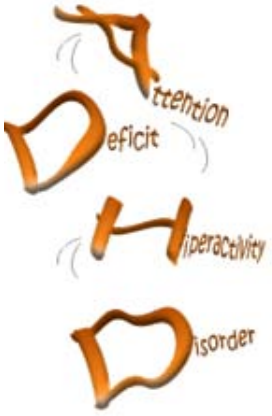
NEWSLETTER



INDICE:

ISTITUTO DI RICERCHE FARMACOLOGICHE MARIO NEGRI IRCCS

BIBLIOGRAFIA ADHD GIUGNO 2013

Adv Ther. 2013 May;30:472-86.

EFFICACY AND SAFETY OF LISDEXAMFETAMINE DIMESYLATE IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND RECENT METHYLPHENIDATE USE.

Jain R, Babcock T, Burtea T, et al.

INTRODUCTION: Lisdexamfetamine dimesylate (LDX) is a long-acting prodrug stimulant for the treatment of attention-deficit/hyperactivity disorder (ADHD). Post hoc subgroup analyses were performed from two studies in children with ADHD to compare the efficacy of LDX in participants who had received prior methylphenidate (MPH) treatment with that of the overall study populations.

METHODS: Study 1 (7-week; open-label design) and study 2 (randomized, double-blind, placebo-controlled, crossover, laboratory school design) enrolled children aged 6-12 years with ADHD and baseline ADHD Rating Scale IV (ADHD-RS-IV) total score >/=28. Both studies excluded children whose prestudy ADHD treatment provided effective control of ADHD symptoms with an acceptable safety profile. Post hoc efficacy analyses were performed in children who had received MPH within 6 months of study enrollment. Efficacy measures included the following scales: ADHD-RS-IV, Clinical Global Impressions-Improvement (CGI-I), Expression and Emotion Scale for Children (EESC), Behavior Rating Inventory of Executive Function (BRIEF), Swanson, Kotkin, Agler, M-Flynn, and Pelham (SKAMP), and Permanent Product Measure of Performance (PERMP).

RESULTS: In studies 1 and 2, 83/318 (26%) and 67/129 (52%) participants, respectively, had received MPH within 6 months and were not adequately controlled on current medication with acceptable tolerability; most of these participants had received long-acting MPH. In prior MPH participants, efficacy assessments demonstrated improvements from baseline (study 1) and versus placebo (study 2) that were comparable with those seen in the respective overall study population. Safety profiles were consistent with long-acting stimulant use.

CONCLUSION: In two studies, children who had received prior MPH treatment improved during treatment with LDX and experienced similar improvements in their symptoms as the overall study populations. For children with ADHD who were previously treated with MPH, LDX may, therefore, be an efficacious treatment option.

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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.

Atten Defic Hyperact Disord. 2013 Jun.

VERBAL FLUENCY IN ADULTS DIAGNOSED WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD) IN CHILDHOOD.

Andreou G, Trott K.

It has been increasingly believed that attention-deficit hyperactivity disorder (ADHD) is a disorder with lifelong course associated with cognitive difficulties including among others, language production, verbal learning, and verbal fluency. However, research is limited to children and adolescents, and very few researchers have examined the impact of ADHD in adulthood on the cognitive domain. The aim of the present study is to examine the performance of adults, diagnosed with ADHD in childhood, on semantic and phonemic verbal fluency tasks. It is hypothesized that adults with ADHD will perform worse on both tasks than matched controls. Sixty university students (30 diagnosed with ADHD in childhood and 30 matched controls) of mean age 20.5 participated in the study. They all completed two verbal fluency tasks. The ADHD group had statistically significant lower scores than the non-ADHD group on the phonemic, but not the semantic task. The study provides some evidence that ADHD in childhood has a negative impact on adults' phonemic verbal fluency. This finding could be probably explained by the fact that phonemic fluency is considered more cognitively demanding and impacting more on the frontal lobe functions, known to be impaired in ADHD, than semantic fluency.

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Autism. 2013 Jun.

ASSOCIATION BETWEEN SEVERITY OF BEHAVIORAL PHENOTYPE AND COMORBID ATTENTION DEFICIT HYPERACTIVITY DISORDER SYMPTOMS IN CHILDREN WITH AUTISM SPECTRUM DISORDERS.

Rao PA, Landa RJ.

Autism spectrum disorder and attention deficit hyperactivity disorder are neurodevelopmental disorders that cannot be codiagnosed under existing diagnostic guidelines (Diagnostic and Statistical Manual of the American Psychiatric Association, 4th ed., text rev.). However, reports are emerging that attention deficit hyperactivity disorder is sometimes comorbid with autism spectrum disorder. In the current study, we examined rates of parent-reported clinically significant symptoms of attention deficit hyperactivity disorder in school-aged children (4-8 years) with autism spectrum disorder, most of whom were first enrolled in our research protocols as toddlers. Results revealed that children with autism spectrum disorder and attention deficit hyperactivity disorder had lower cognitive functioning, more severe social impairment, and greater delays in adaptive functioning than children with autism spectrum disorder only. Implications for clinical practice include the need to assess for attention deficit hyperactivity disorder symptoms at an early age in children diagnosed with autism spectrum disorder. Research is needed to determine efficacious interventions for young children with autism spectrum disorder with comorbid attention deficit hyperactivity disorder to optimize outcomes.

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Autism Res. 2013 May.

SOCIAL ATTENTION IN A VIRTUAL PUBLIC SPEAKING TASK IN HIGHER FUNCTIONING CHILDREN WITH AUTISM.

Jarrold W, Mundy P, Gwaltney M, et al.

Impairments in social attention play a major role in autism, but little is known about their role in development after preschool. In this study, a public speaking task was used to study social attention, its moderators, and its association with classroom learning in elementary and secondary students with higher functioning autism spectrum disorder (HFASD). Thirty-seven students with HFASD and 54 age- and intelligence quotient (IQ)-matched peers without symptoms of ASD were assessed in a virtual classroom public speaking paradigm. This paradigm assessed the ability to attend to nine avatar peers seated at a table, while simultaneously answering self-referenced questions. Students with HFASD looked less frequently to avatar peers in the classroom while talking. However, social attention was moderated in the HFASD sample such that students with lower IQ, and/or more symptoms of social anxiety, and/or more attention deficit/hyperactivity disorder inattentive symptoms, displayed more atypical social attention. Group

differences were more pronounced when the classroom contained social avatars versus nonsocial targets. Moreover, measures of social attention rather than nonsocial attention were significantly associated with parent report and objective measures of learning in the classroom. The data in this study support the hypothesis of the Social Attention Model of ASD that social attention disturbance remains part of the school-aged phenotype of autism that is related to syndrome-specific problems in social learning. More research of this kind would likely contribute to advances in the understanding of the development of the spectrum of autism and educational intervention approaches for affected school-aged children.

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Biol Psychiatry. 2013 May.

TRAJECTORIES OF CEREBRAL CORTICAL DEVELOPMENT IN CHILDHOOD AND ADOLESCENCE AND ADULT ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Shaw P, Malek M, Watson B, et al.

BACKGROUND: Childhood attention-deficit/hyperactivity disorder (ADHD) persists into adulthood in around half of those affected, constituting a major public health challenge. No known demographic, clinical, or neuropsychological factors robustly explain the clinical course, directing our focus to the brain. Herein, we link the trajectories of cerebral cortical development during childhood and adolescence with the severity of adult ADHD.

METHODS: Using a longitudinal study design, 92 participants with ADHD had childhood (mean 10.7 years, SD 3.3) and adult clinical assessments (mean 23.8 years, SD 4.3) with repeated neuroanatomic magnetic resonance imaging. Contrast was made against 184 matched typically developing volunteers.

RESULTS: Attention-deficit/hyperactivity disorder persisted in 37 (40%) subjects and adult symptom severity was linked to cortical trajectories. Specifically, as the number of adult symptoms increased, particularly inattentive symptoms, so did the rate of cortical thinning in the medial and dorsolateral prefrontal cortex. For each increase of one symptom of adult ADHD, the rate of cortical thinning increased by .0018 mm (SE=.0004, t=4.2, p<.0001), representing a 5.6% change over the mean rate of thinning for the entire group. These differing trajectories resulted in a convergence toward typical dimensions among those who remitted and a fixed, nonprogressive deficit in persistent ADHD. Notably, cortical thickening or minimal thinning (greater than -.007 mm/year) was found exclusively among individuals who remitted.

CONCLUSIONS: Adult ADHD status is linked with the developmental trajectories of cortical components of networks supporting attention, cognitive control, and the default mode network. This informs our understanding of the developmental pathways to adult ADHD.

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Br J Psychiatry. 2013 May.

A SHARED POLYGENIC CONTRIBUTION BETWEEN CHILDHOOD ADHD AND ADULT SCHIZOPHRENIA.

Hamshere ML, Stergiakouli E, Langley K, et al.

BACKGROUND: There is recent evidence of some degree of shared genetic susceptibility between adult schizophrenia and childhood attention-deficit hyperactivity disorder (ADHD) for rare chromosomal variants.

AIMS: To determine whether there is overlap between common alleles conferring risk of schizophrenia in adults with those that do so for ADHD in children.

METHOD: We used recently published Psychiatric Genome-wide Association Study (GWAS) Consortium (PGC) adult schizophrenia data to define alleles over-represented in people with schizophrenia and tested whether those alleles were more common in 727 children with ADHD than in 2067 controls.

RESULTS: Schizophrenia risk alleles discriminated ADHD cases from controls (P=1.04 x 10-4, R2=0.45%); stronger discrimination was given by alleles that were risk alleles for both adult schizophrenia and adult bipolar disorder (also derived from a PGC data-set) (P=9.98 x 10-6, R2=0.59%).

CONCLUSIONS: This increasing evidence for a small, but significant, shared genetic susceptibility between adult schizophrenia and childhood ADHD highlights the importance of research work across traditional diagnostic boundaries.

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Brain Dev. 2013 Jun.

OUTPATIENT SCREENING OF JAPANESE CHILDREN WITH EPILEPSY FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (AD/HD).

Tanabe T, Kashiwagi M, Shimakawa S, et al.

The significance of the Strengths and Difficulties Questionnaire (SDQ) score for AD/HD (attention-deficit/hyperactivity disorder) screening was assessed in Japanese epileptic children.

Subjects and methods: Sixty-eight epileptic children were enrolled in this study. Parents were asked to fill out both the SDQ and AD/HD-rating scale (AD/HD-RS) simultaneously.

Results: The SDQ subscale of hyperactivity showed the highest score. The AD/HD-RS showed higher scores for both inattention and hyperactivity-impulsivity. Twenty-two (32.4%) of these subjects were diagnosed as having AD/HD. The SDQ subscale for hyperactivity showed 86.4% sensitivity and 95% specificity, respectively, for detection of AD/HD. All SDQ subscales correlated significantly with inattention and hyperactivity-impulsivity scores of the AD/HD-RS.

Conclusions: The SDQ is a good screening tool which can contribute to the detection of AD/HD, not only of the hyperactive/impulsive but also the inattentive subtype. Furthermore, the SDQ can elucidate more complicated behavioral problems than the core symptoms of AD/HD that are not noticed in the epilepsy clinic.

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Child & Family Behavior Therapy. 2013 Apr;35:144-69.

PREDICTING TREATMENT DROPOUT IN PARENT TRAINING INTERVENTIONS FOR FAMILIES OF SCHOOL-AGED CHILDREN WITH ADHD.

Schneider BW, Gerdes AC, Haack LM, et al.

Premature treatment dropout is a problem for many families seeking mental health services for their children. Research is currently limited in identifying factors that increase the likelihood of dropout in families of school-aged children with Attention-Deficit/Hyperactivity Disorder (ADHD). Thus, the goal of the current study was to examine different child, parental, and family factors that predict dropout for families of children with ADHD at the initial assessment and during treatment. Participants included 73 families who sought treatment services at a university-based ADHD clinic. Variables found to be related to assessment or treatment dropout included ethnicity, ADHD medication status, severity of behavioral problems, and single parent families. In addition, single parent families strongly predicted assessment and treatment dropout. This provides support for identifying child and parental factors early in the evaluation process in order to modify interventions to reduce the risk of families discontinuing treatment before obtaining the benefits of a behavioral intervention.

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Child Adolesc Psychiatry Ment Health. 2013 Jun;7:19.

SUICIDE RELATED EVENTS AND ATTENTION DEFICIT HYPERACTIVITY DISORDER TREATMENTS IN CHILDREN AND ADOLESCENTS: A META-ANALYSIS OF ATOMOXETINE AND METHYLPHENIDATE COMPARATOR CLINICAL TRIALS.

Bushe CJ, Savill NC.

BACKGROUND: Attention Deficit Hyperactivity Disorder (ADHD) is becoming an increasingly commonly diagnosed and treated childhood illness. Untreated ADHD is recognised as an independent risk factor for suicide-related events and deliberate self-harm and is reported more commonly in these populations. With the treatment of ADHD it is thus crucial to understand further any associations between pharmacological treatments and suicide-related events. Specific data for suicide-related events with stimulants have not been publically reported. Suicidal tendencies are, however, a contraindication to the treatment of patients with methylphenidate. Clinicians and patients may be helped by a meta-analytic comparison of suicide-related events in comparative randomised double-blind atomoxetine and methylphenidate clinical trials.

METHODS: Suicide-related events retrospectively mapped to the suicide-related event assessment instrument recommended by the FDA, the Columbia Classification Algorithm for Suicide Assessment (C-CASA), were evaluated in five double-blind placebo controlled comparative studies of atomoxetine and

methylphenidate (n=1024) of 6 to 9 weeks duration. The Mantel-Haenszel risk ratio and Mantel-Haenszel incidence differences have been calculated.
RESULTS: In total there were 5 suicide-related events, atomoxetine (ATX) 3/559 and methylphenidate (MPH) 2/465. There were no suicide attempts nor completed suicides. Meta-analysis finds no difference of a difference in risk between ATX and MPH with a Mantel-Haenszel risk ratio of 0.52 (95% CI; 0.06, 4.54).
CONCLUSION: In the only reported meta-analysis of comparative suicide-related events between atomoxetine and methylphenidate, no significant evidence of a difference in risk has been found. These data may be informative to clinicians and patients when developing clinical guidelines.

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Child Neuropsychol. 2013 Jun.

VERBAL FLUENCY IN CHILDREN WITH ADHD: STRATEGY USING AND TEMPORAL PROPERTIES.

Takacs A, Kobor A, Tarnok Z, et al.

Verbal fluency tasks are commonly used in cognitive and developmental neuropsychology in assessing executive functions, language skills as well as divergent thinking. Twenty-two typically developing children and 22 children with ADHD between the ages of 8 and12 years were examined using verbal fluency tasks, prepotent response inhibition, and working memory tests. The clinical group showed impaired inhibitory and spatial working memory processes. We used different qualitative analyses of verbal fluency tasks to explore the lexical and executive strategies (word clustering and switching), and the temporal properties of the responses. Children with ADHD had a leeway in applying relevant lexical or executive strategies related to difficulties in strategy using. The reduced efficiency of children with ADHD in semantic fluency task is based on suboptimal shifting between word clusters and is related to the lack of ability of producing new clusters of items. The group difference appeared at the level of accessing and/or activating common words; however, the executive process of searching the lexicon extensively is intact.

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Child Neuropsychol. 2013 May.

METHYLPHENIDATE IMPROVES SOME BUT NOT ALL MEASURES OF ATTENTION, AS MEASURED BY THE TEA-CH IN MEDICATION-NAIVE CHILDREN WITH ADHD.

Paton K, Hammond P, Barry E, et al.

The Test of Everyday Attention for Children (TEA-Ch) is a reliable neuropsychological assessment of attention control in children. Methylphenidate (MPH) is an effective treatment to improve attentional difficulties in children with attention deficit/hyperactivity disorder (ADHD). Previous studies investigating the effects of MPH on attention performance of children with ADHD have produced mixed results and prior MPH usage may have confounded these results. No previous study has tested the effects of MPH on the entire TEA-Ch battery. This study investigated the effects of MPH on attention performance using the entire TEA-Ch in 51 medication-naive children with ADHD compared with 35 nonmedicated typically developing children. All children were tested at baseline and after 6 weeks: The children with ADHD were medication-naive at baseline, received MPH for 6 weeks and were tested whilst on medication at the second testing session. A beneficial effect of MPH administration was found on at least one subtest of each of the three forms of attention (selective, sustained, and attentional control) assessed by the TEA-Ch, independent of practice effects. MPH aided performance on the TEA-Ch tasks that were inherently nonarousing and that might require top-down control of attention. It is recommended that the TEA-Ch measures-Sky Search Count (selective attention),Score! (sustained attention), Creature Counting Time Taken for older children (attentional control), and Same Worlds (attentional control) be prioritized for use in future pharmacological studies using MPH.

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Compr Psychiatry. 2013 Jun.

ADHD, AUTISM SPECTRUM DISORDER, TEMPERAMENT, AND CHARACTER: PHENOTYPICAL ASSOCIATIONS AND ETIOLOGY IN A SWEDISH CHILDHOOD TWIN STUDY.

Kerekes N, Brandstrom S, Lundstrom S, et al.

OBJECTIVE: To explore the links between neurodevelopmental disorders - attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) - and personality in a population-based, genetically sensitive study of children.

METHOD: A population-based sample of 1886 twins aged 9 and 12, enriched for childhood mental health problems, was recruited from the Child and Adolescent Twin Study in Sweden (CATSS). Parents were interviewed over the telephone using the Autism-Tics, AD/HD and other Comorbidities (A-TAC) inventory, and in a second step they rated their children according to the Junior Temperament and Character Inventory (JTCI).

RESULTS: ADHD was strongly correlated with novelty seeking, while ASD was correlated positively with harm avoidance and negatively with reward dependence. The strongest associations between personality traits and neurodevelopmental disorders were negative correlations between the character dimensions of self-directedness and cooperativeness and ADHD and ASD alike. Cross-twin cross-trait correlations between ADHD, ASD, and personality dimensions in monozygotic twins were more than double those in dizygotic twins, indicating a strong genetic effect behind the phenotypic covariation between neurodevelopmental disorders and personality.

CONCLUSIONS: Neurodevelopmental disorders are linked specifically to particular temperament profiles and generally to hampered development of the self-governing strategies referred to as "character." Poor self-agency and cooperation may be core functional outcomes in the separation of children with handicapping conditions from those with traits only reminiscent of neurodevelopmental disorders. The associations between neurodevelopmental disorders and personality are at least partly due to genetic effects influencing both conditions. As a consequence, personality must be broadly considered in neuropsychiatry, just as neuropsychiatric disorders and their genetic, neurodevelopmental, and cognitive susceptibilities have to be in personality research and clinical treatment.

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Dev Med Child Neurol. 2013 Jun.

THE IMPACT OF METHYLPHENIDATE ON SEIZURE FREQUENCY AND SEVERITY IN CHILDREN WITH ATTENTION-DEFICIT-HYPERACTIVITY DISORDER AND DIFFICULT-TO-TREAT EPILEPSIES.

Brunklaus A, Dorris L, Zuberi SM.

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Dev Med Child Neurol. 2013 Jun.

ARE CHILDREN AND ADOLESCENTS WITH PSYCHIATRIC ILLNESS AT RISK FOR INCREASED FUTURE BODY WEIGHT? A SYSTEMATIC REVIEW.

Korczak DJ, Lipman E, Morrison K, et al.

The aim of this paper was to review the longitudinal relationship between early-onset depression and disruptive behaviour and adult body weight. A systematic review of prospective longitudinal studies was conducted of articles in which (1) initial assessment occurred during childhood or adolescence (<18y); and (2) the primary outcome reported as body mass index (BMI), overweight (BMI>25-<30kg/m2), obesity (BMI>/=30kg/m2), or depression; and (3) validated assessment measures for assessment of depressive symptoms or disruptive behaviour problems were employed. A total number of 16 articles were identified for review. Obese adolescent females are more likely to develop depressive illness in adulthood than their non-obese peers. Conversely, depressed adolescent females, and possibly males, are more likely to become overweight adults than non-depressed adolescents. There are insufficient data addressing future depression risk among overweight, non-obese, adolescents to evaluate the potentially interactive nature of this relationship. Studies to date are consistent in reporting that children with behaviour problems are at increased risk of future overweight, though whether this risk is conferred by conduct symptoms, ADHD

symptoms, or both, is less clear. Care providers of children with disruptive behaviour problems and depressed adolescents should monitor weight gain. Among obese adolescent females, mood should be followed.

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Dev Psychopathol. 2011 May;23:563-76.

INTERPARENTAL AGGRESSION, ATTENTION SKILLS, AND EARLY CHILDHOOD BEHAVIOR PROBLEMS.

Towe-Goodman NR, Stifter CA, Coccia MA, et al.

The current study explored longitudinal associations between interparental aggression, the development of child attention skills, and early childhood behavior problems in a diverse sample of 636 families living in predominately low-income, nonmetropolitan communities. The results of latent-variable, cross-lagged longitudinal models revealed that maternal-reported interparental aggression in infancy predicted reduced observed attention skills in toddlerhood; no association was observed, however, between attention in infancy and interparental aggression during the toddler years. Further, reduced toddler attention and high interparental aggression were both associated with increased risk for attention-deficit/hyperactivity disorder symptoms and conduct problems at 3 years of age. Processes largely operated in similar ways regardless of child gender or low-income status, although a few differences were observed. Overall, the results suggest that interparental aggression undermines attention development, putting children's early behavioral adjustment at risk.

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Dev Neuropsychol. 2013 Apr;38:153-66.

EMERGING CONTROL AND DISRUPTIVE BEHAVIOR DISORDERS DURING EARLY CHILDHOOD.

Martel MM, Roberts B, Gremillion ML.

The current study evaluates associations between control processes and Oppositional Defiant Disorder (ODD) and attention deficit hyperactivity disorder (ADHD) during early childhood. Participants were 98 children between ages 3 and 6 and their primary caregivers. Diagnostic information on ODD and ADHD symptoms was available from parents and teachers/caregivers via standardized rating forms. Affective, effortful, and cognitive control processes were measured using parent and examiner ratings via standardized questionnaires, observational ratings, and child performance on laboratory tasks of cognitive control. Affective control, but not effortful control, was significantly associated with cognitive control. A latent factor of control was significantly associated with ADHD, but not ODD, symptoms.

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Epidemiology. 2013 Jul;24:590-99.

PERFLUOROOCTANOATE AND NEUROPSYCHOLOGICAL OUTCOMES IN CHILDREN.

Stein CR, Savitz DA, Bellinger DC.

BACKGROUND: In animal studies, perfluorinated compounds affect fetal growth, development, viability, and postnatal growth. The limited epidemiologic findings on child neurobehavioral development are mixed.

METHODS: We recruited and evaluated 320 children who participated in the C8 Health Project, a 2005-2006 survey in a Mid-Ohio Valley community highly exposed to perfluorooctanoate (PFOA) through contaminated drinking water. We examined associations among estimated in utero PFOA exposure, measured childhood PFOA serum concentration, and subsequent performance on neuropsychological tests 3-4 years later at ages 6-12 years. We assessed Intelligence Quotient (IQ) reading and math skills, language, memory and learning, visual-spatial processing, and attention. All multivariable linear regression models were adjusted for age, sex, home environment, test examiner, and maternal IQ. Models with measured childhood PFOA were additionally adjusted for child body mass index.

RESULTS: Children in the highest as compared with lowest quartile of estimated in utero PFOA had increases in Full Scale IQ (beta 4.6, 95% confidence interval [CI]=0.7-8.5) and decreases in characteristics of attention deficit/hyperactivity disorder as measured by the Clinical Confidence Index of Connors'

Continuous Performance Test-II (beta -8.5, 95% CI = -16.1 to -0.8). There were negligible associations between PFOA and reading or math skills or neuropsychological functioning.
CONCLUSION: These results do not suggest an adverse association between the levels of PFOA exposure experienced by children in this cohort and their performance on neuropsychological tests.

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Eur Child Adolesc Psychiatry. 2013 Jun.

ASSOCIATION BETWEEN ADHD DRUG USE AND INJURIES AMONG CHILDREN AND ADOLESCENTS.

Van Den Ban E, Souverein P, Meijer W, et al.

To study the association between attention deficit hyperactivity disorder (ADHD) drug use and the incidence of hospitalization due to injuries. A random sample of 150,000 persons (0-18 years) was obtained from the Dutch PHARMO record linkage system. An ADHD medication cohort as well as an up to six age/sex/index date sampled control cohort with no history of ADHD drug use was formed. Differences in incidence of hospitalization due to injuries were stratified for age and sex and compared prior, during and after exposure on ADHD drugs. The overall incidence of hospital admissions for injuries was two times higher in the ADHD medication cohort [incidence rate ratios (IRR) 2.2 (95 % CI 1.6-2.9)]. The incidence rate for injuries during exposure to ADHD drugs was lower in the exposed period compared to the period prior to ADHD drug use, although the difference was not statistically significant [IRR 0.68 (95 % CI 0.29-1.60)]. The relative risk for injuries was almost five times higher in the ADHD medication cohort among those who concomitantly used other psychotropics [IRR 4.8 (95 % CI 1.4-16.9)]. Risk for injuries was highest in 12-18 years olds. Children and adolescents using ADHD medication showed a twofold risk for hospital admissions for injuries. ADHD drug use might diminish the increased injury risk, but still overall risk is higher than in age/sex sampled children and adolescents without treatment with ADHD drugs. Use of ADHD and concomitant psychotropics increases the risk for injuries compared to only ADHD drug use.

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Evid Based Ment Health. 2013 May.

ARTIFICIAL FOOD COLOUR EXCLUSION AND FREE FATTY ACID SUPPLEMENTATION MAY REDUCE SYMPTOM SEVERITY IN CHILDREN WITH ADHD.

Goodman DW.

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Fiziol Cheloveka. 2013 Jan;39:30-35.

POWER SPECTRA OF THE MAIN EEG RHYTHMS IN CHILDREN WITH DIFFERENT TYPES OF ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Anon

We investigated a group of children aged 9-12 years with attention deficit hyperactivity disorder (ADHD) combined type, have divided into two variants of the clinical picture of ADHD: residual-organic variant (ADH D RO) and idiopathic variant (ADHD RI). We studied the power spectral analysis in the main frequency bands in background EEG eyes closed and are open. The significant differences between both groups observed in the theta frequency band in the fronto-central and occipital leads. In the fronto-central leads of the cortex were the maximum values in the group of children ADHD RO, whereas in children with ADHD IR, the largest values of power spectra were in the occipital leads. Statistically significant differences in spectral power in the alpha range between healthy subjects and groups children with ADHD had not been received. Thus, our studies have shown that these two variants of ADHD have some neurophysiological differences that must be considered when choosing a treatment.

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Genet Test Mol Biomarkers. 2013 May.

ASSOCIATION BETWEEN DOPAMINE BETA-HYDROXYLASE GENE POLYMORPHISMS AND ATTENTION-DEFICIT HYPERACTIVITY DISORDER IN KOREAN CHILDREN.

Kwon HJ, Lim MH.

Attention-deficit hyperactivity disorder (ADHD) is a common disorder of the school-age population. ADHD is familial, and genetic studies estimate heritability at 80%-90%. The aim of the present study was to investigate the association between the genetic type and alleles for the dopamine beta-hydroxylase (DBH) gene in Korean children with ADHD. The sample consisted of 142 ADHD children and 139 control children. We diagnosed ADHD according to DSM-IV. ADHD symptoms were evaluated with the Conners' Parent Rating Scales and Dupaul Parent ADHD Rating Scales. Blood samples were taken from the 281 subjects; DNA was extracted from blood lymphocytes, and polymerase chain reaction was performed for the DBH polymorphism. The alleles and genotype frequencies were compared using the chi-square test. We compared the allele and genotype frequencies of the DBH gene polymorphism in the ADHD and control groups. This study showed that there was a significant correlation among the frequencies of rs1611115 (odds ratio=0.64, 95% confidence interval=0.42-0.97, p=0.034) of the alleles of DBH, but the final conclusions are not definite. Follow-up studies with larger patient or pure subgroups are expected. These results suggested that DBH might be related to ADHD symptoms.

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Int J Dev Neurosci. 2013 Aug;31:342-49.

INTERFERENCE CONTROL IN 6-11 YEAR-OLD CHILDREN WITH AND WITHOUT ADHD: BEHAVIORAL AND ERP STUDY.

Cao J, Wang S, Ren Y, et al.

Event-related potentials (ERPs) were recorded during a hybrid Simon-spatial Stroop task. We compared interference control and conflict monitoring in children with and without attention-deficit/hyperactivity disorder (ADHD), to examine developmental functional patterns. We found that children with ADHD exhibited lower accuracy rates and longer and more variable reaction time (RT) in both tasks, especially in the incongruent condition. In both controls and ADHD children, the accuracy rate increased and RT decreased with age. Major development in interference control occurred from 6-7 to 8 years in ADHD children and controls, yet only occurred from 9 to 10-11 years in normal children. The ERP results revealed that the N2 potentials were not significantly different from age-matched controls in the two tasks and that the development pattern of conflict monitoring was not different in school age children with and without ADHD. Children with ADHD had normal conflict monitoring ability.

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Int J Neuropsychopharmacol. 2013 May;1-11.

PREVALENCE AND CORRELATES OF ANTIPSYCHOTIC POLYPHARMACY IN CHILDREN AND ADOLESCENTS RECEIVING ANTIPSYCHOTIC TREATMENT.

Toteja N, Gallego JA, Saito E, et al.

Antipsychotic polypharmacy (APP), which is common in adults with psychotic disorders, is of unproven efficacy and raises safety concerns. Although youth are increasingly prescribed antipsychotics, little is known about APP in this population. We performed a systematic PubMed search (last update 26 January 2013) of studies reporting the prevalence of APP in antipsychotic-treated youth. Summary statistics and statistical tests were calculated at the study level and not weighted by sample size. Fifteen studies (n=58 041, range 68-23 183) reported on APP in youth [mean age = 13.4+/-1.7 yr, 67.1+/-10.2% male, 77.9+/-27.4% treated with second-generation antipsychotics (SGAs)]. Data collected in these studies covered 1993-2008. The most common diagnoses were attention-deficit hyperactivity disorder (ADHD; 39.9 +/-23.5%) and conduct disorder/oppositional defiant disorder (CD/ODD; 33.6 +/- 24.8). In studies including predominantly children (mean age=<13 yr, N=5), the most common diagnosis were ADHD (50.6+/-25.4%) and CD/ODD (39.5+/-27.5%); while in studies with predominantly adolescents (mean age =13 yr, N=7) the most common diagnoses were schizophrenia-spectrum disorders (28.6+/-23.8%), anxiety disorders (26.9+/-14.9%) and bipolar-spectrum disorders (26.6 +/- 7.0%), followed closely by CD/ODD (25.8+/-17.7).

The prevalence of APP among antipsychotic-treated youth was 9.6+/-7.2% (5.9+/-4.5% in child studies, 12.0+/-7.9% in adolescent studies, p=0.15). Higher prevalence of APP was correlated with a bipolar disorder or schizophrenia diagnosis (p=0.019) and APP involving SGA+SGA combinations (p=0.0027). No correlation was found with APP definition [1 d (N=10) vs. >30-90 d (N=5), p=0.88]. Despite lacking safety and efficacy data, APP in youth is not uncommon, even in samples predominantly consisting of non-psychotic patients. The duration, clinical motivations and effectiveness of this practice require further study.

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Int J Neurosci. 2013 Jun.

ASYMMETRIC TONIC NECK REFLEX AND SYMPTOMS OF ATTENTION DEFICIT AND HYPERACTIVITY DISORDER IN CHILDREN.

Konicarova J, Bob P.

One of the particularly important postnatal developmental reflexes that diminish in later stages of development is asymmetric tonic neck reflex (ATNR), which belongs among the so-called primitive reflexes. According to current evidence, certain later developed functions during ontogenesis of the central nervous system tend to replace the primitive reflexes, and their persistence is related to certain specific neuropsychiatric or neurological disorders. According to current knowledge, there is no evidence to which extent persistence of these reflexes may play a role in attention deficit and hyperactivity disorder (ADHD). With respect to these findings, we have tested a hypothesis to which extent persisting primitive reflex ATNR in 60 children in the school age (8-11 years) will be related to symptoms of ADHD and compared the results with 30 children of the same age. Results of this study show that ADHD symptoms are closely linked to persisting ATNR, which indicates that ADHD symptoms may present a compensation of unfinished developmental stages related to diminishing ATNR.

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Int J Pediatr Otorhinolaryngol. 2013 Jun.

ASSOCIATION BETWEEN THE SELF-INSERTION OF NASAL AND AURAL FOREIGN BODIES AND ATTENTION-DEFICIT/HYPERACTIVITY DISORDER IN CHILDREN.

Celenk F, Gokcen C, Celenk N, et al.

OBJECTIVE: To investigate whether the prevalence of attention-deficit/hyperactivity disorder (ADHD) is higher in children presenting with nasal and aural foreign bodies than in the control group.

METHODS: The present study was conducted between April 2012 and December 2012 and included 60 pediatric patients presenting with self-inserted nasal and aural foreign bodies and 50 healthy controls aged between 3 and 9 years. The Conner Parent Rating Scale (CPRS) and Turgay's DSM-IV based ADHD and disruptive behavior disorders screening scale (T-DSM-IV-Scale) were used to investigate ADHD.

RESULTS: The difference between the patient group and the control group was significant with respect to the abnormal scores obtained from all the subscales ($p<0.05$). In children between 5 and 9 years of age, the abnormal scores were significantly higher in the patients than the controls for all the subscales ($p<0.05$). However, in children between 3 and 4 years of age, there were no significant differences between the patients and the controls for the scores obtained from all the subscales ($p>0.05$). No statistically significant difference was found between the patients with a previous history of self-inserted foreign bodies and those without any history of foreign body insertion ($p>0.05$).

CONCLUSIONS: The findings of our study demonstrated a possible association between the self-insertion of nasal and aural foreign bodies and ADHD. Clinicians should be aware of the possible presence of ADHD in children, especially in those patients between 5 and 9 years of age who present with self-inserted nasal and aural foreign bodies.

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Int J Psychophysiol. 2013 Jun.

SLEEP DEPRIVATION AND NEUROBEHAVIORAL FUNCTIONING IN CHILDREN.

Maski KP, Kothare SV.

Sleep deprivation can result in significant impairments in daytime neurobehavioral functioning in children. Neural substrates impacted by sleep deprivation include the prefrontal cortex, basal ganglia and amygdala and result in difficulties with executive functioning, reward anticipation and emotional reactivity respectively. In everyday life, such difficulties contribute to academic struggles, challenging behaviors and public health concerns of substance abuse and suicidality. In this article, we aim to review 1) core neural structures impacted by sleep deprivation; 2) neurobehavioral problems associated with sleep deprivation; 3) specific mechanisms that may explain the relationship between sleep disturbances and neurobehavioral dysfunction; 4) sleep problems reported in common neurodevelopmental disorders including Attention Deficit Hyperactivity Disorder (ADHD) and Autistic Spectrum Disorders (ASDs).

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ISRN Psychiatry. 2013;2013:875873.

THE COEXISTENCE OF PSYCHIATRIC DISORDERS AND INTELLECTUAL DISABILITY IN CHILDREN AGED 3-18 YEARS IN THE BARWANI DISTRICT, INDIA.

Lakhan R.

Background. The coexistence of psychiatric disorders in people with intellectual disability (ID) is common. This study determined the prevalence of psychiatric disorders in children with ID in Barwani, India.

Method. A total of 262 children with ID were evaluated for psychiatric disorders using the diagnostic criteria outlined in the International Classification of Diseases (ICD-10).

Results. Psychiatric disorders appeared in study participants at the following rates: attention deficit hyperactivity disorder (ADHD), 6.5%; autism, 4.2%; anxiety, 2.7%; bipolar disorder, 1.1%; delusional disorder, 0.8%; depression, 2.3%; obsessive-compulsive disorder, 0.8%; schizophrenia, 1.9%; enuresis, 10.3%; epilepsy, 23.7%; and behavioral problems, 80.9%. The prevalence of psychiatric disorders was statistically higher in severely intellectually disabled children (IQ</=49) than mildly intellectually disabled children (IQ>/=50).

Conclusions. There is a higher prevalence of psychiatric disorders in children with ID when their IQ</=49 compared with ID children whose IQ>/=50.

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J Abnorm Child Psychol. 2013 Jun.

CONTINUITIES AND CHANGES IN THE FRIENDSHIPS OF CHILDREN WITH AND WITHOUT ADHD: A LONGITUDINAL, OBSERVATIONAL STUDY.

Normand S, Schneider BH, Lee MD, et al.

We examined how the real-life dyadic friendships of 87 children with ADHD and 46 comparison children (76 % boys) aged 7-13 years evolved during a 6-month follow-up period. The methods included friendship quality self-report measures and direct observation of friends' dyadic behaviors in three structured analogue tasks. At Time 2, the friends of the participants with ADHD reported less positive friendship quality and more conflict with their friends than at Time 1. They were also considerably less satisfied with their friendship than 6 months prior. In contrast, the friends of comparison children reported fewer negative friendship features, more positive friendship features and a slightly greater friendship satisfaction than at Time 1. In sharp contrast with the invited friends' reports, referred children with ADHD did not report deterioration in their friendship quality over time. Unlike comparison children who significantly reduced violations of game rules between Time 1 and Time 2, children with ADHD broke more game rules during the same period. In negotiating with friends, comparison children, but not children with ADHD, reduced the number of self-centered and insensitive proposals at Time 2. Controlling for Time 1 variance, violations of game rules and a self-centered, insensitive negotiation approach predicted deterioration in friendship quality for children with and without ADHD over time.

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J Abnorm Psychol. 2013 May;122:542-57.

LANGUAGE ABILITY PREDICTS THE DEVELOPMENT OF BEHAVIOR PROBLEMS IN CHILDREN.

Petersen IT, Bates JE, D'Onofrio BM, et al.

Prior studies have suggested, but not fully established, that language ability is important for regulating attention and behavior. Language ability may have implications for understanding attention-deficit hyperactivity disorder (ADHD) and conduct disorders, as well as subclinical problems. This article reports findings from two longitudinal studies to test (a) whether language ability has an independent effect on behavior problems, and (b) the direction of effect between language ability and behavior problems. In Study 1 (N=585), language ability was measured annually from ages 7 to 13 years by language subtests of standardized academic achievement tests administered at the children's schools. Inattentive-hyperactive (I-H) and externalizing (EXT) problems were reported annually by teachers and mothers. In Study 2 (N=11,506), language ability (receptive vocabulary) and mother-rated I-H and EXT problems were measured biannually from ages 4 to 12 years. Analyses in both studies showed that language ability predicted within-individual variability in the development of I-H and EXT problems over and above the effects of sex, ethnicity, socioeconomic status (SES), and performance in other academic and intellectual domains (e.g., math, reading comprehension, reading recognition, and short-term memory [STM]). Even after controls for prior levels of behavior problems, language ability predicted later behavior problems more strongly than behavior problems predicted later language ability, suggesting that the direction of effect may be from language ability to behavior problems. The findings suggest that language ability may be a useful target for the prevention or even treatment of attention deficits and EXT problems in children.

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J Atten Disord. 2013 Jun.

THE POSITIVE ILLUSORY BIAS IN CHILDREN AND ADOLESCENTS WITH ADHD: FURTHER EVIDENCE.

Volz-Sidiropoulou E, Boecker M, Gauggel S.

Objective: This study aimed to examine the accuracy of self-reports of children and adolescents with ADHD in evaluating activity limitations.

Method: Self-reports of children/adolescents with ADHD (n=89) were compared with those of nonreferred children (n=94), relative to parent reports about children's competence. Competence was measured with a 34-item rating scale. Behavioral disorders were documented with the Child Behavior Checklist.

Results: Children/adolescents with ADHD were much more likely than controls to overestimate their competence in certain daily activities relative to parent reports, demonstrating a positive illusory bias. Positive illusory bias was found to be pronounced in activities, which were expected to be affected by symptoms of ADHD. Overestimations of competencies were more likely to be accompanied with externalizing problems.

Conclusion: Results support the presence of the positive illusory bias also in the domain of everyday life activities. Improvement of self-evaluation of competencies should become a focus of treatment.

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J Atten Disord. 2013 May.

THE ASSOCIATION BETWEEN HOSPITAL-TREATED INJURIES AND ADHD SYMPTOMS IN CHILDHOOD AND ADOLESCENCE: A FOLLOW-UP STUDY IN THE NORTHERN FINLAND BIRTH COHORT 1986.

Hurtig T, Ebeling H, Jokelainen J, et al.

Objective: We examined the risk of hospital-treated injuries related to the symptoms/diagnosis of ADHD.

Method: The study population (N=6,111) was composed from the Northern Finland Birth Cohort 1986. At the age of 8, symptoms of hyperactivity and at the age of 15, symptoms of ADHD were assessed by the parents while the clinical diagnoses of ADHD were set in adolescence. Information on injuries was obtained from national register.

Results: The risk for hospital-treated injuries during ages 0 to 7 was 1.7-fold increased among those with symptoms of hyperactivity assessed at age 8. Also, injuries during ages 7 to 15 years were more common

among those with symptoms of ADHD at age 15 with respect to any injury, fractures, and intracranial injuries, and among those with the diagnosis of ADHD with respect to any injury.
Conclusion: The present study shows an association between hospital-treated injuries and symptoms of ADHD in a large epidemiological sample of 0- to 15-year-old children.

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J Atten Disord. 2013 May.
A LONGITUDINAL EXAMINATION OF THE DEVELOPMENTAL EXECUTIVE FUNCTION HIERARCHY IN CHILDREN WITH EXTERNALIZING BEHAVIOR PROBLEMS.
Tillman C, Brocki KC, Sorensen L, et al.
Objective: Using a 4-year longitudinal design, we evaluated two hypotheses based on developmental executive function (EF) hierarchy accounts in a sample of children with externalizing problems.
Method: The participants performed EF tasks when they were between 8 and 12 years (M=9.93), and again approximately 4 years later when they were between 12 and 15 years (M=13.36).
Results: Inhibition in middle childhood predicted working memory (WM) 4 years later. Further, deficits in inhibition and sustained attention were more prominent in middle rather than late childhood, whereas poor WM was salient throughout these periods.
Conclusions: These findings support the hypotheses that EFs develop hierarchically and that EF deficits in ADHD are more prominent in actively developing EFs. They also emphasize ADHD as a developmental disorder.

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J Autism Dev Disord. 2013 Jun.
FACTOR STRUCTURE OF AUTISTIC TRAITS IN CHILDREN WITH ADHD.
Martin J, Hamshere ML, O'Donovan MC, et al.
Attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) often co-occur. Factor analyses of ASD traits in children with and without ASD indicate the presence of social and restrictive-repetitive behaviour (RRB) factors. This study used exploratory factor analyses to determine the structure of ASD traits (assessed using the Social Communication Questionnaire) in children with ADHD. Distinct factors were observed for 'social' and 'rigidity' traits, corresponding to previous factor analyses in clinical ASD and population samples. This indicates that the split between social-communicative and RRB dimensions is unaffected by ADHD in children. Moreover, the study also finds that there is some overlap across hyperactive-impulsive symptoms and RRB traits in children with ADHD, which merits further investigation.

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J Cent Nerv Syst Dis. 2013;5:1-17.
PHARMACOLOGICAL TREATMENT OF ATTENTION DEFICIT HYPERACTIVITY DISORDER IN CHILDREN AND ADOLESCENTS: CLINICAL STRATEGIES.
Shier AC, Reichenbacher T, Ghuman HS, et al.
Attention deficit hyperactivity disorder (ADHD) is a common neurobehavioral disorder of childhood that can result in significant functional impairment, and if not adequately treated can lead to impaired quality of life. Pharmacotherapy is considered the first-line treatment for ADHD in children and adolescents. We review both recent literature and seminal studies regarding the pharmacological treatment of ADHD in children and adolescents. There is ample evidence for the efficacy and safety of both stimulants and non-stimulants in the treatment of ADHD. We review important aspects of evaluation and assessment and discuss first-line pharmacological treatments and as well as when to consider using alternative pharmacological agents. Treatment approaches to manage frequently seen comorbid disorders with ADHD are also covered.

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J Child Adolesc Psychopharmacol. 2013 May;23:244-51.

AN OPEN-LABEL STUDY OF GUANFACINE EXTENDED RELEASE FOR TRAUMATIC STRESS RELATED SYMPTOMS IN CHILDREN AND ADOLESCENTS.

Connor DF, Grasso DJ, Slivinsky MD, et al.

Abstract Objective: The purpose of this open-label pilot study was to investigate the effectiveness and tolerability of guanfacine extended release (GXR) 1-4 mg given in the evening, on the symptoms of traumatic stress (reexperiencing, avoidance, overarousal), generalized anxiety, and functional impairment in children and adolescents with a history of traumatic stress with or without posttraumatic stress disorder (PTSD). As many of our sample had associated attention-deficit/hyperactivity disorder (ADHD) symptoms, we also assessed whether the presence of traumatic stress symptoms impaired the effectiveness of GXR in the treatment of comorbid ADHD symptoms.

Methods: Participants were 19 children and adolescents 6-18 years of age, with current traumatic stress symptoms. In an 8 week open-label design, each patient's scores on parent-, child-, and clinician-reported symptom rating scales assessing traumatic stress symptoms, generalized anxiety, ADHD symptoms, functional impairment, and global symptom severity and improvement (n=17) were evaluated off and on GXR using chi(2) goodness-of-fit tests, paired t tests, and repeated measures analyses of variance (ANOVAs). To examine patterns of change in outcome measures across treatment, MPlus software was used to conduct linear growth curves modeled with individual-varying times of observation (i.e., random slopes).

Results: Using an average GXR daily dose of 1.19 mg+/-0.35 mg and an average weight-adjusted daily dose of 0.03 mg/kg+/-0.01 mg/kg, significant differences were found on all symptom severity measures. Parent reported UCLA Reaction Index scores assessing cluster B (reexperiencing), C (avoidant), and D (overarousal) symptoms significantly improved. In the presence of PTSD symptoms, children with ADHD experienced significantly improved ADHD symptom scores, suggesting that comorbidity does not attenuate an ADHD symptom response to GXR therapy. Medication was generally well tolerated.

Conclusions: Within the limits of an open-label, hypothesis-generating pilot study, our results suggest that the alpha2A-adrenoceptor agonist GXR may have therapeutic effects in the treatment of PTSD symptoms in traumatically stressed children and adolescents. The effective dose may be lower than that found for ADHD. Our pilot study supports the need for further controlled research on the effects of GXR and other alpha2A-adrenoceptor agonists in pediatric disorders of traumatic stress.

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J Child Adolesc Psychopharmacol. 2013 Jun;23:337-51.

EFFECTS OF EXTENDED RELEASE METHYLPHENIDATE TREATMENT ON RATINGS OF ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD) AND ASSOCIATED BEHAVIOR IN CHILDREN WITH AUTISM SPECTRUM DISORDERS AND ADHD SYMPTOMS.

Pearson DA, Santos CW, Aman MG, et al.

Abstract Objective: The purpose of this study was to examine the behavioral effects of four doses of psychostimulant medication, combining extended-release methylphenidate (MPH) in the morning with immediate-release MPH in the afternoon.

Method: The sample comprised 24 children (19 boys; 5 girls) who met American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV-TR) criteria for an autism spectrum disorder (ASD) on the Autism Diagnostic Interview-Revised (ADI-R) and the Autism Diagnostic Observation Schedule (ADOS), and had significant symptoms of attention-deficit/hyperactivity disorder (ADHD). This sample consisted of elementary school-age, community-based children (mean chronological age=8.8 years, SD=1.7; mean intelligence quotient [IQ]=85; SD=16.8). Effects of four dose levels of MPH on parent and teacher behavioral ratings were investigated using a within-subject, crossover, placebo-controlled design.

Results: MPH treatment was associated with significant declines in hyperactive and impulsive behavior at both home and school. Parents noted significant declines in inattentive and oppositional behavior, and improvements in social skills. No exacerbation of stereotypies was noted, and side effects were similar to those seen in typically developing children with ADHD. Dose response was primarily linear in the dose range studied.

Conclusions: The results of this study suggest that MPH formulations are efficacious and well-tolerated for children with ASD and significant ADHD symptoms.

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J Child Psychol Psychiatry. 2013 Jun;54:703-04.

COMMENTARY: RCT OF OPTIMAL DOSE METHYLPHENIDATE IN CHILDREN AND ADOLESCENTS WITH SEVERE ADHD AND ID - A REPLY TO ARNOLD (2013).

Simonoff E, Taylor E, Baird G, et al.

The commentary by Arnold (2013) raises a number of interesting issues and speculations about the action of methylphenidate in children with intellectual disability (ID) and associated neurodevelopmental disorders, such as autism spectrum disorders. In our article (Simonoff et al., 2013), we were careful to stick closely to the statistical analysis plan drawn up (and approved by the Data Monitoring Committee) during data collection and prior to any exploratory analysis. However, a number of the issues raised by Arnold warrant further response, with the aim of clarifying the lessons that can reasonably be drawn for clinical practice.

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J Child Psychol Psychiatry. 2013 May.

MOTIVATIONAL INCENTIVES AND METHYLPHENIDATE ENHANCE ELECTROPHYSIOLOGICAL CORRELATES OF ERROR MONITORING IN CHILDREN WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER.

Groom MJ, Liddle EB, Scerif G, et al.

BACKGROUND: Children with attention deficit hyperactivity disorder (ADHD) are characterised by developmentally inappropriate levels of hyperactivity, impulsivity and/or inattention and are particularly impaired when performing tasks that require a high level of cognitive control. Methylphenidate (MPH) and motivational incentives may help improve cognitive control by enhancing the ability to monitor response accuracy and regulate performance accordingly.

METHODS: Twenty-eight children with DSM-IV ADHD (combined type) aged 9-15 years and pairwise-matched typically developing children (CTRL) performed a go/no-go task in which the incentives attached to performance on no-go trials were manipulated. The ADHD group performed the task off and on their usual dose of MPH. CTRL children performed the task twice but were never medicated. EEG data were recorded simultaneously and two electrophysiological indices of error monitoring, the error-related negativity (ERN) and error positivity (Pe) were measured. Amplitudes of each ERP were compared between diagnostic groups (CTRL, ADHD), medication days (Off MPH, On MPH) and motivational conditions (baseline - low incentive, reward, response cost).

RESULTS: Error rates were lower in the reward and response cost conditions compared with baseline across diagnostic groups and medication days. ERN and Pe amplitudes were significantly reduced in ADHD compared with CTRL, and were significantly enhanced by MPH. Incentives significantly increased ERN and Pe amplitudes in the ADHD group but had no effect in CTRL. The effects of incentives did not interact with the effects of MPH on either ERP. Effect sizes were computed and revealed larger effects of MPH than incentives on ERN and Pe amplitudes.

CONCLUSIONS: The findings reveal independent effects of motivational incentives and MPH on two electrophysiological markers of error monitoring in children with ADHD, suggesting that each may be important tools for enhancing or restoring cognitive control in these children.

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J Child Psychol Psychiatry. 2013 Jun;54:701-03.

COMMENTARY: FILLING OUT THE EVIDENCE BASE FOR TREATMENT OF ATTENTION-DEFICIT HYPERACTIVITY DISORDER SYMPTOMS IN CHILDREN WITH INTELLECTUAL AND DEVELOPMENTAL DISABILITY: CONCLUSIONS FOR CLINICIANS - A RESPONSE TO SIMONOFF ET AL. (2013).

Eugene AL.

This randomized clinical trial of methylphenidate in children with intellectual disability (ID) by Simonoff et al. (2013) advances the field in several ways useful to clinicians. The three-figure widely representative sample more definitively confirms findings previously reported from smaller studies and studies with a differently selected sample. The medium placebo-controlled effect size found is in line with previous more tentative suggestions for ID, such as those summarized by Aman et al. This sample, selected for ID but coincidentally including some children with autism (a third of the sample), nicely complements the RUPP Autism Network (2005) study of 72 children with autism, most of whom also had ID (mean IQ 62.6, range 16-135). Similar effect was found in both studies, suggesting that one might expect a medium effect widely in the intellectual & developmental disability (IDD) population, with a 40-50% response rate.

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J Child Psychol Psychiatry. 2013 May.

PRAGMATIC DEFICITS AND SOCIAL IMPAIRMENT IN CHILDREN WITH ADHD.

Staikova E, Gomes H, Tartter V, et al.

BACKGROUND: Impaired social functioning has been well documented in individuals with attention-deficit/hyperactivity disorder (ADHD). Existing treatments for ADHD are effective for managing core symptoms, but have limited effectiveness at improving social skills, suggesting that social deficits in ADHD may not be directly related to core symptoms of the disorder. Language problems are also common in ADHD, with accumulating evidence of pragmatic language difficulties. Pragmatic deficits are associated with social impairment in several neurodevelopmental disorders. This study systematically examined pragmatic language functioning in children with ADHD and whether social impairment in ADHD is mediated by pragmatic deficits.

METHOD: Sixty-three children (28 ADHD; 35 typically developing), ages 7-11 years, underwent a comprehensive assessment of pragmatic language, including parent ratings, standardized tests, and a narrative task. Parents also rated children's social skills on the Social Skills Improvement System.

RESULTS: Children with ADHD had poorer pragmatic language skills relative to peers across all measures, even after controlling for general language abilities. Furthermore, pragmatic abilities as measured by parent ratings, mediated the relation between ADHD and social skills.

CONCLUSIONS: Pragmatic language skills are impaired in many children with ADHD and may partially account for high rates of social impairment. Implications for treatment and possible prevention of social problems in children with ADHD are discussed.

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J Clin Child Adolesc Psychol. 2013 May.

PARENT ATTENDANCE AND HOMEWORK ADHERENCE PREDICT RESPONSE TO A FAMILY-SCHOOL INTERVENTION FOR CHILDREN WITH ADHD.

Clarke AT, Marshall SA, Mautone JA, et al.

This study examined the relative contribution of two dimensions of parent engagement, attendance and homework adherence, to parent and child treatment response and explored whether early engagement was a stronger predictor of outcomes than later engagement. The sample consisted of parents of participants (n=92; M age=9.4 years, SD=1.27; 67% male, 69% White) in a 12-session evidence-based family-school intervention for children with attention-deficit/hyperactivity disorder. Attendance was assessed using clinician records, and homework adherence was measured by rating permanent products. Outcomes included parent and teacher ratings of family involvement in education, parenting practices, and child functioning. Accounting for the contributions of baseline scores and attendance, homework adherence was a significant predictor of parental self-efficacy, the parent-teacher relationship, parenting through

positive involvement, and the child's inattention to homework and homework productivity. Accounting for the contribution of baseline scores and homework adherence, attendance was a significant predictor of one outcome, the child's academic productivity. Early homework adherence appeared to be more predictive of outcomes than later adherence, whereas attendance did not predict outcomes during either half of treatment. These results indicate that, even in the context of evidence-based practice, it is the extent to which parents actively engage with treatment, rather than the number of sessions they attend, that is most important in predicting intervention response. Because attendance is limited as an index of engagement and a predictor of outcomes, increased efforts to develop interventions to promote parent adherence to behavioral interventions for children are warranted.

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J Clin Psychopharmacol. 2013 Jun.

ABCB1 C.2677G>T VARIATION IS ASSOCIATED WITH ADVERSE REACTIONS OF OROS-METHYLPHENIDATE IN CHILDREN AND ADOLESCENTS WITH ADHD.

Kim SW, Lee JH, Lee SH, et al.

OBJECTIVES: Osmotic-release oral system (OROS)-methylphenidate (MPH) is a safe and well-tolerated drug. Some patients cannot continue this regimen with adverse drug reactions (ADRs). As drug efflux transporters of the central nervous system, ABCB1 plays an important role in the clearance of psychotropic drugs and their metabolites from brain tissues. We hypothesized that genetic variations in the ABCB1 gene may affect ADRs to OROS-MPH.

METHODS: We analyzed ADRs of OROS-MPH in 134 children and adolescents with attention-deficit hyperactivity disorder who completed a 4-week trial of OROS-MPH. The ADRs of OROS-MPH were evaluated by administering the Barkley Stimulant Side Effects Rating Scale.

RESULTS: Our study proved that MPH is a substrate for ABCB1 by using membrane vesicle assay. We analyzed the influence of ABCB1 polymorphisms on ADRs to OROS-MPH. From the association study between ABCB1 polymorphisms and ADRs of OROS-MPH, c.2677G>T (p.Ala893Ser, rs2032582) showed a strong association with OROS-MPH-related ADRs (P = 0.008; odds ratio, 5.72). Furthermore, logistic regression analysis indicated that the TT genotype at the ABCB1 2677 locus is an independent determinant of ADRs attributed to OROS-MPH. In a functional study, the 893Ser variant markedly reduced MPH transport across the cell membrane.

CONCLUSIONS: This is the first study to demonstrate that the TT genotype at position 2677 in the ABCB1 gene is associated with ADRs to OROS-MPH.

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J Int Neuropsychol Soc. 2013 Jun;1-9.

TIME-ON-TASK IN CHILDREN WITH ADHD: AN EX-GAUSSIAN ANALYSIS.

Tarantino V, Cutini S, Mogentale C, et al.

Although it is widely known that high intra-individual variability (IIV) is a key characteristic of attention deficit/hyperactivity disorder (ADHD), a detailed exploration of the IIV pattern during the time course of a cognitive task has never been carried out. In this study, 30 children with ADHD and 30 controls, were administered the Conners' Continuous Performance Task (CPT-II). The across-block individual performance of the groups was analyzed using an ex-Gaussian approach, which enabled a clearer understanding of how individual response times (RTs) fluctuate during a task in comparison with conventional measures of central tendency. While the conventional measures showed a significant group effect on mean RTs but similar RT trends across blocks between the two groups, the ex-Gaussian results revealed no actual differences between the two groups in the normally distributed component of mean RTs (mu). In contrast to the control group, the children with ADHD showed a steep increase in the exponentially distributed component of RTs (tau) across blocks, thereby indicating that extremely long RTs progressively increased soon after the beginning of the task. Taken together, the results demonstrated that sustained attention deficit in ADHD can be detected by analyzing the IIV in the first few task blocks.

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J Learn Disabil. 2013 Jun.

SPELLING ERRORS IN TEXT COPYING BY CHILDREN WITH DYSLEXIA AND ADHD SYMPTOMS.

Re AM, Cornoldi C.

Spelling errors are usually studied in dictations, but teachers report that children with school difficulties often make spelling mistakes when they copy a text too. The present study examines the performance on a text copying task and a text dictation task of two groups of children known for their difficulties in spelling, that is, 22 with symptoms of ADHD and 13 with dyslexia, comparing them with matched controls to see whether children with spelling difficulties make more copying task errors than do controls, whether they make fewer mistakes when copying than when writing under dictation, and whether the pattern of errors remains the same or differs in copy and dictation tasks. Our results show that although children with spelling difficulties made fewer errors in the copying task than under dictation, they still made phonological errors and mistakes relating to accents and duplicates. The pattern of errors differed slightly between the children with dyslexia and those with ADHD, presumably as a consequence of their different underlying weaknesses-related mainly to phonology and orthographic representation in the case of dyslexia and to attentional control in the case of ADHD.

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J Med Ethics. 2013 Jun;39:357-58.

ADHD AND STIMULANT DRUG TREATMENT: WHAT CAN THE CHILDREN TEACH US?

Erler A.

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J Ment Health Policy Econ. 2013 Mar;16:27-33.

THE FISCAL CONSEQUENCES OF ADHD IN GERMANY: A QUANTITATIVE ANALYSIS BASED ON DIFFERENCES IN EDUCATIONAL ATTAINMENT AND LIFETIME EARNINGS.

Kotsopoulos N, Connolly MP, Sobanski E, et al.

OBJECTIVE: To estimate the long-term fiscal consequences of attention deficit hyperactivity disorder (ADHD) on the German government and social insurance system based on differences in educational attainment and the resulting differences in lifetime earnings compared with non-ADHD cohorts.

METHODS: Differences in educational attainment between ADHD and non-ADHD cohorts were linked to education-specific earnings data. Direct and indirect tax rates and social insurance contributions were linked to differences in lifetime, education-specific earnings to derive lost tax revenue in Germany associated with ADHD. For ADHD and non-ADHD cohorts we derived the age-specific discounted net taxes paid by deducting lifetime transfers from lifetime gross taxes paid.

RESULTS: The lifetime net tax revenue for a non-ADHD individual was approximately EUR 80,000 higher compared to an untreated ADHD individual. The fiscal burden of untreated ADHD, based on a cohort of n=31,844 born in 2010, was estimated at EUR 2.5 billion in net tax revenue losses compared with an equally-sized non-ADHD cohort. ADHD interventions providing a small improvement in educational attainment resulted in fiscal benefits from increases in lifetime tax gains.

CONCLUSIONS: ADHD results in long-term financial loss due to lower education attainment and lifetime reduced earnings and resulting lifetime taxes and social contributions paid. Investments in ADHD interventions allowing more children to achieve their educational potential may offer fiscal benefits generating a positive rate of return.

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J Psychiatr Res. 2013 Aug;47:1013-18.

FACTORS ASSOCIATED WITH NEWLY DIAGNOSED TIC DISORDERS AMONG CHILDREN IN TAIWAN: A 10-YEAR NATIONWIDE LONGITUDINAL STUDY.

Chen CY, Liang HY, Chang CM, et al.

Increased attention has been paid to tic disorders clinically, yet relatively few studies have probed potential factors that account for the occurrence of tic disorders in the general population. In this study, we used data derived from the Taiwan's National Health Insurance Research Database to examine an array of factors related to the diagnosis of tic disorders and to further probe gender heterogeneity in clinical manifestation. Poisson regression analyses were applied to model the effects of birth cohort, period, and age, separately, on tic disorders. A total of 880 newly diagnosed tic disorders were identified from 2002 to 2009 among 100,516 youngsters in the study dataset who were born between 1997 and 2005. The results showed that a significant increase in the adjusted incidence rate ratio (IRR) was observed when age increased, with the highest adjusted IRR found at age 8-9 years. Compared to the time period from 2002 to 2005, an elevated IRR was found in the time period from 2006 to 2009 (adjusted IRR: 1.37; 95% CI: 1.05-1.80). Boys tended to be more likely to receive their initial diagnosis from psychiatrists and have higher comorbid attention-deficit/hyperactivity disorder (ADHD), as compared with their girl counterparts. In conclusion, the findings indicate that the effects of age and period, respectively, influence the occurrence of newly diagnosed tic disorders. Gender difference and higher frequent comorbid ADHD in boys than in girls were observed in this study.

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J Psychopharmacol. 2013 Jun.

STIMULANTS IMPROVE THEORY OF MIND IN CHILDREN WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER.

Maoz H, Tsviban L, Gvirts HZ, et al.

Impairments in 'theory of mind' (ToM) were linked to social cognition and reciprocal relationships deficits in children with attention deficit/hyperactivity disorder (ADHD). Twenty-four children with ADHD (13 with inattentive type and 11 with combined type, mean age 10.2 years) completed the Interpersonal Reactivity Index (IRI), a self-reported empathy questionnaire. All children performed the 'faux pas' task and a computerized ToM task in two different sessions either with or without administration of methylphenidate (MPH). Administration of MPH was associated with an improvement in cognitive and affective ToM. Children with ADHD-combined type had significantly lower scores in total IRI and the fantasy scale compared to children with ADHD-inattentive type. We conclude that deficits in empathy and ToM may play an important role in the impairments in social cognition and peer relationship in children with ADHD, especially children a hyperactive component. Stimulants may improve ToM and empathic functions. Future studies including larger samples and additional cognitive tasks are warranted in order to generalize these results and to identify possible underlying mechanisms for improvement in ToM following the administration of MPH.

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JAMA Psychiatry. 2013 May;70.

METHYLPHENIDATE VS. ATOMOXETINE: PERSONALIZED MEDICINE IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Heinrich H, Studer P, Moll GH, et al.

In the light of personalized medicine, future studies should not only address the question of whether one therapy is generally superior than another but also investigate which therapy may work best in a particular patient. In this respect, the article by Schulz and colleagues, in which the neural mechanisms of methylphenidate and atomoxetine during response inhibition were studied in children with attention-deficit/hyperactivity disorder (ADHD) by functional magnetic resonance imaging, appears to be highly relevant, particularly since neural changes are considered in relation to clinical improvements. At about the same time and independent of the Schulz et al study, our group investigated neural mechanisms of methylphenidate and atomoxetine in children with ADHD by means of event-related potentials during an

attention test. We also aimed at an individual titration over several weeks and did not use a placebo condition. In contrast to the study of Schulz et al, we chose a within-subject/ crossover design. We obtained a larger decrease of reaction time variability under methylphenidate paralleled by an increase of the contingent negative variation, a component reflecting cognitive preparation resources. In summary, both studies provide evidence for differential neural effects of methylphenidate and atomoxetine even though they do not provide a converging picture yet. However, in our opinion, they encourage further trials in larger samples aiming at finding predictors of treatment response by combining neuroimaging methods with a high spatial (eg, functional magnetic resonance imaging) and high temporal (eg, event-related potentials) resolution. Such an approach could contribute to a more personalized treatment in ADHD.

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J Abnorm Child Psychol. 2013 May;41:613-25.

A LONGITUDINAL ASSESSMENT OF THE ASSOCIATIONS AMONG RESPONSE ACCESS, ATTENTION PROBLEMS, AND AGGRESSION DURING CHILDHOOD.

Van Eck K, Flory K, Malone PS.

Children with ADHD symptoms often display social competence deficits, yet mechanisms for their social difficulties remain unclear. Using data from the normative sample of non-intervention respondents (N=387; 50 % male; 49 % non-European-American; age at initial assessment: M= 6.5 years, SD=0.48) in the Fast Track project (Lochman and CPPRG Journal of Consulting and Clinical Psychology 63:549–59, 1995), the social-information processing ability of accessing responses for social situations was modeled across four time points from kindergarten to third grade. Teacher-rated aggression and ADHD symptoms were included as predictors of the intercept and slope. Low ADHD symptoms were associated with a decline in aggressive responses across childhood, whereas high ADHD symptoms were linked to an increase in aggressive responses that decelerated between second and third grade. Regarding competent responses, low ADHD symptoms predicted increases in competent responses, but this increase decelerated between second and third grade. High ADHD symptoms were also associated with a slight increase in competent responses into first grade, but competent responses decreased from first to third grade. Neither aggression nor the interaction of ADHD symptoms and aggression accounted for a significant amount of variance in aggressive or competent responses. Future research should identify if differences in response access associated with high and low ADHD symptoms link to difficulties making and keeping friendships.

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J Child Adolesc Psychopharmacol. 2013 Apr;23:194-99.

LONG-TERM TREATMENT WITH ATOMOXETINE FOR ATTENTION-DEFICIT/HYPERACTIVITY DISORDER SYMPTOMS IN CHILDREN AND ADOLESCENTS WITH AUTISM SPECTRUM DISORDER: AN OPEN-LABEL EXTENSION STUDY.

Harfterkamp M, Buitelaar JK, Minderaa RB, et al.

Objective: The efficacy and tolerability of long-term treatment with atomoxetine for symptoms of attention-deficit/hyperactivity disorder (ADHD) in children with autism spectrum disorder (ASD) has not been established.

Methods: In this study, 88 patients 6–17 years of age, with ADHD and ASD, were treated with 1.2 mg/kg/day atomoxetine for 20 weeks as follow-up of an 8 week double-blind placebo-controlled period. Primary endpoint was the ADHD Rating Scale (ADHD-RS).

Results: After 8 weeks of initial treatment, the mean total, inattention, and hyperactivity-impulsivity ADHD-RS further decreased significantly from 34.9 to 27.0 for the total ADHD-RS, from 18.3 to 14.5 for the ADHD-RS inattention subscale, and from 16.5 to 12.6 for the hyperactivity-impulsivity subscale. Adverse events were mild and tended to diminish over time during continued treatment, especially regarding nausea and fatigue. There were no serious adverse events.

Conclusions: The results of the present analysis suggest that continued treatment with atomoxetine up to 28 weeks further improve ADHD symptoms in children and adolescents with ASD, while adverse events tend to subside. Future studies investigating the long-term efficacy of atomoxetine in children and adolescents with ASD should be randomized and placebo controlled.

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J Child Neurol. 2013 May;28:645-47.

CONFOUNDING DIAGNOSES IN THE NEURODEVELOPMENTAL DISABILITIES POPULATION: A CHILD WITH HEARING LOSS, ABSENCE EPILEPSY, AND ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD).

Lance EI, Shapiro BK.

We report the case of a school-age child with a history of hearing loss presenting with staring spells. Electroencephalography (EEG) revealed a pattern consistent with absence epilepsy, and the patient was started on antiepileptic medication with decreased frequency of staring spells but he then continued to have behavioral issues. The patient was diagnosed subsequently with combined-type attention-deficit hyperactivity disorder (ADHD) and started on stimulant medication with subsequent improvement in attention and school performance. Multiple confounding diagnoses are common in children with neurodevelopmental disabilities, and comprehensive evaluation is required for appropriate management.

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J Consult Clin Psychol. 2013 Jun;81:481-93.

SYMPATHETIC- AND PARASYMPATHETIC-LINKED CARDIAC FUNCTION AND PREDICTION OF EXTERNALIZING BEHAVIOR, EMOTION REGULATION, AND PROSOCIAL BEHAVIOR AMONG PRESCHOOLERS TREATED FOR ADHD.

Beauchaine TP, Gatzke-Kopp L, Neuhaus E, et al.

Objective: To evaluate measures of cardiac activity and reactivity as prospective biomarkers of treatment response to an empirically supported behavioral intervention for attention-deficit/hyperactivity disorder (ADHD).

Method: Cardiac preejection period (PEP), an index of sympathetic-linked cardiac activity, and respiratory sinus arrhythmia (RSA), an index of parasympathetic-linked cardiac activity, were assessed among 99 preschool children (ages 4–6 years) with ADHD both at rest and in response to behavioral challenge, before participants and their parents completed 1 of 2 versions of the Incredible Years parent and child interventions.

Results: Main effects of PEP activity and reactivity and of RSA activity and reactivity were found. Although samplewide improvements in behavior were observed at posttreatment, those who exhibited lengthened cardiac PEP at rest and reduced PEP reactivity to incentives scored higher on measures of conduct problems and aggression both before and after treatment. In contrast, children who exhibited lower baseline RSA and greater RSA withdrawal scored lower on prosocial behavior before and after treatment. Finally, children who exhibited greater RSA withdrawal scored lower on emotion regulation before and after treatment.

Conclusions: We discuss these findings in terms of (a) individual differences in underlying neurobiological systems subserving appetitive (i.e., approach) motivation, emotion regulation, and social affiliation and (b) the need to develop more intensive interventions targeting neurobiologically vulnerable children.

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Journal of Psychiatric and Mental Health Nursing. 2013 Apr;20:426-32.

PARENTS REPORTED ORAL SENSORY SENSITIVITY PROCESSING AND FOOD PREFERENCE IN ADHD.

Ghanizadeh A.

Oral sensory processing in children with attention deficit hyperactivity disorder (ADHD) is an area with limited research. Oppositional defiant disorder (ODD) and separation anxiety disorder (SAD) symptoms usually co-occur with ADHD. This study investigates the association of oral sensory processing problems with ODD and SAD symptoms in children with ADHD. The parents of 189 children with ADHD completed

Oral Over- and Underresponsivity Behaviors Inventory reporting oral overresponsivity (OR) and underresponsivity (UR) of their children. Only ODD score predicted OR scale score. None of ADHD severity, anxiety score, age and gender predicted OR score. UR scale score was only predicted by SAD and inattention scores. ODD score and hyperactivity/impulsivity score did not predict UR score. The ODD behaviour in children with ADHD needs to be evaluated and managed more extensively and it should include oral sensory occupational therapy. Future studies should extend this research to children with ADHD and obesity and food reward system.

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NeuroRehabilitation. 2013;32:555-62.

EVALUATION OF A COMPUTER-BASED NEUROPSYCHOLOGICAL TRAINING IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD).

Amonn F, Frolich J, Breuer D, et al.

BACKGROUND: We report the effects of a computer-based neuropsychological training in children with Attention-Deficit Hyperactivity Disorder (ADHD). We hypothesized that a specific training focusing on attentional dysfunction would result in an improvement of inattention, observable in test performance, behavior and performance during experimental school lessons and in parent and teacher ratings of the related core symptom.

METHOD: We chose a within-subject-control-design with a 4 week baseline period and subsequent 12 to 15 weekly training-sessions. 30 children (6 to 13 years old) with a diagnosis of ADHD (ICD 10: F 90.0) and no other comorbidities participated in the study.

RESULTS: The training revealed significant improvement in training parameters of the neuropsychological training and in the symptoms of inattention and deportment as rated during experimental school lessons. However, generalization of training effects as measured by parent and teacher ratings was not detected.

CONCLUSIONS: We conclude that neuropsychological training could be helpful as one adjunct module in the complex treatment of ADHD but to prove clinical value, similar training programs must focus more strongly on individually existing neuropsychological deficits. Training programs should be more intensive and should eventually be combined with home based training access.

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Paediatr Drugs. 2013 Jun.

COMBINATION PHARMACOTHERAPY FOR PSYCHIATRIC DISORDERS IN CHILDREN AND ADOLESCENTS: PREVALENCE, EFFICACY, RISKS AND RESEARCH NEEDS.

Jureidini J, Tonkin A, Jureidini E.

Polypharmacy, defined as the concomitant use of two or more psychotropic drugs, has become increasingly common in the paediatric and adolescent population over the past two decades. Combining psychotropic drugs leads to possible increases in benefits, but also in risks, particularly given the potential for psychotropic drug interactions. Despite the increasing use of concomitant therapy in children and adolescents, there is very little evidence from controlled clinical trials to provide guidance for prescribers. Even while acknowledging the small evidence base, clinical practice guidelines from eminent medical organizations are either relatively silent on or tend to support the use of concomitant treatments more enthusiastically than the evidence would warrant, so that practice and guidance are running ahead of the science. Our narrative review shows that the published evidence for efficacy and safety of concomitant psychotropic drugs in children and adolescents is scanty. A comprehensive search located 37 studies published over the last decade, of which 18 were randomized controlled trials (RCTs). These focused mainly on stimulants, central sympatholytics (such as clonidine), antipsychotics and 'mood stabilizers'. While several small, often methodologically weak, RCTs demonstrated statistically significant advantages for dual pharmacotherapy over monotherapy, only adding central sympatholytics to stimulants for treating attention-deficit hyperactivity disorder (ADHD) symptoms was supported by substantial studies with an effect size large enough to suggest clinical importance. Non-randomized studies tended to have results that supported concomitant treatment, but all have design-related problems that decrease the reliability of the

results. Two studies that specifically examined tolerability of combination pharmacotherapy compared with monotherapy showed significant increases in adverse effects, both subjective and objective, and other studies confirmed a statistically significant increase in adverse effects, including sedation and self-harm. Given the extent of combination therapy occurring, particularly in conditions such as ADHD, and the ambiguous evidence for benefit with clear evidence of harm, we propose that further research should be carried out as a matter of urgency. Until such a time, the attitude to combination pharmacotherapy should be conservative, and combining psychotropic medications should be considered as an 'n of 1' trial to be closely monitored.

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Pediatrics. 2013 Jun;131:e1731-e1738.

OBESITY IN MEN WITH CHILDHOOD ADHD: A 33-YEAR CONTROLLED, PROSPECTIVE, FOLLOW-UP STUDY.

Cortese S, Ramos Olazagasti MA, Klein RG, et al.

OBJECTIVE: To compare BMI and obesity rates in fully grown men with and without childhood attention-deficit/hyperactivity disorder (ADHD). We predicted higher BMI and obesity rates in: (1) men with, versus men without, childhood ADHD; (2) men with persistent, versus men with remitted, ADHD; and (3) men with persistent or remitted ADHD versus those without childhood ADHD.

METHODS: Men with childhood ADHD were from a cohort of 207 white boys (referred at a mean age of 8.3 years), interviewed blindly at mean ages 18 (FU18), 25 (FU25), and 41 years (FU41). At FU18, 178 boys without ADHD were recruited. At FU41, 111 men with childhood ADHD and 111 men without childhood ADHD self-reported their weight and height.

RESULTS: Men with childhood ADHD had significantly higher BMI (30.1 +/- 6.3 vs 27.6 +/- 3.9; P = .001) and obesity rates (41.4% vs 21.6%; P = .001) than men without childhood ADHD. Group differences remained significant after adjustment for socioeconomic status and lifetime mental disorders. Men with persistent (n = 24) and remitted (n = 87) ADHD did not differ significantly in BMI or obesity rates. Even after adjustment, men with remitted (but not persistent) ADHD had significantly higher BMI (B: 2.86 [95% CI: 1.22 to 4.50]) and obesity rates (odds ratio: 2.99 [95% CI: 1.55 to 5.77]) than those without childhood ADHD.

CONCLUSIONS: Children with ADHD are at increased risk of obesity as adults. Findings of elevated BMI and obesity rates in men with remitted ADHD require replication.

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Perception. 2013;42:16-27.

ONSET TIME OF BINOCULAR RIVALRY AND DURATION OF INTER-DOMINANCE PERIODS AS PSYCHOPHYSICAL MARKERS OF ADHD.

Aznar Casanova JA, Amador Campos JA, Moreno SM, et al.

Attention deficit hyperactivity disorder (ADHD) is one of the main neurobiological disorders in young children. Despite its prevalence, current diagnosis is debated. In this study we tested whether measures of binocular rivalry (BR) can contribute to the diagnosis of ADHD. BR is a phenomenon that is produced when two different images are presented to the two eyes simultaneously. Under these conditions the image presented to one eye competes with that presented to the other eye in seeking to achieve perceptual dominance. This competition is resolved through the activation of a given percept coupled with the suppression of the percept that had predominated until that point. We assume that the difficulty with inhibiting responses of ADHD children also affects their ability to inhibit the dominant image in a BR context. We analyzed the time to rivalry onset and the inter-dominance periods as measures of the temporal cost of resolving how long it takes for the brain to select (or suppress) one percept over the other. Our results show that the time to onset of rivalry (the first dominance) was longer in the clinical groups (ADHD-C and ADHD-I) than in the control group. As regards the inter-dominance periods, these were longer in the ADHD-C group than among controls, with the shortest period corresponding to the ADHD-I group. This study shows that BR can be used as a tool to develop a behavioral indicator of ADHD.

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PLoS ONE. 2013;8:e62594.

CHILDHOOD HYPERACTIVITY, PHYSICAL AGGRESSION AND CRIMINALITY: A 19-YEAR PROSPECTIVE POPULATION-BASED STUDY.

Pingault JB, Cote SM, Lacourse E, et al.

BACKGROUND: Research shows that children with Attention Deficit/Hyperactivity Disorder are at elevated risk of criminality. However, several issues still need to be addressed in order to verify whether hyperactivity in itself plays a role in the prediction of criminality. In particular, co-occurrence with other behaviors as well as the internal heterogeneity in ADHD symptoms (hyperactivity and inattention) should be taken into account. The aim of this study was to assess the unique and interactive contributions of hyperactivity to the development of criminality, whilst considering inattention, physical aggression and family adversity.

METHODOLOGY/PRINCIPAL FINDINGS: We monitored the development of a population-based sample of kindergarten children (N = 2,741). Hyperactivity, inattention, and physical aggression were assessed annually between the ages of 6 and 12 years by mothers and teachers. Information on the presence, the age at first charge and the type of criminal charge was obtained from official records when the participants were aged 25 years. We used survival analysis models to predict the development of criminality in adolescence and adulthood: high childhood hyperactivity was highly predictive when bivariate analyses were used; however, with multivariate analyses, high hyperactivity was only marginally significant (Hazard Ratio: 1.38; 95% CI: 0.94-2.02). Sensitivity analyses revealed that hyperactivity was not a consistent predictor. High physical aggression was strongly predictive (Hazard Ratio: 3.44; 95% CI: 2.43-4.87) and its role was consistent in sensitivity analyses and for different types of crime. Inattention was not predictive of later criminality.

CONCLUSIONS/SIGNIFICANCE: Although the contribution of childhood hyperactivity to criminality may be detected in large samples using multi-informant longitudinal designs, our results show that it is not a strong predictor of later criminality. Crime prevention should instead target children with the highest levels of childhood physical aggression and family adversity.

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PLoS ONE. 2013;8:e65098.

SLEEP PROMOTES CONSOLIDATION OF EMOTIONAL MEMORY IN HEALTHY CHILDREN BUT NOT IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER.

Prehn-Kristensen A, Munz M, Molzow I, et al.

Fronto-limbic brain activity during sleep is believed to support the consolidation of emotional memories in healthy adults. Attention deficit-hyperactivity disorder (ADHD) is accompanied by emotional deficits coincidently caused by dysfunctional interplay of fronto-limbic circuits. This study aimed to examine the role of sleep in the consolidation of emotional memory in ADHD in the context of healthy development. 16 children with ADHD, 16 healthy children, and 20 healthy adults participated in this study. Participants completed an emotional picture recognition paradigm in sleep and wake control conditions. Each condition had an immediate (baseline) and delayed (target) retrieval session. The emotional memory bias was baseline-corrected, and groups were compared in terms of sleep-dependent memory consolidation (sleep vs. wake). We observed an increased sleep-dependent emotional memory bias in healthy children compared to children with ADHD and healthy adults. Frontal oscillatory EEG activity (slow oscillations, theta) during sleep correlated negatively with emotional memory performance in children with ADHD. When combining data of healthy children and adults, correlation coefficients were positive and differed from those in children with ADHD. Since children displayed a higher frontal EEG activity than adults these data indicate a decline in sleep-related consolidation of emotional memory in healthy development. In addition, it is suggested that deficits in sleep-related selection between emotional and non-emotional memories in ADHD exacerbate emotional problems during daytime as they are often reported in ADHD.

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PLoS ONE. 2013;8:e64842.

SYMPTOMS OF ADHD IN CHILDREN WITH HIGH-FUNCTIONING AUTISM ARE RELATED TO IMPAIRED VERBAL WORKING MEMORY AND VERBAL DELAYED RECALL.

Andersen PN, Hovik KT, Skogli EW, et al.

Symptoms similar to those found in Attention-Deficit/Hyperactivity Disorder (ADHD) often occur in children with Autism Spectrum Disorders (ASD). The objective of the current study was to compare verbal working memory, acquisition and delayed recall in children with High-Functioning Autism (HFA) to children with ADHD and typically developing children (TDC). Thirty-eight children with HFA, 79 with ADHD and 50 TDC (age 8-17) were assessed with a letter/number sequencing task and a verbal list-learning task. To investigate the possible influence of attention problems in children with HFA, we divided the HFA group into children with (HFA+) or without (HFA-) "attention problems" according to the Child Behaviour Checklist 6-18. The children with HFA+ displayed significant impairment compared to TDC on all three neurocognitive measures, while the children with HFA- were significantly impaired compared to TDC only on the working memory and acquisition measures. In addition, the HFA+ group scored significantly below the HFA- group and the ADHD group on the verbal working memory and delayed recall measures. The results support the proposition that children with HFA+, HFA-, and ADHD differ not only on a clinical level but also on a neurocognitive level which may have implications for treatment.

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PLoS ONE. 2013;8:e63859.

CHILDREN WITH ADHD SYMPTOMS HAVE A HIGHER RISK FOR READING, SPELLING AND MATH DIFFICULTIES IN THE GINIPLUS AND LISAPLUS COHORT STUDIES.

Czamara D, Tiesler CM, Kohlbock G, et al.

Attention-deficit/hyperactivity disorder (ADHD) and dyslexia belong to the most common neuro-behavioral childhood disorders with prevalences of around 5% in school-aged children. It is estimated that 20-60% of individuals affected with ADHD also present with learning disorders. We investigated the comorbidity between ADHD symptoms and reading/spelling and math difficulties in two on-going population-based birth cohort studies. Children with ADHD symptoms were at significantly higher risk of also showing reading/spelling difficulties or disorder (Odds Ratio (OR) = 2.80, p = 6.59x10(-13)) as compared to children without ADHD symptoms. For math difficulties the association was similar (OR = 2.55, p = 3.63x10(-04)). Our results strengthen the hypothesis that ADHD and learning disorders are comorbid and share, at least partially, the same underlying process. Up to date, it is not clear, on which exact functional processes this comorbidity is based.

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Psychiatr Genet. 2013 Apr;23:90-91.

ASSOCIATION OF THE CATECHOL-O-METHYLTRANSFERASE GENE AND ATTENTION DEFICIT HYPERACTIVITY DISORDER: RESULTS FROM AN EPIDEMIOLOGICAL STUDY OF ADOLESCENTS OF MEXICO CITY.

Martínez-Levy GA, Benjet C, Perez-Molina A, et al.

The present study aimed to explore the possible association between Val158Met COMT, VNTR 30 UTR SLC6A, and LPR SLC6A4 candidate genes with ADHD and its subtypes. Association analyses of the aforementioned polymorphisms with ADHD (sex and subtype) were carried out with the SPSS v.15 software. Adjustment for multiple tests was performed with the SISA online procedure. Previous meta-analyses have not established any significant association between the COMT Val158Met polymorphism and ADHD or its subtypes. Furthermore, most studies have evaluated primarily Caucasian and Asian populations, whereas this report contributes data for Mexican Mestizos. However, replication in different or extended cohorts is necessary before drawing any definite conclusion. Moreover, the putative functional impact of the COMT genetic variation requires further investigation in terms of specific cognitive and behavioral aspects related to ADHD.

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Psychiatry Res. 2013 Jul;213:24-30.

DISSOCIABLE ATTENTIONAL AND AFFECTIVE CIRCUITS IN MEDICATION-NAIVE CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Posner J, Rauh V, Gruber A, et al.

Current neurocognitive models of attention-deficit/hyperactivity disorder (ADHD) suggest that neural circuits involving both attentional and affective processing make independent contributions to the phenomenology of the disorder. However, a clear dissociation of attentional and affective circuits and their behavioral correlates has yet to be shown in medication-naive children with ADHD. Using resting-state functional connectivity MRI (rs-fcMRI) in a cohort of medication naive children with (N=22) and without (N=20) ADHD, we demonstrate that children with ADHD have reduced connectivity in two neural circuits: one underlying executive attention (EA) and the other emotional regulation (ER). We also demonstrate a double dissociation between these two neural circuits and their behavioral correlates such that reduced connectivity in the EA circuit correlates with executive attention deficits but not with emotional lability, while on the other hand, reduced connectivity in the ER circuit correlates with emotional lability but not with executive attention deficits. These findings suggest potential avenues for future research such as examining treatment effects on these two neural circuits as well as the potential prognostic and developmental significance of disturbances in one circuit vs the other.

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Psychol Assess. 2013 Jun.

A DISPOSITIONAL TRAIT FRAMEWORK ELUCIDATES DIFFERENCES BETWEEN INTERVIEW AND QUESTIONNAIRE MEASUREMENT OF CHILDHOOD ATTENTION PROBLEMS.

Herzhoff K, Tackett JL, Martel MM.

At present, no single attention-deficit/hyperactivity disorder (ADHD) measure completely and comprehensively captures all ADHD diagnostic criteria (Anastopoulos, 2001). This represents a notable limitation in the assessment of attention problems and suggests the need for research that reconciles differences in information across measures purporting to measure the same or similar constructs. For example, by analyzing differences in measures in relation to a third construct, the third construct can provide an illuminative backdrop against which to view and ultimately reconcile differences between measures of the same attention problem construct. Thus, the purpose of the present study was to draw on a dispositional trait framework to illustrate differences in the ADHD construct assessed by 2 widely used attention problem measures. Parents of 346 children (51% girls) ranging in age from 7 to 12 years (M = 9.92 years, SD = 0.83 years) completed the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001), a structured clinical interview based on the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000), and dispositional trait questionnaires about their child. Both low Conscientiousness/Effortful Control and high Neuroticism/Negative Affect showed strong, unique associations with the CBCL Attention Problem score, whereas only low Conscientiousness/Effortful Control showed a strong, unique association with DSM-IV-TR ADHD symptoms assessed by clinical interview. These discriminant dispositional trait correlates help us understand the nature of the attention problem construct as assessed by each measure, with important implications for the practice of cross-measure integration in both research and applied settings.

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Psychol Med. 2013 May;1-16.

ATTENTION AND INHIBITION IN CHILDREN WITH ASD, ADHD AND CO-MORBID ASD + ADHD: AN EVENT-RELATED POTENTIAL STUDY.

Tye C, Asherson P, Ashwood KL, et al.

BACKGROUND: Substantial overlap has been reported between attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). Deficits in executive function (EF) are characteristic of both disorders but these impairments have not been compared directly across pure and co-morbid cases using event-related potentials (ERPs).

METHOD: Behavioural parameters and ERPs were recorded during a flankered cued-continuous performance test (CPT-OX) administered to 8-13-year-old boys with ASD (n=19), ADHD (n=18), co-morbid ASD + ADHD (n=29) and typically developing controls (TD; n=26). Preparatory processing (contingent negative variation, CNV) and attentional orienting (Cue-P3) at cues, response execution at targets (Go-P3), inhibitory processing at non-targets (NoGo-P3) and conflict monitoring between target and non-target trials (Go-N2 v. NoGo-N2) were examined.
RESULTS: Categorical diagnoses and quantitative trait measures indicated that participants with ADHD (ADHD/ASD + ADHD) made more omission errors and exhibited increased reaction-time (RT) variability and reduced amplitude of the Cue-P3 and NoGo-P3 compared to TD/ASD participants. Participants with ASD (ASD/ ASD + ADHD) demonstrated reduced N2 enhancement from Go to NoGo trials compared to TD/ADHD participants. Participants with ASD-only displayed enhanced CNV amplitude compared to ASD + ADHD and TD participants.
CONCLUSIONS: Children with ADHD show deficits in attentional orienting and inhibitory control whereas children with ASD show abnormalities in conflict monitoring and response preparation. Children with co-morbid ASD + ADHD present as an additive co-occurrence with deficits of both disorders, although non-additive effects are suggested for response preparation. Measuring ERPs that index attention and inhibition is useful in disentangling cognitive markers of ASD and ADHD and elucidating the basis of co-occurring ASD + ADHD to guide clinical assessment.

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Res Dev Disabil. 2013 Jun;34:2669-75.

A COMPARISON OF TANTRUM BEHAVIOR PROFILES IN CHILDREN WITH ASD, ADHD AND COMORBID ASD AND ADHD.

Goldin RL, Matson JL, Tureck K, et al.

The present study was conducted to compare rates of tantrum behaviors in children with autism spectrum disorders (ASD) (n=255), attention-deficit/hyperactivity disorder (ADHD) (n=40) and children with comorbid ASD and ADHD (n=47). Parents/guardians of children aged 3-16 years were surveyed about their children's behaviors using the Autism Spectrum Disorders-Comorbidity for Children (ASD-C-C). Children with ADHD alone differed from children with ASD alone and children with comorbid ASD and ADHD on rates of tantrum behaviors. Examination of individual tantrum behavior items indicated that children with comorbid ASD and ADHD have a more similar symptom presentation to children with ASD than children with ADHD. This study adds to the literature on the presentation of common co-occurring behaviors of ASD when there is comorbid ADHD. The implications of these findings may aid in the assessment and treatment of tantrum behaviors in children with comorbid ASD and ADHD.

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Res Dev Disabil. 2013 Jul;34:2127-32.

OUTPATIENT REHABILITATION UTILIZATION AND MEDICAL EXPENSES IN CHILDREN AGED 0-7YEARS WITH ADHD: ANALYSES OF POPULATION-BASED NATIONAL HEALTH INSURANCE DATA.

Lin JD, Chen YH, Lin LP.

Medical costs of attention-deficit/hyperactivity disorder (ADHD) are substantial and have a large impact on the public health system. The present study presents information regarding outpatient rehabilitation care usage and medical expenditure for children with ADHD. A cross-sectional study was conducted by analyzing data from the Taiwan National Health Insurance claims database for the year 2009. A total of 6643 children aged 0-7years with ADHD (ICD-9-CM codes 314.0x: attention deficit disorder, 314.00: attention deficit disorder without hyperactivity, or 314.01: attention-deficit disorder with hyperactivity) who had used outpatient rehabilitation care were included in the analyses. Results showed that the mean annual rehabilitation care was 22.24 visits. Among the care users, 76% of patients were male, and 24% were female. More than half of the children with ADHD had comorbid mental illnesses as well. A logistic regression analysis of outpatient rehabilitation expenditure (low vs. high) showed that of those children with ADHD, those aged 0-2years tended to incur more medical costs than those aged 6-7years. Other factors

such as frequency of rehabilitation visits, hospital medical setting and ownership, location of medical care setting, and types of rehabilitation were also significantly correlated with medical expenditure. The results from this study suggest that health care systems should ensure accurate diagnosis and measurement of impairment to maintain appropriate and successful management of rehabilitation needs for children with ADHD.

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Res Dev Disabil. 2013 Jul;34:2092-97.

CATECHOL-O-METHYLTRANSFERASE VAL158MET POLYMORPHISM AND HYPERACTIVITY SYMPTOMS IN EGYPTIAN CHILDREN WITH AUTISM SPECTRUM DISORDER.

Karam RA, Rezk NA, Abdelrahman HM, et al.

Catechol-O-methyltransferase (COMT) plays an important role in the catabolism of brain dopamine and norepinephrine, which have been implicated in the pathogenesis of Autism spectrum disorder (ASD) as well as in other neuropsychatric disorders. We aimed to investigate the association of COMT Val158Met gene polymorphism with ASD and to examine the influence of such genotypes on hyperactivity symptoms in ASD patients. Eighty ASD patients (mean age 9+/-1.9 years) and 100 control children (mean age 8.9+/-1.9 years) were examined. COMT Val58Met polymorphism was genotyped using Tetra-primer ARMS-PCR method. The clinical diagnosis of ASD and ADHD were confirmed according to the DSM-IV criteria for research. We found no significant difference in genotypes or alleles' frequencies of COMT Val158Met polymorphism between ASD patients and control group. There was a significant association between COMT (Val/Val) genotype and both increasing CARS (p=0.001) and hyperactivity scores (p=0.006). Regarding Conner's Score, the DSM-IV hyperactive impulsive were significantly higher in Val/Val genotype than both Met/Val and Met/Met genotypes (p=0.03). Our data suggested an association between COMT Val58Met polymorphism and hyperactivity symptoms in Egyptian children with ASD.

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Res Dev Disabil. 2013 Aug;34:2369-78.

RATES OF COMORBID SYMPTOMS IN CHILDREN WITH ASD, ADHD, AND COMORBID ASD AND ADHD.

Jang J, Matson JL, Williams LW, et al.

The current diagnostic criteria do not allow co-diagnosis of autism spectrum disorder (ASD) and attention deficit/hyperactivity disorder (ADHD). As a result, there has been little research on how these two disorders co-occur in the ASD population. The current study aimed to extend the literature in this area by examining comorbid rates in three different diagnostic groups (ASD, ADHD, and comorbid ASD+ADHD) using the Autism Spectrum Disorders-Comorbidity for Children (ASD-CC). Children with comorbid ASD and ADHD evinced higher rates of comorbid symptoms than children with ASD or ADHD alone. Additionally, children with comorbid ASD and ADHD endorsed more severe comorbid symptoms. Implications regarding these findings are discussed.

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Rev Invest Clin. 2013 Jan;65:30-38.

CONCURRENT VALIDITY IN MEXICAN COLLEGE POPULATION OF THE ADULT ADHD SELF REPORT SCALE.

Reyes-Zamorano E, Garcia-Vargas KL, Palacios-Cruz L.

INTRODUCTION: In order to make a valid adult ADHD diagnostic, the clinician must overcome a series of difficulties, the main of which may be the fact that the current DSM-IV diagnostic criteria for ADHD were designed for children, hence having valid and reliable instruments in order to screen for possible patients be very helpful.

OBJECTIVE: To validate the ASRS for its use on Mexican college population through concurrent validity with the FASCT scale.

MATERIAL AND METHODS: We evaluated 447 (287 women, average age 23.59 years) undergraduate students from 4 universities in Mexico City. All participants answered the ASRS and FASCT scales.

RESULTS: Positive and statistically significant correlations were found between the ASRS and FASCT (r = 0.79) and the agreement in diagnostic was moderate (k = 0.58).
CONCLUSIONS: ASRS seems to have adequate concurrent validity with the FASCT, nevertheless further research comparing it with a semi-structured or highly structured interview is needed.

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Rev Med Chil. 2012 Nov;140:1409-16.

ATTENTION DEFICIT HYPERACTIVITY DISORDER IN AYMARA CHILDREN.

Carrasco X, Daiber F, Rothhammer P, et al.

Background: The assessment of Attentional Deficit Hyperactivity Disorder (ADHD) among ethnic groups may reveal environmental or cultural variables that influence the appearance of this disorder.
Aim: To assess the presence and characteristics of ADHD in two communities of the inland Arica valleys (Azapa and Lluta), where the Aymara population predominates.
Material and Methods: Startingfrom a screening based on the Conner's test, we evaluated 79 children aged 8 to 13 years. Sixty children were of Aymara origin and 19 children were of non-Aymara origin. Twenty Aymara and 9 non-Aymara children had ADHD. They were compared with a group of patients from Santiago, Chile (110 children) that were previously assessed.
Results: Patientsfrom Azapa/Lluta displayed similar characteristics to those from Santiago. However the former had significantly less psychiatric comorbidities than the latter. On the other hand, the non-Aymara subgroup of Azapa/ Lluta displayed an increased rate of comorbidities and was exclusively of the combined subtype, although their sample size is too small to draw strong conclusions.
Conclusions: Although we cannot dismiss biological variables, the importance of family values and the respect to authorities may be protective factors for ADHD, associated to Aymara culture. Our findings suggest that the clinical characteristics of ADHD are not uniform among ethnic groups and cultures. The relative contribution of environmental and genetic factors in this variability remain to be determined.

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ScientificWorldJournal. 2013;2013:213979.

COEXISTING DISORDERS AND PROBLEMS IN PRESCHOOL CHILDREN WITH AUTISM SPECTRUM DISORDERS.

Hoglund CL, Norrelgen F, Kjellmer L, et al.

Objectives. To analyze cooccurring disorders and problems in a representative group of 198 preschool children with autism spectrum disorders (ASD) who had had interventions at a specialized habilitation center.
Methods. Parents and children were seen by a research team. Data were based on parental interviews, pediatric assessments, and tests of the child. Information on autistic symptoms, general cognitive function, speech and language, motor function, epilepsy, vision, hearing, activity level, behavior, and sleep was collected.
Results. Three ASD categories were used: (1) autistic disorder (AD), (2) autistic-like condition (ALC) or Asperger syndrome, and (3) one group with autistic symptoms/traits but not entirely all its criteria met for ASD. Children with autism had a mean of 3.2 coexisting disorders or problems, the ALC/Asperger group had a mean of 1.6, and children with autistic traits had a mean of 1.6. The most common disorder/problems in the total group pertained to language problems (78%), intellectual disability (ID) (49%), below average motor function (37%), and severe hyperactivity/ADHD (33%).
Conclusions. The results accord with the concept of early symptomatic syndromes eliciting neurodevelopmental clinical examination (ESSENCE), and highlight the need of considering ASD in a broad perspective taking also other cooccurring developmental disorders into account.

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Seizure. 2013 May.

EPILEPSY IN A LARGE COHORT OF CHILDREN DIAGNOSED WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDERS (ADHD).

Socanski D, Aurlien D, Herigstad A, et al.

PURPOSE: The knowledge about possible relationships between ADHD and epilepsy is largely based on small samples of ADHD patients and on cohorts with epilepsy. There is insufficient information about the clinical characteristics of epilepsy among children diagnosed with ADHD. The aim of this study was to investigate the prevalence and characteristics of epilepsy in a large, unselected cohort of children with ADHD.

METHODS: We conducted a retrospective chart-review of children with ADHD who were evaluated in our clinic between the years 2000 and 2005. We compared age, sex, disorders of psychological development, cognitive level, pharmacological treatment for ADHD, initial response to treatment and ADHD subtype with and without epilepsy. In addition, we compared our data with data from a Norwegian study in a large general pediatric population.

RESULTS: Of 607 children with ADHD (age 6-14 years; 82.4% males); 14 (2.3%) had a history of epilepsy, and 13 of these had active epilepsy. This is a higher occurrence than expected in the general pediatric population (0.5%). The majority of our patients had mild (an easily treated) epilepsy and they were more likely to be seizure free (79%) compared to the patients with epilepsy in general pediatric population. The ADHD patients with and without epilepsy did not differ regarding age, gender, disorders of psychological development, IQ level<85 or ADHD subtype. The patients had been diagnosed with epilepsy on average 1.8 years before the ADHD assessment. All patients with epilepsy were treated with methylphenidate (MPH), and initial response to MPH was achieved in 85.7%.

CONCLUSION: The epilepsy diagnosis preceded the ADHD diagnosis, and was found in a significantly higher rate than would be expected in the general pediatric population. The majority of patients had mild epilepsy and ADHD-Combined Inattentive/Hyperactive-Impulsive Subtype. All cases with epilepsy and ADHD were treated with MPH, with initial response achieved in 86%.

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Sleep Disord. 2013;2013:698957.

SLEEP LAB ADAPTATION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND TYPICALLY DEVELOPING CHILDREN.

Bessey M, Richards J, Corkum P.

Objectives. Research has shown inconsistencies across studies examining sleep problems in children with attention-deficit/hyperactivity disorder (ADHD). It is possible that these inconsistencies are due to sleep lab adaptation. The goal of the current study was to investigate the possibility that children with ADHD adapt differently to the sleep lab than do typically developing (TD) children.

Patients and Methods. Actigraphy variables were compared between home and the sleep lab. Sleep lab adaptation reports from the parent and child were compared between children with ADHD (n=25) and TD children (n=25).

Results. Based on actigraphy, both groups had reduced sleep duration and reduced wake after sleep onset in the sleep lab compared to home. The only interaction effect was that TD children had increased sleep efficiency in the sleep lab compared to home.

Conclusions. The results of this study do not support the hypothesis that children with ADHD adjust to the sleep lab differently than their typically developing peers. However, both groups of children did sleep differently in the sleep lab compared to home, and this needs to be considered when generalizing research findings from a sleep lab environment to children's sleep in general.

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Tijdschr Psychiatr. 2013;55:349-57.

DISTURBED SLEEP IN CHILDREN WITH ADHD: IS THERE A PLACE FOR MELATONIN AS A TREATMENT OPTION?

Holvoet E, Gabriels L.

BACKGROUND: Sleep disorders are common in children with ADHD and they are aggravated by treatment with stimulantia. We focus on treatment with melatonin and weigh up its efficacy and safety.
AIM: To consider the evidence supporting the use of melatonin in the treatment of children with ADHD and to assess the efficacy and safety of such treatment.
METHOD: We studied the literature using databases Embase, PubMed, PsycINFO and the Cochrane Library and the search terms 'ADHD', 'melatonin', 'insomnia', 'methylphenidate', 'side-effects', 'endocrinology'.
RESULTS: 25-50% of children with ADHD reported disturbed sleep patterns particularly in the form of (chronic) sleep onset insomnia ((C)SOI). Currently available research results indicate that melatonin can be effective in the treatment of (C)SOI and, on the whole, is well tolerated. However, there is a lack of pharmaceutical preparations of melatonin that give details about their use for children and that give evidence-based guidelines about the dosage and timing of intake. Very little systematic research has been done into the possible impact of melatonin intake on puberty and the endocrine system. Therefore, treatment with melatonin in children with ADHD and (C)SOI is best reserved for children with persistent insomnia which is having a severe impact on daily functioning, particularly in cases where is an obvious phase-shift of the endogenous circadian rhythm.
CONCLUSION: If indications are particularly strong there may be good reason to use melatonin to treat sleep disorders in children with ADHD. However, further research into the safety of melatonin is needed.

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Z Kinder Jugendpsychiatr Psychother. 2013 May;41:163-69.

THE ROLE OF OBSESSIVE-COMPULSIVE SYMPTOMS IN THE PSYCHOPATHOLOGICAL PROFILE OF CHILDREN WITH CHRONIC TIC DISORDER AND ATTENTION-DEFICIT HYPERACTIVITY DISORDER.

Roessner V, Buse J, Schultze F, et al.

OBJECTIVE: The study examines the role of obsessive-compulsive symptoms (OCS) as a part of the psychopathology of children with chronic tic disorders (CTD) and/or attention-deficit hyperactivity disorder (ADHD).
METHOD: We assessed the psychopathology of four large patient groups without further psychiatric disorders: CTD (n = 112), CTD + ADHD (n=82), ADHD (n=129), and controls (n=144)) by implementing the Child Behavior Checklist (CBCL). We compared the main effects for CTD and ADHD with and without including OCS as covariates.
RESULTS: Including OCS led to substantially different main effects for CTD on seven out of eight CBCL subscales. Slightly different main effects for ADHD were determined with respect to ADHD, mainly on the subscale withdrawn.
CONCLUSIONS: OCS are closely related to CTD-associated psychopathology and - to a lesser extent, but nevertheless of importance in daily clinical practice - on ADHD-related symptoms. This information can be helpful in implementing more precise diagnostics and treatment in daily routine care.

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Z Kinder Jugendpsychiatr Psychother. 2013 May;41:199-213.

EFFECTIVENESS OF NEUROPSYCHOLOGICAL TRAINING IN CHILDREN WITH ATTENTION-DEFICIT HYPERACTIVITY DISORDER (ADHD).

Amonn F, Frolich J, Dopfner M.

Recently published studies on the effects of neuropsychological training in children with attention-deficit hyperactivity disorder (ADHD) reflect our present knowledge about the pathogenesis of the disorder. This review article collects the results of published treatment studies drawn from a MEDLINE search. Because of the restricted number of available studies we considered randomized studies as well as studies with a lower evidence level, including case reports. Due to the heterogeneous nature of the study samples, we

restrict our interpretation of the study results to the application of various diagnostic criteria, to different levels of effect measurement, and to diverse, only partially comparable treatment contents and length. Despite these limitations, neuropsychological training may be effective in reducing some specific cognitive deficits in ADHD. In a next step replication studies on homogeneous samples would be required under application of comparable training modules.

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Zhongguo Dang Dai Er Ke Za Zhi. 2013 May;15:343-47.

INFLUENTIAL FACTORS FOR METHYLPHENIDATE TREATMENT COMPLIANCE IN CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER.

Ding KJ, Liu YF, Kang CY, et al.

OBJECTIVE: To investigate influential factors for the tendency to medicate and medication compliance in children with attention deficit hyperactivity disorder (ADHD).

METHODS: A total of 188 children aged from 5 to 16 years, who were initially diagnosed with ADHD according to DSM-IV criteria, were included in the study. They underwent symptom assessment and cognitive function test. The compliance of methylphenidate treatment was evaluated.

RESULTS: Patients with better emotional state, and fewer oppositional and hyperactive behaviors and those who had a family history of psychiatric diseases and who obtained lower scores in the number cancellation test (NCT), were more prone to medication and/or exhibited better medication compliance. Logistic regression analysis showed that fewer oppositional and hyperactive behaviors and lower NCT scores were the predictive factors for a higher tendency to medicate, and a better emotional state was the predictive factor for better medication compliance. Patients of predominantly inattentive type were more prone to medication and showed better medication compliance, as compared with those of combined type. Gender, age and symptom severity were not associated with the tendency to medicate and/or medication compliance.

CONCLUSIONS: There is a need to enhance medication compliance in children with ADHD who have hyperactive, impulsive and oppositional behaviors, and to improve their long-term social functions.

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Time-on-Task in Children with ADHD: An ex-Gaussian Analysis

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Abstract

Although it is widely known that high intra-individual variability (IIV) is a key characteristic of attention deficit/hyperactivity disorder (ADHD), a detailed exploration of the IIV pattern during the time course of a cognitive task has never been carried out. In this study, 30 children with ADHD and 30 controls, were administered the Conners' Continuous Performance Task (CPT-II). The across-block individual performance of the groups was analyzed using an ex-Gaussian approach, which enabled a clearer understanding of how individual response times (RTs) fluctuate during a task in comparison with conventional measures of central tendency. While the conventional measures showed a significant group effect on mean RTs but similar RT trends across blocks between the two groups, the ex-Gaussian results revealed no actual differences between the two groups in the normally distributed component of mean RTs (*mu*). In contrast to the control group, the children with ADHD showed a steep increase in the exponentially distributed component of RTs (*tau*) across blocks, thereby indicating that extremely long RTs progressively increased soon after the beginning of the task. Taken together, the results demonstrated that sustained attention deficit in ADHD can be detected by analyzing the IIV in the first few task blocks. (*JINS*, 2013, *19*, 1–9)

Keywords: Attention-deficit/hyperactivity disorder, Intra-individual variability, Sustained attention, Continuous performance task, Ex-Gaussian function, Developmental disorder

INTRODUCTION

Although most children with Attention Deficit/Hyperactivity Disorder (ADHD) are clinically described as impulsive and fast to respond, their performance in cognitive tasks is surprisingly slow, given that they generally report significantly higher mean response times (RTs) compared to a control group, regardless of the specific ability under examination (e.g., Klein, Wendling, Huettner, Ruder, & Peper, 2006; Nigg, Willcutt, Doyle, & Sonuga-Barke, 2005; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). This apparent divergence has recently been accounted for through finer-grained analyses of RTs during the execution of computerized tasks requiring repeated responses. In fact, when examining the trial-by-trial distribution of RTs collected during a task, children with ADHD typically show both extremely fast and extremely slow responses (for a review, see Castellanos, Sonuga-Barke, Milham, & Tannock, 2006), thus presenting a high intra-individual variability (IIV). Therefore, higher mean RTs have been hypothesized to be the result of a periodic fluctuation in response times rather than a general slowing of responses.

Remarkably, high IIV in ADHD can consistently be observed in a number of studies (Epstein, Langberg, et al., 2011), and it has been suggested that high IIV should not be considered as simply a reflection of error variance, but as one of the core features of ADHD, and one which can be regarded as a reliable clinical index because it correlates with ADHD diagnosis (Castellanos et al., 2005; Epstein et al., 2003; Leth-Steensen, Elbaz, & Douglas, 2000). Crucially, stimulant medication (e.g., methylphenidate) has been found to attenuate individual RT variability in children with ADHD (Castellanos et al., 2005; Epstein et al., 2006; Epstein, Brinkman, et al., 2011; Spencer et al., 2009; Tannock, Schachar, & Logan, 1995; Teicher, Lowen, Polcari, Foley, & McGreenery, 2004). Studies have analyzed the frequency of extremely long responses in time series RT data by means of Fast Fourier Transform (FFT), and have found that they have a characteristic periodicity in children with ADHD, namely they occur at a frequency of 0.05 Hz (i.e., approximately every 20 s; Castellanos et al., 2005). Later findings support

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the existence of a low frequency periodicity for long RTs (in the range of 0.03–0.07 Hz) in a variety of tasks, such as the Sustained Attention to Response Task (SART; Johnson et al., 2007), the Ericksen Flanker Task (Di Martino et al., 2008), and the Go/NoGo Task (Vaurio, Simmonds, & Mostofsky, 2009).

Therefore, a considerable body of research has recently been developed to understand the nature of the IIV of RTs in ADHD. It has been thought to reflect moment-to-moment fluctuations in attention (Castellanos & Tannock, 2002; Douglas, 1999), lack of top-down control (Bellgrove, Hester, & Garavan, 2004; Castellanos et al., 2005), failure of response inhibition (Ridderinkhof, 2002), or state regulation (Geurts et al., 2008; Kuntsi, Oosterlaan, & Stevenson, 2001; Sergeant, 2005; Sergeant, Geurts, Huijbregts, Scheres, & Oosterlaan, 2003). The exact nature of such phenomena, however, is still a matter of debate.

When analyzing RTs one needs to take into account that individual RTs are not adequately described by conventional measures of central tendency, such as total mean and standard deviation (*SD*; Hockley & Corballis, 1982; Ratcliff & Murdock, 1976). In both typically developing controls and clinical populations, the RT distribution does not present a normal shape but is positively skewed (Luce, 1986). Specifically, the distribution of RTs has been demonstrated to fit optimally with an ex-Gaussian probability density function resulting from the convolution of a Gaussian and an exponential curve (Burbeck & Luce, 1982). Three parameters describe the ex-Gaussian fit: *mu* (μ), *sigma* (σ), and *tau* (τ) (Heathcote, Popiel, & Mewhort, 1991; Ratcliff & Murdock, 1976). The *mu* and the *sigma* parameters represent the normally distributed components of the curve. The *tau* parameter represents the exponentially distributed component, which accounts for the positive skew of the RT distribution. The mean of the ex-Gaussian distribution corresponds to the sum of *mu* and *tau*. The standard deviation of the distribution corresponds to the sum of *tau* and *sigma*. Notably, according to the ex-Gaussian approach, extremely high RT values are not treated as outliers but are included in the analysis as they contribute both to the calculation of the mean response time and the size of the variance, and consequently lead to higher values of global mean and standard deviation. Therefore, a child showing higher *mu* values and low *tau* values likely has generalized slowing response times, whereas a child showing lower *mu* values and higher *tau* values likely has generally fast responses intermixed with extremely slow responses.

Decomposing response times recorded during computerized tasks into ex-Gaussian parameters has been shown to be an efficient approach for providing a more sensitive and specific measure of variability in patients with ADHD (e.g., Borella, de Ribaupierre, Cornoldi, & Chicherio, 2012; Buzy, Medoff, & Schweitzer, 2009; Epstein, Langberg, et al., 2011; Hervey et al., 2006; Leth-Steensen et al., 2000; Vaurio et al., 2009). In a foreperiod task, for example, Leth-Steensen et al. (2000) found that the RT distribution in children (9–13 years old) with ADHD was characterized by significantly higher values of the exponential *tau* parameter when compared to an age-matched control group, but had similar values for *mu* and *sigma* parameters. Furthermore, the authors showed that *mu* and *sigma* values were significantly higher in younger control children (7 years old) compared to the ADHD group. On the one hand, these results indicated that the RTs of children with ADHD differed from the non-clinical sample because of the presence of a larger number of excessively long RTs (i.e., beyond the individual mean), and on the other hand that ex-Gaussian parameters were differentially affected by individual variables, such as age. In a Continuous Performance Task (the Conners' CPT-II), Hervey et al. (2006) found that while traditional RT analyses showed significantly slower and more variable RTs in children with ADHD, ex-Gaussian analyses revealed lower *mu* (i.e., faster RTs) and higher *sigma* values. Notably, the largest group difference was reported in the *tau* values, which significantly increased as the inter-stimulus interval (ISI) duration increased, especially in the ADHD group. This result strongly suggested the presence of an inefficient phasic attention, which in turn affected response preparation. In two Go/NoGo tasks, Vaurio et al. (2009) found that children with ADHD presented significantly higher values of both the normal (*sigma*) and the exponential (*tau*) components of variability, regardless of the working memory load.

To date, the IIV of RTs in ADHD has been investigated by taking into account only the overall performance or the effect of ISI. In the present study, we overcome such limitation by exploring how IIV fluctuates over the course of a CPT in children with ADHD and a control group. To this end, we compared error rates and IIV in RTs across the six blocks of the CPT; RTs were analyzed separately for each block using both a conventional and an ex-Gaussian approach. We expected to find an increasing trend of *tau* values (reflecting abnormally long RTs) across blocks in children with ADHD, significantly higher than in the control group. A different ex-Gaussian pattern emerging from the two groups would demonstrate that managing sustained attention resources over the course of a task is one of the core abilities impaired in ADHD.

METHOD

Participants

A total of 30 children with a diagnosis of ADHD, aged 8–13 years ($M = 11.48$; $SD = 1.73$; male = 26), were enrolled at a local Clinical Service ("Centro Phoenix di Psicologia, Neuropsicologia, Psicoterapia", Bassano del Grappa, Italy). A diagnosis of ADHD was established by qualified neuropsychologists on the basis of DSM-IV-TR criteria (APA, 2000), using a clinical interview and by asking parents to complete two behavioral checklists, standardized for the Italian population, for assessing hyperactivity and inattentive behaviors (SDAG; Cornoldi, Gardinale, Masi, & Pettenò, 1996), and the Child Behavior Checklist (CBCL; Achenbach, 1991). The clinical interviews with parents assessed whether

the child met DSM-IV-TR criteria for ADHD, both for inattention and hyperactivity/impulsivity, namely the presence of six symptoms displayed at home and at school. The SDAG scale contains 18 items investigating all DSM-IV-TR symptoms, which are divided into two subscales: one for inattention and one for hyperactivity–impulsivity behaviors. Parents are required to evaluate the frequency of each behavior on a four-point Likert scale, ranging from "almost never" (0) to "very often" (3). The cutoff for considering a child for a possible diagnosis of ADHD was a total score of 14 in either one of the two subscales (Marzocchi, Re, & Cornoldi, 2010). In the ADHD group, the mean SDAG score on the inattention scale was 18.5 ($SD = 2.70$), and on the hyperactivity–impulsivity scale was 15.8 ($SD = 3.50$). A total of three (10.00%) children obtained scores above the clinical cutoff on the internalizing scale of the CBCL (Frigerio et al., 2004), and a total of four (13.33%) children obtained scores higher than the clinical cutoff on the externalizing scale. On the basis of both the clinical evaluation and the scores derived from the questionnaires, the following percentages relating to ADHD subtypes were identified: 8 (26.66%) predominantly inattentive, 3 (10.00%) predominantly hyperactive/impulsive, and 16 (63.33%) combined subtype. All the children included in the study obtained full-scale IQ scores above 85 ($M = 102.73$; $SD = 11.53$), assessed by the Wechsler Intelligence Scale for Children (WISC-III; Orsini & Picone, 2006; Wechsler, 1991). Based on reading, writing, and calculation tests, none of them presented learning disabilities. Reading abilities were assessed by means of words and non-words lists (Sartori, Job, & Tressoldi, 2009) and text reading (Cornoldi & Colpo, 1998); writing skills were assessed by means of a sentence writing test (Sartori et al., 2009) and a praxis (Tressoldi & Cornoldi, 1991) test; mathematical abilities were assessed by means of a battery of tests (Biancardi & Nicoletti, 2004). Learning disabilities were defined if children scored below the 10th percentile in at least two measures for each domain.

A total of 30 age and sex-matched children were included in the control group (age range = 8–13 years; $M = 11.30$; $SD = 1.26$; male = 26). The two groups did not differ in age ($p = .642$). Control participants were recruited at schools in the same geographical area (a region in northeast Italy) as the ADHD group, and came from the same socioeconomic background. Children were included in the control group if their IQ scores were above 85, if teachers reported neither cognitive or behavioral deficits nor learning disabilities, and if their parents scored lower than the cutoff in both the two subscales included in the SDAG questionnaire. The mean full IQ in the control group ($M = 107.56$; $SD = 10.43$) did not differ from the mean IQ in the ADHD group ($p = .104$). The mean SDAG scores of the control group on the inattention scale was 9.80 ($SD = 3.70$); the mean SDAG score on the hyperactivity–impulsivity scale was 7.20 ($SD = 3.20$). The SDAG scores of the ADHD group were significantly lower than the control group ($p = .020$, and $p < .001$, respectively).

None of participants had a history of seizures, brain injury or other neurological damage, uncorrected visual, auditory or speech deficits, pervasive developmental disorders, or medical conditions that may mimic ADHD. All children with ADHD were medication-naïve. The study was conducted according to the principles stated in the Declaration of Helsinki and parents were informed about the general experimental procedures and provided written consent.

Procedure and Task

All children performed the Conners' Continuous Performance Test (CPT-II; Conners, 2000) within the standard neuropsychological assessment session. The task takes approximately 14 min to be completed. With respect to other previously investigated tasks (5.5 min, Johnson et al., 2007; 8 min, Vaurio et al., 2009), this is an optimal duration for observing potential deficits related to sustained attention. The task was presented individually to each child using a laptop computer. Children were instructed to press the spacebar whenever a letter appeared on the screen (Go trials), except for the letter "X" (NoGo trials). The task included a total of 360 letters consecutively presented at the center of the screen, each for 250 ms. The 360 trials were divided into six blocks, each consisting of 60 trials. The blocks were divided into three randomly presented sub-blocks, one for each ISI (1, 2, or 4s): the three levels of ISI were randomized across trials. The appearance of the NoGo stimulus ("X") was rare (10%: 36 times) and RTs were measured from the onset of the letter appearing on the screen.

Data Analysis

Two types of error were recorded: omissions (no response to the target letters) and commissions (response to the Xs). The ex-Gaussian parameters (*mu*, *sigma*, and *tau*) of the probability distribution were calculated using the *egfit* MATLAB function (Lacouture & Cousineau, 2008). This function computes an iterative search process to fit the ex-Gaussian probability density function to the frequency distribution, and generates the three parameters from which the observed RTs are most likely to be sampled. Anticipated responses (RTs < 100 ms) were excluded from the analysis. A total of 1.62 ($SD = 2.08$) anticipations in the ADHD group and 0.73 ($SD = 1.34$) in the control group was found. On average, the RT distribution did not fit the ex-Gaussian function but instead approximated to an exponential function (i.e., *sigma* values were lower than 1) in 7.3% of the blocks in the ADHD group and in 4% of the blocks in the control group. In these cases, estimated values of *mu*, *sigma*, and *tau* were not included in the analysis but were replaced by the average value of the sample. Notably, the Kolmogorov-Smirnov normality test conducted on each individual block did not yield statistically significant results.

To examine the effect of group and block on these measures, separate 2 × 6 mixed model analyses of covariance (ANCOVAs) were conducted, in which Group (ADHD *vs.* control) was entered as the between-subject factor, Block number as the within-subject factor, and Age as covariate. Since the focus of the study was to examine whether the time-on-task effect and the number of trials at each ISI is equally

distributed across blocks, we collapsed different ISIs; by doing so, we obtained several trials for a reliable estimate of ex-Gaussian parameters.

An alpha level of .050 was considered for statistical significance. To control for multiple testing (i.e., seven different outcomes for the same task), a false discovery rate correction (FDR) was applied to *p* values (Benjamini & Hochberg 1995). Within each ANCOVA model, the Bonferroni correction was applied in *post hoc* analyses. Effect sizes were calculated in terms of partial eta squares (η_p^2). The relationship between age and error rates or RT parameters, as well as the association between error rates and RT parameters, was further examined by calculating Spearman's correlation coefficients (rho) between errors, Gaussian and ex-Gaussian measures.

RESULTS

Errors

The ANCOVA revealed that the overall number of omissions was significantly higher in the ADHD group in comparison with the control group ($F(1,57) = 30.112$; $p < .001$; $\eta_p^2 = .346$). A main effect of Block was found ($F(5,53) = 2.864$; $p = .035$; $\eta_p^2 = .048$). Importantly, the Group × Block interaction was also significant ($F(5,53) = 4.313$; $p = .003$; $\eta_p^2 = .070$), showing that the block number (order) only had a significant effect on the number of omissions in children with ADHD. The *post hoc* analysis of the interaction revealed that while omissions did not differ across blocks in the control group, children with ADHD made significantly more omission errors in blocks 4, 5, and 6 compared to block 1 (all $ps < .003$), and in blocks 5 and 6 compared to block 2 (both $ps = .004$). Figure 1a shows the distribution of the mean omission errors across the six blocks in the two groups, corrected for age.

No differences were found in the mean number of commissions between the two groups ($F(1,57) = 0.172$; $p = .680$; $\eta_p^2 = .003$). As illustrated in Figure 1b, the total number of commission errors was high in the ADHD group as well as in the control group (the maximum number of possible commission errors is six).

Age did not influence commission but significantly interacted with block number on the number of omissions ($F(1,53) = 2.760$; $p = .040$; $\eta_p^2 = .046$). In particular, age negatively correlated with the mean number of omissions in block 3 (rho = -.361; $p = .005$).

Gaussian RT Parameters

As expected, overall mean RTs were significantly higher in the ADHD group ($F(1,57) = 17.977$; $p < .001$; $\eta_p^2 = .243$). The ADHD group showed significantly higher mean RTs compared to the control group in all blocks (all $ps < .016$). Both groups showed a steep increase in mean RTs after the first block of trials; subsequently this remained relatively stable throughout the entire task (see Figure 2a). The ANCOVA did not yield a significant Block ($F(5,53) = 0.706$; $p = .619$; $\eta_p^2 = .012$) or Group × Block interaction ($F(5,53) = 1.511$; $p = .187$; $\eta_p^2 = .026$).

Overall, children with ADHD showed significantly more variability than children in the control group, as revealed by analyzing the mean RT standard deviation ($F(1,57) = 21.221$; $p < .001$; $\eta_p^2 = .275$). As shown in Figure 2b, the mean RT standard deviation of children with ADHD rose in the last three blocks of the task, whereas it remained stable in the control group. The ADHD group showed significantly higher SD than the control group in all blocks except the first and last ones. The Block ($F(5,53) = 1.416$; $p = .219$; $\eta_p^2 = .025$) or interaction effect ($F(5,53) = 2.263$; $p = .064$; $\eta_p^2 = .039$) did not reach statistical significance.

In all children, age significantly affected mean RTs ($F(1,57) = 14.48$; $p = .001$; $\eta_p^2 = .243$) and mean RT standard deviation ($F(1,57) = 9.94$; $p = .009$, $\eta_p^2 = .151$). The correlation analysis between mean RTs and age confirmed that, regardless of block, as age increased mean RTs and mean RT standard deviation significantly diminished (rho = −.371; $p = .004$ and rho = −.278; $p < .033$, respectively).

Ex-Gaussian RT Parameters

As shown in Figure 2c, mean *mu* values increased from the first to the second block in both groups, a pattern similar to that observed in mean RTs calculated according to the

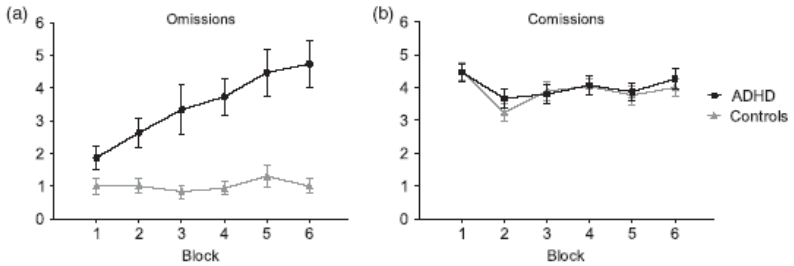

Fig. 1. Mean number of (a) Omission and (b) Commission errors plotted according to six blocks of the Conners' Continuous Performance Task (CPT) and to group (black line: attention deficit/hyperactivity disorder [ADHD], gray line: control). Data are age-corrected. Bars represent standard errors.

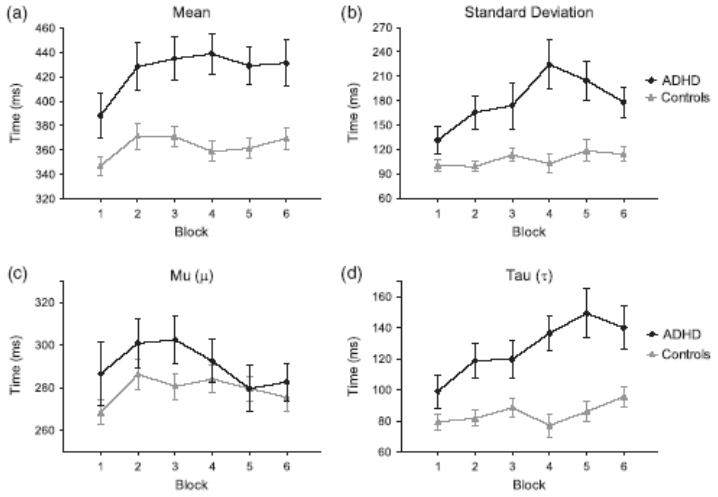

Fig. 2. Response times expressed in terms of Gaussian parameters: (a) mean, (b) standard deviation; and ex-Gaussian parameters: (c) *mu* (μ) and (d) *tau* (τ). Data are plotted according to the six blocks of the Conners' Continuous Performance Task (CPT) and to group (black line: attention deficit/hyperactivity disorder [ADHD]; gray line: control). Data are age-corrected. Bars represent standard errors.

Gaussian distribution (cf., Figure 2a). After the second block, however, mean *mu* values demonstrated a different pattern, in that they decreased in the ADHD group while they remained approximately stable in the control group. A main effect of Block was found ($F(5,53) = 2.606$; $p = .049$; $\eta_p^2 = .044$). The *post hoc* comparisons showed that mean *mu* values in block 2 were significantly higher than in block 5 and 6 (both *ps* = .026). Notably, *mu* values did not significantly differ between the two groups in any block ($F(1,57) = 2.012$; $p = .162$; $\eta_p^2 = .035$).

The ex-Gaussian parameter *sigma* was significantly higher in the ADHD group in all task blocks ($F(1,57) = 18.420$; $p < .001$; $\eta_p^2 = .248$). There was no significant main effect for Block ($F(5,53) = 1.299$; $p = .264$; $\eta_p^2 = .023$) or Group × Block interaction effect ($F(5,53) = 1.668$; $p = .142$; $\eta_p^2 = .029$).

The most interesting results were related to the *tau* parameter, which presented an evident increase from block 1 to block 6 in the ADHD group, as shown in Figure 2d. Overall, mean *tau* values were higher in the ADHD group ($F(1,57) = 28.268$; $p < .001$; $\eta_p^2 = .335$). Moreover, the ANCOVA yielded a significant main effect of Block ($F(5,53) = 3.562$; $p = .012$; $\eta_p^2 = .060$) and Group × Block interaction ($F(5,53) = 2.638$; $p = .048$; $\eta_p^2 = .045$). Bonferroni *post hoc* analyses showed that *tau* values in the ADHD group were significantly higher in blocks 2, 4, 5, and 6 compared to block 1 (all *ps* < .033), in blocks 5 and 6 compared to block 2 (all *ps* < .047), and in block 5 compared to block 3 ($p = .025$). Mean *tau* values were significantly higher in the ADHD group compared to the control group in all blocks except the first one (all *ps* < .014).

The across-block pattern of the *tau* was explored in detail by fitting a linear regression equation, separately for the ADHD and the control group. The mean slope significantly differed from zero only in the ADHD group ($\beta = 8.926 \pm 1.914$; 95% confidence interval [CI] = 3.613–14.240), not in the control group ($\beta = 2.358 \pm 1.378$; 95% CI = −1.477–6.186). Furthermore, the two linear regression were significantly different ($F(1,8) = 7.749$; $p = .023$).

Remarkably, the fact that in both groups the across-block trend of *tau* values mirrored the pattern observed for the normally distributed RT standard deviation (Figure 2b) suggests that intra-individual RT variability in ADHD children is mostly related to extremely slow responses.

Age significantly affected mean *mu* ($F(1,57) = 7.719$; $p = .021$; $\eta_p^2 = .121$), *sigma* ($F(1,57) = 21.51$; $p < .001$; $\eta_p^2 = .248$), and *tau* ($F(1,57) = 15.762$; $p = .001$; $\eta_p^2 = .220$) values, namely they significantly decreased with age. Furthermore, age significantly interacted with Block in influencing *mu* ($F(5,53) = 2.935$; $p = .035$; $\eta_p^2 = .050$) and *tau* ($F(5,53) = 2.908$; $p < .035$; $\eta_p^2 = .049$). Correlation analyses showed that age negatively correlated with *mu* values in blocks 1, 4, and 6 (rho < −.273; $p < .037$); whereas it negatively correlated with *tau* in all but the first block (rho < −.270; $p < .038$).

Correlations between Measures

Table 1 shows the results of correlation analyses between omission and commission errors with Gaussian and ex-Gaussian parameters. As illustrated in the table, in the ADHD group omission errors were significantly and positively correlated with the *sigma* parameter, while commission errors were negatively correlated with the *mu* parameter. Importantly, in the ADHD group, RT standard deviation was significantly correlated only

Table 1. Non parametric correlation coefficients (rho) between errors, Gaussian and ex-Gaussian measures. Lower diagonal values refer to ADHD group, upper diagonal values refer to control group.

Spearman's rho	Omissions	Commissions	RT mean	RT standard deviation	mu	sigma	tau
Omissions	–	.512**	.017	.553**	−.330	.158	.372*
Commissions	.030	–	−.359	.289	−.562**	.217	.075
RT mean	.279	−.590**	–	.566**	.820***	.371*	.700***
RT standard deviation	.396*	−.125	.631***	–	.139	.567**	.885***
Mu	.047	−.708***	.722***	.073	–	.247	.260
Sigma	.522**	.056	.427*	.359	.281	–	.416*
tau	.396*	−.294	.850***	.889***	.351	.406*	–

*$p < .05$, **$p < .01$, ***$p < .001$.

with the *tau* parameter, while in the control group, it correlated with the *tau* and the *sigma* parameters. This confirms that the RT variability in ADHD is principally due to extremely long RTs.

DISCUSSION

The aim of the study was to examine intra-individual variability during a sustained attention task in children with ADHD by investigating their block-by-block fluctuation in responses, in terms of variations of errors (omission, commission), conventional RT measures (mean RT and standard deviation), and ex-Gaussian RT parameters (*mu*, *sigma*, and *tau*). To this end, these measures were compared across the six blocks of a CPT lasting 14 min (CPT-II; Conners, 2000), based on a sample of children with ADHD and a control group.

The results revealed that omission errors progressively increased after the first block of trials (i.e., at approximately 2.5 min from the beginning of the task) in the ADHD group but not in the control group. As expected, the conventional Gaussian analysis showed a significant main effect of group on mean RTs. In addition, it revealed the presence of a similar across-block trend between the two groups, namely RTs significantly increased after the first block and remained steady afterward. In contrast, the ex-Gaussian analysis revealed no actual differences between the two groups in terms of the normally distributed RT parameter *mu*. On the other hand, mean *mu* values showed a completely different across-block pattern from that of the Gaussian values (Figure 2a and 2c): they significantly decreased in the last two blocks. Importantly, the *tau* trend across blocks differed between the two groups: the ADHD group showed a significant increase, namely *tau* values steeply and progressively increased from the first block to block 6, whereas the control group they remained steady until the end of the task. These findings clearly suggest that the higher omission rates and mean RTs observed in children with ADHD were mostly due to the exponential component of RTs (i.e., to extremely long RTs), which significantly increased as the task proceeded. In addition, the fact that *tau* values did not differ between groups in the first block but differed in all following blocks suggests that intra-individual variability increases with time-on-task demands.

The across-block variation in intra-individual variability was consistent with that reported by Klein et al. (2006). Indeed, in a similar Go/NoGo task, these authors found a significant increase of RT standard deviation across the 15 blocks of a CPT in a group of children with ADHD. Our study further extended these findings by demonstrating that intra-individual variability of RTs in children with ADHD was mostly caused by abnormally long responses, as suggested by the *tau* parameter distribution. The present findings are in agreement with previous studies showing the *tau* parameter to be a sensitive marker of ADHD-related between-groups differences, based on CPT (Hervey et al., 2006), choice discrimination (Leth-Steensen et al., 2000), and Go/NoGo (Epstein, Langberg, et al., 2011; Vaurio et al., 2009) tasks. Furthermore, our results support previous evidence which shows significant low frequency fluctuations throughout a task in individuals with ADHD (Castellanos et al., 2005; Di Martino et al., 2008; Helps, Broyd, Bitsakou, & Sonuga-Barke, 2011; Johnson et al., 2007; Vaurio et al., 2009). Indeed, it is possible that the prolonged RTs are related to abnormally slow spontaneous oscillations in brain activity.

Particularly important is the finding that children with ADHD showed a steep increase of intra-individual variability after few minutes from the commencement of the task (i.e., after the first block), while the control group did not show any relevant across-block variation in errors, Gaussian, and ex-Gaussian measures.

Unlike the Gaussian mean RT, the fact that overall the *mu* parameter (i.e., the normally distributed component of mean RTs) did not significantly differ between the two groups confirmed previous findings that children with ADHD are generally no slower than children in control groups (Hervey et al., 2006; Leth-Steensen et al., 2000). Furthermore, the fact that *mu* values in the ADHD group decreased after the third block while RT standard deviation simultaneously increased corroborates the idea the time-on-task demands affect intra-individual variability not the overall response time speed.

The normally distributed *sigma* parameter was overall higher in the ADHD group, which is consistent with previous reports (Hervey et al., 2006; Vaurio et al., 2009). In addition, overall mean *tau* values were positively correlated with *sigma* values only in the control group, suggesting that phasic and tonic attention are subject to covariation.

Commission errors did not differ between groups, given that the rate of NoGo trials was very low (10%); not surprisingly,

the children in the control group also found it very difficult to inhibit their motor response. Similarly, previous investigations using the Conners CPT observed no differences in the total number of commission errors between the ADHD and control group (Epstein et al., 2010; Hervey et al., 2006).

Of interest, overall omission rates were positively correlated with the exponential component of mean RTs (*tau*) in both groups, meaning that both phenomena reflect a common process. On the other hand, the negative correlation between commission errors and the Gaussian component of mean RTs (*mu*) reveals that children who failed more often were those with overall faster overall RTs. The positive correlation between omission rates and *tau*, together with the negative correlation between commission rates and *mu*, may also reflect the effect of a speed-accuracy trade-off in both groups. Furthermore, the positive correlation between omissions and *tau*, together with the negative correlation between omissions and *mu*, in children with ADHD, may partially be explained by the presence of pre- and post-error slowing (Epstein et al., 2010). These results suggest that tau and mu parameters are likely linked to two independent processes, namely, lapses of attention (Castellanos & Tannock, 2002; Douglas, 1999) and failures of response inhibition (Ridderinkhof, 2002).

The findings presented here support the hypotheses of the presence of either a deficit of top-down control (Barkley, 1997; Bellgrove et al., 2004) or sub-cortical state regulation (Geurts et al., 2008; Kuntsi et al., 2001; Sergeant et al., 2003) in ADHD. From a neural perspective, the increase in excessively long RTs and in error rates over the course of the task might reflect an inefficient suppression of activity in those brain areas involved in the default network, such as the medial prefrontal cortex (Fassbender et al., 2009; Kelly et al., 2004; Sonuga-Barke & Castellanos, 2007; Weissman, Roberts, Visscher, & Woldorff, 2006). Furthermore, the activation of frontal brain areas might be involved as the task demands sustained attention (e.g., Manly et al., 2003; Stuss, Murphy, Binns, & Alexander, 2003; Wilkins, Shallice, & McCarthy, 1987). Specifically, dorsolateral prefrontal regions have been found to be associated with increased over-time variability and inter-trial fluctuations, even in easy choice RT tasks (Bellgrove et al., 2004; Stuss et al., 2003); these regions are also considered to be dysfunctional in individuals with ADHD (for reviews, see Bush, 2010, 2011).

Strength of this study is that, in addition to having confirmed the IIV potential as a biomarker of ADHD, we demonstrated that an increased time-to-task demand is closely associated with increasing IIV and error rates in ADHD. Based on these observations, IIV in cognitive tests can no longer be considered "statistical noise", and theories that stem from such a perspective should be dismissed (e.g., Castellanos et al., 2006).

Moreover, our study extended previous investigations on sustained attention deficit in ADHD, by showing that variations in individual performance across a task in children with ADHD are associated with difficulties in sustaining attention. We interpreted such results as a consequence of an inability to distribute attentional resources strategically over time, which in turns leads to off-task behaviors. Importantly, the analysis of the ex-Gaussian *tau* parameter allows the detection of an ADHD-related deficit in sustained attention even in the first few blocks of the task. These findings are relevant given that although the existence of sustained attention deficit in ADHD is a well-known phenomenon, it has been surprisingly poorly investigated and still remains controversial (Johnson et al., 2007; Klein et al., 2006; van der Meere, Shalev, Borger, & Gross-Tsur, 1995; van der Meere, Wekking, & Sergeant, 1991).

Some limitations of the study should be considered when interpreting the findings. First, the diagnostic interview with parents and teachers that aimed to identify behavioral and emotional disorders was not standardized; therefore, the inclusion of some children with such comorbid disorders in the ADHD group as well as in the control group could not be completely ruled out. Moreover, the control group was not systematically assessed for learning disabilities. Although the control group was recruited from schools in the same geographical area and is assumed to have similar socioeconomic background as the ADHD group, no data were available to confirm this. Given the relatively small sample size, the present results should be replicated by future studies; nevertheless, it is worth noting that the results are consistent with previous findings.

In conclusion, the block-by-block analysis of variations in errors and RTs unveiled the presence of a marked increase in errors and abnormally slow responses in children with ADHD as the task progressed. Of interest, there was no difference in the distribution of RTs across blocks between the two groups in terms of normal mean, a difference was found in extremely long responses. These results suggested that intra-individual variability of children with ADHD over the course of a sustained attention task should be regarded as a crucial aspect when evaluating these patients.

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Spelling Errors in Text Copying by Children With Dyslexia and ADHD Symptoms

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Abstract

Spelling errors are usually studied in dictations, but teachers report that children with school difficulties often make spelling mistakes when they copy a text too. The present study examines the performance on a text copying task and a text dictation task of two groups of children known for their difficulties in spelling, that is, 22 with symptoms of ADHD and 13 with dyslexia, comparing them with matched controls to see whether children with spelling difficulties make more copying task errors than do controls, whether they make fewer mistakes when copying than when writing under dictation, and whether the pattern of errors remains the same or differs in copy and dictation tasks. Our results show that although children with spelling difficulties made fewer errors in the copying task than under dictation, they still made phonological errors and mistakes relating to accents and duplicates. The pattern of errors differed slightly between the children with dyslexia and those with ADHD, presumably as a consequence of their different underlying weaknesses—related mainly to phonology and orthographic representation in the case of dyslexia and to attentional control in the case of ADHD.

Keywords

ADHD, dyslexia, writing, copy task

Spelling errors under dictation or in text production are frequent in the earlier school grades, with higher rates among children with various learning difficulties. In particular, children with dyslexia very often have difficulty in writing as well as in reading. Their problems seem related to linguistic weaknesses that impair the literacy learning process. Weaknesses in phonological representations and lexical access make it difficult for children with dyslexia to develop an appropriate orthographic representation of the words to be written (Goswami, 1999).

Another group of children who seem to have spelling problems, for partly different reasons, are those with ADHD symptoms. Given the strong degree of comorbidity for ADHD and dyslexia, it could be argued that the spelling difficulties of children with ADHD are simply because they have dyslexia too. It seems, however, that children with ADHD but without dyslexia still tend to make more spelling errors than matched controls; for instance, in a series of studies on expressive writing skills of children with ADHD with no comorbid learning disorders, Re and coauthors (Re, 2006; Re & Cornoldi, 2010; Re, Pedron, & Cornoldi, 2007) found that children with ADHD 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 suggests that the spelling errors were not a result of orthographic weaknesses but rather of the self-regulatory problems of children with ADHD. Spelling and its precursors were more specifically examined in a study by Kroese, Hynd, Knight, Hiemenz, and Hall (2000) on 78 children aged 8 to 12 years (34 with dyslexia, 31 with ADHD, and 13 typically developing controls) in a battery of tests including cognitive, linguistic, academic, phonemic awareness, and memory tests. Their results showed that the performance of children with dyslexia was significantly worse in the phonological tasks than the performance of the other two groups, which did not differ significantly. The ADHD group's spelling performance was intermediate between that of the dyslexic and control groups; that is, they made fewer mistakes than the children with dyslexia but more than the controls in some measures (*Wide Range Achievement Test* Spelling and Rating Scale total score), suggesting that children with ADHD may be weak in spelling, but for partially different reasons than in the case of children with dyslexia. Spelling difficulties were also identified in two more recent studies. In one, focused on handwriting, Adi-Jafa and collaborators (2007) found that children with ADHD made more spelling mistakes than

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did controls and their handwriting was more frequently illegible. The children with ADHD were more likely than controls to make mistakes that involved inserting superfluous letters and omitting, substituting, or transposing letters. According to the authors, this pattern of errors stems more from their attentional problems than from any linguistic or phonological issues.

In the other study, Johnels, Kopp, and Gillberg (2012) related behavioral, psycholinguistic, cognitive (memory/executive), and graphomotor measures to spelling skills in school-age girls with ADHD ($n = 30$) and an age-matched group with typical development ($n = 35$). The ADHD group was divided into two subgroups that were comparable in terms of their inattentive or hyperactive-impulsive symptoms, but differed in spelling; that is, one group had poor spelling performance (ADHDPSP, $n = 19$), whereas the other had a typical spelling performance (ADHDTYPSP, $n = 11$). The authors found that both ADHD subgroups had equally severe difficulties in graphomotor control–handwriting and in written expression by comparison with the control group. On the other hand, the ADHD subgroup with spelling difficulties had more problems with phonological and orthographic recoding and verbal memory, and were more likely to make commission errors in a continuous performance task (CPT) than controls or the ADHD subgroup with a normal spelling performance. Further analyses on the collapsed ADHD group showed that both digit span and the presence of CPT commissions predicted spelling performance independently of each other. Finally, there was evidence of phonological recoding skills mediating the association between digit span and spelling performance in ADHD. In short, this study shed some important light on the spelling difficulties of children with ADHD, but its findings cannot be generalized because of some limitations. In fact, the sample was very specific and not representative of the ADHD population, a choice task was used to test phonological skills, a questionnaire was administered to the parents to obtain details about the children's written expression, and information was lacking on the possibility of the ADHDPSP group also having dyslexia.

To sum up, there is some evidence of children with ADHD having spelling problems, and of their problems differing from the spelling problems experienced by children with dyslexia, but further and more in-depth studies are needed, using different tasks, groups, and analytical methods. In particular, concerning the differentiation between children with ADHD and other groups of children presenting difficulties in spelling, the specific consideration of the patterns of errors may be useful. In fact, in the analysis of spelling errors, it seems important to also consider the types of errors made by the child.

Spelling is a multilinguistic skill, and as such it takes several linguistic abilities to accurately produce written words. That is why many distinctions have been proposed for spelling errors (see, e.g., Ehri, 1986; Frith, 1985; Treiman, 2000), mainly based on developmental models of the acquisition of reading and writing competence. For example, Ehri (1986, 1995) developed a stage theory of reading and writing development, suggesting that children go through a series of qualitatively different stages as they are learning to spell. The earliest spellings bear no relationship to the sounds in the intended word and have been called prealphabetic (*precommunicative*; Gentry, 1982). *Semiphonetic* or *partial alphabetic* spellings represent some of the phonemes in the word (e.g., "l" for *elephant*). *Phonetic* or *full alphabetic* (e.g., "elefut" for *elephant*, "chran" for *train*) provide a more complete representation and may capture certain features of the pronunciation that are ignored in conventional English spelling (Ehri, 1986; Gentry, 1982). During the *morphemic* or *consolidated alphabetic* stage, children increasingly rely on visual and morphological information (e.g., spelling *eighty* as "eightee" instead of the phonetic "ate"), revealing a type of preference that cannot be the object of observation in transparent languages, like Italian.

A classification of writing errors widely accepted in Italy and particularly appropriate when the body of errors is relatively small is based on the distinction between phonological and nonphonological errors (see Tressoldi & Cornoldi, 2000). This classification is based on Frith's (1985) classical model for learning to read and write, which involves a series of learning stages, some of which are associated with specific types of spelling error. In the first stage, called *logographic*, a child can only associate a particular graphic configuration with a certain concept. In the second stage, called *alphabetic*, a child discovers the concept of phonemes and learns to associate every phoneme with its particular graphic sign pattern. In this stage, errors are of the phonological type because of the incorrect association between a grapheme and the corresponding phoneme. In the third stage, called *orthographic*, a child learns that writing is governed by syntactic and orthographic rules, and no longer works with phonemes but with syllables or other sublexical units, so the writing process becomes more rapid and correct. In the fourth stage, children learn specific lexical entries and are able to read and write words that do not follow the phonological rules (typical writing errors in Italian are represented by illegal fusions and separations). Finally, Tressoldi and Cornoldi (2000) described a fifth stage for Italian spelling requiring a lexicon-based refinement of lexical and phonological analysis, in which the main difficulties are represented by the proper use of last-syllable accents and geminate consonants. Miceli, Benvegnù, Capasso, and Caramazza (1995) have also produced evidence of a specific writing disorder relating to double letters and their consequent autonomous representation in Italian. At this stage, the selection of phonemes and graphemes may be appropriate but overlook details

regarding longer-lasting phonemes (requiring the use of double letters in Italian, as in *correre*, to run) or an accent (which is required only when the accent is on the last syllable in Italian). In sum, the most used classification of spelling mistakes in Italian distinguishes between only three types of error, offering the advantage of providing basic information that can be used in quantitative analyses on a limited amount of written material. The first type of error is *phonological*, where the written string of words sounds different from the one pronounced (e.g., "il *b*ane" rather than "il *p*ane"). The second type of error is *nonphonological*, where the written string of words is incorrect but sounds like the one pronounced (e.g., "ilpane" instead of "il pane"). Concerning this type of error, it is important to bear in mind that although there are many opportunities for making nonphonological errors in opaque languages, the range of nonphonological errors is more limited in such highly transparent languages as Italian. Examples of possible nonphonological errors include splitting a word into 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 sounds for "quota" and "cuore" are identical) . The third type is the error of *refinement* and concerns an appropriate selection of graphemes associated with inappropriate usage of accents and double consonants (e.g., *giràfa* for *giraffa*, or *citta* for *città*); these errors take longer to disappear than the other types of error, and they are frequently seen in the case of children with ADHD (Re, 2006; Re et al., 2007).

As already mentioned, literature and assessment procedures have focused mainly on the use of dictation and text production tasks, both of which have some limitations. Dictation may be affected by prosody, dialectal influences, and dictating speed, a problem that seems particularly critical in areas where children and teachers (or other people dictating a text) do not share the same linguistic origins. To give an example, in northern Italian schools, attended mainly by children from northern Italian families and foreign children, a large proportion of teachers come from southern Italy (where it is more difficult to find a teaching post), and the risk of linguistic misunderstandings (and spelling errors because of differences in pronunciation between the north and south of the country) has often been mentioned by northern communities and politicians (Pasolini, 2011). On the other hand, analyses on spelling errors in free text production may be biased by the children's choice of words; that is, children might try to conceal their weakness in spelling by using only simple, well-known words.

Recently, Tressoldi, Cornoldi, and Re (2012) suggested that the difficulties inherent in procedures relying on dictation and text production could be overcome by adding a new standardized procedure requiring that children copy as many words as possible from a complex text within a limited amount of time. Using a copy task seemed not only to avoid the above-mentioned difficulties but also to provide a direct measure of the children's ability to comply with a typical requirement at school, as when they have to copy from the blackboard. Copying a text is an activity that involves a number of cognitive processes. According to the literature (see Adi-Jafa et al., 2007; Tressoldi et al., 2012), copying a text requires that a word be read, memorized in the phonological buffer, and associated with its lexical representation (if possible), and then with its orthographic representation. More specifically, copying involves reading, retrieving orthographic representations from long-term memory, using working memory (to retain the words in short-term memory and check the orthographic representations on the basis of their written forms), controlling attention, and writing operations. Children can make mistakes because they did not precisely match the words letter by letter or because of an erroneous orthographic representation of the word. In the copy task proposed by Tressoldi and coauthors (2012), the conditions for ensuring a precise match letter by letter are limited because the children are asked to proceed as quickly as possible and have only 5 minutes to complete the task.

Writing under dictation involves partly different processes. First of all, children start by listening to (not reading) a word, so auditory discrimination and phonemic analysis are fundamental in the first step of writing under dictation. Then the children cannot find any external support, as in the copy task, but must rely only on their phonological trace and on long-term memory representations. Children have two main options: They can use phoneme-grapheme conversion (used especially by children who are not expert writers, or when writing new words or pseudowords), or they can draw from a memorized lexicon of ready-to-use orthographic representations of commonly encountered words (Adi-Jafa et al., 2007).

Thus, although dictation is the most widely used procedure for assessing spelling performance, including the copy subtest suggested by Tressoldi and collaborators (2012) in a writing battery may generate important, specific information. Tressoldi and collaborators validated their procedure by demonstrating that the rate of spelling errors in the copy task gradually declines with training (also see Candela, Cornoldi, & Re, 2012; Parker, McMaster, Medhanie, & Silberglitt, 2011). On the other hand, Tressoldi and coauthors (2012) did not clearly demonstrate that a copy task can identify the difficulties encountered by children known to have spelling weaknesses. In fact, to date, the literature has never examined copy task errors in children with spelling difficulties, and there is a paucity of data on the fact that some children make spelling mistakes even when copying a text.

The present study aimed to fill this gap by administering a copy task to children known to have spelling difficulties,

that is, children with dyslexia or ADHD. The first question to answer was whether such children make more spelling errors on a copy task than do controls. The second was whether, in general, children make fewer spelling errors when copying than when writing under dictation; and a related third question was whether the pattern of their spelling errors differs between copying and writing under dictation. These second and third questions were examined in general, comparing controls to children typically liable to spelling errors (i.e., children with dyslexia and ADHD), and also in a specific comparison between the dyslexic subgroup and the children with ADHD. We predicted that the copy task would generally reduce, but not eliminate, group differences in spelling errors, and more specifically that the copy task would affect children with dyslexia and those with ADHD in different ways. In fact, copying a text is a complex task (Lambert, Alamargot, Larocque, & Caporossi, 2011; Tressoldi et al., 2012) involving not only linguistic and phonological processes, such as reading, retrieving orthographic representations from long-term memory, and retaining them in short-term memory, but also attentional processes, such as checking the orthographic representations on the basis of their written forms and maintaining attentional control during the task. Since children with dyslexia and those with ADHD make spelling errors for different reasons (relating mainly to matters of orthographic representation in the former and to distractibility in the latter), the two groups might also be facilitated in different ways by the availability of the text in the copy task, and the resulting pattern of errors could be different. In particular, children with dyslexia could have more difficulty in reading the text and retrieving the correct orthographic representations, but partly overcome these difficulties by means of an accurate control over how a word is written in the text. This facilitation should be particularly evident in the case of material related with nonphonological errors.

Method

Participants

From a large group of 393 pupils attending state schools in the Veneto region of northeastern Italy (Vicenza), 35 children with spelling problems and 35 typically developing controls matched for schooling, age, and estimated IQ were selected on the basis of their school records and their teachers' rating scales. Particular school policies meant that boys were overrepresented in the group of children with spelling difficulties, and the control group also included more boys than girls. The schools were located in the suburbs of Vicenza (Castelgomberto and Poiana Maggiore), where most of the residents are white families employed in the public sector and in industry. All the children came from families whose first language was Italian. The children with spelling problems formed two subgroups, one of 13 children with a diagnosis of dyslexia, the other comprising 22 children with symptoms of ADHD.

The children with dyslexia had been diagnosed by qualified psychiatrists or clinical psychologists according to the fourth edition text revision of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-TR*; American Psychiatric Association [APA], 2000). There are no standard procedures for assessing and diagnosing ADHD in Italy, and this condition is still the object of debate, so only some of the children with symptoms of ADHD had been formally diagnosed as having ADHD, whereas others were included in the ADHD group by their teachers and a school psychologist when observation, family reports, and a teacher's rating scale consistently pointed to the presence of ADHD symptoms. In particular, all such children had to meet the diagnostic criteria for ADHD in a *DSM-IV* ADHD symptom checklist called the *SDAI Rating Scale* (*Scala per i Disturbi di Attenzione/Iperattività per Insegnanti*; Marzocchi, Re, & Cornoldi, 2010).The *SDAI Rating Scale* is one of the scales most often used in Italy for identifying children with ADHD. It involves teachers rating the child's frequency and intensity of the nine symptoms of inattention and the nine symptoms of hyperactivity/impulsivity described in the *DSM-IV-TR* (APA, 2000) on a 4-point scale from 0 (*no problem*) to 3 (*severe problems*). The interrater reliability of the *SDAI Rating Scale* is $r = .80$ for the Inattention subscale and $r = .74$ for the Hyperactivity-Impulsivity subscale. The test–retest reliabilities are $r = .83$ and $r = .81$ for Inattention and Hyperactivity-Impulsivity, respectively (Marzocchi et al., 2010). For each subscale, the cutoff is at 14 points. All the children included in the ADHD group scored above the cutoff on at least one scale (Inattention or Hyperactivity-Impulsivity). More specifically, 11 children had mainly attentional symptoms, 3 had mainly hyperactive symptoms, and 8 were of the combined type. None of the children in the ADHD group had learning disorders.

Teachers were interviewed to confirm the characteristics of the groups and also asked to rate any general cognitive and learning difficulties, oppositional and aggressive behavior, and anxiety and depressive behavior on a scale of 0 to 3, using the *COM Comorbidity Scale*, which has the same format as the *SDAI Rating Scale* and has also revealed good psychometric properties (e.g., an interrater reliability of $r = .97$; Marzocchi et al., 2010). To exclude the possibility that a spelling problem could be the result of an associated condition rather than to ADHD, a small group of children with such problems were excluded from consideration. Other exclusion criteria were IQ scores of less than 85; the use of medication; a previous diagnosis of a learning disorder, or a suspected math and reading disorder in children with ADHD, or symptoms of ADHD in children with dyslexia; a history of neurological disorders, sensory problems, motor impairments, or any neurodevelopmental disorder other than

Table 1. Characteristics of the Groups: Gender and Mean Age, Spatial IQ, Inattention, Hyperactivity, Reading Scores, and Results of the Student's *t* Test Comparisons Among Groups.

	Controls (32 males, 3 females)		School Difficulty (32 males, 3 females)			ADHD (20 males, 2 females)		Dyslexia (12 males, 1 female)		
	M	*SD*	*M*	*SD*	*t*(*df* = 68)	*M*	*SD*	*M*	*SD*	*t*(*df* = 33)
Age (months)	113.77	9.75	113.69	9.47	0.037	114.09	8.28	113	11.53	0.32
IQ (*PMA* spatial)	118.83	15.85	112.23	15.16	1.78	113.18	12.32	110.61	19.51	0.48
SDAI Rating Scale Inattention	0.94	2.14	14.31	5.5	13.39***	16.91	4.36	9.92	4.41	4.56**
SDAI Rating Scale Hyperactivity-Impulsivity	1.4	2.85	9.31	8.99	4.91***	12.41	9.7	4.08	4.23	2.93**
Reading	37.63	9.5	32.03	11.06	2.72*	35.86	10.27	25.54	9.5	2.96**

*$p < .05$. **$p < .01$. ***$p < .001$.

ADHD or dyslexia; and *DSM-IV-TR* criteria for major depression, anxiety, bipolar disorder, psychotic disorder, or mood disorder. To further check the children's reading and intellectual levels, we assessed their reading skills with a lexical decision test (*Prova di decisione lessicale*; Caldarola, Perini, & Cornoldi, 2012), consisting of silently reading a list of words and nonwords and identifying the words as rapidly as possible. We assessed intellectual abilities by administering part of the *PMA* 2 to 4 and 4 to 6 Spatial Reasoning subscales (Thurstone & Thurstone, 1963/1981), which involved finding which one of four different figures could produce a square when combined with a given model, within an allotted time. From the Italian standardization of the *PMA*, we derived a measure of IQ that can be considered only as an approximate estimation because only one subtest was used. Table 1 provides details on the groups.

Tasks and Procedure

For the writing assessment, we adapted two specific tasks included in the *Battery for the Assessment of Writing Skills in Children Between 7 and 13* (Tressoldi et al., 2012), that is, Text Dictation and Text Copy. Based on the text used in the copy task, "Libertà linguistiche e scioglilingua," which presents several orthographic difficulties, we built two equally difficult texts, "Il cuoco" (the cook) and "Il Capitano" (the captain), with the same number of words (103) and similar word characteristics and syntactic complexity. One text was dictated, the other had to be copied.

In the dictation task, the experimenter (who had a local accent and had been trained to dictate clearly and slowly) dictated the text normally, as in a routine classroom dictation. The children were told that if they did not understand a word or forgot a word, they were to skip the missing word and go on, keeping up with the rhythm of the dictation. In the copy task, each child received a sheet of paper with the text and had to copy as many words as possible correctly in 5 minutes. The experimenter stressed the importance of proceeding quickly because the score considered both accuracy and the number of words copied.

In both tasks, the children used their own pens and a page of the workbook they typically used at school. All the tasks were administered at school, to small groups of children in their own classrooms, during a session lasting about an hour.

All children were administered both writing tasks. The order in which the tasks (copy and dictation) were presented and the choice of text to be dictated or copied were balanced across participants.

Results

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 distinguished among three different kinds of error, according to the classification in the manual:

- Phonological errors, where reading the written word would produce a different phonological result from the real word
- Nonphonological errors, where reading the written word would produce the same sound as the real word
- Third category (or refinement) errors, where the right sequence of letters is written, but there are errors relating to double letters or accents on the last vowel

As the amount of written material differed from one participant to another, both for the dictation (because of words being skipped) and for the text copy task, 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.

Data Analysis

The analysis of our results is divided into two parts. First we compared the control group to the overall group of children with spelling difficulties to see to what extent these

Table 2. Mean Percentages and Standard Deviations of Errors in the Dictation and Copy Tasks and Student's *t* Test and Mann–Whitney *U* Comparisons Between Controls and Children With Spelling Difficulties.

	Control		Spelling Difficulties					
	M	*SD*	*M*	*SD*	*t*(*df* = 68)	*p*	*U*	*p*
Dictation								
% total errors	6.68	3.85	19.02	10.81	6.36	< .001	134.5	< .001
Copy								
% total errors	2.66	2.65	5.12	4.34	2.85	< .01	361.5	.003

Table 3. Mean Percentages and Standard Deviations and Student's *t* Test and Mann–Whitney *U* Comparisons Between Controls and Children With Spelling Difficulties for the Different Types of Errors in the Dictation and Copy Tasks.

	Controls		Spelling Difficulties					
	M	*SD*	*M*	*SD*	*t*(*df* = 68)	*p*	*U*	*p*
Dictation								
% phonological errors	2.65	1.89	7.2	3.64	6.54	< .001	134.5	< .001
% nonphonological errors	1.93	1.25	3.68	2.37	3.86	< .001	320	.001
% third category	0.61	0.92	4.2	3.73	5.5	< .001	154.5	< .001
Copy								
% phonological errors	1.79	2.1	2.98	3.02	1.91	.060	440	< .05
% nonphonological errors	0.57	1.11	0.59	1.07	0.93	> .05	610	> .05
% third category	0.27	0.58	1.37	1.92	3.26	.002	384	< .01

difficulties existed in a copy task too. Then we examined the two subgroups of children with spelling difficulties separately to see if any different patterns emerged. General analyses were conducted using ANOVA, and specific comparisons were drawn with Student's *t* test, with an alpha of .05, but the tables also show the actual probabilities to allow for multiple comparisons.

Comparison Between Children With Spelling Difficulties and Controls

Table 2 shows the percentage of errors in the total set of words written by the two groups in the copy and dictation tasks. The values are necessarily small because the percentage of errors was calculated on the total word count (including simple words such as articles, prepositions, and so on, where the likelihood of making a spelling mistake was very low); the measures were discriminatory nonetheless, as revealed by a 2 × 2 ANOVA (groups × types of task). In fact, our first question was whether the group with spelling difficulties made more mistakes than controls, and this was the case, $F(1, 68) = 43.65$, $p < .001$, $\eta^2_p = .39$; this was true in general, but also in the specific case of the copy task, $t(68) = 2.85$, $p < .01$. Our second question was whether fewer errors are made in a copy task than under dictation. Here again, this assumption was confirmed as the ANOVA showed a significant main effect of the type of writing task: $F(1, 68) = 80.44$, $p < .001$, $\eta^2_p = .54$. It is worth noting that children with spelling difficulties were particularly facilitated in the copy task by having the text in front of them, so there was a greater reduction in the proportion of spelling mistakes they made with respect to the dictation, as shown by the interaction between groups and tasks: $F(1, 68) = 24.47$, $p < .001$, $\eta^2_p = .26$ (see Table 2).

We also examined whether the differences between the spelling difficulties and control groups varied in terms of the types of error made in the two writing tasks. This comparison should be considered with caution because the percentages of spelling errors were very low in some cases. We decided to analyze the error data nonetheless and report them here because they provide some interesting information on an area in need of some preliminary evidence. As shown in Table 3, more errors were made under dictation and the two groups differed significantly in all types of error; in the copy task, on the other hand, the differences were smaller and remained significant only in the case of the third (refinement) type of error, whereas there were only slight differences in the case of phonological errors and the differences disappeared in the case of nonphonological errors, which occurred in very small percentages.

Given the properties of the distributions, we also conducted an analysis treating the data as nonparametric (see Tables 2 and 3, rightmost columns), which replicated the results obtained with the parametric analyses and made the group differences in terms of nonphonological errors in the text copy task more evident.

Table 4. Mean Percentages and Standard Deviations of Errors in the Dictation and Copy Tasks and Student's *t* Test and Mann–Whitney *U* Comparisons Between Children With ADHD and Those With Dyslexia.

	ADHD		Dyslexia					
	M	*SD*	*M*	*SD*	*t*(*df* = 33)	*p*	*U*	*p*
Dictation								
% total errors	14.48	6.24	26.71	12.7	3.82	.001	57.5	< .01
Copy								
% total errors	4.34	3.48	6.43	5.4	1.39	> .05	121.5	> .05

Table 5. Mean Percentages and Standard Deviations and Student's *t* Test and Mann–Whitney *U* Comparisons Between Children With ADHD and Those With Dyslexia on the Types of Errors in Dictation and Copy Tasks.

	ADHD		Dyslexic					
	M	*SD*	*M*	*SD*	*t*(*df* = 33)	*p*	*U*	*p*
Dictation								
% phonological errors	5.83	2.59	9.51	4.07	3.28	< .01	60	< .01
% nonphonological errors	2.58	1.37	5.54	2.57	4.45	< .001	38.5	< .001
% third category	2.75	2.35	6.66	4.39	3.44	< .01	57.5	< .01
Copy								
% phonological errors	2.29	2.34	4.15	3.74	1.82	.078	111.5	> .05
% nonphonological errors	0.56	1.1	0.65	1.07	0.25	> .05	134	> .05
% third category	1.27	1.34	1.56	2.69	0.42	> .05	125	> .05

Comparisons Between Children With Dyslexia and Children With ADHD

We repeated the analyses dividing the group of children with spelling difficulties in two subgroups. We first compared these two groups and also the controls, and then only the two groups with spelling difficulties. A preliminary omnibus 3 × 3 × 2 (group × type of error × task) ANOVA on the number of errors confirmed a main effect of task, $F(3, 65) = 56.63$, $p < .001$, $\eta^2_p = .72$, and showed a main effect of groups, $F(3, 65) = 10.86$, $p < .001$, $\eta^2_p = .33$, as well as a significant interaction between groups and task, $F(3, 65) = 8.56$, $p < .001$, $\eta^2_p = .28$.

To further clarify the specific differences between the two clinical subgroups, we drew further comparisons on these two groups alone. A 2 × 2 (task × subgroup) ANOVA showed a significant main effect of task: $F(1, 33) = 74.86$, $p < .001$, $\eta^2_p = .69$. We also found a significant main effect of subgroup, $F(1, 33) = 16.29$, $p < .001$, $\eta^2_p = .33$, with the dyslexic subgroup making more mistakes than the ADHD subgroup, as well as a significant interaction, $F(1, 33) = 8.32$, $p < .01$, $\eta^2_p = .20$, resulting from the stronger facilitation effect of the copy task for the children with dyslexia. Table 4 shows the error percentages for the two groups and the results of the group comparisons for the two tasks. The difference was significant for dictation, but not at all significant for the copy task.

The degree to which the children with dyslexia were facilitated by the copy task, by comparison with the other groups, differed slightly according to the type of error (see Table 5). Although the dyslexics made more mistakes under dictation than the children with ADHD for all types of error, no significant differences emerged in the copy task; there was only a tendency for them to make more phonological errors. The rightmost columns of Tables 4 and 5 show the results of the nonparametric analyses, which substantially replicated the results of the parametric analyses.

The discriminatory power of the copy task was further supported when the controls were compared with the two spelling difficulty groups separately. Considering the copy task alone, and comparing controls to children with ADHD and controls to children with dyslexics, the task was still discriminatory. We found significant differences for the total errors in both spelling difficulty groups, but with a different pattern of results in terms of the types of error: the ADHD group made significantly more "refinement" errors than did controls, $t(33) = 3.87$, $p < .001$, whereas the children with dyslexia made significantly more phonological, $t(33) = 2.76$, $p < .01$, and refinement errors than did controls, $t(33) = 2.71$, $p < .01$.

Given the limited number of errors involved, we could not carry out statistical analyses on other subtypes of errors. However, an examination of the protocols enabled us to identify other characteristics of the types of error made by

the children. For example, the analysis of the phonological errors revealed that the most common mistake involved one phoneme being replaced by another (54.51% of errors made under dictation were of this type, and 45.46% in the copy task), relating often to phonologically similar consonants (e.g., "*b*anchina" for "*p*anchina"). Sometimes phonemes were lost (e.g., "*sco*stata" for "*scro*stata"), but this happened less often (33.55% of errors under dictation, 32.95% of those in the copy task) and mainly concerned the loss of a single phoneme. Phonemes were rarely added (e.g., "salamo*gl*ia" for "salamoia"), but this happened more when copying (11.94% of errors under dictation and 21.59% in the copy task). These error patterns were similar in the three groups, except that the ADHD group was more likely to lose phonemes (44.82%) than to make substitutions (34.48%) in the copy task. This result might reflect the tendency of children with ADHD to lose parts of words or even whole words when copying text.

Concerning the nonphonological errors, the children had more difficulty segmenting appropriately words (e.g., they wrote "ogni qual volta" for "ogniqualvolta"; 80.4%) than handling letters within a word ("quoco" for "cuoco"; 19.6%), and the three groups—with a lower—presented the same pattern of errors.

As for the last category of errors, we considered errors involving accents and double consonants separately and found the latter (65.35%) more common than the former (34.21%). This result is attributable mainly to the children with spelling difficulties, whose errors mainly involved double letters (77.96% for dyslexics and 54.04% for cases of ADHD). (For the nonphonological and refinement errors, we considered only the dictation task because too few of these types of error were made in the copy task.)

Number of Written Words Copied in the Copy Task

Finally, we counted the number of words copied within the allotted time and found a significant difference between the controls and the two groups with spelling difficulties, $t(68) = 3.28$, $p < .01$, suggesting that the larger number of mistakes made by the two clinical groups was not a result of a particular speed–accuracy trade-off. We found no significant difference between the ADHD and dyslexic groups, $t(33) = 0.91$, $p > .05$.

Conclusions

The present study is the first, to our knowledge, to examine the clinical implications of a text copying task and the patterns of spelling performance in typically developing children and in those with dyslexia and ADHD. In the study we first examined whether spelling performance improved when children known to have spelling difficulties in dictation were administered a copy task. Our results confirmed that children were facilitated by having the correct spelling of the words available (as in the copy task), but the children with dyslexia and those with ADHD still both made significantly more mistakes than did the controls. On the other hand, the generally greater spelling difficulties under dictation of the children with dyslexia by comparison to the children with ADHD tended to disappear in the copy task, suggesting that it was easier for the dyslexics than for the ADHD group to focus the attention needed to check their spelling against the text available for consultation. The similarities between the two clinical groups were particularly evident for errors concerning duplicates and accents, where particular attention is needed to check whether the words include double letters or accents, confirming the finding reported by Re (2006; Re et al., 2007) that children with ADHD are not only generally weak in spelling even when they have no comorbid learning disorders, but they also encounter particular difficulties with this aspect of spelling. There tended to be a difference between the two clinical groups (albeit falling short of statistical significance) for phonological errors, presumably because the poor phonological performance of children with dyslexia prevented them from taking full advantage of having the text available during the copy task. It has been suggested (Tressoldi et al., 2012) that both the orthographic representation and the ability to retain the sequence of phonemes (which corresponds perfectly to the sequence of graphemes in Italian) are crucial when it comes to copying an orthographically complex word. As for the nonphonological errors, which mainly concern a few simple but crucial questions in Italian (e.g., word segmentation, use of an "h"), so the children may be well aware of the risk of error and pay particular attention, it is noteworthy that the copy task had a strong facilitation effect, substantially eliminating this type of error in both groups. This finding suggests that nearly all the children took advantage of being able to check the appropriate spelling when it came to these potential nonphonological errors, whereas they were less careful to check all the other parts of the text, where the risk of error was less obvious (given also the need to work at speed). This is consistent with the observation (see Goswami, 1999; Tressoldi et al., 2012) that, presented with certain crucial words, Italian children are aware that they might make a nonphonological error, even though they may not be able to decide between two different possible spellings.

An exploratory separation of the phonological errors into three different subcategories (losing, adding, and substituting phonemes) showed that the most common error involved one phoneme being replaced with another, followed by phonemes being lost, and last by phonemes

being added. As for the nonphonological errors, we found that children had more difficulty with splitting words and that children with dyslexia and ADHD tended to make more mistakes with double consonants than with accents. Further research on a larger body of written texts could shed more light on the different patterns of errors, by using more than one classification system and assessing more thoroughly how typically developing children and those with dyslexia or ADHD differ in terms of specific types of error. Working on a larger number of errors would also show whether some of the effects seen in the present study might be attributable to the low absolute values for some of the measures. In fact, given the limited number of participants tested and the small amount of written material administered to them in the present study, our findings need to be supported and generalized by further studies on children's copying skills. As the comorbidity of ADHD with other behavioral or emotional problems is very high, further research should also examine whether the same patterns of results can be found in children with ADHD who have also received other diagnoses in comorbidity. In any case, the fact that our group presented a specific ADHD profile gives the possibility of excluding that the observed pattern of results was a result of another associated condition, rather than an ADHD profile.

In conclusion, the present study showed that a text copy task can put in evidence specific difficulties met by groups known for their spelling difficulties and may contribute important, specific information. This result has a series of educational implications. First, concerning assessment, a copy task should be included in spelling batteries in circumstances where dictation is probably not enough to establish a child's spelling ability or when there is a specific interest in knowing children's text copying skills. Second, concerning school curricula, greater attention should be devoted to school activities requiring children to pay attention to the possibility of making errors even when copying a text. Third, concerning intervention for children with spelling difficulties, treatment should include, together with the classical activities (phonological exercises, writing under dictation, etc.), exercises of copying written material, especially for reducing the difficulties resulting from phonological errors, including accents and duplicates. As copying is more simple than writing under dictation, copy activities could precede dictation activities in the case of children with severe difficulties. Fourth, the intervention involving the use of copy tasks could be adapted to the specific characteristics of the children with spelling difficulty, for example focusing the attention of the children with dyslexia on the risk of phonological errors and focusing the attention of the ADHD children on the risk of errors with accents and duplicates.

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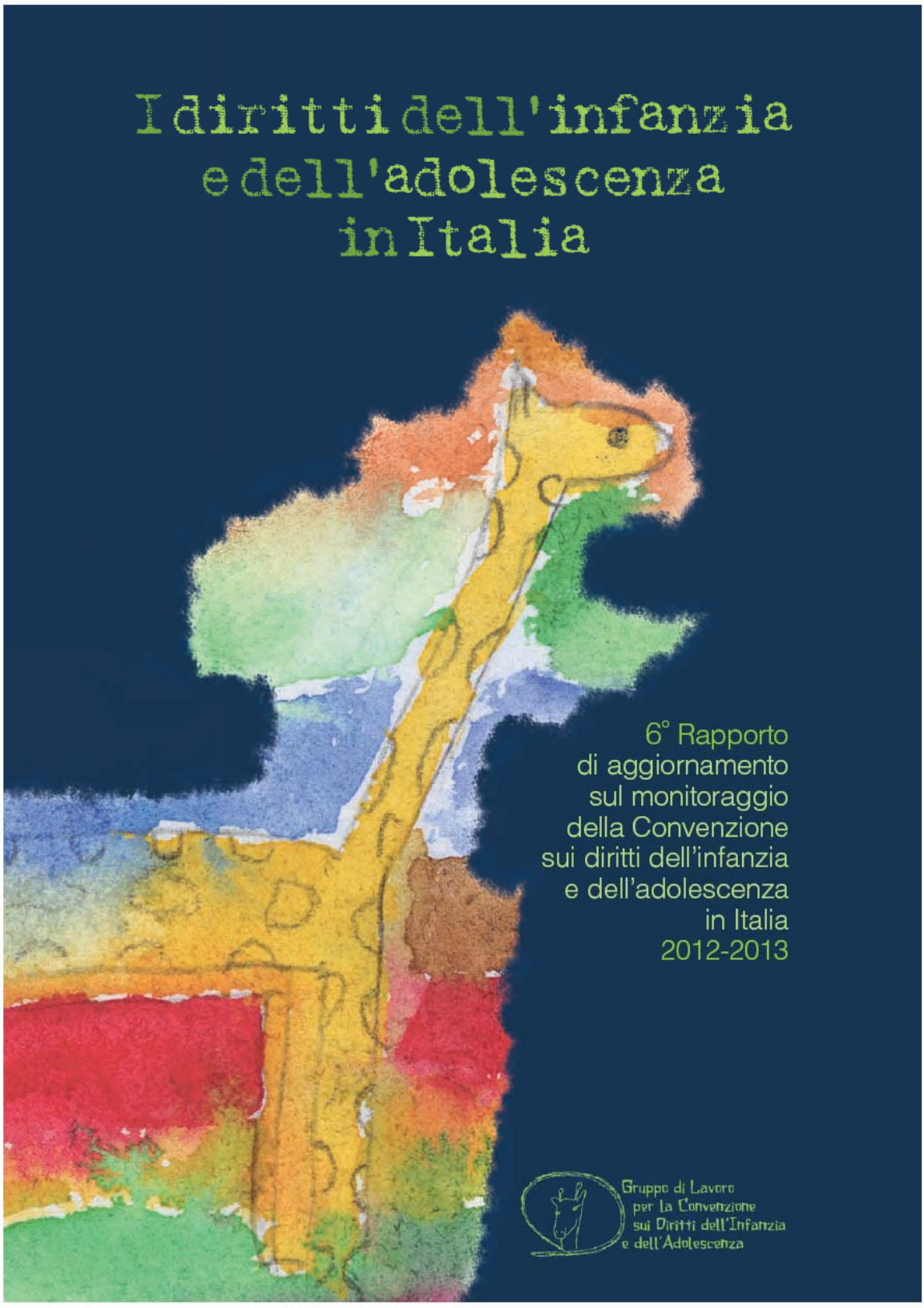

I diritti dell'infanzia
e dell'adolescenza
in Italia
6° Rapporto
di aggiornamento
sul monitoraggio
della Convenzione
sui diritti dell'infanzia
e dell'adolescenza
in Italia
2012-2013
Gruppo di Lavoro
per la Convenzione
sui Diritti dell'Infanzia
e dell'Adolescenza

6. SALUTE MENTALE

52. Il Comitato, riferendosi al proprio Commento generale n. 4 (2003) sulla salute e lo sviluppo degli adolescenti, raccomanda che l'Italia rafforzi servizi e programmi disponibili e di qualità per la salute mentale e in particolare che:
(a) applichi ed effettui il monitoraggio senza indugio delle Linee guida nazionali sulla salute mentale;
(b) sviluppi una politica generale nazionale sulla salute mentale chiaramente incentrata sulla salute mentale degli adolescenti e ne garantisca l'applicazione efficace attraverso l'attribuzione di finanziamenti, risorse pubbliche adeguate, sviluppo e applicazione di un sistema di monitoraggio;
(c) applichi un approccio multidisciplinare al trattamento dei disturbi psicologici e psicosociali tra i minori attraverso la definizione di un sistema integrato di assistenza sanitaria per la salute mentale dei minori che coinvolga, a seconda dei casi, genitori, famiglia e scuola.

CRC/C/ITA/CO/3-4, punto 52

Nell'ambito della salute mentale in infanzia e adolescenza, permangono le criticità già evidenziate nel 5° Rapporto CRC[76]. L'Italia ha buoni modelli e normative[77], anche se poco applicate, e con ampie disuguaglianze intra e inter-regionali. Resta insufficiente lo stanziamento di risorse da parte delle Regioni per garantire alle ASL e ai Servizi di Neuropsichiatria dell'Infanzia e dell'Adolescenza (NPIA) di diffondere e consolidare la necessaria rete di strutture territoriali, semiresidenziali, residenziali e di ricovero, garantendo al loro interno le *équipe* multidisciplinari indispensabili per l'efficacia dei percorsi diagnostici e terapeutici. Continuano ad esservi Regioni[78] in cui mancano gli stessi servizi territoriali e/o il personale è gravemente insufficiente e/o non sono previste tutte le figure multidisciplinari necessarie per i percorsi terapeutici[79]. La situazione è peggiorata nel 2012 a seguito dei provvedimenti di contenimento della spesa pubblica.
Come già evidenziato nel 5° Rapporto CRC[80], nelle Regioni in situazione meno precaria **l'accesso ai servizi di NPIA continua a collocarsi intorno al 5-6%** della popolazione infantile[81], **con un bisogno che è più che doppio.** La patologia psichiatrica resta quella maggiormente negletta[82], in particolare in adolescenza, sia nell'ambito della diagnosi precoce sia in quello della gestione delle emergenze che richiedono ricovero o interventi intensivi, per le quali il quadro è assai critico. Dei 382 letti di NPIA esistenti, quelli disponibili per acuzie psichiatrica sono solo 79. Solo un terzo dei ricoveri ordinari riesce ad avvenire in reparto di neuropsichiatria infantile, mentre gli altri avvengono in reparti inappropriati, compresi quelli psichiatrici per adulti[83], con il rischio di percorsi di cura inefficienti e inefficaci, e di cronicizzazio-

76 5° Rapporto CRC, pag 71-76, www.gruppocrc.net/IMG/pdf/50_Rapporto_di_aggiornamento__Gruppo_CRC.pdf.
77 Ad esempio, è l'unico paese al mondo che mantiene integrate neurologia, psichiatria e neuropsicologia all'interno dei servizi di Neuropsichiatria Infantile, nell'ottica di guardare al bambino nella sua globalità e non solo alle singole funzioni; è anche il primo Paese ad avere avviato l'integrazione dei disabili nelle scuole e ad avere chiuso i manicomi e altre istituzioni totali.
78 Ad esempio, Calabria, Campania, Liguria, Puglia, Sardegna ed altre.
79 Ad esempio, in Piemonte, che è una delle pochissime Regioni di cui vi siano dati aggiornati sia di attività che di personale (si veda dopo), il 62% dei servizi di NPIA non ha al proprio interno il personale riabilitativo.
80 Si veda 5° Rapporto CRC 2011-2012, pag. 72.
81 Regione Piemonte, www.sinpia.eu/regionali/sezione/cat/37/page/documenti; Regione Emilia-Romagna, www.saluter.it/documentazione/rapporti/ssr/Pubbli_SSR_2011.pdf; Regione Toscana, *I servizi di salute mentale in Toscana: Rapporto novembre 2010*.www.regione.toscana.it/regione/multimedia/RT/documents/2010/11/23/1290501980781_Servizi%20di%20salute%20mentale%20in%20Toscana.pdf.; Documento GAT Acuzie Psichiatrica in Adolescenza Regione Lombardia, http://normativasan.servizirl.it/port/GetNormativaFile?fileName=3400_DOCUMENTO%20GAT.pdf
82 Riesce ad accedere ai servizi di NPIA 1 utente su 2 con disturbo specifico di apprendimento, contro 1 su 4 con disturbo psichiatrico (si vedano i rapporti regionali citati).
83 Calderoni D., *"Criticità di sistema nei ricoveri psichiatrici in adolescenza"*, intervento al Convegno "Modelli innovativi di intervento nella crisi acuta in adolescenza", Milano, maggio 2010; documento GAT Acuzie Psichiatrica in Adolescenza, Regione Lombardia, febbraio 2012. http://normativasan.servizirl.it/port/GetNormativaFile?fileName=3400_DOCUMENTO GAT.pdf

ne[84]. La maggior parte dei ricoveri psichiatrici in adolescenza avvengono per disturbi della condotta, abuso di sostanze o di alcool, gravi disturbi d'ansia e disturbi del comportamento alimentare.[85] Altrettanto critica è la situazione relativa agli inserimenti in **comunità terapeutica**, su cui non esistono dati nazionali e che, spesso, avvengono lontano dalla residenza dei ragazzi a causa della carenza di strutture, con lunghe attese e difficoltà nel reinserimento nel proprio territorio[86]. L'impatto dei disturbi della condotta appare essere sempre più rilevante, come l'abuso di sostanze e di alcool[87], che raramente è una vera e propria tossicodipendenza, ma ha comunque un ruolo significativo sia nella slatentizzazione del disturbo psichiatrico che nella complessità della sua gestione. Ciò implica la necessità di rimodulare i percorsi diagnostici e terapeutici e di giungere a definire modalità di raccordo stabile con i Dipartimenti Dipendenze.

Anche i **Disturbi del Comportamento Alimentare** (DCA) rappresentano un'area che richiede attenzione. In adolescenza (13-17 anni), la prevalenza *lifetime* per la Anoressia Nervosa (AN) è 0.3%, per la Bulimia Nervosa (BN) è 0.9%, per il *Binge Eating Disorder* (BED) 1.6%, con una prevalenza sottosoglia[88] di 0.8% per la AN e 2.5% per il BED[89]. Dati italiani indicano invece una prevalenza tra 12 e 25 anni del 2% per l'AN, tra il 2 e il 3% per la BN, e del 3-4% per i disturbi EDNOS[90]. L'assenza di un sistema di classificazione universalmente accettato e di modalità standardizzate per determinare la presenza e il tipo di disturbo alimentare tra i bambini rende difficile il confronto tra i risultati degli studi sull'epidemiologia e le risposte al trattamento.

L'incidenza dei DCA si è mantenuta abbastanza stabile negli ultimi anni, con un abbassamento nell'età d'esordio. L'incidenza dei DCA fino a 13 anni è stimata in 3,01 nuovi casi ogni 100.000, con una chiara relazione tra incidenza e aumento dell'età [91]. Non sono stati identificati casi di DCA al di sotto dei 5 anni. In recenti studi italiani[92], l'incidenza dell'AN è di 4-8 nuovi casi anno per 100.000 individui, e di 9-12 per la BN, e l'età di esordio è stabilizzata fra i 10 e i 30 anni, con una età media di 17 anni. Questi dati mostrerebbero un aumento soprattutto per la BN e il BED. Inoltre, il rapporto maschi-femmine, finora stimato a 1/9, si sta modificando per l'aumento del numero dei maschi in età pre-adolescenziale e adolescenziale colpiti dalla malattia o con nuovi disturbi tipici del sesso maschile come, ad esempio, la bigoressia o *reverse anorexia*[93].

La creazione di una piattaforma online[94], con una mappa aggiornata e dettagliata dei servizi pubblici e convenzionati su scala nazionale e delle associazioni dedicate ha confermato che sono pochissime le strutture specifiche per il trattamento dei DCA in età evolutiva e le prime risposte terapeutiche finiscano per essere prevalentemente affidate ai singole figure professionali (pediatri, psicologi, dietologi etc.), che per lo più rispondono al problema solo foca-

84 Royal College of Psychiatrists, "*Recommendations for In-patient psychiatric care for young people with severe mental illness*", London 2005, WHO (2005), "Child and Adolescent Mental Health Policies and Plans", Mental Health Policy and Service Guidance Package, www.who.int/mental_health/policy/Childado_mh_module.pdf.

85 Calderoni D., "*Criticità di sistema nei ricoveri psichiatrici in adolescenza*", Intervento al Convegno "Modelli innovativi di intervento nella crisi acuta in adolescenza", Milano, maggio 2010; Clavenna, A., Cartabia M., Sequi M., Costantino M.A., Bortolotti A., Fortino I., Merlino L., Bonati M., "*Burden of psychiatric disorders in the pediatric population*", European Neuropsychopharmacology 23, 2013, 98–106.

86 Direzione Generale Sanità Regione Lombardia, Report relativo ai ricoveri extracontratto 2010, nota della DG Sanità del 4-6-2012 prot H1.2012.0017581 http://normativasan.servizirl.it/port/GetNormativaFile?fileName=3660_Ricoveri extracontratto psichiatria e NPIA 2010.doc_

87 Si veda anche Capitolo VII, paragrafo "Il consumo di droghe e alcool tra i minori".

88 In cui cioè un disturbo alimentare sembra comunque presente, anche se non vengono rispettati completamente i criteri diagnostici del DSM-IV

89 Swanson, S. A., Crow, S. J., Le Grange, D., Swendsen, J., Merikangas, K. R. (2011), "*Prevalence and Correlates of Eating Disorders in Adolescence*", Archives of General Psychiatry, 68 (7), 2011, pp. 714-723.

90 Dati Aba (Associazione Bulimia Anoressia, 2012) e SISDCA (Società Italiana per lo Studio dei Disturbi del Comportamento Alimentare, 2012).

91 Nicholls, D., Bryant-Waugh, R., "*Eating Disorders of Infancy and Childhood: Definition, Symptomatology, Epidemiology, and Comorbidity*", Child and Adolescent Psychiatric Clinics of North America, 18, 2009, pp. 17-30.

92 AA VV., "*Il coraggio di guardare. Prospettive e incontri per la Prevenzione dei Disturbi del Comportamento Alimentare*", Collana Mettere le Ali, 2012.

93 Fonte: ABA (Associazione Bulimia Anoressia), www.bulimianoressia.it/.

94 La piattaforma www.disturbialimentarionline.it è stata realizzata nell'ambito del progetto nazionale 'Le Buone Pratiche di cura e la Prevenzione sociale nei disturbi del comportamento alimentare' promosso dal Ministero della Salute e dalla Presidenza del Consiglio dei Ministri- Dipartimento della Gioventu' (2007-2010).

lizzandosi sull'aspetto concreto dell'alimentazione, trascurando l'importanza delle famiglie e dei genitori nella cura dei DCA. In realtà un intervento non corretto rischia di rinforzare il sintomo e di favorirne l'evoluzione verso la cronicità.
Le raccomandazioni del Documento di Consenso a cura dell'Istituto Superiore di Sanità (ISS)[95] confermano l'efficacia di un modello organizzativo per la gestione dei DCA età-specifico, multidimensionale, interdisciplinare e multi-professionale integrato, e sottolineano la necessità di celebrare al più presto una *consensus conference* specifica per i DCA in età infantile e adolescenziale.

Per quanto riguarda i **suicidi**, gli ultimi dati si riferiscono al periodo 1993-2009 e i quozienti per classe d'età pubblicati consentono analisi solo per gli under 25[96]. La mortalità è diminuita significativamente, con un dimezzamento del numero di suicidi ogni centomila abitanti, che sono passati per i maschi da valori vicino a 4 per centomila nel 1993 a 2,1 nel 2009. Importanti riduzioni, quasi un terzo di suicidi in meno rispetto al valore di inizio periodo, si sono registrate anche tra le donne con meno di 24 anni (da 0,9 a 0,6 per centomila). La composizione per sesso evidenzia la maggiore propensione dei maschi al suicidio, più di tre volte superiore a quella delle femmine.

Per quanto riguarda **la prescrizione degli psicofarmaci per i bambini e gli adolescenti,** i dati più recenti evidenziano che non ci sono stati sostanziali cambiamenti negli ultimi anni. Come già illustrato nel 5° Rapporto CRC[97], la prevalenza di prescrizioni in età pediatrica di antipsicotici e antidepressivi dal 2003 al 2010 è diminuita rispetto ai tre anni precedenti ed è stabile (1,1 per mille per gli antidepressivi e 0,7 per mille per gli antipsicotici). I dati del registro nazionale dell'ADHD indicano che nel periodo 2007-2012 sono stati 2239 (0,03% della popolazione italiana tra i 6 e i 17 anni) i bambini e i ragazzi in trattamento con metilfenidato o atomoxetina[98]. Sostanzialmente stabile risulta l'uso di sedativi e tranquillanti senza prescrizione medica negli adolescenti (12% nelle ragazze e 8% nei ragazzi)[99].
Nonostante tale situazione, la preoccupazione nell'opinione pubblica sull'uso di psicofarmaci nei bambini affetti da ADHD è in crescita. Sebbene tali terapie sembrino ben tollerate, è senza dubbio necessario pianificare studi di verifica longitudinali più a lungo termine, poiché un terzo dei bambini in terapia interrompe il trattamento prima di un anno per eventi avversi a volte gravi[100]. Va inoltre segnalato come il trattamento farmacologico di bambini al di sotto dell'età che consente di effettuare diagnosi di ADHD secondo i criteri internazionali (6 anni) risulti inefficace ed inappropriato, con il 90% dei bambini che continuano a manifestare i sintomi anche molto tempo dopo l'inizio del trattamento farmacologico[101]. Andrebbero inoltre implementate le risorse per i trattamenti non farmacologici scientificamente validati.
La perdurante **assenza di un sistema di monitoraggio complessivo della salute mentale** in età evolutiva e dello stato dei servizi e delle iniziative in questo campo è particolarmente critica proprio nell'ambito degli interventi intensivi per la patologia psichiatrica in adolescenza, che pur essendo carenti sul piano quantitativo, maggiormente si potrebbero prestare a rischi di istituzionalizzazione di ritorno. Resta da realizzare la sensibilizzazione e formazione dei pediatri di famiglia, nella direzione di un raccordo stabile con i servizi di NPIA.
Sul piano dei **documenti istituzionali e linee guida**, si segnala che sono stati approvati in Conferenza Stato-Regioni un documento di indirizzo sui disturbi dello spettro autistico e due

95 WWW.ISS.it
96 ISTAT, "I suicidi in Italia", www.istat.it/it/archivio/68812, 2012
97 Si veda 5° Rapporto CRC
98 Istituto Superiore di Sanità, Registro nazionale ADHD, www.iss.it/adhd/
99 The 2011 ESPAD Report Substance Use Among Students in 36 European Countries www.espad.org/Uploads/ESPAD_reports/2011/The_2011_ESPAD_Report_FULL_2012_10_29.pdf
100 Didoni A, Sequi M., Panei P., Bonati M., "*Lombardy ADHD Registry Group. One-year prospective follow-up of pharmacological treatment in children with attention-deficit/hyperactivity disorder*", Eur J Clin Pharmacol. 2011 Oct;67(10):1061-7
101 The Preschool Attention-Deficit/Hyperactivity Disorder Treatment Study (PATS) 6-Year Follow-Up -www.jaacap.com/article/S0890-8567(12)00993-8/abstract

sui disturbi specifici di apprendimento[102], ed è stato approvato il Piano d'Azione Nazionale Salute Mentale con un'ampia parte relativa ai servizi di NPIA e alla necessità di un adeguato sistema di monitoraggio[103]. È stata inoltre celebrata presso l'ISS la *Consensus Conference* sui DCA[104]. Proseguono, in alcune Regioni, programmi di intervento mirati per migliorare il coordinamento e la rete[105], e per potenziare i servizi attraverso progetti innovativi[106]. Nel Piano Nazionale Prevenzione[107] è previsto il contrasto ai DCA, con lo sviluppo di programmi di prevenzione nelle scuole. Si segnalano in questo senso positive esperienze[108], numericamente contenute, volte a evitare fattori di rischio e a favorire quelli protettivi, che evidenziano la centralità di un approccio multi-fattoriale e di una modalità relazionale di interazione e condivisione dei vissuti emotivi con ragazzi e ragazze, genitori e insegnanti.

Ciononostante, nel campo della promozione della salute mentale in infanzia e adolescenza e della diagnosi precoce dei disturbi neuropsichici, le iniziative continuano a restare poche, frammentate, con fondi molto limitati soprattutto nell'attuale periodo di crisi, e non sufficientemente coordinate tra le diverse componenti sanitarie (Dipartimento di Salute Mentale degli adulti, servizi di NPIA e pediatrici, servizi consultoriali, Dipartimento Dipendenze) e con l'area scolastica, educativa e sociale.

Pertanto il Gruppo CRC, come già nel 2012, raccomanda:

1. Al **Ministero della Salute** e alla **Commissione Salute della Conferenza delle Regioni** di garantire, attraverso adeguati investimenti di risorse, la presenza omogenea in tutto il territorio nazionale di un sistema integrato di servizi di Neuropsichiatria Infantile, sia in termini di professionalità che di strutture, in grado di operare in coerente sinergia con pediatri, pedagogisti clinici e altre figure professionali riconosciute, così da garantire un approccio il più possibile multidisciplinare ai disturbi neuro psichici dell'infanzia e dell'adolescenza, e di strutturare al suo interno Centri di Riferimento per patologie particolarmente rilevanti come DCA, autismo ecc., riferendo annualmente l'esito dell'azione alla Commissione Parlamentare per l'Infanzia e l'Adolescenza e alla Commissione salute della Conferenza delle Regioni;
2. Al **Ministero della Salute**, alla **Commissione Salute della Conferenza delle Regioni**, all'**Istituto Superiore di Sanità**, ai **Servizi di Neuropsichiatria** di strutturare un adeguato sistema di monitoraggio della salute mentale dei bambini e degli adolescenti, dello stato dei servizi ad essa dedicati e dei percorsi diagnostici e assistenziali dei disturbi neuropsichici nell'età evolutiva, riferendo annualmente l'esito dell'azione alla Commissione Parlamentare per l'Infanzia e l'Adolescenza e alla Commissione salute della Conferenza della Regioni;
3. Al **Ministero della Salute**, al **Ministero dell'Istruzione, dell'Università e della Ricerca**, alla **Commissione Salute della Conferenza delle Regioni** di pianificare interventi coordinati di promozione della salute mentale, con particolare attenzione alla sensibilizzazione e formazione dei pediatri di famiglia e degli operatori scolastici, all'uso appropriato dei farmaci, alla prevenzione

102 Conferenza Stato-Regioni del 25 luglio 2012, "*Indicazioni per la diagnosi e la certificazione dei disturbi specifici di apprendimento (DSA)*", Atti n.140/CSR www.statoregioni.it/Documenti/DOC_037451_140%20%20csr%20punto%20%201bis.pdf); Conferenza Unificata del 22 novembre 2012, "*Linee di indirizzo per la promozione e il miglioramento degli interventi assistenziali nel settore dei Disturbi Pervasivi dello Sviluppo (DPS), con particolare riferimento ai disturbi dello spettro autistico*", rep. Atti n. 132/CU www.statoregioni.it/Documenti/DOC_038443_132%20CU%20(P.%205%20BIS%20ODG).pdf; Conferenza Stato-Regioni, "*Linee guida per la predisposizione dei protocolli regionali per le attività di individuazione precoce dei casi sospetti di DSA in ambito scolastico*", Atti n. 13/CSR del 24/01/2013 www.statoregioni.it/Documenti/DOC_039336_13%20%20csr%20punto%201%20odg.pdf).

103 "*Piano di azioni nazionale per la salute mentale*", Accordo tra il Governo, le Regioni e le Province Autonome di Trento e Bolzano del 24/01/2013 2013, rep. Atti n. 4/CU www.statoregioni.it/Documenti/DOC_039329_4%20CU%20(P.%2010%20ODG).pdf

104 Informazioni su www.iss.it._

105 Emilia Romagna, Lombardia, Piemonte, Toscana.

106 Emilia Romagna, Lombardia, Toscana.

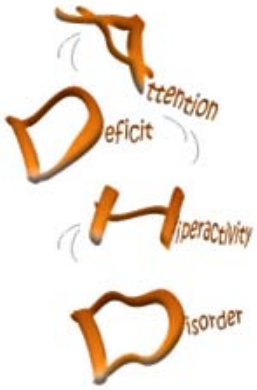
107 Si veda ultimo Piano Nazionale della Prevenzione 2010-2012, pag. 45-46.

108 Progetto nazionale "Le Buone Pratiche di cura e la Prevenzione sociale nei disturbi del comportamento alimentare" promosso dal Ministero della Salute e dalla Presidenza del Consiglio dei Ministri-Dipartimento della Gioventu' (2007-2010); AA VV., "*Il coraggio di guardare. Prospettive e incontri per la Prevenzione dei Disturbi del Comportamento Alimentare*", Collana Mettere le Ali, 2012

dei suicidi, dei DCA e di altri analoghi disturbi ad elevato impatto, riferendo annualmente l'esito dell'azione alla Commissione Parlamentare per l'Infanzia e l'Adolescenza e alla Commissione salute della Conferenza della Regioni.

La versione integrale del "**6° Rapporto di aggiornamento sul monitoraggio della Convenzione sui diritti dell'infanzia e dell'adolescenza in Italia 2012-2013**" si può scaricare al seguente link:

http://www.marionegri.it/mn/it/aggiornamento/news/rapporto_gruppo_crc.html#articolo



ADHD: per una condivisione dei percorsi diagnostico-terapeutici

28 - 29 maggio 2013

IRCCS – Istituto di Ricerche Farmacologiche Mario Negri

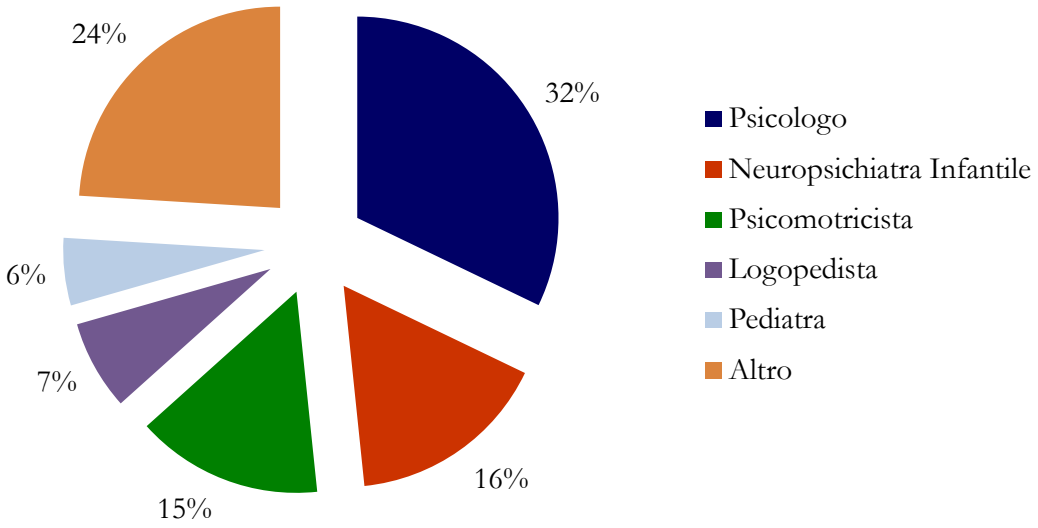
Via G. La Masa, 19 - 20156 Milano

– Customer Satisfaction –

PARTECIPAZIONE

Sono pervenute alla Segreteria Organizzativa del Convegno complessivamente 451 iscrizioni. Di questi, 371 hanno firmato per la presenza: 333 partecipanti e 38 relatori.

Le figure professionali dei partecipanti erano così distribuite:

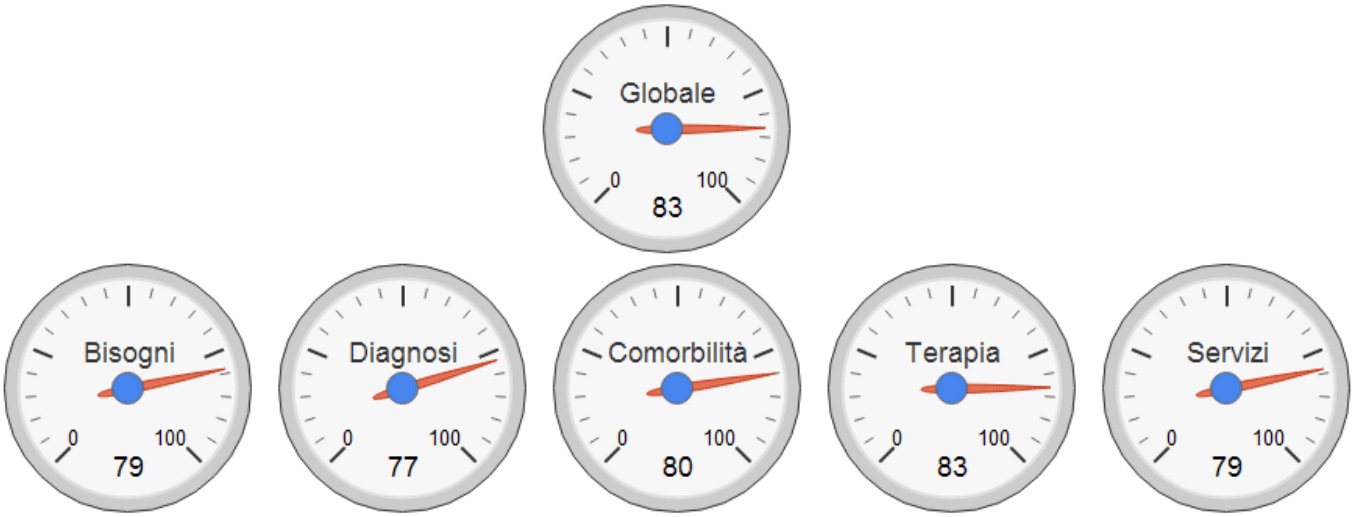


236 partecipanti avevano richiesto i crediti formativi ECM all'atto dell'iscrizione.
212 hanno raggiunto i requisiti per l'assegnazione.

Nella seconda giornata è stato chiesto a tutti i partecipanti di rispondere in forma anonima a un questionario per la valutazione del grado di soddisfazione ("Customer Satisfaction") dell'evento formativo.

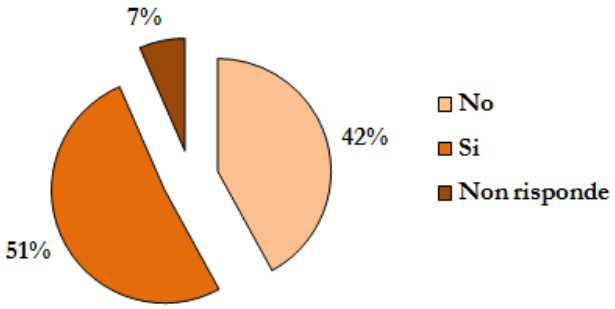
276 sono stati i questionari riconsegnati compilati e che quindi sono stati valutati.

Valutazione del grado di soddisfazione globale del convegno e di ciascuna sessione:



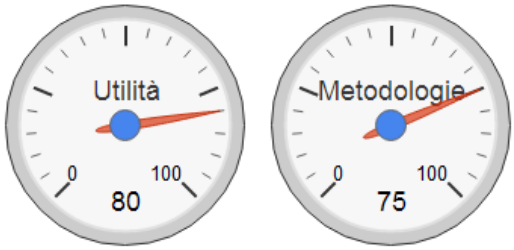
Come si evince dai risultati, il grado di soddisfazione globale dei partecipanti è stato molto alto: ciascuna sessione del convegno ha avuto un punteggio maggiore dei 3/4, per cui si può ritenere che l'obiettivo formativo è stato raggiunto per ogni sessione del convegno.

Ulteriori esigenze formative:
Alla domanda "Rispetto agli argomenti trattati nel convegno, ha ulteriori esigenze formative?" i partecipanti hanno così risposto:



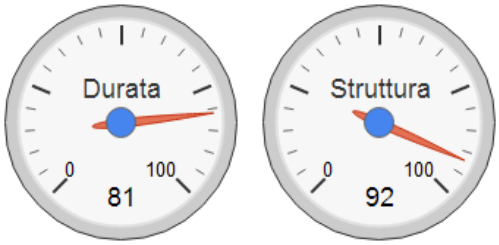
142 partecipanti hanno segnalato di avere ulteriori esigenze formative in merito agli argomenti del convegno. Gli argomenti maggiormente citati sono stati gli "strumenti diagnostici" e i "trattamenti terapeutici" (in particolare le attività di child, parent, e teacher training), come si può anche evincere dalla valutazione ricevuta dalla sessione ad essi dedicata durante il convegno.

Valutazione della didattica:



Ottimo il giudizio sull'utilità dei contenuti trattati nelle varie sessioni: molti partecipanti hanno segnalato che i contenuti presentati sono stati molto interessanti e aggiornati.
Per quanto riguarda le metodologie, la soddisfazione è leggermente più bassa in quanto, sebbene sia stato molto apprezzato il supporto dei video di alcuni relatori, molti partecipanti avrebbero desiderato avere del materiale per prendere appunti o delle dispense per seguire meglio le presentazioni.

Valutazione dell'organizzazione dell'evento:



Per quanto riguarda la durata del convegno, molti partecipanti hanno indicato che, vista la mole di contenuti presentati, forse era meglio dedicare una giornata in più all'evento anche per concedere più spazio alle discussioni interattive col pubblico e ai dibattiti.
Ottimo l'apprezzamento per l'adeguatezza della struttura ospitante.

Giudizio complessivo dell'evento e aspetti positivi e negativi:

Ottimo l'apprezzamento dell'evento come si evince dai commenti riportati dai partecipanti nel punto "Aspetti positivi" del questionario: interventi interessanti e aggiornati, competenza e chiarezza espositiva dei relatori, approccio globale all'argomento, intervento di tutte le figure coinvolte.

Per ricevere la newsletter iscriversi al seguente indirizzo:
http://crc.marionegri.it/bonati/adhdnews/subscribe.html

Iniziativa nell'ambito del Progetto di Neuropsichiatria dell'Infanzia e dell'Adolescenza
Il Progetto è realizzato con il contributo, parziale, della Regione Lombardia
(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*".

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