vitamin D might be a safe and effective strategy for reducing the risk of ADHD, but, further genomic and some other test and relevant studies need to be done.

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Health (London). 2013 Nov;17(6):584-604. Epub 2013 Feb 14.

ATTENTION DEFICIT/HYPERACTIVITY DISORDER BLAME GAME: A STUDY ON THE POSITIONING OF PROFESSIONALS, TEACHERS AND PARENTS.

Frigerio A, Montali L, Fine M.

Attention deficit/hyperactivity disorder is currently the most debated childhood psychiatric diagnosis. Given the circulation of competing perspectives about the 'real' causes of children's behaviour and the 'best' way to treat them, we aim to analyse the interactions of the central social actors' discourses about attention deficit/hyperactivity disorder children within the Italian context. Adopting a multi-method approach, we focus on the polyphonic chorus of voices surrounding the child, studying the discourses of mental health professionals, teachers and parents. These actors are representative of three contexts that are deeply engaged with attention deficit/hyperactivity disorder: medical institutions, schools and families. Our theoretical and methodological approach integrates positioning theory, the Bakhtinian notion of dialogical thinking and discourse analysis to study stakeholders' reflexive and interactive positioning in terms of the attribution of rights, duties, responsibilities and power issues. The results show that mutual blame is a constitutive element of relational dynamics among the key adults surrounding attention deficit/hyperactivity disorder children. We argue that these conflicting relationships are not merely related to the debate regarding the validity of the attention deficit/hyperactivity disorder diagnosis. Rather, the mutual blame centres on questions of compliance, recognition of authority and morality. Through the blame game, adults

negotiate their own and others' subjectivity in ways that simultaneously (re)produce power relationships and resistance efforts.

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J Atten Disord. 2014 May;18:385-91.

ADVANCING THE DISCUSSION ABOUT SYSTEMATIC CLASSROOM BEHAVIORAL OBSERVATION, A PRODUCT REVIEW OF TENNY, J. (2010). eCOVE OBSERVATION SOFTWARE. PACIFIC CITY, OR: eCOVE SOFTWARE, LLC.

Froiland JM, Smith L.

Applied child psychologists and behavioral consultants often use systematic behavioral observations to inform the psychological assessment and intervention development process for children referred for attention and hyperactivity problems. This article provides a review of the 2010 version of the eCOVE classroom observation software in terms of its utility in tracking the progress of children with attention and hyperactive behaviors and its use in evaluating teacher behaviors that may impede or promote children's attention and positive behavior. The eCOVE shows promise as an efficient tool for psychologists and behavioral consultants who want to evaluate the effects of interventions for children with symptoms of ADHD, ODD, mood disorders and learning disorders; however, some research-based improvements for future models are suggested. The reviewers also share their firsthand experience in using eCOVE to evaluate teacher and student behavior exhibited on a television show about teaching urban high school students and during a movie about an eccentric new kindergarten teacher. Rich examples are provided of using strategic behavioral observations to reveal how to improve the classroom environment so as to facilitate attention, motivation and positive behavior among youth. Broader implications for enhancing the use of systematic behavioral observations in the assessment of children and adolescents with attention disorders and related behavioral problems are discussed. Key issues are examined such as the use of behavioral observations during psychological consultation to prevent the previously found gender bias in referrals for ADHD. Using behavioral observations to enhance differential diagnosis is also discussed.

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J Atten Disord. 2014 Apr;18:247-57.

BELIEFS REGARDING STIMULANT MEDICATION EFFECTS AMONG COLLEGE STUDENTS WITH A HISTORY OF PAST OR CURRENT USAGE.

Pillow DR, Naylor LJ, Malone GP.

OBJECTIVE: To examine the beliefs of ADHD college students concerning stimulant medications and to apply the theory of planned behavior toward better understanding the factors instrumental in decisions regarding stimulant use.

METHOD: A cross-sectional, correlational design was used, and students completed a survey under controlled laboratory conditions. Participants were 193 students taking introductory psychology who self-reported receiving a diagnosis of attention deficit disorder or ADHD and a treatment history of using stimulant medications.

RESULTS: Beliefs regarding the effects of medication use are represented by four factors ((i.e., improved attention/academics, loss of authentic self, social self-enhancement, and common side effects), where the first three significantly and systematically differentiate between those currently using stimulants and those who are not.

CONCLUSION: To understand decisions regarding stimulant use, it is important to consider how college students perceive the positive and negative effects of the medication with respect to sense of self and social relationships.

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J Atten Disord. 2014 May;18:357-68.

WORKING MEMORY CONTRIBUTES TO ELEVATED MOTOR ACTIVITY IN ADULTS WITH ADHD: AN EXAMINATION OF THE ROLE OF CENTRAL EXECUTIVE AND STORAGE/REHEARSAL PROCESSES.

Hudec KL, Alderson RM, Kasper LJ, et al.

OBJECTIVE: The relationship between working memory (WM) and objectively measured motor activity was examined in adults with ADHD and healthy controls (HCs).

METHOD: Thirty-five adults (ADHD = 20, HC = 15) were grouped using self-report and collateral-report measures in addition to a semistructured clinical interview. All participants completed control conditions with minimal WM demands, and separate phonological (PH) and visuospatial (VS) WM tasks with recall demands ranging from four to seven stimuli.

RESULTS: The ADHD group exhibited significantly more motor activity relative to the HC group, and both groups exhibited greater activity during PH and VS WM tasks, relative to control conditions. Finally, the central executive (CE) and PH storage/rehearsal subsystems were associated with large-magnitude between-group differences in activity.

CONCLUSION: Findings suggest that increased demands on WM, particularly the CE and PH storage/rehearsal, contribute to ADHD-related hyperactivity, though a portion of excessive motor activity in adults with ADHD may occur independently of WM demands.

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J Atten Disord. 2014 Feb;18:169-75.

DULOXETINE IN ADULTS WITH ADHD: A RANDOMIZED, PLACEBO-CONTROLLED PILOT STUDY.

Bilodeau M, Simon T, Beauchamp MH, et al.

OBJECTIVE: To assess the effect of duloxetine on ADHD in adults.

METHOD: In a 6-week double-blind trial, 30 adults with ADHD received placebo or duloxetine 60 mg daily. The Conners' Adult ADHD Rating Scale (CAARS) and the Clinical Global Impression Scales (CGI) were used to assess symptom severity and clinical improvement. The Hamilton Anxiety Rating Scale (HARS) and the Hamilton Depression Rating Scale (HDRS) were used to measure the effect on anxiety and depressive symptoms.

RESULTS: The Duloxetine group showed lower score on CGI-Severity at Week 6 (3.00 vs. 4.07 for placebo, $p < .001$), greater improvement on CGI-Improvement (2.89 vs. 4.00 at Week 6, $p < .001$), and greater decreases on five of eight subscales of the CAARS. There was no treatment group effect on HDRS or HARS scores.

CONCLUSION: Duloxetine may be a therapeutic option for adults with ADHD, but further studies are required to replicate these findings in larger samples.

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J Atten Disord. 2014 May;18:275-82.

NONPHARMACOLOGICAL TREATMENTS FOR ADHD: A META-ANALYTIC REVIEW.

Hodgson K, Hutchinson AD, Denson L.

OBJECTIVE: The authors replicated and expanded on Fabiano et al.'s meta-analysis of behavioral treatments for ADHD, systematically comparing the efficacy of 7 nonpharmacological interventions.

METHOD: A total of 14 controlled treatment studies conducted post-1994-evaluating behavior modification, neurofeedback therapy, multimodal psychosocial treatment, school-based programs, working memory training, parent training, and self-monitoring-were identified, primarily by searching electronic English-language databases. The results were meta-analyzed: mean-weighted effect sizes for the treatment outcomes of 625 participants (382 treatment, 243 controls) were calculated, and moderator analyses examined contributions of gender, ADHD subtype, and treatment "dosage" to outcome.

RESULTS: Behavior modification and neurofeedback treatments were most supported by this evidence. Interventions were generally more efficacious for girls, and least efficacious for the "combined" ADHD subtype. The authors found no dose or age effects.

CONCLUSION: Based on the small, published literature, this study supports some nonpharmacological interventions for ADHD, and indicates directions for more evaluation research into psychological treatments.

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J Atten Disord. 2014 May;18:369-78.

VISUOSPATIAL WORKING MEMORY IN ADHD PATIENTS, UNAFFECTED SIBLINGS, AND HEALTHY CONTROLS.

van EH, Heslenfeld DJ, Luman M, et al.

OBJECTIVE: The aim of this study was to (a) test the usefulness of visuospatial working memory (VSWM) as an endophenotype for ADHD and (b) study the developmental trajectory of VSWM in ADHD.

METHOD: A total of 110 ADHD patients, 60 unaffected siblings, and 109 controls, aged 8 to 29 years, were assessed on VSWM functioning. Multilevel analyses were carried out to account for the correlation between measurements within families.

RESULTS: ADHD patients showed impaired VSWM performance compared with unaffected siblings and controls, with comparable performance between unaffected siblings and controls. Impaired VSWM in ADHD patients was not more pronounced on higher memory loads, signifying executive rather than storage deficits as an underlying mechanism. ADHD patients, unaffected siblings, and controls showed parallel developmental trajectories of VSWM.

CONCLUSION: Current findings question the usefulness of VSWM as a neurocognitive endophenotype for ADHD and provide unique insights into the developmental trajectory of VSWM in ADHD.

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J Clin Psychiatry. 2014 Apr;75:386-92.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOM EXPRESSION: A COMPARISON OF INDIVIDUAL AGE AT ONSET USING ITEM RESPONSE THEORY.

Peyre H, Hoertel N, Cortese S, et al.

BACKGROUND: The DSM-IV age at onset criterion for attention-deficit/hyperactivity disorder (ADHD) has been a subject of debate. In DSM-5, the required age at onset (ie, the age by which impairing symptoms must have been present) has increased from 7 years to 12 years. The present study examined measurement properties of ADHD symptoms according to age at onset.

METHOD: Data were derived from the 2004-2005 National Epidemiologic Survey on Alcohol and Related Conditions, which included 34,653 US participants. Among participants with a lifetime DSM-IV diagnosis of ADHD (assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV), we compared the psychometric properties of the 18 ADHD symptoms according to 3 categories of age at onset (≤ 7 years, >7 and ≤ 12 years, and >12 and ≤ 18 years). A 2-parameter item response model was used to estimate differential item functioning (DIF) between these groups.

RESULTS: 364 participants with a lifetime DSM-IV diagnosis of ADHD had an age at onset ≤ 7 years, 252 had an age at onset >7 and ≤ 12 years, and 148 had an age at onset >12 and ≤ 18 years. In both dimensions of ADHD (ie, inattention and hyperactivity-impulsivity), there was no significant DIF between age at onset groups.

CONCLUSIONS: Expression of DSM-IVADHD symptoms was not affected by age at onset in the 3 groups considered. This study provides psychometric support to the change in the age criterion introduced by DSM-5 and further suggests that the age at onset criterion could be extended to 18 years without changing the psychometric properties of the ADHD symptoms.

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J Fam Pract. 2014 May;63:E1-E9.

ADDRESSING THE UNIQUE ISSUES OF STUDENT ATHLETES WITH ADHD.

Perrin AE, Jotwani VM.

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J Pers Disord. 2014 Feb;28:5-18.

REWARD: EMPIRICAL CONTRIBUTION. TEMPORAL DISCOUNTING AND CONDUCT DISORDER IN ADOLESCENTS.

White SF, Clanton R, Brislin SJ, et al.

The current study examined temporal discounting (the decrease in subjective reward value as a function of increasing delay) in youths with conduct disorder (CD) and the extent to which this was modulated by level of psychopathic traits. In the temporal discounting task, participants were asked to choose between immediate rewards of varying values and a larger reward, held at a constant value (\$10), whose receipt was delayed by different time intervals across trials (e.g., 7 days, 360 days). The level of immediate reward necessary for selection over the larger, delayed reward is the measure of temporal discounting. Forty-six youths (21 with CD and 25 healthy youths) participated in this study. Compared with healthy youths, youths with CD chose significantly smaller amounts of immediate reward rather than the larger future rewards. This was the case even in youths with CD without comorbid attention-deficit/hyperactivity disorder. However, level of psychopathic traits did not modulate temporal discounting in this sample. These results are discussed in terms of neurobiological models of CD and psychopathic traits.

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JAMA Pediatr. 2014 Feb;168:170-77.

PSYCHOPATHOLOGY AND ITS RISK AND PROTECTIVE FACTORS IN HEARING-IMPAIRED CHILDREN AND ADOLESCENTS: A SYSTEMATIC REVIEW.

Theunissen SC, Rieffe C, Netten AP, et al.

IMPORTANCE: Pediatric hearing impairment is a chronic handicap that can potentially lead to the development of psychopathology. Yet, for hearing-impaired children and adolescents, the exact occurrence of various forms of psychopathology and its causes are unclear, while this knowledge is essential to enable targeted screenings and interventions.

OBJECTIVE: To investigate the level of psychopathological symptoms in hearing-impaired children and adolescents as compared with normally hearing peers. Second, the influence of type of hearing device and possible risk and protective factors on psychopathology were examined.

EVIDENCE REVIEW: A systematic literature search was performed covering relevant databases, including PubMed, Embase, and Web of Science. Two independent researchers identified the relevant articles. The final search was performed on May 2, 2013, and resulted in a total of 35 articles.

FINDINGS: Literature consistently demonstrated that hearing-impaired children and adolescents were more prone to developing depression, aggression, oppositional defiant disorder, conduct disorder, and psychopathy than their normally hearing peers. Levels of anxiety, somatization, and delinquency were elevated in some, but not all, hearing-impaired participants, for reasons related to sex, age, and type of school. Divergent results were obtained for the level of attention-deficit/hyperactivity disorder and the influence of type of hearing device on psychopathology. Possible risk and protective factors were identified, including age at detection and intervention of hearing loss, additional disabilities, communication skills, intelligence, type of school, and number of siblings.

CONCLUSIONS AND RELEVANCE: Literature on psychopathology in hearing-impaired children and adolescents is scarce and sometimes inconsistent. To define a more precise occurrence of psychopathology, more studies are needed. These studies should have a longitudinal design to draw firmer conclusions on causality. Hopefully, this will lead to more knowledge in the future to help and support each hearing-impaired individual.

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JAMA Psychiatry. 2014 Apr;71:432-38.

PATERNAL AGE AT CHILDBEARING AND OFFSPRING PSYCHIATRIC AND ACADEMIC MORBIDITY.

D'Onofrio BM, Rickert ME, Frans E, et al.

IMPORTANCE: Advancing paternal age is associated with increased genetic mutations during spermatogenesis, which research suggests may cause psychiatric morbidity in the offspring. The effects of advancing paternal age at childbearing on offspring morbidity remain unclear, however, because of inconsistent epidemiologic findings and the inability of previous studies to rigorously rule out confounding factors.

OBJECTIVE: To examine the associations between advancing paternal age at childbearing and numerous indexes of offspring morbidity.

DESIGN, SETTING, AND PARTICIPANTS: We performed a population-based cohort study of all individuals born in Sweden in 1973-2001 (N=2,615,081), with subsets of the data used to predict childhood or adolescent morbidity. We estimated the risk of psychiatric and academic morbidity associated with advancing paternal age using several quasi-experimental designs, including the comparison of differentially exposed siblings, cousins, and first-born cousins.

EXPOSURE: Paternal age at childbearing.

MAIN OUTCOMES AND MEASURES: Psychiatric (autism, attention-deficit/hyperactivity disorder, psychosis, bipolar disorder, suicide attempt, and substance use problem) and academic (failing grades and low educational attainment) morbidity.

RESULTS: In the study population, advancing paternal age was associated with increased risk of some psychiatric disorders (eg, autism, psychosis, and bipolar disorders) but decreased risk of the other indexes of morbidity. In contrast, the sibling-comparison analyses indicated that advancing paternal age had a dose-response relationship with every index of morbidity, with the magnitude of the associations being as large or larger than the estimates in the entire population. Compared with offspring born to fathers 20 to 24 years old, offspring of fathers 45 years and older were at heightened risk of autism (hazard ratio [HR] =3.45; 95% CI, 1.62-7.33), attention-deficit/hyperactivity disorder (HR=13.13; 95% CI, 6.85-25.16), psychosis (HR=2.07; 95% CI, 1.35-3.20), bipolar disorder (HR=24.70; 95% CI, 12.12-50.31), suicide attempts (HR=2.72; 95% CI, 2.08-3.56), substance use problems (HR=2.44; 95% CI, 1.98-2.99), failing a grade (odds ratio [OR] = 1.59; 95% CI, 1.37-1.85), and low educational attainment (OR=1.70; 95% CI, 1.50-1.93) in within-sibling comparisons. Additional analyses using several quasi-experimental designs obtained commensurate results, further strengthening the internal and external validity of the findings.

CONCLUSIONS AND RELEVANCE: Advancing paternal age is associated with increased risk of psychiatric and academic morbidity, with the magnitude of the risks being as large or larger than previous estimates. These findings are consistent with the hypothesis that new genetic mutations that occur during spermatogenesis are causally related to offspring morbidity.

JAMA Psychiatry. 2014 Mar;71:319-25.

SERIOUS TRANSPORT ACCIDENTS IN ADULTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND THE EFFECT OF MEDICATION: A POPULATION-BASED STUDY.

Chang Z, Lichtenstein P, D'Onofrio BM, et al.

IMPORTANCE: Studies have shown that attention-deficit/hyperactivity disorder (ADHD) is associated with transport accidents, but the magnitude of the association remains unclear. Most important, it is also unclear whether ADHD medication reduces this risk.

OBJECTIVES: To estimate the association between ADHD and the risk of serious transport accidents and to explore the extent to which ADHD medication influences this risk among patients with ADHD.

DESIGN, SETTING, AND PARTICIPANTS: In total, 17,408 patients with a diagnosis of ADHD were observed from January 1, 2006, through December 31, 2009, for serious transport accidents documented in Swedish national registers. The association between ADHD and accidents was estimated with Cox proportional hazards regression. To study the effect of ADHD medication, we used stratified Cox regression to compare the risk of accidents during the medication period with the risk during the nonmedication period within the same patients.

MAIN OUTCOMES AND MEASURES: Serious transport accident, identified as an emergency hospital visit or death due to transport accident. **RESULTS:** Compared with individuals without ADHD, male patients with ADHD (adjusted hazard ratio, 1.47; 95% CI, 1.32-1.63) and female patients with ADHD (1.45; 1.24-1.71) had an increased risk of serious transport accidents. In male patients with ADHD, medication was associated with a 58% risk reduction (hazard ratio, 0.42; 95% CI, 0.23-0.75), but there was no statistically significant association in female patients. Estimates of the population-attributable fractions suggested that 41% to 49% of the accidents in male patients with ADHD could have been avoided if they had been receiving treatment during the entire follow-up.

CONCLUSIONS AND RELEVANCE: Attention-deficit/hyperactivity disorder is associated with an increased risk of serious transport accidents, and this risk seems to be possibly reduced by ADHD medication, at least among male patients. This should lead to increased awareness among clinicians and patients of the association between serious transport accidents and ADHD medication.

J Abnorm Child Psychol. 2014 May;42:623-34.

RELIABLE RATINGS OR READING TEA LEAVES: CAN PARENT, TEACHER, AND CLINICIAN BEHAVIORAL RATINGS OF PRESCHOOLERS PREDICT ADHD AT AGE SIX?

O'Neill S, Schneiderman RL, Rajendran K, et al.

To assess the relative ability of parent, teacher, and clinician behavioral ratings of preschoolers to predict ADHD severity and diagnosis at 6 years of age. Hyperactive/inattentive preschoolers [N =104, 75 % boys, Mean (SD) age =4.37 (0.47) years] were followed over 2 years (mean =26.44 months, SD =5.66). At baseline (BL), parents and teachers completed the ADHD-RS-IV and clinicians completed the Behavioral Rating Inventory for Children following a psychological testing session. At age 6, [Mean (SD) age = 6.62 (0.35) years], parents were interviewed with the K-SADS-PL; teachers completed the ADHD-RS-IV; and laboratory measures of hyperactivity, impulsivity, and inattention were obtained from children. Hierarchical logistic and linear regression analyses examined which combination of BL ratings best predicted 6-year-old ADHD diagnosis and severity, respectively. At age 6, 56 (53.8 %) children met DSM-IV criteria for a diagnosis of ADHD. BL ratings from parent/teacher/clinician, parent/teacher and parent/clinician combinations significantly predicted children who had an ADHD diagnosis at age 6. Parent and clinician, but not teacher, behavior ratings were significant independent predictors of ADHD diagnosis and severity at 6-years-old. However, only clinician reports of preschoolers' behaviors predicted laboratory measures of over-activity and inattention at follow-up. Cross-situationality is important for a diagnosis of ADHD during the preschool years. Among parents, teachers and clinicians, positive endorsements from all three informants, parent/teacher or parent/clinician appear to have prognostic value. Clinicians' ratings of preschoolers' inattention, impulsivity and hyperactivity are valid sources of information for predicting ADHD diagnosis and severity over time.

J Abnorm Child Psychol. 2014 May;42:611-21.

EMOTION REGULATION MEDIATES THE ASSOCIATION BETWEEN ADHD AND DEPRESSIVE SYMPTOMS IN A COMMUNITY SAMPLE OF YOUTH.

Seymour KE, Chronis-Tuscano A, Iwamoto DK, et al.

The purpose of this study was to examine the longitudinal relationship between attention-deficit/hyperactivity disorder (ADHD) symptoms, emotion regulation (ER) ability, and depressive symptoms within a diverse community sample of 277 youth, ages 9–12 (56 % male). Participants were drawn from a larger study examining adolescent risk behaviors, and completed annual assessments over 3 years. Youth ADHD symptoms were assessed at Time 1 (T1) using the parent-reported Disruptive Behavior Disorders Rating Scale, ER was assessed with the parent-reported Emotion Regulation Checklist at Time 2 (T2), and youth depressive symptoms were assessed using the self-reported Revised Child Anxiety and Depression Scales at Time 3 (T3). Analyses examined T2 ER as a mediator between T1 ADHD symptoms (including the unique contributions of inattentive [IA] versus hyperactive/impulsive [HI] symptoms) and T3 depressive

symptoms. Structural equation modeling (SEM) indicated the path model specified provided an excellent fit to the data. Tests of indirect effects suggested that T2 ER appears to be a significant mechanism that underlies the relationship between T1 ADHD and T3 depression, even when accounting for T1 oppositional defiant and depressive symptoms. Furthermore, while both T1 IA and HI symptoms had significant indirect effects on T3 depression through the mechanism T2 ER, HI proved a more robust predictor of T2 ER than IA. Results of this prospective study support cross-sectional findings pointing to ER as a potential mechanism linking ADHD and depressive symptoms in youth. Clinical implications and future directions are discussed.

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J Abnorm Psychol. 2014 May;123:440-51.

SYMPTOMS OF AUTISM AND ADHD: A SWEDISH TWIN STUDY EXAMINING THEIR OVERLAP.

Ronald A, Larsson H, Anckarsäter H, et al.

Autism spectrum disorders (ASD) and attention deficit hyperactivity disorder (ADHD) show high comorbidity. The following questions were addressed regarding their specific symptoms: What is the factor structure of ASD and ADHD symptoms, to what degree do different symptom domains cluster together, to what extent are these domains caused by the same genetic and environmental influences, and what is the best model of their co-occurrence? A population-based twin cohort of over 17,000 9- and 12-year-olds were assessed using the Autism-Tics, AD/HD, and other Comorbidities parental interview inventory. Principal component analyses were conducted, and symptom domain clustering was assessed. Four multivariate twin models were compared. Factors split into three ASD (social impairments, communication impairments, and restricted repetitive behaviors and interests), and three ADHD (inattention, hyperactivity, and impulsivity) symptom domains. Some ASD-ADHD symptom domain combinations clustered together often, although others not at all. A two-factor common pathway model fit the data, suggesting that ASD and ADHD symptom domains tap into separate "ASD" and "ADHD" latent factors that showed high genetic overlap. All subdomains also showed significant specific genetic and environmental influences, reflecting the etiological heterogeneity both within and between ASD and ADHD. These findings support the conceptual distinction of ASD and ADHD, and demonstrate the considerable natural co-occurrence of particular ASD/ADHD symptom domains. The results imply that more children with 1 condition show features of the other condition than show complete comorbidity. Emphasis on symptom co-occurrence, rather than complete comorbidity between disorders, may help focus clinical approaches and advance molecular genetic research.

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J Autism Dev Disord. 2014.

WHITE MATTER MICROSTRUCTURE PREDICTS AUTISTIC TRAITS IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Cooper M, Thapar A, Jones DK.

Traits of autism spectrum disorder (ASD) in children with attention-deficit/hyperactivity disorder (ADHD) have previously been found to index clinical severity. This study examined the association of ASD traits with diffusion parameters in adolescent males with ADHD (n=17), and also compared WM microstructure relative to controls (n=17). Significant associations ($p < 0.05$, corrected) were found between fractional anisotropy/radial diffusivity and ASD trait severity (positive and negative correlations respectively), mostly in the right posterior limb of the internal capsule/corticospinal tract, right cerebellar peduncle and the midbrain. No case-control differences were found for the diffusion parameters investigated. This is the first report of a WM microstructural signature of autistic traits in ADHD. Thus, even in the absence of full disorder, ASD traits may index a distinctive underlying neurobiology in ADHD.

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J Child Adolesc Psychopharmacol. 2014;24:210-17.

PARTICIPANT-PERCEIVED QUALITY OF LIFE IN A LONG-TERM, OPEN-LABEL TRIAL OF LISDEXAMFETAMINE DIMESYLATE IN ADOLESCENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Childress AC, Cutler AJ, Saylor K, et al.

Objectives: The purpose of this study was to assess long-term improvement in quality of life (QOL) in adolescents with attention-deficit/hyperactivity disorder (ADHD) treated with lisdexamfetamine dimesylate (LDX).

Methods: Adolescents with ADHD treated for (greater-than or equal to) 3 weeks in a 4 week, placebo-controlled study entered a 1 year, open-label study. After the 4 week dose optimization (30, 50, and 70mg/day LDX) period, treatment was maintained for 48 additional weeks. Change from baseline (of prior study) to week 52/early termination (ET) (of open-label study) in ADHD Rating Scale IV (ADHD-RS-IV) assessed effectiveness, and the Youth QOL-Research Version (YQOL-R) assessed participant-perceived QOL. Post-hoc analyses described effectiveness and QOL for participants with self-perceived poor QOL at baseline ((greater-than or equal to) 1 SD below the mean) versus all others, and for study completers versus study noncompleters.

Results: These post-hoc analyses included 265 participants. Participants with baseline self-perceived poor QOL (n=32) versus all others (n=232) exhibited robust YQOL-R perceptual score changes (improvement) with LDX, emerging by week 28 and maintained to week 52/ET. Week 52/ET mean change score ranged from +9.8 to +17.6 for participants with baseline self-perceived poor QOL and +0.4 to +5.1 for all others; week 52/ET improvements in ADHD-RS-IV total scores were similar, regardless of baseline YQOL-R total score. At week 52/ET, study completers had greater YQOL-R improvements than did noncompleters; ADHD-RS-IV total score changes were also numerically larger at week 52/ET for completers than for noncompleters.

Conclusion: Participant-perceived QOL and ADHD symptoms improved from baseline with LDX in adolescents with ADHD; greatest improvements occurred among participants with baseline self-perceived poor QOL.

J Child Adolesc Psychopharmacol. 2014;24:190-200.

A RANDOMIZED TRIAL OF EDIVOXETINE IN PEDIATRIC PATIENTS WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Lin DY, Kratochvil CJ, Xu W, et al.

Objective: The purpose of this study was to assess the efficacy and safety of edivoxetine (LY2216684), a selective norepinephrine reuptake inhibitor, in pediatric patients with attention-deficit/hyperactivity disorder (ADHD).

Method: A fixed-dose, randomized, double-blind, 8 week study was conducted in patients 6-17 years of age, who were randomized by two strata: 1) Patients with prior stimulant use randomized to placebo, edivoxetine 0.1mg/kg/day, 0.2mg/kg/day, or 0.3mg/kg/day arms in a 1:1:1:1 ratio; 2) Stimulant-naïve patients randomized to placebo, edivoxetine 0.1mg/kg/day, 0.2mg/kg/day, 0.3mg/kg/day, or osmotic-release oral system methylphenidate (OROS MPH) (18-54mg/day based on body weight) arms in a 1:1:1:1:1 ratio. The primary efficacy measure was baseline-to-week 8 change of ADHD Rating Scale (ADHD-RS) total score for edivoxetine 0.2mg/kg/day and 0.3mg/kg/day.

Results: A total of 340 patients were randomized to placebo (n=78); edivoxetine 0.1mg/kg/day (n=76), 0.2mg/kg/day (n=75), or 0.3mg/kg/day (n=75); or OROS MPH (n=36). In the stimulant-naïve stratum, the positive control, OROS MPH, was significantly superior to placebo in mean ADHD-RS total score change at end-point (-19.46, p=0.015). The edivoxetine 0.2mg/kg/day and 0.3mg/kg/day arms had statistically significantly greater improvement than the placebo arm in mean ADHD-RS total score change at end-point (placebo -10.35; edivoxetine 0.2mg/kg/day -16.09, p<0.010; edivoxetine 0.3mg/kg/day -16.39, p<0.010) and Clinical Global Impressions-Improvement score (placebo 3.05; edivoxetine 0.1mg/kg/day 3.01, p=0.860; edivoxetine 0.2mg/kg/day 2.54, p=0.013; edivoxetine 0.3mg/kg/day 2.53, p=0.013). In the overall efficacy-analyses data set (n=270), the effect size estimates for edivoxetine doses 0.1mg/kg/day, 0.2mg/kg/day and 0.3mg/kg/day at the week 8 time point were 0.17, 0.51, and 0.54, respectively (for the stimulant-naïve stratum, the effect size estimate for OROS MPH was 0.69). Compared with placebo,

edivoxetine treatment was associated with statistically significant increases in blood pressure and pulse ($p < 0.050$), and a smaller increase or slight decrease in weight.

Conclusions: Edivoxetine at doses of 0.2mg/kg/day and 0.3mg/kg/day demonstrated efficacy in ADHD treatment, despite the presence of a sizeable placebo response. No unexpected adverse events were identified.

Clinical Trial Registry identifier: NCT00922636

Journal of Child Psychology and Psychiatry. 2014 Jun;55:685-710.

ANNUAL RESEARCH REVIEW: REACTION TIME VARIABILITY IN ADHD AND AUTISM SPECTRUM DISORDERS: MEASUREMENT AND MECHANISMS OF A PROPOSED TRANS-DIAGNOSTIC PHENOTYPE.

Karalunas SL, Geurts HM, Konrad K, et al.

Background: Intraindividual variability in reaction time (RT) has received extensive discussion as an indicator of cognitive performance, a putative intermediate phenotype of many clinical disorders, and a possible trans-diagnostic phenotype that may elucidate shared risk factors for mechanisms of psychiatric illnesses.

Scope and Methodology: Using the examples of attention deficit hyperactivity disorder (ADHD) and autism spectrum disorders (ASD), we discuss RT variability. We first present a new meta-analysis of RT variability in ASD with and without comorbid ADHD. We then discuss potential mechanisms that may account for RT variability and statistical models that disentangle the cognitive processes affecting RTs. We then report a second meta-analysis comparing ADHD and non-ADHD children on diffusion model parameters. We consider how findings inform the search for neural correlates of RT variability.

Findings: Results suggest that RT variability is increased in ASD only when children with comorbid ADHD are included in the sample. Furthermore, RT variability in ADHD is explained by moderate to large increases ($d = 0.63$ – 0.99) in the ex-Gaussian parameter t and the diffusion parameter drift rate, as well as by smaller differences ($d = 0.32$) in the diffusion parameter of nondecision time. The former may suggest problems in state regulation or arousal and difficulty detecting signal from noise, whereas the latter may reflect contributions from deficits in motor organization or output. The neuroimaging literature converges with this multicomponent interpretation and also highlights the role of top-down control circuits.

Conclusion: We underscore the importance of considering the interactions between top-down control, state regulation (e.g. arousal), and motor preparation when interpreting RT variability and conclude that decomposition of the RT signal provides superior interpretive power and suggests mechanisms convergent with those implicated using other cognitive paradigms. We conclude with specific recommendations for the field for next steps in the study of RT variability in neurodevelopmental disorders.

J Clin Psychiatry. 2014;75:535-42.

NEUROCOGNITIVE EFFECTS OF NEUROFEEDBACK IN ADOLESCENTS WITH ADHD: A RANDOMIZED CONTROLLED TRIAL.

Bink M, van NC, Popma A, et al.

Objective: Neurofeedback aims to reduce symptoms of attention-deficit/ hyperactivity disorder (ADHD), mainly attention problems. However, the additional influence of neurofeedback over treatment as usual (TAU) on neurocognitive functioning for adolescents with ADHD remains unclear.

Method: By using a multicenter parallel randomized controlled trial (RCT) design, male adolescents with a DSM-IV-TR diagnosis of ADHD (mean age=16.1 years; range, 12-24) were randomized to receive either a combination of TAU and neurofeedback ($n = 45$) or TAU ($n = 26$). Randomization was computer generated and stratified by age group (ages 12 through 15, 16 through 20, and 21 through 24 years). The neurofeedback intervention consisted of approximately 37 sessions over a period of 25 weeks of theta/sensorimotor rhythm training on the vertex (Cz). Primary neurocognitive outcomes included performance parameters derived from the D2Test of Attention, the Digit Span backward, the Stroop Color-

Word Test and the Tower of London, all assessed preintervention and postintervention. Data were collected between December 2009 and July 2012.

Results: At postintervention, outcomes of attention and/or motor speed were improved, with faster processing times for both intervention conditions and with medium to large effect sizes (range, (not equal to) $p^2=.08-54$; P values $<.023$). In both groups, no improvements for higher executive functions were observed. Results might partly resemble practice effects.

Conclusions: Although neurocognitive outcomes improved in all adolescents receiving treatment for ADHD, no additional value for neurofeedback over TAU was observed. Hence, this study does not provide evidence for using theta/sensorimotor rhythm neurofeedback to enhance neurocognitive performance as additional intervention to TAU for adolescents with ADHD symptoms.

J Health Econ. 2014;37:58-69.

DO STIMULANT MEDICATIONS IMPROVE EDUCATIONAL AND BEHAVIORAL OUTCOMES FOR CHILDREN WITH ADHD?

Currie J, Stabile M, Jones L.

We examine the effects of a policy change in the province of Quebec, Canada which greatly expanded insurance coverage for prescription medications. We show that the change was associated with a sharp increase in the use of stimulant medications commonly prescribed for ADHD in Quebec relative to the rest of Canada. We ask whether this increase in medication use was associated with improvements in emotional functioning or academic outcomes among children with ADHD. We find little evidence of improvement in either the medium or the long run. Our results are silent on the effects on optimal use of medication for ADHD, but suggest that expanding medication in a community setting had little positive benefit and may have had harmful effects given the average way these drugs are used in the community.

J Psychiatry Neurosci. 2014;39:32-33.

MANAGING ADHD AND DISRUPTIVE BEHAVIOUR DISORDERS WITH COMBINATION PSYCHOSTIMULANT AND ANTIPSYCHOTIC TREATMENT.

Elbe D, Barr AM, Honer WG, et al.

J Psychopathol Behav Assess. 2014.

ESTIMATES OF THE UTILITY OF CHILD BEHAVIOR CHECKLIST/TEACHER REPORT FORM ATTENTION PROBLEMS SCALE IN THE DIAGNOSIS OF ADHD IN CHILDREN REFERRED TO A SPECIALTY CLINIC.

Edwards MC, Sigel BA.

Examination of the accuracy or diagnostic utility of behavioral rating scales can contribute to an evidence base for assessment practice. The purpose of this study was to provide estimates of the diagnostic utility of the Attention Problems scales from the Child Behavior Checklist and Teacher Report Form in the assessment of Attention-Deficit/Hyperactivity Disorder (ADHD) in children referred for evaluation to a specialty clinic. It was hypothesized that the utility of the Attention Problems scales in diagnosing ADHD would be fair to moderate in magnitude. This study extends the literature on the diagnostic accuracy of the Attention Problems scales by utilizing various diagnostic standards, multiple cutoffs, and multiple informants. Signal detection, Bayesian, and efficiency approaches were used to evaluate the diagnostic utility of the Attention Problems scale. Results showed the quality of efficiency for the Attention Problems scale was moderate for parents and teachers. In general, teacher ratings showed slightly higher quality of efficiency than parent ratings when teacher ratings were included in the diagnostic standard.

J Psychopathol Behav Assess. 2014.

EMOTIONAL IMPULSIVITY IN CHILDREN WITH ADHD ASSOCIATED WITH COMORBID-NOT ADHD-SYMPTOMATOLOGY.

Factor PI, Reyes RA, Rosen PJ.

Children with ADHD often demonstrate sudden and intense shifts in both positive and negative affect. This study examined the role of diagnostic status on emotional impulsivity in children utilizing ecological momentary assessment (EMA). Parents of 64 8-12 year old children (15 ADHD-only; 27 ADHD-comorbid; 22 control) completed a diagnostic structured interview and then an EMA protocol, rating the child's affect thrice daily for 28 days. Analysis of covariance (ANCOVA) suggested that children with ADHD and a comorbid disorder demonstrated significantly more EMA-derived emotional impulsivity than children with ADHD only and control children. No difference was found between children with ADHD only and control children. This study suggested that children with ADHD demonstrate significantly higher levels of emotional impulsivity than control children only in the presence of a comorbid disorder.

J Psychopathol Behav Assess. 2014.

LONELINESS IN CHILDREN AND ADOLESCENTS WITH AND WITHOUT ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Houghton S, Roost E, Carroll A, et al.

Although there have been developments in understanding loneliness in children and adolescents, there is still very limited understanding of the construct in children and adolescents diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD). The Perth A-Loneness scale (PALs), which comprises 24 items measuring four dimensions of loneliness in young people, was administered to 84 children and adolescents who had been clinically diagnosed as meeting criteria for ADHD. Eighty four individually age and gender matched non ADHD Community Comparisons with no diagnosed neurological deficits also completed the PALs. Competing measurement models were evaluated using confirmatory factor analysis and a first-order model represented by four correlated factors (Friendship Loneliness, Isolation, Negative Attitude to Solitude, and Positive Attitude to Solitude) was superior: CMIN/DF ratio (1.644), CFI (0.90), and RMSEA = 0.056 (90 % CI: 0.05, 0.07). A multivariate analysis of variance revealed no significant multivariate interactions or main effects of Group (ADHD/Non ADHD) or Sex (Male/Female). Overlap of 90 to 98 % between the ADHD and non ADHD samples in their 95 % Confidence Intervals for each of the four loneliness scores along with very small Effect Sizes further strengthened the finding of a non-significant main effect.

J Psychopharmacol. 2014;28:671-76.

CATECHOL-O-METHYLTRANSFERASE Val158-MET POLYMORPHISM AND A RESPONSE OF HYPERACTIVE-IMPULSIVE SYMPTOMS TO METHYLPHENIDATE: A REPLICATION STUDY FROM SOUTH KOREA.

Park S, Kim J-W, Kim B-N, et al.

We investigated the association between the catechol-O-methyltransferase (COMT) Val158-Met (rs4680) genotype and both subjective and objective treatment responses to methylphenidate in Korean children with attention-deficit/ hyperactivity disorder (ADHD). We enrolled 120 medication-naïve children with ADHD in an open-label, 8-week trial of methylphenidate. The participants were genotyped and evaluated using the Clinical Global Impression Scale and the ADHD Rating Scale-IV (ADHD-RS), and completed the Continuous Performance Test (CPT) before and after treatment. We found a significant association between the COMT Val/Val genotype and a good response, in terms of hyperactive-impulsive scores on the ADHD-RS (odds ratio (OR)=2.61; p=0.044) and response-time variability on the CPT (OR=2.66; p=0.028). The association of the COMT Val/Val genotype with a good response, in terms of response time variability, was significant in both the sub-sample of combined-type (OR=3.45; p=0.026) and sub-sample of inattentive-type (OR=5.52; p=0.029); but the association with a good response in terms of hyperactive-impulsive scores was not significant in sub-sample analyses. Although the reported nominally significant

associations did not stay significant after correcting for multiple testing, our results support previous findings about the possible involvement of the COMT (Val158-Met) polymorphism in the treatment response to methylphenidate in children with ADHD.

J Am Acad Child Adolesc Psychiatry. 2014.

DIFFERENT MECHANISMS OF WHITE MATTER ABNORMALITIES IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER: A DIFFUSION TENSOR IMAGING STUDY.

van EH, Heslenfeld DJ, Zwiers MP, et al.

Objective: Literature regarding white matter (WM) abnormalities in attention-deficit/hyperactivity disorder (ADHD) is sparse and inconsistent. In this article, we shed more light on WM microstructure in ADHD, its association with symptom count, and the familiarity of WM abnormalities in ADHD.

Method: Diffusion tensor imaging (DTI) was performed in a large sample of individuals with ADHD (n=170), their unaffected siblings (n=80), and healthy controls (n=107), aged 8 to 30 years. Extensive categorical as well as dimensional data regarding ADHD status and symptom count were collected. A whole-brain voxelwise approach was used to investigate associations between ADHD status and symptom count and WM microstructure, as measured by fractional anisotropy (FA) and mean diffusivity (MD).

Results: Individuals with ADHD showed decreased FA and decreased MD in several widespread, non-overlapping brain regions. In contrast, higher ADHD symptom count was consistently associated with increased FA and decreased MD in the ADHD group. Unaffected siblings resembled individuals in the ADHD group with regard to decreased FA but had MD similar to that in healthy controls. Results were not confounded by socioeconomic status, the presence of comorbidities, or a history of medication use.

Conclusions: Our results indicate widespread disturbances in WM microstructure in ADHD, which seem to be driven by 2 different mechanisms. Decreased FA in ADHD may be due to a familial vulnerability to the disorder, whereas a second mechanism may drive the association between ADHD symptom count and both higher FA and lower MD. Such different mechanisms may play an important role in the inconsistencies found in the current literature.

J Am Acad Child Adolesc Psychiatry. 2014.

BIOLOGICAL OVERLAP OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND AUTISM SPECTRUM DISORDER: EVIDENCE FROM COPY NUMBER VARIANTS.

Martin J, Cooper M, Hamshere ML, et al.

Objective: Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) often co-occur and share genetic risks. The aim of this analysis was to determine more broadly whether ADHD and ASD share biological underpinnings.

Method: We compared copy number variant (CNV) data from 727 children with ADHD and 5,081 population controls to data from 996 individuals with ASD and an independent set of 1,287 controls. Using pathway analyses, we investigated whether CNVs observed in individuals with ADHD have an impact on genes in the same biological pathways as on those observed in individuals with ASD.

Results: The results suggest that the biological pathways affected by CNVs in ADHD overlap with those affected by CNVs in ASD more than would be expected by chance. Moreover, this was true even when specific CNV regions common to both disorders were excluded from the analysis. After correction for multiple testing, genes involved in 3 biological processes (nicotinic acetylcholine receptor signalling pathway, cell division, and response to drug) showed significant enrichment for case CNV hits in the combined ADHD and ASD sample.

Conclusion: The results of this study indicate the presence of significant overlap of shared biological processes disrupted by large rare CNVs in children with these 2 neurodevelopmental conditions.

J Am Soc Hypertens. 2014;8:e15.

BLOOD PRESSURE CLASSIFICATION AND CARDIOVASCULAR RISK FACTORS IN CHILDREN WITH AND WITHOUT ADHD.

Shatfat IF, Lewis K, Al QD, et al.

Background: It is estimated that 8% of children ages 4-17 in the US carry the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD) and a significant portion of them take medications to treat their ADHD symptoms. Previous NHANES analyses showed 2-3% of children in the US suffer from hypertension. The prevalence of hypertension and cardiovascular risk factors in children with ADHD on CNS stimulant treatment vs no treatment compared to their healthy counterparts is not well described.

Aim: Using the NHANES database, we examine demographic and cardiovascular risk factors of 4,907 children with and without the diagnosis of ADHD.

Results: 383 (10.7%) of children carried the diagnosis of ADHD; of whom 111 (3.4%) were on CNS stimulant medications, and (272) 7.3% were not. Mean age was 15 years. Children with ADHD on stimulant medication were significantly younger, male, and white ($p=0.001$). BMI Z score, GFR, total cholesterol levels, the prevalence of albuminuria and poverty were not significantly different. 160 (2.7%) children were hypertensive and 637 (12.4%) were prehypertensive. The prevalence of hypertension and/or prehypertension was not different between the groups with ADHD on CNS treatment vs. no treatment and without ADHD. Systolic BP percentiles were not significantly different between the three groups, 40.87%, 37.53%, and 38.46, respectively. Heart Rate (HR) was significantly higher in the ADHD group on stimulants vs. the group without ADHD groups; 81.7 BPM and 76.8 BPM, respectively ($p=0.006$).

Conclusion: The prevalence of hypertension and/or prehypertension is comparable between children with ADHD on stimulant treatment vs. no treatment and is comparable to children without ADHD. Children with ADHD on stimulant treatment have significantly higher HR.

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Kinderanalyse. 2014 Apr;22:105-25.

ZUR INTERSUBJEKTIVEN GENESE DES ADHS. = ON THE INTERSUBJECTIVE GENESIS OF ADHD.

Traxl B.

Especially in the last 10 years, psychoanalytic interest in the ADH disorder has been notable for a high degree of theoretical engagement and major advances on the empirical front in the form of clinical evidence. Accordingly, the article sets out to delineate the central psychoanalytic positions on ADHD at present and to work them into a prototypic model of the course taken by the disorder. The author then adds an inter-subjective nuance to the model, an aspect that he feels has been neglected so far. It transpires that the way ADHD develops may point to a lowest common denominator resulting from the inability of primary objects to find a form of representation for the child that goes beyond its actual presence.

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Med Eng Phys. 2014;36:922-26.

OBJECTIVE DIAGNOSIS OF ADHD USING IMUS.

O'Mahony N, Florentino-Liano B, Carballo JJ, et al.

This work proposes the use of miniature wireless inertial sensors as an objective tool for the diagnosis of ADHD. The sensors, consisting of both accelerometers and gyroscopes to measure linear and rotational movement, respectively, are used to characterize the motion of subjects in the setting of a psychiatric consultancy. A support vector machine is used to classify a group of subjects as either ADHD or non-ADHD and a classification accuracy of greater than 95% has been achieved. Separate analyses of the motion data recorded during various activities throughout the visit to the psychiatric consultancy show that motion recorded during a continuous performance test (a forced concentration task) provides a better classification performance than that recorded during "free time".

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Mov Disord. 2014;29:S402.

MONITORING ANTIPSYCHOTIC SAFETY IN CHILDREN WITH TOURETTE SYNDROME AND ADHD: A PROSPECTIVE COHORT STUDY.

Pringsheim T, Hammer T, McLennan J, et al.

Objective: To prospectively monitor children with Tourette Syndrome and ADHD treated with antipsychotics for extrapyramidal, metabolic and hormonal side effects using an evidence based monitoring protocol.

Background: For children with severe symptoms of Tourette Syndrome and/or ADHD, antipsychotics may provide symptom relief. Treatment of children with second generation antipsychotics is associated with extrapyramidal, metabolic and hormonal side effects. The CAMESA (Canadian Alliance for Monitoring Effectiveness and Safety of Antipsychotics in Children) guidelines provide evidence based recommendations for monitoring antipsychotic medication safety in children, and on how to manage and mitigate these complications.

Methods: All children seen at the Child Development Centre at the University of Calgary who were started on an antipsychotic were prospectively monitored using the CAMESA monitoring protocol. The monitoring protocol includes measurement of body mass index, waist circumference, blood pressure, the Extrapyramidal Symptom Rating Scale examination, and laboratory tests. Children are monitored at baseline, month 1,2,3, 6, 9 and 12 and 6 monthly thereafter. We recorded the rate of metabolic, extrapyramidal and hormonal side effects over time.

Results: From January 2012 to December 2013, 25 children were started on an antipsychotic; 15 on aripiprazole and 10 on risperidone. The primary reason for treatment was tics in 90% of the sample. Mean age was 10.8 years; mean length of follow-up was 7.2 months. Ten children developed metabolic or hormonal side effects of the medication, including body mass index over the 85th or 95th percentile, waist circumference greater than the 90th percentile, abnormal cholesterol or triglycerides, elevated insulin and elevated prolactin. Antipsychotics had to be discontinued in 4 children secondary to metabolic or hormonal side effects. Nine children developed extrapyramidal side effects, the most common akathisia and tremor. Dose adjustments were required to mitigate extrapyramidal side effects in 3 children; the remaining were mild and no intervention was required.

Conclusions: Metabolic, hormonal and extrapyramidal side effects are common in children treated with second generation antipsychotics for Tourette Syndrome. Clinicians need to monitor children systematically and provide anticipatory guidance.

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Mov Disord. 2014;29:S301.

THE PREVALENCE OF RESTLESS LEGS SYNDROME IN PARENTS OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDERS.

Dogu O, Tasmertek F, Toros F, et al.

Objective: The aim of the study is to investigate the prevalence of Restless Legs Syndrome (RLS) in parents of children with ADHD.

Background: There are several studies suggesting that (RLS) are more common in parents of children with attention deficit hyperactivity disorder.

Methods: The study subjects were selected from parents of patients who admitted to Mersin University Child Psychiatry outpatient clinic. A semistructured interview including questions regarding RLS criteria was performed with the subjects. The RLS diagnosis was made by the International Restless Legs Study Syndrome Group (IRLSSG) criteria. Three hundred and ninety seven parents were included in this study. RLS in pregnancy was correlated with maternal RLS ($p=0,009$), but not correlated with the parity of mothers. There was no association between pregnancy trimester and maternal RLS. Compared with the first and second trimester, third trimester was found to be related with developing RLS.

Results: The mean age of mothers' was 36,43 (plus or minus) 5,69 and fathers' 40,50 (plus or minus) 6,21. Maternal participation rate was 97% and paternal participation rate was 82,4%. The prevalence of RLS in both gender found to be 7,3% which was 9,7 % in females and 4,3% in males. The mothers were more likely to have RLS than fathers ($p=0,04$). Compared with the results of a population based study conducted

in the same region, the maternal prevalence of RLS is higher but paternal prevalence of RLS was similar in both studies. Gender of the children was not associated with prevalence of maternal or paternal RLS.

Conclusions: Results of this study supports the genetic links between ADHD and RLS. RLS in parents was linked significantly to maternal RLS but not paternal RLS. Maternal factors in transmission suggest that influences such as genomic imprinting, a modifier X chromosomal locus or mitochondrial locus may be involved.

Nat Med. 2014 May;20:454-55.

FDA CLEARANCE PAVES WAY FOR COMPUTERIZED ADHD MONITORING.

Dolgin E.

Neuro Endocrinol Lett. 2014;35:1-6.

ADHD AND GROWTH: QUESTIONS STILL UNANSWERED.

Ptacek R, Kuzelova H, Stefano GB, et al.

Attention deficit hyperactivity disorder (ADHD) is one of the most commonly diagnosed childhood psychiatric disorders. It is manifested in every part of an affected child's behavior, with multiple symptomatology and heterogeneous etiology. Published studies report that ADHD children may show changes in growth and development. Most of the studies on ADHD have been focused on connections between medication and growth changes and describe growth delays associated with medication. However, recent research results point to the low significance of the changes accompanying pharmacological treatment. Changes in growth may not only be a secondary effect of the treatment, but may also be specific characteristics of ADHD.

No To Hattatsu. 2014 Jan;46:22-25.

DRUG THERAPY FOR AD/HD INVESTIGATION OF USEFULNESS OF EXTENDED-RELEASE METHYLPHENIDATE AND ATOMOXETINE FROM THE VIEWPOINT OF PERSISTENCY RATE.

Sugama M, Ishizaki A.

OBJECTIVE: Currently, extended-release methylphenidate (MPH) and atomoxetine (ATX) are used for the medical treatment of AD/HD. The purpose of this study is to investigate the current state of these treatments from the viewpoint of the persistency rate of each drug. **METHODS:** Of patients who had AD/HD or pervasive developmental disorder (PDD) associated with the symptoms of AD/HD, 460 cases who receiving MPH and 121 receiving ATX were investigated in terms of the diagnosis, the persistency rate, the persistency rate by the diagnostic name, reasons for discontinuation, and concomitant drugs as continual medications. **RESULTS:** The cases who continued MPH accounted for 59.8% (275/460), and those who continued ATX accounted for 49.6% (60/121). There were 40 cases who received MPH and ATX concomitantly. The persistency rate of ATX among those who had PDD was low. **CONCLUSIONS:** The persistency rate of ATX was low because it was used for serious cases and MPH included the cases with proven effectiveness and discontinuation. There were also many cases requiring combination therapy. MPH had a high persistency rate for PDD, which did not necessarily mean that it was generally effective.

Nord J Psychiatry. 2014;68:289-95.

IS ADHD AN EARLY STAGE IN THE DEVELOPMENT OF BORDERLINE PERSONALITY DISORDER?

Storebo OJ, Simonsen E.

Background: Several studies report associations between adults with borderline personality disorder (BPD) and a history of attention-deficit hyperactivity (ADHD) symptoms in childhood. Aims: To explore the association between BPD and a history of ADHD in childhood.

Method: A comprehensive search of EMBASE, PsychInfo and Medline and hand-searching yielded 238 "hits". Fifteen articles were found to have sufficient quality and relevance to be included in the final review. The data were considered in six possible explanatory psychopathological models of the association between ADHD and BPD.

Results: Most of the 15 articles showed a statistical association between ADHD and BPD. The data, most strongly provided a basis for the hypotheses that ADHD is either an early developmental stage of BPD, or that the two disorders share an environmental and genetic aetiology. Furthermore, one of the disorders seems to give a synergic effect, reinforce the other or complicate the disorders. In one prospective study, the risk factor for children with ADHD to develop BPD was as high as odds ratio 13.16. No studies have looked at treatment of ADHD as a mediator of the risk for BPD.

Conclusions: Many studies pointed at shared aetiology or the risk for development of one disorder, when the other disorder is present. The data do not evaluate how treatment factors or other factors mediate the risk or how overlap of diagnostic criteria adds to the statistical association. More research is much needed, in particular studies looking at early intervention and which treatment of ADHD that might prevent later development of BPD.

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Pediatr Blood Cancer. 2014 Jun;61:1074-79.

PROGNOSTIC FACTORS THAT INCREASE THE RISK FOR REDUCED WHITE MATTER VOLUMES AND DEFICITS IN ATTENTION AND LEARNING FOR SURVIVORS OF CHILDHOOD CANCERS.

Reddick WE, Taghipour DJ, Glass JO, et al.

OBJECTIVE: In children, CNS-directed cancer therapy is thought to result in decreased cerebral white matter volumes (WMV) and subsequent neurocognitive deficits. This study was designed as a prospective validation of the purported reduction in WMV, associated influential factors, and its relationship to neurocognitive deficits in a very large cohort of both acute lymphoblastic leukemia (ALL) and malignant brain tumors (BT) survivors in comparison to an age similar cohort of healthy sibling controls.

PROCEDURES: The effects of host characteristics and CNS treatment intensity on WMV were investigated in 383 childhood cancer survivors (199 ALL, 184 BT) at least 12 months post-completion of therapy and 67 healthy siblings that served as a control group. t-Tests and multiple variable linear models were used to assess cross-sectional WMV and its relation with neurocognitive function.

RESULTS: BT survivors had lower WMV than ALL survivors, who had less than the control group. Increased CNS treatment intensity, younger age at treatment, and greater time since treatment were significantly associated with lower WMV. Additionally, cancer survivors did not perform as well as the control group on neurocognitive measures of intelligence, attention, and academic achievement. Reduced WMV had a larger impact on estimated IQ among females and children treated at a younger age.

CONCLUSIONS: Survivors of childhood cancer that have undergone higher intensity therapy at a younger age have significantly less WMV than their peers and this difference increases with time since therapy. Decreased WMV is associated with significantly lower scores in intelligence, attention, and academic performance in survivors.

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Pediatr Nurs. 2014 Jan;40:38-42.

ENCOURAGING POSITIVE BEHAVIOR IN 'CHALLENGING' CHILDREN: THE NURTURED HEART APPROACH.

Ahmann E.

Conventional parenting approaches often fall short of the mark for children who exhibit difficult behavior, sometimes inadvertently leading to increased oppositionality and poor self-esteem. As a result, parents of children with intense personalities and challenging behaviors need strategies that work very differently. The Nurtured Heart Approach is a philosophy/technique developed to help parents rewrite the often negative parenting scripts used with these children by limiting the amount of attention given to negative or undesirable behaviors while noticing and acknowledging even small positive behaviors, naming them, "energizing" attention given to them, and valuing their occurrence. Although there has been very limited empirical study of the Nurtured Heart Approach to date, it has been used, with anecdotal reports of success, in a variety of settings, including Head Start programs, schools, foster care agencies, a treatment center, and a pre-adolescent diversion program (Glasser, 2000).

Pediatr Med Rodzinna. 2014;10:91-96.

NEUROFEEDBACK IN THE TREATMENT OF PATIENTS DIAGNOSED WITH ADHD-A REVIEW OF RESEARCH.

Flisiak-Antonijczuk H, Adamowska S, Chladzinska-Kiejna S, et al.

Attention-deficit/hyperactivity disorder (ADHD) is a chronic disorder of multifactorial aetiology, usually recognized in childhood but also occur in adulthood. Diagnostics of ADHD is complex and requires a comprehensive approach considering interview and observations from different sources. In patients with ADHD more frequently co-occur antisocial behaviour, addiction to alcohol and drugs, depression, and increased risk of suicide. Treatment of ADHD requires a comprehensive approach that involves the use of psychoeducation, behavioural therapy and pharmacotherapy. Standard pharmacological treatment and psychological therapy are often insufficient. The drugs increase the risk of side effects and their use is limited due to the limitations of the reimbursement. The most serious adverse effects include the possibility of psychostimulant drugs addiction, inhibition of growth, insomnia, lack of appetite, dysphoria, anticholinergic symptoms and extrapyramidal symptoms. Studies of children with ADHD have demonstrated characteristic abnormalities in EEG in specific locations of the brain. Neurofeedback, a type of behavioural therapy, is one of the non-standard treatment for ADHD. The essence of neurofeedback is modelling behaviour through effects on the bioelectric activity of the brain. In comparison with pharmacotherapy it is a relatively cheap method-even if the costs are not reimbursed-not overloading for the patient and safe (has few side effects). There is no, however, well-documented studies of effectiveness this method in ADHD so in the review we focused on the methodology, critically referring to results not derived from controlled trials.

Pediatr Res. 2014;75:731-37.

A CRUCIAL ROLE FOR WHITE MATTER ALTERATIONS IN INTERFERENCE CONTROL PROBLEMS OF VERY PRETERM CHILDREN.

De Kieviet JF, Heslenfeld DJ, Pouwels PJW, et al.

Background: Attention problems are among the most prominent behavioral deficits reported in very preterm children (below 32 wk of gestation) at school age. In this study, we aimed to elucidate the brain abnormalities underlying attention problems in very preterm children by investigating the role of abnormalities in white and gray brain matter during interference control, using functional magnetic resonance imaging (fMRI)-guided probabilistic diffusion tensor tractography.

Methods: Twenty-nine very preterm children (mean (SD) age: 8.6 (0.3) y), and 47 term controls (mean (SD) age: 8.7 (0.5) y), performed a fMRI version of the Eriksen Flanker task measuring interference control.

Results: Very preterm children showed slower reaction times than term controls when interfering stimuli were presented, indicating poorer interference control. Very preterm children and term controls did not differ in mean activation of the cortical regions involved in interference control. However, impaired fractional

anisotropy (FA) was found in very preterm children in specifically those fiber tracts that innervate the cortical regions involved in interference control. Lower FA was related to poorer interference control in very preterm children.

Conclusion: White matter alterations have a crucial role in the interference control problems of very preterm children at school age.

Perspect Public Health. 2014 Mar;134:85-92.

ADDRESSING THE INVERSE CARE LAW: THE ROLE OF COMMUNITY PAEDIATRIC SERVICES.

Rahman FR, Maharaj V, Yates R, et al.

BACKGROUND: Children's health suffers disproportionately from the effects of poverty. The inverse care law states that those who need care the most are the least likely to receive it. Community paediatricians are well placed to address health inequalities in children.

AIMS: To explore, using routinely collected data, whether we address health inequalities and the inverse care law, particularly for certain conditions targeted by our specialty.

METHODS: Five years of data were analysed, during which health equity audits have led to service changes in order to tackle inequities. The data include postcodes, allowing each child to be assigned to a deprivation quintile, and a range of diagnoses, including five sentinel conditions: attention deficit hyperactivity disorder (ADHD) on medication, autistic spectrum disorder (ASD), epilepsy, cerebral palsy and Down's syndrome. This allowed analysis of the caseload by deprivation index for these conditions, comparison with the background population and exploration of time trends.

RESULTS: The number of children on the caseload and their distribution across the quintiles remained stable. The proportion of deprived children (i.e. in the lowest two quintiles) on the caseload over the last five years taken together is 56%, compared to 44% in the background population. The numbers of children with ADHD on medication has almost quadrupled in deprived quintiles and doubled in the least deprived quintile, while the numbers of children with this diagnosis in the most deprived is four times that in the least deprived. Numbers of children with ASD have also increased in each quintile. In contrast, the number of children with epilepsy and cerebral palsy did not show much variation, but those from deprived quintiles made up a greater proportion of the caseload.

CONCLUSIONS: Routine data collection demonstrates that inequalities are addressed using all four quality domains of service provision and sentinel conditions more likely to affect deprived children are targeted. We believe it is possible for all services to collect and analyse data thus with minimal effort, thereby providing a foundation from which to address the inverse care law.

PLoS ONE. 2014;9.

SHARED COGNITIVE IMPAIRMENTS AND AETIOLOGY IN ADHD SYMPTOMS AND READING DIFFICULTIES.

Cheung CHM, Frazier-Wood AC, Asherson P, et al.

Background: Twin studies indicate that the frequent co-occurrence of attention deficit hyperactivity disorder (ADHD) symptoms and reading difficulties (RD) is largely due to shared genetic influences. Both disorders are associated with multiple cognitive impairments, but it remains unclear which cognitive impairments share the aetiological pathway, underlying the co-occurrence of the symptoms. We address this question using a sample of twins aged 7-10 and a range of cognitive measures previously associated with ADHD symptoms or RD.

Methods: We performed multivariate structural equation modelling analyses on parent and teacher ratings on the ADHD symptom domains of inattention and hyperactivity, parent ratings on RD, and cognitive data on response inhibition (commission errors, CE), reaction time variability (RTV), verbal short-term memory (STM), working memory (WM) and choice impulsivity, from a population sample of 1312 twins aged 7-10 years.

Results: Three cognitive processes showed significant phenotypic and genetic associations with both inattention symptoms and RD: RTV, verbal WM and STM. While STM captured only 11% of the shared

genetic risk between inattention and RD, the estimates increased somewhat for WM (21%) and RTV (28%); yet most of the genetic sharing between inattention and RD remained unaccounted for in each case.

Conclusion: While response inhibition and choice impulsivity did not emerge as important cognitive processes underlying the co-occurrence between ADHD symptoms and RD, RTV and verbal memory processes separately showed significant phenotypic and genetic associations with both inattention symptoms and RD. Future studies employing longitudinal designs will be required to investigate the developmental pathways and direction of causality further.

Psychiatr Danub. 2014;26:165-71.

THE MOST EFFECTIVE INTERVENTION FOR ATTENTION DEFICIT-HYPERACTIVITY DISORDER: USING CONTINUOUS PERFORMANCE TEST.

Meftagh SD, Najimi A, Mohammadi N, et al.

Background: This study compares the effectiveness of three treating methods including behavioral mother training (BMT), Verbal self-instruction to the children (VSI), and pharmacotherapy in children with attention deficit-hyperactivity disorder (ADHD) using the continuous performance test (CPT).

Subjects and methods: In this semi-experimental study, 51 elementary students were identified in a boys' school in Shiraz (age 8-10) with attention deficit-hyperactivity disorder in a pilot study (among 1760 students). They were randomly divided into three groups; BMT, VSI, and control group. Moreover, 22 students were selected with ADHD among the clients in Hafez hospital. They were chosen by the availability method and they were put into the Pharmacotherapy group. Data collection tools were the Child Symptoms Inventory (CSI-4) and the continuous performance test. All of the groups were evaluated after the intervention and in post-test and also 2 months later in follow up.

Results: The treatment type (group) showed statistically significant difference in the result of CPT on severity of attention-deficit and in the number of correct responses ($P=0.01$), yet on the hyperactivity symptoms, there was no significant difference between the different treatment groups ($P=0.08$). The time factor shows a significant difference among the different groups ($p<0.001$).

Conclusions: Comparison of the various treatments of ADHD indicates that pharmacotherapy can improve the severity of attention deficit and the number of correct answers of children with ADHD.

Psychiatry Res Neuroimaging. 2014.

DISORDER-SPECIFIC FUNCTIONAL ABNORMALITIES DURING TEMPORAL DISCOUNTING IN YOUTH WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD), AUTISM AND COMORBID ADHD AND AUTISM.

Chantiluke K, Christakou A, Murphy CM, et al.

Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD) are often comorbid and share cognitive abnormalities in temporal foresight. A key question is whether shared cognitive phenotypes are based on common or different underlying pathophysiologies and whether comorbid patients have additive neurofunctional deficits, resemble one of the disorders or have a different pathophysiology. We compared age- and IQ-matched boys with non-comorbid ADHD (18), non-comorbid ASD (15), comorbid ADHD and ASD (13) and healthy controls (18) using functional magnetic resonance imaging (fMRI) during a temporal discounting task. Only the ASD and the comorbid groups discounted delayed rewards more steeply. The fMRI data showed both shared and disorder-specific abnormalities in the three groups relative to controls in their brain-behaviour associations. The comorbid group showed both unique and more severe brain-discounting associations than controls and the non-comorbid patient groups in temporal discounting areas of ventromedial and lateral prefrontal cortex, ventral striatum and anterior cingulate, suggesting that comorbidity is neither an endophenocopy of the two pure disorders nor an additive pathology.

Psychiatry Res Neuroimaging. 2014.

BRAIN ACTIVITY IN PREDOMINANTLY-INATTENTIVE SUBTYPE ATTENTION-DEFICIT/HYPERACTIVITY DISORDER DURING AN AUDITORY ODDBALL ATTENTION TASK.

Orinstein AJ, Stevens MC.

Previous functional neuroimaging studies have found brain activity abnormalities in attention-deficit/hyperactivity disorder (ADHD) on numerous cognitive tasks. However, little is known about brain dysfunction unique to the predominantly-inattentive subtype of ADHD (ADHD-I), despite debate as to whether DSM-IV-defined ADHD subtypes differ in etiology. This study compared brain activity of 18 ADHD-I adolescents (ages 12-18) and 20 non-psychiatric age-matched control participants on a functional magnetic resonance image (fMRI) auditory oddball attention task. ADHD-I participants had significant activation deficits to infrequent target stimuli in bilateral superior temporal gyri, bilateral insula, several midline cingulate/medial frontal gyrus regions, right posterior parietal cortex, thalamus, cerebellum, and brainstem. To novel stimuli, ADHD-I participants had reduced activation in bilateral lateral temporal lobe structures. There were no brain regions where ADHD-I participants had greater hemodynamic activity to targets or novels than controls. Brain activity deficits in ADHD-I participants were found in several regions important to attentional orienting and working memory-related cognitive processes involved in target identification. These results differ from those in previously studied adolescents with combined-subtype ADHD, who had a lesser magnitude of activation abnormalities in frontoparietal regions and relatively more discrete regional deficits to novel stimuli. The divergent findings suggest different etiological factors might underlie attention deficits in different DSM-IV-defined ADHD subtypes, and they have important implications for the DSM-V reconceptualization of subtypes as varying clinical presentations of the same core disorder.

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Psychol Rep. 2014 Feb;114:93-103.

RELIABILITY OF AUTISM-TICS, AD/HD, AND OTHER COMORBIDITIES (A-TAC) INVENTORY IN A TEST-RETEST DESIGN.

Larson T, Kerekes N, Selinus EN, et al.

The Autism-Tics, AD/HD, and other Comorbidities (A-TAC) inventory is used in epidemiological research to assess neurodevelopmental problems and coexisting conditions. Although the A-TAC has been applied in various populations, data on retest reliability are limited. The objective of the present study was to present additional reliability data. The A-TAC was administered by lay assessors and was completed on two occasions by parents of 400 individual twins, with an average interval of 70 days between test sessions. Intra- and inter-rater reliability were analysed with intraclass correlations and Cohen's kappa. A-TAC showed excellent test-retest intraclass correlations for both autism spectrum disorder and attention deficit hyperactivity disorder (each at .84). Most modules in the A-TAC had intra- and inter-rater reliability intraclass correlation coefficients of $\geq .60$. Cohen's kappa indicated acceptable reliability. The current study provides statistical evidence that the A-TAC yields good test-retest reliability in a population-based cohort of children.

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Psychol Assess. 2014 Jun;26:586-97.

ARE SLUGGISH COGNITIVE TEMPO AND DAYTIME SLEEPINESS DISTINCT CONSTRUCTS?

Langberg JM, Becker SP, Dvorsky MR, et al.

Sluggish cognitive tempo (SCT) and daytime sleepiness are both common in individuals with attention-deficit/hyperactivity disorder (ADHD). There appears to be considerable overlap between the tired and lethargic aspects of SCT and behaviors frequently exhibited by individuals with daytime sleepiness. However, no studies have examined the degree to which these constructs overlap and whether or not they are empirically distinct. In Study 1, a confirmatory factor analysis with the SCT subscale of the Barkley Adult ADHD Rating Scale-IV (BAARS-IV) and the Epworth Sleepiness Scale (ESS) was conducted in a sample of 768 college students. Results demonstrated that SCT and daytime sleepiness exhibit

considerable overlap but are empirically distinct. In Study 2, we examined the relation between SCT and daytime sleepiness and also the impact of comorbid SCT and sleepiness on the functioning of 58 college students rigorously diagnosed with ADHD. Regression analyses in both Study 1 and Study 2 showed that SCT predicts daytime sleepiness above and beyond symptoms of ADHD, anxiety, and depression. The 2 constructs were significantly related ($r = .51$), with the highest correlations occurring between the SCT tired and lethargic items with daytime sleepiness. College students with ADHD + SCT and daytime sleepiness were significantly more impaired than college students diagnosed with ADHD without SCT or daytime sleepiness. Together, these results fill an important gap in the literature by confirming SCT to be overlapping but empirically distinct from daytime sleepiness and demonstrating that SCT and daytime sleepiness are associated with functioning in college students with ADHD.

Res Autism Spectr Disord. 2014 Jun;8:625-32.

IS NEONATAL JAUNDICE ASSOCIATED WITH AUTISM SPECTRUM DISORDER, ATTENTION DEFICIT HYPERACTIVITY DISORDER, AND OTHER PSYCHOLOGICAL DEVELOPMENT? A NATIONWIDE PROSPECTIVE STUDY.

Chen MH, Su TP, Chen YS, et al.

Neonatal jaundice may cause the lifelong sequelae of central nerve system developmental disorders. However, the results are inconsistent. 2016 newborns with neonatal jaundice and 8064 age-/gender-matched (1:4) controls were enrolled during 1999–2000. Participants of autistic spectrum disorder (ASD), attention-deficit hyperactivity disorder (ADHD), and other developmental disorders that occurred during the follow-up were identified. Newborns with neonatal jaundice had increased risks of developing ASD (hazard ratio [HR]: 1.75, 95% confidence interval [CI]: 1.05–2.90), any developmental delay (HR: 1.27, 95% CI: 1.02–1.58), and developmental speech or language disorder (HR: 1.41, 95% CI: 1.11–1.79). Newborn exposure to hyperbilirubinemia was related to the increased risk of developing ASD, any developmental delay, and developmental speech or language disorder in later life.

Res Autism Spectr Disord. 2014;8:1008-15.

USING THE DBC-P HYPERACTIVITY INDEX TO SCREEN FOR ADHD IN YOUNG PEOPLE WITH AUTISM AND ADHD: A PILOT STUDY.

Gargaro BA, May T, Tonge BJ, et al.

This study aimed to (1) determine preliminary validity of the Developmental Behaviour Checklist-Hyperactivity Index (DBC-HI) as a screening measure of combined-type ADHD in autism and ADHD, and (2) compare emotional-behavioural disturbance using the DBC in autism, ADHD and autism + ADHD. Forty-nine age- and PIQ-matched young people [6-18 years; 12 autism, 13 ADHD, 12 autism + ADHD, 12 typically developing] were recruited. Parents completed the Conners-Revised Rating Scale and DBC. The DBC-HI displayed strong internal consistency and good external validity, reliably measuring combined-type ADHD. The DBC-HI distinguished autism from autism + ADHD with fair sensitivity and specificity. Individuals with autism + ADHD exhibited a more severe profile of emotional-behavioural disturbance than autism or ADHD alone. The DBC may be a useful 'all-in-one' screening tool to (1) identify comorbidity and (2) determine the severity of emotional-behavioural disturbance in autism and/or ADHD.

Res Dev Disabil. 2014;35:2199-204.

SPELLING ERRORS AMONG CHILDREN WITH ADHD SYMPTOMS: THE ROLE OF WORKING MEMORY.

Re AM, Miranda C, Esposito SS, et al.

Research has shown that children with attention deficit/hyperactivity disorder (ADHD) may present a series of academic difficulties, including spelling errors. Given that correct spelling is supported by the phonological component of working memory (PWM), the present study examined whether or not the spelling difficulties of children with ADHD are emphasized when children's PWM is overloaded. A group of

19 children with ADHD symptoms (between 8 and 11 years of age), and a group of typically developing children matched for age, schooling, gender, rated intellectual abilities, and socioeconomic status, were administered two dictation texts: one under typical conditions and one under a pre-load condition that required the participants to remember a series of digits while writing. The results confirmed that children with ADHD symptoms have spelling difficulties, produce a higher percentages of errors compared to the control group children, and that these difficulties are enhanced under a higher load of PWM. An analysis of errors showed that this holds true, especially for phonological errors. The increased errors in the PWM condition was not due to a tradeoff between working memory and writing, as children with ADHD also performed more poorly in the PWM task. The theoretical and practical implications are discussed.

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Res Dev Disabil. 2014 Jun;35:1412-24.

A REVIEW OF ATOMOXETINE EFFECTS IN YOUNG PEOPLE WITH DEVELOPMENTAL DISABILITIES.

Aman MG, Smith T, Arnold LE, et al.

This review summarizes the pharmacokinetic characteristics, pharmacodynamic properties, common side effects, and clinical advantages and disadvantages associated with atomoxetine (ATX) treatment in typically developing children and adults with ADHD. Then the clinical research to date in developmental disabilities (DD), including autism spectrum disorders (ASD), is summarized and reviewed. Of the 11 relevant reports available, only two were placebo-controlled randomized clinical trials, and both focused on a single DD population (ASD). All trials but one indicated clinical improvement in ADHD symptoms with ATX, although it was difficult to judge the magnitude and validity of reported improvement in the absence of placebo controls. Effects of ATX on co-occurring behavioral and cognitive symptoms were much less consistent. Appetite decrease, nausea, and irritability were the most common adverse events reported among children with DD; clinicians should be aware that, as with stimulants, irritability appears to occur much more commonly in persons with DD than in typically developing individuals. Splitting the dose initially, starting below the recommended starting dose, and titrating slowly may prevent or ameliorate side effects. Patience is needed for the slow build-up of benefit. Conclusions: ATX holds promise for managing ADHD symptoms in DD, but properly controlled, randomized clinical trials of atomoxetine in intellectual disability and ASD are sorely needed. Clinicians and researchers should be vigilant for the emergence of irritability with ATX treatment. Effects of ATX on cognition in DD are virtually unstudied.

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Res Dev Disabil. 2014;35:2252-59.

HOW DOES ASD SYMPTOMOLOGY CORRELATE WITH ADHD PRESENTATIONS?

Konst MJ, Matson JL, Goldin R, et al.

Elevated rates of attention deficit/hyperactivity disorder (ADHD) symptoms have been documented in the autism spectrum disorder (ASD) population. However, the recent restructuring of the ASD diagnostic category and its respective symptom structure has elicited concern about how these changes may impact prevalence rates, the deliverance of services, and the rates of comorbid psychopathology. At present, few researchers have investigated the prevalence rates of specific ADHD presentations within ASD populations. As we seek to increase our understanding of ADHD symptom manifestation in ASD populations it is important to establish base rates of attention and hyperactive symptoms. The current manuscript sought to investigate the prevalence of inattention and impulsive symptoms in 1722 infants and toddlers. Individuals were separated into three diagnostic groups for analyses, a DSM-5 ASD group, an atypically developing group, and a DSM-IV-TR ASD group. Initial analysis extended previous research by demonstrating significantly elevated rates of inattention/impulsive symptoms in toddlers meeting DSM-5 criteria for ASD when compared to the DSM-IV-TR ASD and atypically developing groups. Additional analysis demonstrated that ASD symptom severity was positively correlated with inattention/impulsive symptoms regardless of primary diagnosis. Lastly, analyses examined the exhibition of inattention and

impulsive symptoms separately within diagnostic groups. Results suggest that the expression of impulsive and inattentive symptoms did not significantly differ within diagnostic groups.

Value Health. 2014;17:A219.

IMPACT OF ATYPICAL ANTIPSYCHOTICS USE ON LONG ACTING STIMULANTS PERSISTENCE AMONG CHILDREN AND ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Bali V, Kamble P, Aparasu RR.

Objectives: Pediatric Attention Deficit/Hyperactivity Disorder (ADHD) patients are usually prescribed combination of psychotropic agents. This study looked at the impact of atypical antipsychotic (AAP) use on long acting stimulant (LAS) persistence in children and adolescents with ADHD.

Methods: This study used 4 years (January 2004 to December 2007) of IMS LifeLink(trademark) claims data involving 6-16 years old youths with ADHD and at least 1 LAS prescription between July 2004 to December 2006 and continuous eligibility 6 months before and 1 years after the index LAS prescription. Persistence was measured by summing the total number of days a patient remained on the index LAS from the index prescription date with allowable gap of no more than 30 days. Multivariate Cox proportional hazards regression was used to examine the impact of concomitant atypical antipsychotic use on persistence of stimulants.

Results: The study cohort consisted of 39,981 subjects. Of these, 1,560 (3.90%) received LAS and AAP polypharmacy and the rest 38,421 (96.10%) received LAS monotherapy. Bivariate analyses revealed that concomitant users had longer persistence (by 71 days) than the stimulant alone users. Cox proportional hazards regression revealed that concomitant atypical antipsychotic use improved LAS persistence by 15% (HR=0.85, CI=0.76-0.94) in comparison to the non-users among LAS recipients. Other factors such as age, region, season, coexisting mental health conditions, use of co-medications, and general mental health status influenced the LAS treatment persistence among children and adolescents with ADHD.

Conclusions: Use of atypical antipsychotics improved LAS treatment persistence in children and adolescents with ADHD. Various patient, clinical and treatment factors were associated with the LAS treatment persistence in ADHD youths. Understanding of these factors can help to improve persistence to LAS treatment.

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PSYCHOMETRIC PROPERTIES OF THE ADHD RATING SCALE-IV (ADHD RS-IV) AND ADULT ADHD SELF-REPORT SCALE (ASRS) IN A PHASE 3B CLINICAL TRIAL OF PATIENTS WITH PHENYLKETONURIA.

Wyrwich KW, Auguste P, Yu R, et al.

Objectives: Phenylketonuria (PKU) is the most common in-born error of metabolism and is associated with neuropsychiatric sequelae. Interviews among adults and parents of children with PKU have established that inattentiveness is an important psychiatric symptom. Although the Adult ADHD Self-Rating Scale (ASRS; self-report) and ADHD Rating Scale (ADHD RS-IV; parent-report) instruments have been validated for measuring symptoms of inattentiveness in persons with ADHD, their psychometric value for measuring PKU-related inattentiveness has not been established. This study investigated the psychometric properties of the ASRS and ADHD RS-IV inattentiveness subscales in a PKU population (greater-than or equal to) 8 years old.

Methods: A post-hoc analysis was conducted in participants (greater-than or equal to) 8 years of age in a Phase 3b double blind, placebo-controlled clinical trial in PKU over a 13-week period. The ASRS/ADHD RS-IV reliability, construct validity, and responsiveness were measured using clinician- and adult-/parent-reported outcomes collected in this clinical trial.

Results: Data analysis revealed strong internal consistency reliability for both measures ((alpha) (greater-than or equal to) 0.87). In addition, the test-retest analyses resulted in ICCs (greater-than or equal to) 0.87, indicating outstanding agreement between the Baseline and Week 4 (re-test visit) measures for both the adult- and parent-rated inattentiveness subscales. Both inattentiveness measures demonstrated an ability

to discriminate between known groups ($p < 0.0001$) defined by the Clinical Global Impression-Severity (CGI-S) scale. Correlations between the ASRS/ADHD RS-IV with the CGI-S and age-appropriate Behavior Rating Inventory of Executive Function (BRIEF) Working Memory subscale were consistently moderate-to-strong (r (greater-than or equal to) 0.56). Similarly, results of the change score correlations were moderate (r (greater-than or equal to) 0.43) for both measures when compared to changes over time in the BRIEF Working Memory subscale.

Conclusions: These findings of reliability, validity, and responsiveness of both the ASRS and the ADHD RS-IV inattentiveness sub-scales, in addition to content validation results, further support their use for the assessment of inattentive symptoms among persons with PKU (greater-than or equal to) 8 years old in clinical trials.

Value Health. 2014;17:A209.

COMPARING THE INFLUENCE OF MONTH OF BIRTH AND GENDER IN TWO ACADEMIC YEARS ON ATTENTION DEFICIT HYPERACTIVITY DISORDER DIAGNOSES (ADHD) AMONG CHILDREN IN THE HEALTH IMPROVEMENT NETWORK (THIN) UK DATA.

O'Leary C, Bourke A, Ansell D.

Objectives: Long-term costs follow a diagnosis of ADHD; therefore it is important to examine factors influencing diagnosis. This study determines the prevalence of ADHD among children according to month of birth and gender across two academic years.

Methods: Children aged 5-15 years in the academic years Sep 2010-Aug 2011 (Year 1) and Sep 2011-Aug 2012 (Year 2) in The Health Improvement Network (THIN) were assessed for ADHD using diagnoses and prescriptions. Percentages were calculated and differences across month of birth assessed using chi squared tests for trend. Children with later months of birth (Mar-Aug) were compared to earlier months of birth (Sep-Feb), and males to females using relative risks (RR).

Results: 436,299 children in Year 1 and 398,718 in Year 2 were included with 0.75% and 0.76% diagnosed with ADHD respectively. There was evidence at the 5% level of an increasing trend in ADHD prevalence in both academic years ($p < 0.001$, $p = 0.005$ in Year 1, Year 2 respectively). Younger children were 14% more likely ($RR = 1.14$, 95% CI 1.07-1.23) in Year 1 and 12% more likely ($RR = 1.12$ 95% CI 1.04-1.20) in Year 2 to have ADHD than older children. Males were around five times more likely to have an ADHD diagnosis in both years ($RR = 5.00$ 95% CI 4.56-5.49, $RR = 4.92$ 95% CI 4.47-5.42 in Year 1, Year 2 respectively).

Conclusions: There was good agreement across academic years both in the percentage with ADHD diagnosis, and the increasing trend through the academic year. Younger children were more likely to be diagnosed with ADHD than their older peers. This may partly be due to them appearing to lack the maturity of their older classmates. Males were more likely to have an ADHD diagnosis than females in both years. Further work could assess the differences in different age groups and be extended to include other conditions.

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ORIGINAL CONTRIBUTION

Searching for the best approach to assess teachers' perception of inattention and hyperactivity problems at school

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Abstract Although major guidelines in the field and current diagnostic criteria clearly demand an assessment of children's attention deficit/hyperactivity disorder (ADHD) symptoms at school, few studies address the fundamental question of which is the best approach for clinicians to get this information from teachers. Three screening strategies for ADHD were applied to teachers of 247 third grade students. They were asked (1) an overt question about potential cases of ADHD in their classroom; (2) to complete a broad-band questionnaire assessing common child mental health problems; (3) to rate ADHD-specific symptoms in a narrow-band questionnaire. Based on the overt question, teachers identified one in five students (21.1 %) as having ADHD; 28 cases (11.3 %) were identified using standard cut-offs for the narrow-band, and 13 (5.3 %) using a standard threshold for the sub-scale of hyperactivity from the broad-band questionnaire. Agreement among strategies was low ($k = 0.28$). A subsample of students, clinically assessed to confirm screenings, showed modest agreement with final diagnosis. The narrow-band questionnaire had

the best diagnostic performance. Multivariate analysis indicated that the presence of a comorbid externalizing disorder was the only variable associated with teachers' ascertainment of ADHD caseness or non-caseness. Choice of screening strategy significantly affects how teachers report on ADHD symptoms at school. The halo effect of externalizing behaviors impacts the correct identification of true cases of ADHD in the school setting. Clinicians can rely on narrow-band instruments like the SNAP-IV to get information on ADHD symptoms at school from teachers.

Keywords ADHD · Inattention · Hyperactivity · Screening · Scales · Teachers

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a common childhood neuropsychiatric disorder, affecting 5.29 % of children and adolescents worldwide [25] or approximately at least one child in every classroom. The symptoms of ADHD are characterized by developmentally inappropriate levels of inattention, hyperactivity, and impulsivity that cause significant impairments in daily life and can affect multiple domains of functioning, including academic performance, peer and family relations. Negative outcomes reported for children with ADHD include, but are not limited to, lower academic achievement [11], increased behavioral problems [43], substance abuse [23], lower occupational rates [6], higher rates of traffic accidents and violations [9] and suicide [5] when compared with typically developing peers.

In diagnosing ADHD, the role of information sources is a complex issue. Previous studies have shown that there is substantial disagreement among informants [22]. Parents

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and teachers only moderately agree in their ratings of ADHD symptoms, with correlations around 0.3 [22, 30]. This discordance has been interpreted as indicating that parents and teachers perceive child behavior differently, or alternatively, that child behavior may vary in home and school environments. Nonetheless, these low correlations across ratings reflect the degree to which each informant provides unique information for an accurate diagnosis.

Teachers play a major role in the identification and referral of children with ADHD, as they are in a privileged position to inform both parents and clinicians about the child's behavior and how it compares to others in the class, in various situations, from social interactions to task-focused activities, over long periods of time. Moreover, as current diagnostic criteria for ADHD [3] require documentation of impairment in more than one setting, and evidence suggests that parents are not good informants for symptoms at school [32], the diagnosis of ADHD in children must rely on the information obtained from the school staff too.

Evidence suggests, however, that most teachers have little or no training on childhood behavioral disorders, including ADHD [17, 41]. Over the past decade, few studies have examined teachers' knowledge about ADHD [35, 36, 40]; these were mostly based on true or false questionnaires, with correct answers at or little above chance level (ranging from 48 to 76 %). ADHD-type, comorbidity (halo effect of conduct/oppositional problems), and severity of symptoms may all affect the ability of teachers to correctly identify children who may have ADHD [38]. Particularly, the presence of learning disabilities (LD) can increase the difficulty to distinguish between the two disorders in the school context. Without specific training, decisions to refer a child who might have ADHD seem to be related to several factors other than to the problem behavior itself, including gender, age, height and weight, race, and socioeconomic status [34].

Although clinicians often rely on behavior rating scales for documentation about a child's functioning in different settings, it is not known how these instruments affect teachers' perceptions and ratings of ADHD symptoms. The objective of this cross-sectional study was to compare the performance of three different screening strategies for ADHD based on teachers' perception of classroom behavior: (1) an overt question, to capture teachers' general perception and subjective impression of a student as having ADHD; (2) a structured broad-band questionnaire, containing items related to ADHD among other behavior symptoms; (3) a narrow-band instrument, presenting only the current DSM-IV diagnostic criteria for ADHD. A subsample of students was clinically evaluated to identify which screening strategy performed better in terms of agreement with medical diagnosis. Finally, we assessed

which factors were associated with teachers' correct ascertainment of students to ADHD case or non-case groups.

Methods

Participants

Participants were 247 elementary school children attending ten third grade classrooms and their respective teachers. All children enrolled in the third grade and their respective teachers were eligible for the study. Public elementary schools situated around the university hospital area were identified in collaboration with the local school authority; proximity to the hospital was anticipated as critical because parents would be required to visit the research center for the child's clinical assessment. Third grade classrooms were chosen based on two theoretical assumptions: on one hand, the diagnosis of ADHD, even for experienced professionals, is particularly difficult in very young children (under 7 years of age), and on the other, classroom activities are split among different teachers from fourth grade on, reducing the amount of time each teacher spends with the class.

Instruments and procedures

Third grade teachers in the participating schools were presented with information about study goals and assessment procedures; all accepted to participate and signed an informed consent. Parents or legal guardians also received a letter detailing research procedures along with an informed consent form to authorize the use of teacher's ratings for research purposes. The hospital's institutional review board approved the study protocol.

First, teachers were individually presented a previously prepared sheet with the following overt question: "In your opinion, which (if any) of the students below has attention deficit/hyperactivity disorder (ADHD)?" The question was followed by the names of a random sample of half of the students in their respective third grade classes, listed in alphabetical order. Teachers were instructed to place a check mark besides the name of students for which they would answer the question affirmatively.

The reason to assess only half of the class at a time was that this study ran parallel to an intervention designed to improve teacher awareness on ADHD in the participating schools [2]; therefore, all procedures described here were conducted twice (half of students were assessed before and half after the intervention) (see below).

Immediately following the initial assessment, teachers received a package containing a set of three structured

rating scales, nominal for each student, as described below. Packages were collected at the participating schools 2–4 weeks later.

1. The teacher version of the Strengths and Difficulties Questionnaire (SDQ). A 25-items questionnaire enquiring about five dimensions of behavior (conduct problems, inattention and hyperactivity, emotional symptoms, peer relationships, and prosocial behavior) [12]. The SDQ has been translated into more than 60 languages, with good validity for child psychiatric conditions [42]. The SDQ is rated in a three-point Likert scale (0 = 'not true', 1 = 'somewhat true', 2 = 'certainly true'). The ADHD section is composed of five questions and caseness was defined as a score ≥ 6 , following the standard SDQ cut-off for hyperactivity and inattention problems.
2. The Swanson, Nolan, and Pelham IV scale (SNAP-IV) [39]. A reliable, valid and culturally adapted [21] instrument, largely used in both clinical and community settings. The scale is based on a total of 26 items: the 18 symptoms comprising the DSM-IV diagnosis of ADHD (9 in inattentive and 9 in hyperactive/impulsive dimensions) and the eight symptoms of oppositional defiant disorder (ODD). SNAP-IV items are rated on a scale from 0 ('not at all') to 3 ('very much') and caseness was defined as the presence of ≥ 6 symptoms in any ADHD dimension.
3. The Screening Form of Academic Function [10], a brief, non-standardized measure that evaluates teachers' perception of academic performance in reading, writing and math to compare students' performance relative to other students in the same grade level. The instrument is based on a 5-point Likert scale, from 0 = 'well below', 3 = 'average', to 5 = 'well-above'.

Clinical assessment

All students positively identified by teachers using the open question or any of the two screening strategies for ADHD were invited for a full evaluation in our research center to clinically establish or refute a diagnosis of ADHD. A random sample of students for which all three ADHD screenings approaches were negative was also recruited to better assess the agreement between clinical diagnosis and teachers' evaluations. Parents of students invited to the clinical appointments received a second letter, which explained the objectives and procedures involved. A contact phone was provided and parents were asked to call the research center to schedule an appointment. If no response was received over 60 days after the letter was sent, telephone home numbers were obtained from school registers and five attempts were made to schedule an evaluation

before the student was considered unreachable. Parent informed consent and child's assent were also gathered at this stage.

The diagnosis of ADHD and other potentially comorbid conditions was established using a best estimate procedure previously described elsewhere [29]. Briefly, a semi-structured interview (Schedule for Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime Version—K-SADS-PL) [16] was applied to parents by trained psychiatrists to derive DSM-IV diagnoses [3]; diagnoses derived through the K-SADS-PL were then discussed in a clinical committee, led by a senior experienced child psychiatrist (LAR). Required information about symptoms and impairment in the school environment were obtained through teacher ratings in the SNAP-IV and SDQ. Child's IQ was assessed through the use of Raven's standard progressive matrices test [4].

Intervention designed to improve teacher awareness on ADHD

Because this study is part of a larger investigation designed to test strategies to improve teacher awareness on ADHD [2], the procedures described above were performed twice, with half of each class randomly assessed before or after an intervention package. Teachers filled the reports (open question + scales) for half of the class before the intervention, while the other half of students was assessed following the intervention described below.

The intervention program was conceptualized to be a consistent but quick and easy to implement package of units of learning on ADHD and LD. The total length of the intervention was about 6 h to make it deliverable on a 1-day basis. The format includes a well-balanced mixture of lectures and presentations of clinical vignettes specially constructed for challenging potential misconceptions followed by vivid group discussion about ADHD/LD issues.

Statistical analyses

Descriptive statistics were calculated, including frequencies for categorical variables and mean, standard deviation, median, and range for continuous variables. Student's *t* test and Chi-square were used to assess differences between groups. Cohen's kappa was calculated to quantify agreement between teachers' ratings, and between ascertainment of case status by teachers and final clinical diagnosis. Multivariate binary logistic regression analyses were conducted to determine factors associated with teachers' perception of a child's ADHD status. For the primary analyses in this study, the following covariates were defined as study factors: assessment before/after intervention; school of origin; teacher; age; IQ; gender; math, reading and writing

performance; psychiatric diagnoses derived from KSADS-PL. Teacher positive identification of students as ADHD was considered the outcome. Statistically, a variable was defined to enter in multivariate analyses if associated with both independent and dependent variables for $p \leq 0.1$ in bivariate analyses. Additionally, age and IQ were included as a covariate in the multivariate models based on a conceptual rationale. Thus, variables were entered into the multivariate model based on one of the two criteria: (1) in the univariate analysis, the variable predicted ascertainment of case status based on above threshold score on SNAP-IV or SDQ scales for a $p < 0.10$; or (2) due to its conceptual importance to the outcome, regardless of statistical significance. ROC curve analyses were conducted to assess diagnostic performance of the two screening instruments. All tests were two-tailed. Statistical significance was set at $p < 0.05$. Analyses were performed using SPSS software, version 20.

Results

Six public elementary schools were identified in a 5-mile radius around the university hospital. One school did not agree to participate due to teachers' time constraints (classes were being held during the weekend to compensate for a recent strike); one school was excluded from the study because of a relatively recent intervention focused on child and adolescent anxiety disorders [31]. Thus, a total of four schools, comprising 279 third grade students, divided in 10 classrooms, were invited to participate in the study. Parents of 32 children did not sign the informed consent, resulting in a final sample of 247 students.

Participants were children regularly attending third grade classes in four public schools serving similar student populations, primarily composed of lower middle-class families, situated in a central urban area in the capital of the southernmost state of Brazil. 53.4 % were female, with ages ranging from 8 to 12 years (mean 9.62 ± 0.64). Mean score on Raven's standard progressive matrices was 26.74 ± 5.14 , corresponding to an IQ of 110, based on a subsample of 106 students tested.

Table 1 presents the rates of positive identification based on the screening strategy. Agreement among the three strategies was very low, with mean Kappa score 0.28,—all $p < 0.002$ (Table 2). While a significant correlation was found between teachers' SDQ ratings of ADHD and SNAP-IV scores in the hyperactivity ($p = 0.263$; $p < 0.001$) and oppositional behavior dimensions ($p = 0.228$; $p < 0.001$), this was not observed for inattention problems ($p = 0.063$; $p = 0.324$).

Considering all three screening strategies together, positive identification of students as ADHD was associated

Table 1 Teacher positive identification of students as ADHD based on screening strategy

	Screening instrument
Overt question	52 (21.1 %)
SNAP-IV	28 (11.3 %)
SDQ	13 (5.3 %)

Table 2 Correlation of positive identification between screening strategies

	Spearman's (ρ)
Overt question-SNAP	0.35
Overt question-SDQ	0.19
SNAP-IV-SDQ	0.30

with age ($p = 0.045$), but not gender or IQ (respectively, p values = 0.37 and 0.69). Higher levels of academic difficulties, as rated by teachers on the Screening Form of Academic Function, were also found in association with teachers' positive identification of students (Fig. 1). Mean scores for reading, writing and math differed significantly according to case status, with progressively lower scores in all three academic abilities depending on the number of positive screenings for ADHD (0, 1, 2 or 3 positive screenings).

A total of 122 students were invited for a full clinical assessment, including all of the 52 students positively identified by teachers; a random sample of other 70 students with negative screening was also invited (Fig. 2). Diagnosis was confirmed in 18 cases, of which 17 had been positively identified by at least one of the structured questionnaires (SDQ, SNAP-IV, or both). Agreement between teachers' assessment and final clinical diagnosis was higher for the 73 negative cases, which included 51 cases negatively screened in both structured questionnaires. Among the three screening strategies, both the SNAP-IV and the SDQ scales showed moderate agreement with the final clinical diagnosis (Table 3).

Since both the SNAP and SDQ yielded similar agreement with the final clinical diagnosis, a receiver operating characteristic curve (ROC) analysis was performed to further explore the performance of these screening strategies (Fig. 3). Results showed that while the SNAP performed well, with area under the curve (AUC) of 0.818, the ADHD module of the SDQ performed at nearly chance level (AUC = 0.527).

Finally, we conducted a binary multivariate logistic regression to identify which factors were associated with teachers' correct or incorrect identification of a child as having or not ADHD. For this outcome, clinical diagnosis

Fig. 1 Mean *z*-scores of teacher rated reading, writing, and math abilities on the Screening Form of Academic Function according to the student's number of positive screenings for ADHD. Not suspect = negative in all three screening strategies (overt question, SDQ, SNAP-IV); low = 1 positive screening; medium = 2 positive screenings; high = positive identification in all three screening strategies

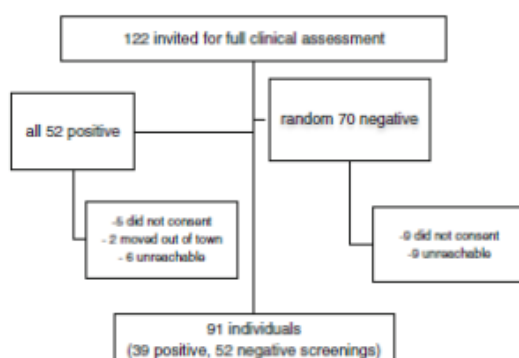
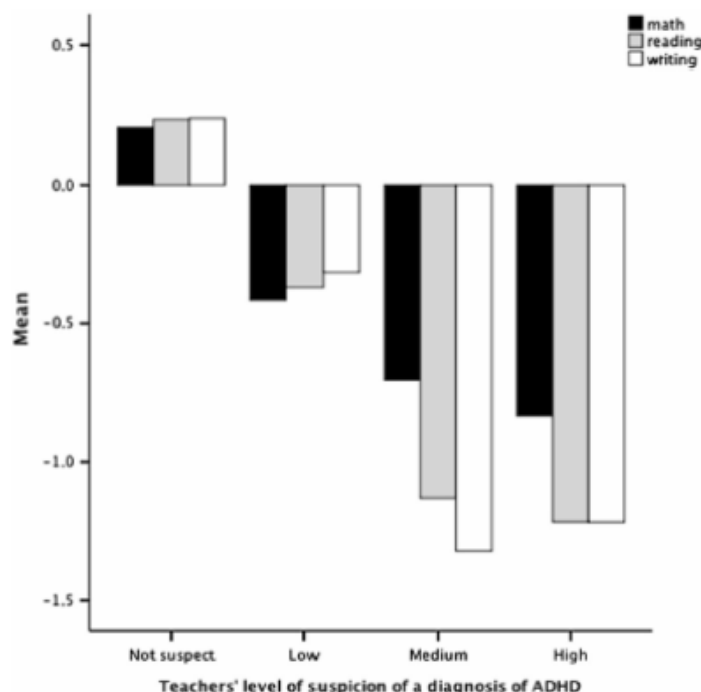


Fig. 2 Patient flowchart

Table 3 Agreement between screening instrument and clinical diagnosis

	κ	p
Overt question	0.15	0.17
SNAP-IV	0.49	<0.001
SDQ	0.43	<0.001

was compared to SNAP-IV ratings to establish concordant ($n = 75$) and discordant ($n = 16$) evaluations between teachers and clinicians. SNAP-IV ratings above the standard

cut-off of six symptoms per dimension were used to define positive status of a student based on teachers' judgment. We hypothesized that other emotional/behavior issues, learning difficulties, younger age, lower IQ, and male sex would reduce teachers' ability to correctly identify students as ADHD. As our intervention to improve awareness might have influenced teachers' ability to identify cases of ADHD, this variable was also introduced in the model. Age ($p = 0.92$) and IQ ($p = 0.99$) were not associated with the outcome in the univariate analysis but were included in the multivariate model based on clinical relevance. The final model indicated that only the presence of a comorbid externalizing disorder (ODD or conduct disorder) significantly predicted a decreased likelihood of being correctly identified by teachers as having ADHD (Table 4).

Discussion

In searching for the best approach to obtain information on ADHD symptoms in the school setting, we found that structured questionnaires—either narrow or broad range—provide a more useful strategy than open questions. While overt questioning resulted in the identification of over 20 % of students as possibly having ADHD, this figure dropped to half and a quarter with the use of SNAP-IV and SDQ, respectively. Moreover, following individual clinical

Fig. 3 Receiver-operating characteristic curves for teacher reported SDQ score and SNAP-IV symptoms

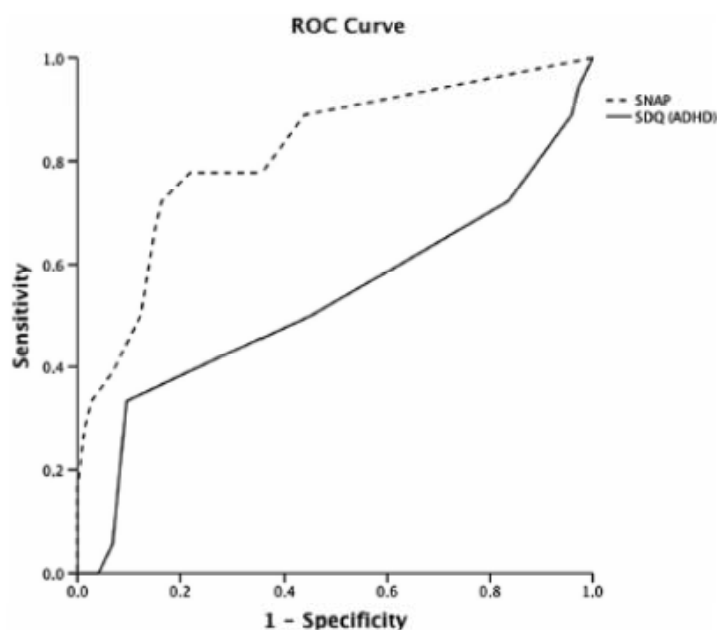


Table 4 Multivariate binary logistic regression of variables associated with teachers' correct identification of student status as ADHD

	B	SEM	Odds ratio	p value
Intervention	−0.852	0.703	0.42 (0.10–1.69)	0.225
Age	0.823	0.587	2.28 (0.72–7.20)	0.161
IQ	0.065	0.073	1.07 (0.92–1.23)	0.367
Male gender	0.718	0.698	2.05 (0.52–8.04)	0.303
Math performance	0.033	0.855	1.03 (0.19–5.51)	0.969
Reading performance	−1.62	0.884	0.20 (0.35–1.11)	0.066
Writing performance	1.29	0.919	3.63 (0.60–22.0)	0.160
Anxiety disorders	−0.775	0.661	0.46 (0.12–1.68)	0.461
Mood disorders	0.065	1.58	1.06 (0.48–23.7)	0.967
Externalizing disorders	−1.85	0.728	0.16 (0.38–0.65)	0.011

Variables entered on the model were age; IQ; gender; session (before/after intervention); reading, writing, and math performance based on the SFAF; clinical diagnosis of anxiety, mood or externalizing disorders (conduct disorder and oppositional defiant disorder) based on KSADS-PL.

SFAF Screening Form of Academic Function, KSADS-PL Schedule for Affective Disorders and Schizophrenia for School-Age Children, Epidemiological Version—K-SADS-PL.

assessment, we have shown that the use of the two screening questionnaires was able to identify almost all (17 out of 18) true cases of ADHD. Our results indicate that while both SNAP-IV and SDQ show a moderate agreement with the final clinical diagnosis of ADHD, only the SNAP-IV was able to provide an accurate discrimination of true positive and negative cases.

Teachers have a central role in the diagnostic process of children with ADHD. From early referral to assessment of symptoms in the classroom, and the subsequent monitoring of treatment effects, teachers actively participate in the often-complex evaluation process required to establish a careful diagnosis of ADHD. Modern guidelines, current and future diagnostic classification systems have all stressed the importance of both reports from different information sources and the pervasiveness of symptoms when diagnosing ADHD in elementary school children [8, 15, 24]. These children spend most of their daily time at school. Since getting reports from teachers on ADHD symptoms is becoming a challenge in different cultural environments, there is a need to define which are the reliable and easy to implement approaches to obtain information on ADHD from teachers [33]. Very few investigations tackle this clinical and logistic dilemma.

Our results suggest that the choice of screening strategy has a significant impact on the correct identification of students for further clinical evaluation. While by a simple overt question, teachers identified one in every five students as possibly presenting ADHD, the use of standard cut-off ratings of structured questionnaires yielded a more conservative estimation and a higher proportion of true positive and negative cases.

Both standardized assessment tools investigated in this study, SNAP-IV and SDQ, have good psychometric properties and are generally easy to complete, allowing their application with multiple informants; they are available on the internet free of charge, take relatively little time to

complete, and require no specific training. In our study, the performance of SDQ, or more precisely, of the five questions pertaining to ADHD in the questionnaire, provided a prevalence of approximately 5 %, which is close to that found in the community [25]. This would suggest that the SDQ module for inattention/hyperactivity problems is not suitable for screening ADHD in schools, as this may result in an underestimation of affected children, with many false-negative cases. Our results also suggest that this underestimation may be due to a relatively low sensitivity of the SDQ in capturing the inattentive dimension of ADHD, as ratings correlated only with hyperactivity/impulsivity and oppositional problems in SNAP-IV. This effect has been observed in a previous research with Italian teachers [20], showing that, according to a factor analysis of the SDQ, the two hyperactivity items of the questionnaire loaded on the same factor as the conduct problems items.

The use of a narrow-scale, the SNAP-IV, presenting teachers with a comprehensive list of ADHD symptoms rendered more promising results. The SNAP-IV identified almost 12 % of our sample as potentially having ADHD, based on teacher ratings of observed school behavior. The diagnostic performance of the instrument in ROC curve analyses was the only acceptable. A previous research has shown that teacher rated SNAP-IV has useful accuracy in detecting symptomatic changes following treatment (for both inattentive and hyperactive behaviors) [27] and in distinguishing children with behavioral/emotional problems from those who do not, although not for differentiating high-risk children who meet DSM-IV criteria for ADHD or not [7].

Our study confirms previous observations of an association between ADHD symptoms and scholastic impairment in non-referred samples of school-aged children [28]. We showed that the number of positive screenings for ADHD was associated with progressively lower ratings of academic abilities in math, reading and writing. This adds to a well-established body of evidence showing significant academic and educational problems in clinical samples with full diagnosis [11, 18, 19]. Compared with typically developing children, ADHD children are more likely to use remedial academic services, be placed in special education classes, be suspended or expelled from school, show significant academic underachievement, with poor grades in reading and mathematics, and an increased likelihood of repeating a school year.

We also showed that co-occurring behavioral problems, particularly comorbid ODD and/or conduct disorder, significantly predicted a lower accuracy in the discrimination of correct positive and negative cases of ADHD. The negative halo effect exerted by externalizing disorders, by which a child displaying one behavior (e.g., oppositional)

is rated as having other (e.g., inattention and hyperactivity) without any direct evidence of these other behaviors [13], has been consistently demonstrated in the literature [1, 13, 14, 38]. Contrary to our hypothesis, sex, age, IQ and academic difficulties (with the exception of reading, which was marginally associated with the outcome) did not contribute to the final model. Moreover, the intervention conducted with teachers also had no significant impact on the correct ascertainment of ADHD status. This finding highlights the need to carefully assess the effectiveness of teacher training programs. The issue of lack of efficacy of some universal educational and/or psychosocial interventions has been extensively discussed recently [33, 37].

Our results must be interpreted in the context of some limitations. Our sample size was moderate, derived from a single geographical area including only third grade students and chosen by convenience. To that extent, our results may have suffered from selection bias and need to be confirmed by investigations with larger samples including students from different elementary grades and cannot be generalized to other study populations. Second, we were unable to confirm or refute the diagnosis of ADHD in all students; therefore, we cannot rule out that a potential selection bias may have influenced instruments' performance for the diagnostic phase of the study. However, students not clinically assessed did not differ from those included on age, sex, and more importantly on SDQ and SNAP-IV scores (data available upon request). Third, although we were not aware of any students who were at the time being treated for ADHD in the sample, we did not control for teachers' previous knowledge of the diagnostic status of ADHD (i.e., we did not ask teachers whether they were aware of any student who had already been diagnosed with ADHD). Fourth, we relied on a non-standardized instrument (Screening Form of Academic Function) to assess academic abilities and IQ measures were based on a nonverbal group test that was not obtained for the whole sample. Finally, any investigation like ours carries a potential tautological problem since ADHD clinical diagnosis determined by best estimate procedures includes information on ADHD at school by teachers. Thus, there is a higher chance of agreement between the independent variables (overt question on ADHD, SDQ and SNAP-IV scores) and the dependent variable (clinical diagnosis of ADHD). There is no satisfactory solution for this dilemma until biological markers might be available for diagnosing ADHD.

In sum, our results indicate that the use of different screening strategies to assess ADHD symptoms in schools results in significantly different rates of identification. We suggest that the use of structured, narrow-band questionnaires provides a more adequate strategy for screening ADHD in schools, compared to overt questioning of teachers' impressions or small sub-scales in broad-band

surveys of emotional symptoms. Moreover, our results indicate that comorbid externalizing disorders impose further difficulties in the correct identification of actual cases of ADHD by teachers. Inclusion of childhood mental health problems in the curriculum of teacher training programs needs to be more tested before assuming its efficacy. If implemented, special attention should be given to improve teachers' correct differentiation between externalizing disorders and ADHD. Teachers may also help to identify students at risk for other childhood mental health problems, and can play a key role in the assessment, management, and prevention of negative outcomes [26]. Future diagnostic classification systems should provide more specific recommendations on how to obtain and incorporate data from different information sources for the diagnosis of ADHD.

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Conflict of interest Dr Rohde was on the speakers' bureau and/or acted as consultant for Eli-Lilly, Janssen-Cilag, Novartis and Shire in the last 3 years. He receives authorship royalties from Oxford Press and ArtMed. He also received travel awards (air tickets + hotel) for taking part of two child psychiatric meetings from Novartis and Janssen-Cilag in 2010. The ADHD and Juvenile Bipolar Disorder Outpatient Programs chaired by him received unrestricted educational and research support from the following pharmaceutical companies in the last 3 years: Abbott, Eli-Lilly, Janssen-Cilag, Novartis, and Shire. Dr. C. Kieling received two partial travel stipends to participate in ADHD-related meetings from Novartis. Dr. R. Kieling, Dr. Aguiar, Dr. Domeles and Dr. Costa have no conflict of interest to disclosure.

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Article

health:

Attention deficit/hyperactivity disorder blame game: A study on the positioning of professionals, teachers and parents

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Abstract

Attention deficit/hyperactivity disorder is currently the most debated childhood psychiatric diagnosis. Given the circulation of competing perspectives about the ‘real’ causes of children’s behaviour and the ‘best’ way to treat them, we aim to analyse the interactions of the central social actors’ discourses about attention deficit/hyperactivity disorder children within the Italian context. Adopting a multi-method approach, we focus on the polyphonic chorus of voices surrounding the child, studying the discourses of mental health professionals, teachers and parents. These actors are representative of three contexts that are deeply engaged with attention deficit/hyperactivity disorder: medical institutions, schools and families. Our theoretical and methodological approach integrates positioning theory, the Bakhtinian notion of dialogical thinking and discourse analysis to study stakeholders’ reflexive and interactive positioning in terms of the attribution of rights, duties, responsibilities and power issues. The results show that mutual blame is a constitutive element of relational dynamics among the key adults surrounding attention deficit/hyperactivity disorder children. We argue that these conflicting relationships are not merely related to the debate regarding the validity of the attention deficit/hyperactivity disorder diagnosis. Rather, the mutual blame centres on questions of compliance, recognition of authority and morality. Through the *blame game*, adults negotiate their own and others’ subjectivity in ways that simultaneously (re)produce power relationships and resistance efforts.

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attention deficit/hyperactivity disorder, blame, discourse analysis, morality, positioning

Attention deficit/hyperactivity disorder children in the midst of scientific, social and political conflicts

Childhood behavioural and mental problems are on the rise in terms of both public attention and the number of diagnoses (Pastor and Reuben, 2008). Currently, the most common and debated psychiatric diagnosis for children is attention deficit/hyperactivity disorder (ADHD) (Furman, 2005). The behavioural spectrum of ADHD includes hyperactivity, impulsivity and inattention.

The ADHD debate is characterised by a myth–reality dichotomy (Bailey, 2009) that is constructed on the opposition between two main discourses. On the one hand, ADHD is a disorder with neurobiological correlates (Rohde et al., 2005) and high heritability (Swanson et al., 2000). On the other hand, critics consider ADHD a construct modelled on changes in social and scientific contexts due to continually evolving conceptualisations of the disorder and its diagnostic criteria (Singh, 2008), its high rate of comorbidity (Newcorn et al., 2001) and the lack of a biological test for the diagnosis (Nair et al., 2006). According to critics, this construct reflects a tendency towards pathologisation (Timimi et al., 2004) and an implementation of regulatory devices and forms of social control for children and families (Conrad, 1976: 89).

The dominant mode of treatment, methylphenidate, is the subject of considerable controversy (Breggin, 2002). Sceptics consider medications simplistic solutions (McLeod et al., 2007) that may negatively influence a child's autonomy and responsibility (Brock, 1998: 55).

The debate has been exacerbated by the rapid rise of the disorder (Zito et al., 2000). Its prevalence has dramatically escalated in recent decades, especially in the United States (Akinbami et al., 2011).

In Italy, ADHD is a relatively recent issue for debate. In a 2007 article, Frazzetto and colleagues emphasised that ADHD was not recognised as a valid disorder by many Italian child psychiatrists, and methylphenidate was not available in the market. A small group of parents fought to educate the public and teachers about ADHD. Things have changed rapidly, and ADHD is now a popular disorder among professionals and lay people. The number of people diagnosed has increased significantly in conjunction with the introduction of methylphenidate to the Italian pharmaceutical market in 2007. A recent study estimates that ADHD affects 7.1% of children between 6 and 7 years old (Mugnaini et al., 2006). These changes are also linked to the activity of associations and advocacy groups attempting to influence social policies and legislation regarding ADHD. Some committees and campaigns have focused on the potential abuse of medication during childhood and the pathologisation of human behaviour. The Italian Association of ADHD Families (Associazione Italiana Famiglie ADHD (AIFA)) and an association of professionals promoting the social acceptability of ADHD (Associazione Italiana Disturbi Attenzione e Iperattività (AIDAI)) have created networks for parents and organised trainings and have attempted to counter critical information.

In general, ADHD children are at the centre of a scientific and social controversy about the ‘real’ causes of their behaviour and the ‘best’ way to treat them. Because there is no organic marker for the disorder, the presence of ADHD is diagnosed by stakeholders, professionals as well as teachers and parents, whose interactions determine the diagnosis and management of the problem. The presence of conflicting discourses regarding ADHD children and the role of key adults in the diagnostic and treatment processes lead to interesting analyses of how different groups of social actors discursively frame and understand the nebulous problems linked to ADHD. These discourses shape and provide meaning for this phenomenon and show how ADHD relates to the larger social, political and economic contexts of children’s lives (Singh, 2011).

Research aims

We aim to analyse the interaction of the discourses of central social actors, mental health professionals, primary school teachers and parents, regarding children diagnosed with ADHD. We believe that these actors are representative of three contexts that are deeply engaged with this topic: medical institutions, schools and families.

We focus on stakeholders’ self-positioning and mutual positioning because discourses about ADHD construct different subjectivities for children and the people around them. Specifically, we concentrate on the attribution of rights, duties, responsibility and power issues to study how participants define a specific local moral order (Davies and Harré, 1990) and establish coherence within an ambiguous semantic field. These dynamics are important because they not only shape people’s subjectivities but also affect their perceptions and actions (Winslade, 2003).

The literature has paid insufficient attention to the relationships between adults proximal to the ADHD child, and this topic requires further examination and understanding. ADHD children and their social environment undergo a process of mutual shaping (Singh, 2011).

Previous research has highlighted a range of implications of the ADHD phenomenon (Bennett, 2007; Malacrida, 2004; Rafalovich, 2005; Schmitz et al., 2003; Schubert et al., 2005, 2009). However, the socio-contextual implications of ADHD constitute an under-researched topic of study in Italy. As Frazzetto et al. (2007: 395) noted, it is important to deepen the understanding of the national characterisation of ADHD to appreciate how the phenomenon is shaped by specific institutional, social and cultural factors.

Two questions orient the analytical section of this article: how do social actors organise their reflexive and interactive positioning? How are moral dimensions and power articulated within this positioning dynamic?

Positioning the self and others: mapping rights, obligations and power distribution

Because ADHD is at the centre of a collision of different *statements* constructing distinct versions of reality, we integrated tools derived from positioning theory (Van Langenhove and Harré, 1999) and a Foucauldian reading of the text (Foucault, 1969) at both a theoretical level and a methodological level.

Positions are conceptualised as relational processes that constitute the interactions between individuals and explain the dynamics of their interplay. Positioning is a discursive construction used to locate and define both the self and the others who are participating in narratives (Tirado and Gálvez, 2007). Each position is associated with specific rights and duties of speaking and acting, which define a particular local moral order within one or more storylines (Harré et al., 2009) and precipitate obligations and expectations.

The concept of discursive positioning conceptually refers to the Bakhtinian notions of multivocality and dialogism (Bakhtin, 1981: 426) because every act of positioning is situated within the context of multiple social discourses, a condition that Bakhtin calls ‘heteroglossia’ (1981: 263, 428). Within this ‘corridor of voices’ (Bakhtin, 1986: 121), the construction of meaning is structurally relational and dialogical. The Bakhtinian dialogical approach is a particularly useful tool for group research settings, as it allows to address the polyvocality that characterises group discussions, frequently featured by shifting discourses and multiple nuanced perspectives.

Positions’ meanings are relative to the position taken by or attributed to others (Hermans, 2001), and positioning is associated with a set of rights, duties and obligations. In this frame, positioning theory is useful to address the way in which power is constructed, distributed and localised through discursive practices (Boxer, 2003: 255–257). Discursive practices are implicated in the construction and negotiation of power relations via the recognition or the delegitimation of specific subjective positions (Ling, 1998). Positions are characterised by different levels of privilege concerning the possibilities for action and the right to be viewed as legitimate social agents (Winslade, 2003). Subjective positions, and their related power differentials, are connected to specific regimes of knowledge and to the broader historical, sociopolitical and discursive context in which the power is embedded (Foucault, 1969).

Method

Data collection

Data were collected using multiple methods, including interviews, focus groups and non-participant observations of natural groups meetings. Specifically, 13 mental health professionals (6 child psychiatrists, 5 psychologists and 2 social workers – 10 women and 3 men) participated in a 1-hour interview. Fifty-four female primary school teachers were involved in seven focus groups. Thirty-five parents (20 women and 15 men) participated in self-help and support group meetings for parents of children diagnosed with ADHD, which were followed for 6 months. Some theoretical assumptions have oriented the sampling strategy and the choice of the methods employed.

We have tried to use goal-oriented methods of collecting data. Personal interview was adopted as the method with specialists because we were interested in exploring how they constructed accounts on ADHD starting from their experience and how they provided reasons to support their professional practice. Moreover, putting professionals in a group situation could result in a polarisation of the discussion centred on the ADHD controversy, which was not our focus.

We found focus groups an appropriate source of data with teachers because the group discussions allowed to witness the social interaction processes implied in the construction of a contested topic like ADHD (Kitzinger, 1994). Although focus groups should not be considered as equivalent to natural conversations, they constitute a research setting where participants enact conversations that could reproduce everyday situations of interaction and debate.

The parents' self-help group was selected as an appropriate way of collecting data because it allowed to observe how parents, through the interaction with other parents, are socialised to the 'ADHD world' and the 'appropriate' ways of talking about ADHD. Moreover, the association these parents are involved with is one of the most relevant voices within the Italian actual debate on ADHD. These parents, through their activism, are contributing to the construction of specific discourses related to ADHD.

Sample size is one of the aspects that mostly distinguishes discourse analysis from traditional research perspective (Potter and Wetherell, 1987: 161). According to discourse analysis, sampling criteria should consider the potential for data to express significant features and elucidate specific patterns relevant for the phenomena under study.

Potter and Wetherell (1987: 161) highlighted that discourse analysis is a very laborious approach and, because of that, collecting too much data might lead to the inability of analysing linguistic details. Furthermore, the authors state that 'a large number of linguistic patterns are likely to emerge from a few people, small samples or a few interviews are generally quite adequate for investigating an interesting and practically important range of phenomena' (Potter and Wetherell, 1987: 161).

In line with these assumptions, we considered that about 15 interviews with mental health professionals would represent a proper number. Indeed, a larger number of interviews would have prevented an in-depth analysis of data, and a fewer number of interviews would have not allowed to include different kinds of disciplinary sectors (psychiatry, psychology and social work). Therefore, a purposive sampling strategy has been used to have a cross-professional representation of ADHD diagnostic and treatment processes. We contacted 16 specialists, and among them, 3 declined our invitation because of time constraints. This resulted in a sample of 13 professionals. This sample size is in line with previous research based on discourse analysis (Avdi et al., 2000; Benford and Gough, 2006; Stevens and Harper, 2007). Regarding the data collection with teachers, we thought that a number of about eight focus groups could offer a wide and diversified, but still manageable, amount of data. We contacted nine schools; given that two schools' principals did not accept our invitation to participate in the research because of concerns about the difficulties in organising the groups, our final sample includes seven focus groups. Concerning parents, a 6-month observation of their meetings was considered a reasonable time to develop some level of intimacy and trust with parents in order to observe the spontaneous intergroup dynamics.

In-depth interviews and focus groups were conducted following two guides: one for the professionals' interviews and another for the teachers' focus groups, to address ideas about and experiences with ADHD children and their contexts. For the parents' group meetings, non-participant observation was chosen as the method to witness the spontaneous intergroup dynamics during the parents' discussions and to not influence the intimate atmosphere that parents constructed to share their experiences and feelings.

Parents met monthly, and the encounters were moderated by a woman and a man who were active members of the Italian Association of ADHD Families (AIFA). The meetings were attended by varying numbers of parents, ranging from 5 to 16.

After some public primary schools, public child psychiatric services and private therapists and clinicians in northern Italy were identified, prospective participants were contacted through email or telephone invitations. Two schools and three professionals declined the invitation because of time constraints. Permission to attend the parents' meetings was given by AIFA.

We conducted the research respecting the Code of Ethics for Research and Teaching of the Italian Psychological Association (Associazione Italiana di Psicologia (AIP)). Participants were informed about the aims of the research in terms of the social aspects of ADHD, and their anonymity was ensured. Informed consent was obtained to audio-taping. Data were collected by the first author in 2011, and all materials were recorded and transcribed.

Data analysis

We analysed the content and the organisation of participants' positioning repertoire, focusing on reflexive positioning, which is used to position oneself, and interactive positioning, which is used to position others.

Discourse analysis was applied to analyse data. Our approach integrates two different but overlapping traditions in the field (Wetherell, 1998: 338), as we drew on both discursive psychology and Foucauldian discourse analysis (Willig, 2001).

The first one can be defined as a micro-discursive approach and corresponds to the interpretative repertoires paradigm (Edwards and Potter, 1992; Potter, 1996). This paradigm implies a close analysis of the text to describe the discursive strategies and resources (Stainton Rogers, 2011: 132–133) used by speakers to construct specific versions of reality, counter possible alternatives and present themselves as credible. This approach focuses on the rhetorical and pragmatic aspects of the text, as well as the discursive sequence and the use of language, to describe 'how people use discourse in order to achieve interpersonal objectives in social interaction' (Willig, 2001: 91).

This description of discursive strategies is useful to understand what people are doing when speaking. Since we wanted to identify the links between the stories told by participants and socially available discourses and processes of power, this approach has been integrated with a Foucauldian inspired discourse analysis (Parker, 2008). This macro-discursive approach focuses on power, ideology and subjectivity (Stainton Rogers, 2011: 136–137). In particular, the historical context of emergency of phenomena is considered (Harper, 2011: 85), in order to locate the text within wider discursive practices. In line with Foucault's definition of discourse as social 'practices that systematically form the objects of which they speak' (Foucault, 1969: 49), this approach aims at examining how discourses constitute particular phenomena as natural (Parker, 1997). The analytic focus is on patterns of discourse, that is, systems of meanings linked to wider social discourses, ideologies and structures on which people draw upon when talking about their experiences and opinions and which form their subjectivity (Parker, 1997: 296). In this sense, the analysis goes behind the text, considering how the individual discourse embodies

patterns and resources available in the specific socio-historical context, which are linked to power dynamics and constrains (Willig, 2001: 107).

The original transcripts in Italian language were first read several times by the primary investigator, who produced a list of recurring and interesting categories and features of the texts and associated them with the relevant extracts. This list constituted the basis for the analysis and was directly elaborated in English language to allow a pluralistic approach, given that one of the authors is not Italian speaker. The extracts from the transcripts were first translated from Italian to English by the first author and then reviewed by a bilingual interpreter to ensure equivalence of meaning. Then, following a recursive process of coding, discursive strategies and patterns progressively emerged through several discussions between the authors. Following Parker (1994), attention has been paid to the ‘subjects’ populating the participants’ accounts and the right, duties and responsibilities associated with each of them, as well as with the ‘objects’ appearing in the text and their multiple significations. We then mapped diverse discursive strategies and patterns, considering the actions they perform and the role that these discourses play in reproducing or subverting power relationships. The analysis within each group of participants was followed by an analysis of the dynamics and the interplay between the three sets of accounts, to identify elements of concordance, contradiction and contrast within and across the different voices of the participants.

It must be acknowledged that despite the researcher’s position as a silent observer during the parents’ meetings, the presence of a psychologist may have influenced the parents’ conversations. For example, the presence of a psychologist may have led the parents to enact justifying and legitimatising strategies.

Results

Multiple discourses about ADHD characterise professional, scholarly and parental narratives. Three types of discourses shape ADHD as they relate to the positioning of social actors. The first type is discourses related to the positioning of the ADHD child. The second type relates to the reflexive positioning, that is discourses regarding the self-positioning associated with the ADHD experience. Finally, there are discourses related to the positions attributed to a plurality of others who inhabit storylines that are characterised by a ‘blame loop’.

In this article, we present discourses related to the self and to others’ positioning, which show the dialogical relation between the construction of one’s own subjectivity and the symbolic locations attributed to others involved in the narratives. Discourses related to the positioning of the child will be addressed elsewhere.

Reflexive positioning: personal engagement with ADHD

In this section, we address how participants position themselves in the process of constructing ADHD.

Many professionals exclude the subjective nature of their own perspectives on ADHD-associated activities. They do so by referring to ‘precise guidelines and procedures’ (child psychiatrist 2), ‘well established treatments’ (child psychiatrist 3) and

‘check lists’ (child psychiatrist 5). This construction functions to avoid any reference to the specialist’s personal perspective and subjective involvement in the diagnostic and treatment processes and to conquer a self-position as a mere executor of protocols that provide ‘an objective feedback of what happens’ (child psychiatrist 5).

Regarding the use of medications, which is one of the most frequently debated issues related to ADHD, professionals use two main strategies. The first strategy is the use of the rhetoric of scientific proof and objectivity:

My approach is so scientific and rigorous that drugs are given in an absolutely objective way.
(Child psychiatrist 4)

The second strategy is articulated around the need for a pharmacological intervention. Evoking the idea of necessity works to construct experts’ choices as decisions that depend on the external situation and are not related to personal responsibility:

I have used the pharmacologic treatment a lot with kids when ... we just had to use it. We are not a drug-oriented unit, but in some cases, another approach was not thinkable. (Child psychiatrist 1)

This emphasis on the objective and neutral nature of their professional work contrasts with the fact that when professionals are specifically asked about the evaluation of treatment outcomes, they claim to rely on subjective assessment criteria:

It is not a strictly clinical evaluation, it is also a very subjective one ... when the kid goes to school without getting 27 reprimands in a month and passes in all subjects ... then the treatment was effective. (Psychologist 3)

Another discursive resource that mental health professionals use to exclude any form of responsibility is to engage in a ‘cross-reference circle’ to resolve dilemmas related to drug administration. In particular, psychologists and social workers tend to refer to the authority of child psychiatrists, claiming that doctors are in charge of understanding medications issues and affirming their own incompetence and inability to take a stance on the use of drugs:

The drug-related damages can be well understood only by those who deal with [them] ... say, the neurologist, the psychiatrist, the child-psychiatrist. I really can’t enter that field because I lack specific knowledge ... how can I tell it? (Psychologist 5)

This statement shows that the ‘rhetoric of expertise’ operates even within the community of experts by defining ADHD as a medical affair and by developing a hierarchy that positions the majority of professionals as mere executors of predetermined (medical) procedures.

Child psychiatrists in turn refer to the Italian ministerial protocol, delegating their responsibility to the abstract and reified level of default procedures and guidelines. As one psychiatrist affirmed when asked what he does in case of treatment failure, ‘It depends on what the protocol says’ (child psychiatrist 4).

Unlike the majority of professionals, teachers' accounts show that they are professionally and personally engaged with issues related to ADHD because children's behaviour constitutes a challenge to teachers' professional role and social position.

Teachers' subjectivity seems to be at risk because of the challenge that children represent to adults. As one teacher says, 'It's a challenge with the adult, they challenge you in every possible way ... as a grown-up, it's destabilising' (focus group 6). In particular, ADHD children do not respect the boundaries established by traditional inter-generational discourse that requires children to respect adult status and teachers' authority:

They contest you, you feel questioned by a kid ... at times if I say that something 'is so' it is so, then you gotta step back and say, 'Now I'm the teacher here and you must listen, period'. (Focus group 1)

Because of this disrupted image of the 'innocent child' (Beah, 2007), teachers' educational practices can no longer be directed by the traditional scholarly discourse. This 'fall' leads teachers to feel uncertain and to question their ability to manage situations associated with hyperactive and inattentive children.

- TB: There's fear in managing these situations ... I never know if I'm adequate, if I'm capable, if I can tackle it.
TE: If you're doing it right or not.
TA: I'm afraid of that too ... of failing! (Focus group 4)

The frailty perceived by teachers may provide an opportunity for medicine, psychiatry and psychology to enter the school system. Teachers' lack of self-confidence contributes to a transfer of responsibility to mental health professionals, who are considered in charge for managing children's behavioural problems:

It's fundamental to have also medical support in the education of the child (...) The educator will sustain the development (...) but we need a scientific reading in school. (Focus group 7)

On the one hand, teachers position themselves as needing of doctors' knowledge and support. On the other hand, teachers reclaim the value of their social mission and their right to exert a recognised educational role. For example, during a focus group, a teacher commented on an encounter with a child psychiatrist who, in response to a request for suggestions and indications, 'told us "this is the pathology" so it's this way because he's sick, period'. This quote highlights the gap between what teachers feel they should do and what they think is suggested by some specialists. Furthermore, the next extract by the same teacher shows the conflicting character of the relationship between professional and scholarly discourses and teachers' struggle to find a non-subordinate space for action:

The frustration of thinking, 'What the hell, we're here to teach something, we have an educational role here' ... the rules, it's true that he (the child) can't internalise them, but what are you gonna do? Let him be? (Focus group 2)

Likewise, ADHD is a challenge to parents' identity as they question their parenting abilities and feel stigmatised by the school and by professionals who do not reference the ADHD diagnosis for their children's problems. Parents make use of many types of narratives to manage blame and to construct themselves as prototypes of good parenting.

Parents as self-sacrificers. This narrative especially characterises mothers, who construct themselves as able and ready 'to do everything' for their children. In this sense, mothers internalise the value of sacrifice associated with the maternal role (Singh, 2004) and construct themselves as the subjects responsible for their children's state of being:

I gave up working, I resigned and I immediately started being at home ... I started going around, doing, bringing ... now people say to me, 'You've been great, you've done this, you've done that'. I haven't been great, I simply love my son ... it's normal, I believe this is the normal thing that every parent should do. (Mother 1)

Parents as real experts. The majority of parents place their accounts within a chronological frame according to which they realised that 'something was wrong' since the very first years of the child's life. The purpose of this construction is to underline the non-educational character of the problem and to demonstrate parents' ability to understand their children:

In the first grade, I said, 'There's something wrong here'. I mean, there's something wrong and it's not our fault. He (the child) was lucky, I believe, to have two parents that were over-confident ... It was not an education issue, but I could get the [ADHD] certification after two years even if I had immediately understood. (Mother 12)

Parents as lonely fighters. In line with the position of real experts, parents shape their subjectivity as victims of others' ignorance who must fight against schools, psychologists and doctors to have their children's pathology recognised:

I've worked for 12 years on my own when there were no resources on this ... without doctors, without psychologists, I was alone and I fought against everybody, psychotherapists, psychometricians ... I found such teachers and I had to move him to another school because they haven't understood the problem. (Mother 15)

Self-diagnosed fathers. A special discursive pattern pertains to some fathers who, given the supposed hereditary character of ADHD, categorise themselves as having ADHD in response to their children's diagnosis. Whereas mothers internalise the discourse that identifies them as the primary subjects responsible for 'fixing' their children's behaviour, fathers assume biological responsibility for their children's condition, constructing themselves in conformity with medical knowledge and with ideas of self-formation and self-improvement (Comstock, 2011):

While being at the association, I discovered that I have ADHD myself. Considering all of the things we were told during meetings, I'm actually like that (...) I'd like to try this famous Ritalin drug. I can manage to do things pretty well even now, so we'll see after I take it. (Father 6)

Interactive positioning: the blame loop

In this section, we discuss the dynamics of the mutual positioning between social actors ‘at work’ in the context of the child. We argue that people who are personally and professionally engaged with ADHD negotiate the reality of the child’s condition, the necessary interventions and their subjectivities in a vicious circle of mutual blame.

Both teachers and parents view medical knowledge on ADHD as authoritative and unquestionable from a theoretical point of view. For some teachers, especially the youngest ones, the presence of a psychiatric diagnosis certifies per se the existence of a physical condition:

If someone is diagnosed with something, it’s because he has ... an organic, structural problem.
(Focus group 4)

Similarly, parents frame the medical understanding of their children’s behaviour as the scientific, proven ‘truth’ of the illness, which clears them of responsibility:

Father 2: ADHD doesn’t come from psychological distress, so you don’t have to think to be responsible for that.

Mother 1: This is very important ... you don’t have to blame yourself(...) they are born this way ... it’s a genetic thing.

Although teachers and parents construct hyperactivity and inattention as topics under medical authority, many professionals are blamed for diverse reasons. For teachers, this blame relates to the potentially negative implications of the medical discourse and the struggle of resisting them. By positioning themselves as active social agents in children’s education, teachers reclaim the right to ‘try to do something’. The following extract compares two different psychiatric centres to offer a concrete example of the legitimacy of teachers’ practices. The attempt to reclaim a specific space for action paradoxically reinforces the position of specialists as those who are in charge of judging the teachers’ work:

The child-psychiatrist (told us) ... because we were looking for answers ... the answer was, ‘When he grows up, he’ll either be a suicide or a criminal ...’ When we didn’t accept this and said, ‘We’re not ok with this’, they looked at us ... these two idiots! Now he attends another centre and the answer has been, ‘No, it’s not like that, the work you did was actually very good’ ... Maybe he’ll be a delinquent, but he might also become ... at least we’ve tried! (Focus group 2)

Parents signify their experience of being stigmatised blaming the majority of the *psy-community* for not recognising ADHD and addressing it in a standardised way:

Mother 4: [You have] to go to a psychologist, but one that knows what we’re talking about.

Mother 7: Right, because in the vast majority of cases they don’t.

Mother 4: They don’t! They don’t know, and many times they refuse it! They have to know what you’re talking about to help you in the right way!

Because if you end up in the hands of a child psychiatrist or psychologist who doesn't understand this thing, they're gonna ruin your kid!

Parents use the medical knowledge they have acquired on ADHD as a device to reverse the traditional relationship between passive patients and authoritative specialists, positioning themselves as the real experts and many professionals as in need of training:

We can't sit in front of someone that knows less than us ... I told the psychologist, 'Doctor, how come that I know more than you? ... If it's so, let's switch roles, and let's have you paying me the hour and I'll teach you what an ADHD kid is'. (Father 3)

Teachers are positioned by mental health professionals as anchored to an old-fashioned educational outlook and are criticised for their 'scarce knowledge and awareness of this pathology' (psychologist 4). This position is tied to what professionals see as teachers' intentional unwillingness to recognise experts' authority and related negligence towards the child:

Some teachers want to diagnose kids themselves. I hear a lot of 'but, in my opinion ...' There are some parameters and standards, and we put them to use. Questioning the diagnosis means to not give the child the necessary support. (Psychologist 2)

The lack of compliance by teachers is attributed to their inability to accept that their 'legitimate place' is under the authority of psychiatrists and psychologists:

There is ignorance and overconfidence on the part of teachers ... They are also overconfident in the sense that they don't want to acknowledge the phenomenon, they complain ... So everyone should do their own job and know their place. (Child psychiatrist 4)

Parents also blame teachers. In light of the ADHD diagnosis, teachers are accountable for the child's performance deficit, and they are often considered culpable for not updating their 'obsolete' knowledge or adapting their practice to scientific prescriptions:

When he was diagnosed, I brought the papers, and they (the teachers) didn't even know what it was. Not only didn't they take any classes, but they didn't even treat him with the compensatory and dispensatory measures. (Mother 15)

These divergences lead parents and teachers to frequent debates and conflicts about who is capable, authoritative, and understanding of the problem:

The main teacher didn't know anything at all ... She thought she was so clever and good at managing him, and she blamed us parents for being incompetent (...) She attacked me because I'm incapable of giving him rules and all, whereas actually she is the incapable one. (Mother 13)

Although parents are positioned by professionals as 'victims of the pathology' (psychologist 5), they are intensely blamed for a vast array of reasons. In particular, parents are under scrutiny with respect to their own mental condition and the family's configuration. Even if

these aspects are never directly linked to the child's difficulties, professionals assess parents to determine whether they will be willing to follow the experts' instructions. In the next quote, a psychologist re-conceptualises the concept of normality, a socially unacceptable term, translating it into the ability 'to make the specialist's work easier':

Many ADHD children have families that are not so well structured ... single parents, strange domestic partnerships, them being taken care of by the grandparents ... or with personality disorders ... Let's consider a normal family ... I don't like the word normal, I used it without thinking ... Let's say a family that makes this task easier. (Psychologist 5)

When parents do not apply professionals' instructions, they are pushed into an infantilised position that depicts them as victims of their own psychological defensive mechanisms or as incapable of accepting the idea that they are affected by the same pathology as their child. This dynamic supports Berman and Wilson's (2009) results, which stated that mothers' resistance to medical statements is frequently constructed as pathological:

Parents always have a defensive attitude towards new rules suggested by the therapist for them to apply as parents (...) They sometimes disobey. (Child psychiatrist 1)

Parents' struggle to accept that their son has a problem represents also their struggle with accepting that they have a problem themselves. The mother of an ADHD kid was a clear case of undiagnosed ADHD, and she didn't want to accept it. (Psychologist 1)

When parents refuse to accept medications, they are instrumentally positioned as guilty via a rhetoric that distinguishes between observable medical evidence and parents' 'anchorage to prejudice', mistaken perceptions, irrational feelings, fears, personal problems and selfishness:

In many cases, they are sceptical (about drug use) ... There's this fear, but the fear is only theirs. I mean, it might have to do with them, their problems, their past ... Well, all these parents don't put themselves in their sons' shoes, they don't feel the struggle and the pain of the child. It's some sort of selfishness ... I mean, I don't know, I'd call it selfishness. (Child psychiatrist 3)

Teachers also draw upon a discursive blame pattern related to the way they position parents. Throughout the focus groups, most teachers came to articulate their discourses around the interaction between genes and environment, highlighting the powerful influence of social factors to signify the ongoing increase in children's level of hyperactivity. The social environment is seen as the problematic root of many contemporary childhood difficulties. The family is viewed as the place where negative social tendencies exert an influence on children, and parents are positioned as perpetrators of negative educational practices. Society affects families, which, in turn, affect children.

- TC: They don't have any rules at home, so they come to school and they can't even accept a minimum of regulation.
- TB: They are at the computer or they watch TV.
- TE: So there's this inadequacy of the educative role [of parents]. (Focus group 1)

In this sense, families are represented as the harmful and misleading Other:

If you have some principles in class and at home kids have opposite behavioural models, well, you are building something and they are demolishing it. (Focus group 6)

Positioning game: knowledge, compliance, authority and morality

The results presented in the previous sections suggest that participants shape their own and others' positions around four main interrelated issues: knowledge, compliance, authority and morality. In this section, we will explore these dynamics in depth.

Mental health professionals construct their activities and practices with reference to the concept of objective knowledge, and they claim that teachers and parents must be trained to become 'more effective educators'. In this sense, professionals locate parents and teachers in a 'childlike position', and their educational relationship to the child is considered an outcome of possessing the proper knowledge:

Both schools and families need to learn how to manage these children, following a training path to be better educators themselves because these children need a specific approach, at school and in the family. (Social worker 2)

The relationship between health specialists and schools is limited to passing on the standardised 'instructions to follow' or 'recipe' (psychologist 1) necessary to manage the child. Between professionals and parents, a powerful discursive pattern regarding the 'parental function' of science dominates the relationship: parents should be trained to become 'skilled problem solvers' (child psychiatrist 2), they should be 'educated on how to interact with their son' (social worker 1) and they should focus on applying 'instructions for use for the ADHD child' (psychologist 4).

Teachers and parents are placed in a powerless position and are accused of lacking understanding of ADHD children; professionals put themselves in the authoritative position of fulfilling the social mandate to educate children when parents and schools are unable. Overall, this dynamic explains why specialists blame teachers and parents despite the fact that the children's conditions are considered to have a biological origin. Refusing to accept experts' authority and demonstrating non-compliant behaviour lead to guilt because failing to follow experts' instructions is construed as an irresponsible action that works against the child's future. Within this local moral order, teachers and parents show a mix of acceptance and resistance to medical discourse, struggling against the position of 'passive executors' and reclaiming their right to speak and act.

Legitimacy and authority issues characterise also the conflicted relationship between teachers and parents:

TA: The changed role that we have as teachers also has an influence (...) We lost that importance we had in the society and in the parents' eyes, and kids feel that ... what about the stuff the teacher says? You listen to it if you want to.

TG: Today everybody is an expert in education, isn't it?

TD: As teachers, we're not authoritative anymore. (Focus group 3)

There are teachers who are sure to know everything. My son's teacher is insane, I told her, 'Please, if you wanna come to one of our (parents') meetings, so you can understand lot of things' (...) nothing. They think they know everything just because they are teachers. (Father 4)

The above quote shows that schools and families often depict themselves as antithetic agencies of socialisation that do not recognise their authority to one another and blame each other for not behaving in a 'responsible' way.

Overall, the underlying problem facing key adults shifts from the causes of the child's behaviour to questions of true knowledge, compliance with instructions and recognition of authority. The network of adults does not distribute blame for the child's behaviour; rather, social actors distribute blame for the lack of respect towards medical, educational or parental authority. The actors struggle to have their voice recognised and create a space of action that others restrict or limit. These topics are linked to the issue of morality. Compliance and recognition of others' authority are framed as assumptions of moral responsibility for the child's best interest. By contrast, the lack of recognition of others' role and authority is constructed as an immoral act of refusing to behave in the child's interest. These dynamics attest to the relevance of moral dimensions related to ADHD (Singh, 2011) and show that morality pervades the relationships between the adults involved.

Discussion

The results show that blame and mutual accusations are constitutive elements of social relationships among the adults who play significant roles in the lives of children with ADHD. In particular, we argue that the conflicting relationships between social agents who are supposed to work together for the child are not merely a matter of believing that ADHD is biologically based or related to psychosocial factors. Rather, these relationships are concerned with questions of compliance, authority and morality.

The literature has highlighted that ADHD is discursively placed within a culture of blame, and studies have especially focused on parents' experiences of blame (Hansen and Hansen, 2006; Harborne et al., 2004; Singh, 2004). In particular, Singh (2004) has explored mothers' experience of blame in a culture that valorises maternal self-sacrifice. Consistent with this literature, our results show that even though hyperactivity and inattention are ascribed to biological and genetic conditions, this conceptualisation does not prevent conflicts among medical, scholarly and familial institutions. Our contribution shows that blame not only affects parents but also circulates in the triangle of adults who interact with the child. This blame discourse is the storyline by which all participants inscribe others and themselves and frames their construction of subjectivity.

The circulation of blame is articulated differently for the three groups. Experts' construction of their knowledge as objective leads them to devalue teachers' and parents' knowledge and expertise. In particular, experts blame schools and families when they do not conform to their indications.

Teachers may not question the medical understanding of ADHD, but a substantial number of them direct blame towards parents and society in general to account for the child's behaviour. This pattern is coherent with the 'toxic childhood' rhetoric

(Horton-Salway, 2010: 12) that characterises some discourses on children and ADHD but shows that biological and psychosocial discursive repertoires of ADHD, as identified by Horton-Salway (2010), are not markedly distinct in the case of teachers, who construct mixed discourses. This process might be indicative of the tension between the tendency to conform to the psychiatric body of knowledge and the effort to maintain a distinct perspective. Therefore, the tendency to integrate the academic and medical agendas, which suggests that medical and psychological knowledge is needed for proper child development (Singh, 2006), is supported primarily by professionals and is partially resisted by teachers.

Finally, parents, particularly mothers, counter the blame by both professionals and teachers by shaping their subjectivity in terms of narratives of sacrifice. Mothers' arguments attempt challenge blame but simultaneously contribute to reproducing the social order that positions them as objects of oppressive social expectations related to the maternal role (Singh, 2004).

Regardless of the way the positioning is articulated, the transfer of responsibility from the self to others represents a common discursive pattern among participants. It is interesting to note the primacy of individual responsibility as opposed to collective responsibility (Fine, 2012). Indeed, we can witness an individualisation of guilt via a common rhetoric strategy that opposes a homogeneous chorus of voices relying on a well-recognised knowledge to a single isolated voice that 'wilfully' refuses to accept the truth.

The *blame game* is a way for adults to negotiate not only what must be done but also by whom, allocating rights, duties and obligations in ways that (re)produce power relationships and efforts to resistance. Indeed, social actors are embedded in the politics of knowledge that defines medical and psychological statements as legitimate and establishes a priori whose knowledge counts and who has the authority to dictate instructions to others (Fine, 2012). These conflicting dynamics outline a constellation of different levels of legitimacy; blame emerges as a way to resist these power inequalities.

Although some discourses are normative and others are marginalised, everyone is constrained by certain social bonds established in discourses (Parker, 2005). The discourses we have presented prescribe specific positions that are limiting for teachers, parents and professionals. For the two former social actors, the legitimacy of their views, the relevance of their 'evidence' and the value of their expertise are frequently limited and constrained. As professionals scrutinise teachers and parents, they also monitor each other within a general dynamic of mutual devaluation and surveillance in the name of the child's wellness.

Teachers and parents are not the only targets of criticism and prescription. Professionals are also pushed to embrace the medical 'hegemony' (Gramsci, 1975: 1249), and every act of resistance is constructed as intentional ignorance, a refusal to know or irresponsibility.

Because the relationships between adults and their respective institutions influence the relationships between adults themselves and the child, this loop of mutual refusal to recognise the rights and agencies of others may have concrete negative implications for children. It may prevent effective collaboration within the network of parents, teachers and clinicians, negatively influencing the quality of care given to the child. The results

of this study will be discussed with the participants, in particular with the parents and the teachers, to engage them in a process of re-authoring their narratives that may contributing to new, flexible forms of positioning. Working with the diverse social actors relevant to children may create a reflexive space to make sense of complexity (Kildea et al., 2011: 613), promote respect for diverse forms of knowledge and prevent the minimisation and marginalisation of others' voices.

These dynamics may also influence the practices of child welfare and educational system. For example, pressure on professionals to provide a standardised answer may lead to a marginalisation of alternative ways of understanding children's difficulties, which may result in a greater tendency towards medicalisation and an increased prevalence of the ADHD diagnosis. Moreover, blame exerted on teachers may interact with structural conditions, such as a lack of resources in public schools, large classroom sizes and rigid programs. This interaction may lead educators to conform to the dominant mode of treating children with medications, with the adverse effect of reinforcing the 'psychologisation and therapisation of teaching' (Miller and Leger, 2003: 26). Finally, blaming parents may encourage them to adjust to simple and quick solutions to complex problems instead of adopting more holistic and inclusive approaches.

This systemic mutual blame may also lead to a further search for biological evidence of ADHD in hopes of resolving this controversy. This approach may reinforce a reductionist view by linking problems to the brain, restricting therapeutic options and increasing the tendency to provide partial solutions to a multifaceted phenomenon.

In conclusion, we argue that the scientific, social and political conflicts concerning ADHD are not only linked to the validity of the diagnosis, but also intersect with wider issues related to the contemporary social power of psychiatry, the delegitimation of public education and the underestimation of the influence of social factors on children's mental health, which is combined with narrow scrutiny on the child and his or her parents. In this sense, the ADHD phenomenon, particularly in times of neo-liberal shrinkage of the state and 'austerity' (Fine, 2010), constitutes an increasingly privatised channel for the expression of opposition between three major social institutions: the family, school and medicine.

This study has some limitations. In particular, this group of parents is unique because they are involved in an association that works to promote the social acceptability of ADHD. In our future research, we aim to involve parents who are not members of associations or social movements as well as professionals who have an alternative vision of children's expressions.

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Spelling errors among children with ADHD symptoms: The role of working memory



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ABSTRACT

Research has shown that children with attention deficit/hyperactivity disorder (ADHD) may present a series of academic difficulties, including spelling errors. Given that correct spelling is supported by the phonological component of working memory (PWM), the present study examined whether or not the spelling difficulties of children with ADHD are emphasized when children's PWM is overloaded. A group of 19 children with ADHD symptoms (between 8 and 11 years of age), and a group of typically developing children matched for age, schooling, gender, rated intellectual abilities, and socioeconomic status, were administered two dictation texts: one under typical conditions and one under a pre-load condition that required the participants to remember a series of digits while writing. The results confirmed that children with ADHD symptoms have spelling difficulties, produce a higher percentages of errors compared to the control group children, and that these difficulties are enhanced under a higher load of PWM. An analysis of errors showed that this holds true, especially for phonological errors. The increased errors in the PWM condition was not due to a tradeoff between working memory and writing, as children with ADHD also performed more poorly in the PWM task. The theoretical and practical implications are discussed.

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1. Introduction

Attention Deficit/Hyperactivity Disorder (ADHD) is a psychiatric diagnosis that identifies children who exhibit inappropriate levels of inattention and/or hyperactivity (American Psychiatric Association, 2013). The disorder is typically associated with poor scholastic outcomes (e.g., Fischer, Barkley, Edelbrock, & Smallish, 1990). Children with ADHD may also have a comorbidity with learning disabilities (Mayes, Calhoun, & Crowell, 2000; Re, Pedron, & Lucangeli, 2010); however, children with ADHD without any comorbidity may also encounter difficulties while performing school tasks, especially when their regulative deficits (i.e., attentional control, planning, organization, monitoring, etc.) are in conflict with the task requirements, such as in writing. Indeed, writing represents one of the most complex learning abilities for all children, particularly those with ADHD, because it involves several cognitive functions that include planning, working memory, organization, monitoring, attention, long-term memory, etc. Research has indicated that the influence of neurocognitive

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functions determines the difference between good and poor writers (Hooper, 2002). One such function is working memory (WM) (Berninger & Swanson, 1994; Swanson & Berninger, 1996). WM is crucial during the writing process because it allows one to maintain linguistic strings and retrieve words, ideas, and grammatical rules from long-term memory; further, it permits the online monitoring that is fundamental during writing (Kellog, 1996; McCutchen, 1996; Swanson & Berninger, 1996). A greater efficiency in the writing processes results in a better management of working memory resources, as well as in better writing performance (Olive, 2004).

Given the well-known deficit in executive functions, particularly working memory, within children with ADHD (Martinussen, Hayden, Hogg-Johnson, & Tannock, 2005), it is reasonable to expect that such individuals could encounter several difficulties in a writing task. Despite its importance and its crucial role in school learning (Hooper et al., 1993), the writing skills of children with ADHD have not received much attention thus far. Existing evidence suggests that children with ADHD have greater difficulties in writing (in different aspects of writing, such as written expression, spelling, and graphia) compared to other scholastic abilities (Kroese, Hynd, Knight, Hiemenz, & Hall, 2000; Mayes & Calhoun, 2007; Mayes et al., 2000). In a recent study, Re and Cornoldi (2013) also found that children with ADHD made more spelling errors than typically developing children—not only under dictation, but also in a copy task, particularly when they had to write accents and geminates.

In a series of studies on the expressive writing skills of children with ADHD and without comorbid learning disorders, Re and coauthors (Re, 2006; Re & Cornoldi, 2010; Re, Pedron, & Cornoldi, 2007) found that these children made more mistakes when invited to produce new texts, but these errors tended to disappear when the children were trained to adopt specific controlled procedures during text production (Re, Caeran, & Cornoldi, 2008). This finding suggests that the spelling errors were not due to orthographic weaknesses, but, rather to the self-regulatory problems of children with ADHD. Recently, Noda and colleagues (2013) studied writing performance in two clinical groups: ADHD and developmental coordination disorder. The authors considered several aspects of writing, such as spelling accuracy, tracing and copying accuracy, and handwriting. The results showed that inattention predicted spelling accuracy and handwriting fluency, while fine motor ability predicted tracing and copying accuracy.

In sum, there is initial converging evidence showing that children with ADHD have writing difficulties and make many spelling errors during the writing process. This spelling difficulty could be attributed to a series of factors associated with spelling, including working memory, that may be defective in children with ADHD (Martinussen et al., 2005), especially because of its phonological component that is critically associated with spelling (Baddeley, 1986). However, the specific role of working memory in the spelling accuracy of children with ADHD symptoms during a typical writing task, such as a dictation, has not yet been studied.

To examine these issues, in the present study we compared the performance of a group of children with ADHD symptoms and a control group in two dictation texts, one under typical conditions and one under a pre-load condition that required the participants to remember a series of digits while writing. We hypothesized that the children with ADHD symptoms would be more prone to spelling errors and would have a lower performance in the working memory task than the children in the control group, as suggested by the previous literature; further, we expected that the concurrent working memory task would specifically affect the performance of children with ADHD symptoms. In particular, due to the phonological properties of the to-be-remembered material, we hypothesized that the spelling impairment in the dual task condition would mainly interest phonological errors and, to a lower extent, the other two error categories that are typically considered when assessing Italian spelling accuracy (Tressoldi, Cornoldi, & Re, 2012), such as non-phonological errors and errors within geminate accents.

2. Method

2.1. Participants

Nineteen children with symptoms of ADHD (mean age: 120 months, $SD=9$, males = 16) and 19 typically developing children (mean age: 118 months, $SD=9$, males = 16) participated in this study. All children were Italian and were recruited from local primary schools. The two groups were matched for age, gender, rated intellectual ability, and educational level.

Children were included in the ADHD group on the basis of teachers' interviews and the cut-offs available for the SDAI scale ('Scala per i Disturbi di Attenzione/Iperattività per Insegnanti,' ADHD scale for teachers; Marzocchi, Re, & Cornoldi, 2010); this scale includes 18 items, each depicting descriptions of one of the 18 symptoms of ADHD as indicated in the DSM-5 (APA, 2013). The scale includes two subscales, one for Inattention (9 items), and one for Hyperactivity/Impulsivity (9 items). Teachers are required to closely observe the child's behavior for about 2 weeks and report the frequency of the symptomatic behaviors that are described in each item. Scores range from 0 (problematic behavior never present) to 3 (very often present). We selected those children who scored above the cut off (14) in at least one of the two scales. The mean scores in the Inattention Subscale were respectively 14.84 ($SD=4.07$) and 0.53 ($SD=1.43$) for the ADHD and the control group, while the mean scores for the Hyperactivity Subscale were respectively 10.26 ($SD=7.53$) and 0.37 ($SD=.83$).

Both children with ADHD symptoms and the children in the control group had an average cognitive level and did not present other serious psychological problems (i.e., oppositional and aggressive behaviors, anxiety, and depressive symptoms): These aspects were assessed through the specific items of the COM questionnaire (Marzocchi et al., 2010) that was completed by the teachers. Moreover, the teachers were interviewed in order to confirm the presence of ADHD

symptoms, as well as to exclude children with other relevant difficulties. None of the children had a history of neurologic or psychiatric problems. Written consent from the children's parents was obtained before participating in the experiment.

2.2. Material and procedure

2.2.1. Dictation tasks

All children were tested in a quiet room at their school. They participated in two consecutively administered dictation tasks: a first text was taken from BVSCO (Batteria per la Valutazione della Scrittura e della Competenza Ortografica [Battery for the Assessment of Writing Skills of Children from 7 to 13 years of age], Tressoldi et al., 2012), and a second text was specifically designed for the purposes of the present study and had the same characteristics of the first text. The two texts were matched for their number of words (135), number of sentences (7), and orthographic difficulties. Within each text, the seven sentences varied in length, as well as in terms of linguistic and syntactic complexity, in order to represent the different typical sentences that a child can write. The presentation of one of the two texts was associated with a Phonological Working Memory task (PWM) which consisted of remembering 4-digit sequences that were read aloud by the experimenter before each sentence. The children were required to keep the digits in mind while writing the sentence dictated by the experimenter. Specifically, the experimenter first read the digits, then read one of the 7 sentences from the text (at the pace indicated in the test manual) and the child had to write down the sentence and the previously heard digits (see examples in Table 1). The order of the presentation of the two texts and the presence of the PWM task were counterbalanced between the participants according to the following scheme:

- Text A in standard condition; Text B in PWM condition.
- Text A in PWM condition; Text B in standard condition.
- Text B in standard condition; Text A in PWM condition.
- Text B in PWM condition; Text B in standard condition.

The two dictation tasks were administered consecutively in a unique session that lasted about 30 min.

2.2.2. Scoring

The procedure recommended in the test manual (Tressoldi et al., 2012) was used to score the children's productions. We computed the total number of spelling errors and then categorized three different kinds of errors according to the classification in the manual:

- *Phonological errors (PhE)*: Reading the written word would produce a different phonological result from the real word (e.g., "il bane" rather than "il pane");
- *Non-phonological errors (NphE)*: Reading the written word would produce the same sound as the real word (e.g., "ilpane" instead of "il pane"). Examples of possible non-phonological errors include splitting a word in two, combining two words into one, and errors in the use of "h" (in Italian, "anno" [year] and "hanno" [they have] are pronounced in the same way) or "q" (in Italian the initial sound for "quota" and "cuore" is identical).
- *Refinement errors due to accents or geminates*: The right sequence of letters is written, but there are errors that relate to double letters or accents on the last vowel (e.g., "girafa" for "giraffa," or "citta" for "città").

Given that a few dictated words were sometimes missing and, therefore, the amount of written material could differ from one participant to another, we computed the overall percentage of errors for each child, and the percentages of the three types of error in relation to the total number of words written by each child.

For the scoring of the phonological working memory task, we considered the total number of digits correctly recalled (and in the correct order) by the children.

2.2.3. Data analysis

First of all, we conducted a mixed ANOVA on the total percentage of errors in order to examine the differences between groups and between conditions (i.e., with or without PWM). We then analyzed the specific types of errors with a mixed ANOVA. Finally, we compared the two groups on the PWM task with *t*-tests.

Table 1
Example of procedure for the dictation with concurrent PWM.

Experimenter	7. 2. 9.5 (PWM)
Experimenter	In the endless American plains, before the arrival of the White men, Indian tribes lived for longtime in their lands, in hamony with nature (<i>Nelle sterminate pianure americane, prima dell'arrivo dell'uomo bianco, le tribù indiane vivevano da secoli nelle loro terre, in armonioso equilibrio con la natura</i>). (dictation)
Children	7. 2. 9. 5. (written)
Experimenter	6. 1. 3. 8. (PWM)
Experimenter	Dictation...

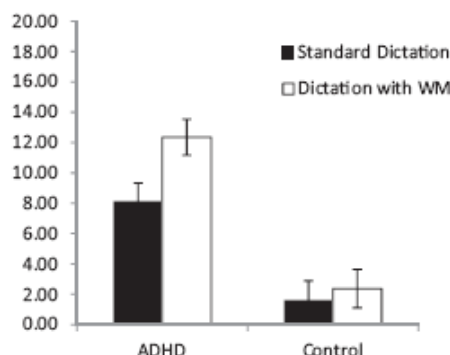


Fig. 1. Percentage of total errors in the two groups of participants (bars represent standard errors).

Table 2

Mean percentages of errors in the standard dictation and in the dictation with PWM in both groups of participants (standard deviations are reported in parentheses).

	Standard dictation			Dictation with PWM		
	Phonological	Non-phonological	Other	Phonological	Non-phonological	Other
ADHD	7.74 (7.28)	1.63 (1.73)	3.63 (3.30)	14 (8.78)	2.42 (2.85)	3.84 (3.35)
Control	1.53 (1.43)	.37 (.83)	.79 (1.51)	1.89 (1.91)	.68 (.94)	1.32 (1.83)

3. Results

All of the children paid attention to both tasks and were included in the data analyses. In order to investigate whether or not differences between the two groups would emerge in the number of errors and if these findings depended on the type of dictation, we first examined the case of the total number of errors, as this measure was the most robust. Therefore, we conducted a mixed ANOVA 2 (Group: ADHD vs. control) \times 2 (Type of dictation: standard vs. with PWM), with Group as the between-participant factor and Type of dictation as the within-participant factor on the percentages of total errors as the dependent measure. We found a main effect of Group, $F(1,36) = 25.14$, $p < .001$, $\eta_p^2 = .41$, such that the ADHD group produced more overall errors than the control group of children; further, we found a main effect of Type of dictation, $F(1,36) = 21.03$, $p < .001$, $\eta_p^2 = .37$, which was qualified by an interaction with Group, $F(1,36) = 10.17$, $p < .01$, $\eta_p^2 = .22$; post hoc tests showed that, only in the group of children with ADHD, a significantly higher percentage of errors was produced in the dictation with the WM load ($M = 12.36$, $SD = 7.48$) compared to the standard dictation text ($M = 8.14$, $SD = 7.08$) (see Fig. 1).

Further, we examined whether differences would also emerge in terms of the specific types of errors. To this end, we conducted a mixed ANOVA 2 (Group) \times 2 (Type of dictation) \times 3 (Type of error) on the percentages of errors. As predicted, the three-way interaction was significant, $F(2,72) = 12.50$, $p < .001$, $\eta_p^2 = .26$. Post hoc comparisons showed that the preload condition produced a significant increase in comparison to the standard condition in the percentage of errors of children with ADHD, only in the case of phonological errors (see Table 2), a pattern of results that was not observed in the control-group children. This ANOVA also revealed the effects found in the previous analysis and for this reason they will be not discussed here.

Further, we examined whether groups indeed differed in the working memory performance. Thus, we performed a t -test on the total number of correctly recalled digits. A digit was considered correctly recalled if it was recalled and appeared in the correct order. We found a difference between groups, $t(36) = 6.81$, $p < .001$, with the typically developing children having a higher WM performance ($M = 26.42$, $SD = 1.61$) than children with ADHD symptoms ($M = 18.05$, $SD = 5.1$). More generally, a higher WM performance was related to better spelling performance. Indeed, in the total sample of children, the WM score was negatively highly correlated with the total percentage of errors in both the standard dictation task ($r = -.65$, $p < .001$) and in the dictation with PWM ($r = -.77$, $p < .001$).

4. Discussion

One of the main difficulties that children with ADHD encounter in their lives is related to academic failure. However, literature has not brought sufficient attention to the nature of these academic difficulties, especially in the case in which ADHD is not comorbid with a learning disability. The present study examines the case of spelling and offers further evidence on the difficulties of children with ADHD symptoms in this field (Re & Cornoldi, 2013). The results show that these difficulties hold true, even when children do not present a comorbid diagnosis of learning disabilities.

The present study offers information on mechanisms that relate to writing and that highlight the role of phonological working memory in the writing process.

Indeed, in the present study we compared children with ADHD symptoms and a group of typically developing children on two dictation texts: one under typical conditions and one under a pre-load condition that required them to remember a series of digits while writing the sentence dictated by the experimenter. The results showed an increase in spelling errors, especially in the PWM load condition, and this increase was particularly evident in the group of children with ADHD symptoms. This result is consistent with the notion that the phonological loop is responsible for the maintenance and processing of both series of digits and words (Baddeley, 1986) and an impaired phonological loop affects spelling performance (Re, Tressoldi, Cornoldi, & Lucangeli, 2011). We know from the principal writing models that WM is crucial during the writing process for two main reasons: first, because it allows one to maintain all of the conceptual information to produce a sentence (such as linguistic strings, ideas, and grammatical rules from long-term memory); second, because it permits the online monitoring that is fundamental during writing (Cornoldi, Del Prete, Gallani, Sella, & Re, 2010; Kellog, 1996; McCutchen, 1996; Swanson & Berninger, 1996). A good efficiency of WM permits a good management of all of the requested information during the writing process. In the specific case of this research, an efficient WM permits the maintenance of the digits and the retrieval of the correct spelling of the dictated words.

In particular, the dual task especially increased phonological errors, which further supports the specific effect due to the phonological WM load. In fact, the phonological representation in memory of a word is crucial (and potentially sufficient) for avoiding phonological errors. The phonological loop is not sufficient for avoiding the other types of errors where the access to the long-term memory orthographic lexicon is necessary (Kellog, 1996). Furthermore, children with ADHD symptoms who performed poorly on the writing tasks had also a poor performance in the working memory task. Thus, it was not the case that they devoted much higher attention to the working memory task to the detriment of the dictation task. In general, the overall poor performance of children with ADHD in the WM load condition may be due to their impaired WM (Barkley, 1997); the association of the two concomitant tasks in the current study—dictation and memory for digits—likely overwhelmed these children's abilities, while it was within the capacity limits of typically developing children. We note that evidence of a disrupted WM in children with ADHD mainly refers to visuo-spatial working memory (VSWM) tasks (Martinussen et al., 2005), and active WM tasks (Cornoldi, Giofrè, Calgaro, & Stupiggia, 2013) whereas phonological memory may be intact (Cornoldi et al., 2001). In the current study, children with ADHD symptoms had a worse performance, even in a phonological WM task. This is likely due to the fact that the dual task proposed here required high cognitive and attentional resources, even if the digit span was a passive (and simple) working memory task that children with ADHD symptoms usually perform well (Martinussen et al., 2005). This result is consistent with the assumption that, when there is a dual request, a passive simple span also becomes an active task, thus creating a particular difficulty for children with ADHD (Cornoldi & Vecchi, 2003).

We cannot exclude the assertion that the present findings were influenced by the minor orthographic weakness of children with ADHD: If retrieval of a correct orthographic representation is less automatic in these children, it is therefore likely that a secondary task which limits the cognitive resources would damage the final performance (McCutchen, 1996). For this reason, future research is warranted in order to examine this specific aspect, including, for example, a secondary task which does not involve phonological working memory. It would also be important to replicate the study with clinical samples of children with ADHD and other severe disorders (we must note that in Italy there is a general caution for the diagnosis of ADHD and typically the diagnosis is made only in the most severe cases that usually present several comorbidities). Further, a wider body of larger written materials should be considered in future research. Indeed, it is possible that the fact that part of our results did not replicate previous findings (i.e., the higher frequency of accents and geminates; Re & Cornoldi, 2013) could be due to the specific material proposed in this study that included a small number of words that could elicit this type of error.

With these limitations in mind, the present study nonetheless shed light on the important role of working memory in sustaining the writing process, which represents one of the most important learning abilities. The results of the present study support the importance of the role of working memory during the writing process. The outcome of this research adds an important piece to the puzzle of the specific role of working memory in the spelling accuracy of children with ADHD symptoms during a typical writing task such as a dictation. Indeed, our children with ADHD symptoms made more errors in the condition with PWM load and significantly more phonological errors. This result offers further confirmation of the hypothesis that the spelling difficulties of children with ADHD are related to the more general problem in executive functions of these children, in particular on WM, than to general spelling weakness; this research shows how WM difficulties can worsen a performance in a scholastic task such as a dictation. In a precedent-setting study on the expressive writing of children with ADHD symptoms, the authors found that a simple facilitation such as a guide-scheme (that support the planning phase of the expressive writing process) could improve significantly the performance of these children, even significantly reducing spelling errors (Re et al., 2008). The results of the present study once again confirm those results, underlining the fact that errors may be worse if children are put into non-optimal conditions, particularly if their executive dysfunctions are not taken into account.

Consequently, from an educational perspective, from this study we can deduce important considerations. We notice that children are typically required to write under conditions that affect their phonological WM capacity, as it happens when they are disturbed by concurrent auditory noise, or when they must write while remembering other verbal information, instructions, etc. These conditions may foster the likelihood of incurring spelling errors, even in the absence of a

dysorthography. By reducing this concurrent load, it should be possible to attenuate the difficulties of children with ADHD symptoms and develop the autoimmunization of orthographic competencies.

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(in attuazione della D.G. sanità n. 3250 del 11/04/2011)
Capofila Progetto: UONPIA Azienda Ospedaliera "Spedali Civili di Brescia"
"Condivisione dei percorsi diagnostico-terapeutici per l'ADHD in Lombardia".