

NEWSLETTER



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PREVALENCE OF ADHD IN A SAMPLE OF ITALIAN STUDENTS: A POPULATION-BASED STUDY.
Research in Developmental Disabilities 2013;34:2543–2550 pag. 12

3. Segnalazione
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Convegno “I DISTURBI SPECIFICI DELL’APPRENDIMENTO E I BISOGNI EDUCATIVI SPECIALI. SCREENING, DIAGNOSI E INTERVENTO”
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BIBLIOGRAFIA ADHD LUGLIO 2013

Acta Paediatrica. 2013 Jun;102:640-43.

ATTENTION-DEFICIT/HYPERACTIVITY DISORDER INCREASED THE RISK OF INJURY: A POPULATION-BASED FOLLOW-UP STUDY.

Kang JH, Lin HC, Chung SD.

Aim: To explore the frequency and risk for injury among children with Attention-deficit/hyperactivity Disorder (ADHD) in Taiwan through a population-based study.

Methods: A total of 3616 subjects aged between four and twelve years diagnosed with ADHD were selected along with a comparison cohort comprising 18 080 subjects. Each subject was individually traced for a three-year period from their index date to identify those subjects who subsequently received a diagnosis of injury. We used stratified Cox proportional hazards regressions to examine the three-year injury-free survival rates between the two cohorts.

Results: Of the subjects, the incidence rate of injury during the three-year follow-up period was 7.97 (95% CI = 7.45–8.51) and 5.36 (95% CI = 5.17–5.56) for the study and comparison cohort, respectively. After adjusting for geographic region, the hazard ratio (HR) of injury for subjects with ADHD was 1.64 (95% CI = 1.50–1.79) that of comparison subjects. In addition, we found children with ADHD aged between four and 6 years to demonstrate a greater HR (1.98, 95% CI = 1.72–2.28) than those aged between seven and twelve (HR = 1.46, 95% CI = 1.31–1.63).

Conclusions: Children with ADHD appear to be at a higher risk for injury than children that are not diagnosed with ADHD.

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

Acta Psychiatr Scand. 2013 Jul;128:70-77.

STIMULANT AND NON-STIMULANT ATTENTION DEFICIT/HYPERACTIVITY DISORDER DRUG USE: TOTAL POPULATION STUDY OF TRENDS AND DISCONTINUATION PATTERNS 2006–2009.

Zetterqvist J, Asherson P, Halldner L, et al.

Objective: To explore the prevalence and discontinuation of dispensed medications for attention deficit/hyperactivity disorder (ADHD) drugs from 2006 to 2009.

Method: A total population cohort of all individuals aged 6–45 years, alive and registered as residents in Sweden during any calendar year from 2006 to 2009 (N = 5 149 791) included 41,700 patients dispensed with an ADHD drug (methylphenidate, atomoxetine, amphetamine, or dexamphetamine). The dispensing prevalence was calculated for each year, stratified on sex and age. A longitudinal analysis was also performed to compare the rates of treatment discontinuation across the strata.

Results: The dispensing prevalence increased from 2.93 per 1000 in 2006 to 6.98 in 2009 (PR = 2.38, 95% CI = 2.34–2.43). The prevalence ratio (PR) was 3.40 for adults, 22–45 years old; 2.41 for adolescents, 15–21 years old; and 1.90 for children aged 6–14. The increase was also greater in women than in men (PR = 2.92 vs. 2.19). Patients aged 15–21 were the most likely to discontinue treatment; after 3 years and 11 months, 27% of those patients were still under treatment.

Conclusion: From 2006 to 2009, the number of prescriptions dispensed for ADHD drugs increased substantially. The rate of treatment discontinuation in the age interval 15–21 is higher than expected considering the persistence rates of the disorder.

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Acta Psychiatr Scand. 2013 Jul;128:78-87.

EXAMINING THE NATURE OF THE COMORBIDITY BETWEEN PEDIATRIC ATTENTION DEFICIT/HYPERACTIVITY DISORDER AND POST-TRAUMATIC STRESS DISORDER.

Biederman J, Petty CR, Spencer TJ, et al.

Objective: This study sought to address the link between attention deficit/hyperactivity disorder (ADHD) and post-traumatic stress disorder (PTSD) in youth by providing a comprehensive comparison of clinical correlates of ADHD subjects with and without PTSD across multiple non-overlapping domains of functioning and familial patterns of transmission.

Method: Participants were 271 youths with ADHD and 230 controls without ADHD of both sexes along with their siblings. Participants completed a large battery of measures designed to assess psychiatric comorbidity, psychosocial, educational, and cognitive parameters.

Results: Post-traumatic stress disorder was significantly higher in ADHD probands vs. controls (5.2% vs. 1.7%, $\chi^2(1) = 4.36$, $P = 0.04$). Irrespective of the comorbidity with PTSD, ADHD subjects had similar ages at onset of ADHD, similar type and mean number of ADHD symptoms, and similar ADHD-associated impairments. PTSD in ADHD probands was significantly associated with a higher risk of psychiatric hospitalization, school impairment, poorer social functioning and higher prevalences of mood, conduct disorder, and anxiety disorders. The mean onset of PTSD (12.6 years) was significantly later than that of ADHD and comorbid disorders (all $P < 0.05$). Siblings of ADHD and ADHD + PTSD probands had higher prevalences of ADHD vs. siblings of controls (35% vs. 18%, $z = 4.00$, $P < 0.001$ and 67% vs. 18%, $z = 4.02$, $P < 0.001$ respectively) and siblings of ADHD+PTSD probands had a significantly higher prevalence of PTSD compared with the siblings of ADHD and control probands (20% vs. 3% and 3%, $z = 2.99$, $P = 0.003$ and $z = 2.07$, $P = 0.04$ respectively).

Conclusion: Findings indicate that the comorbidity with PTSD in ADHD leads to greater clinical severity as regards psychiatric comorbidity and psychosocial dysfunction. ADHD is equally familial in the presence of PTSD in the proband indicating that their co-occurrence is not owing to diagnostic error.

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Acta Psychiatr Scand. 2013 Jul;128:34-44.

OUTCOMES OF CHILD PSYCHIATRIC TREATMENT.

Lundh A, Forsman M, Serlachius E, et al.

Objective: The aim of this study was to investigate outcomes of child psychiatric outpatient treatment as usual and to identify outcome predictors, with special regard to attention-deficit/hyperactivity disorder (ADHD), mood disorder, obsessive-compulsive disorder and conduct disorder.

Method: Routinely collected data from 12 613 outpatients between July 2006 and January 2010 in Stockholm, Sweden were analysed. The outcome measure was change in Children's Global Assessment Scale (CGAS) ratings between first visit and case closure (?CGAS).

Results: CGAS improved during the course of treatment across all diagnostic groups, ranging from a mean change of 4 (mental retardation) to 16 (suicide attempts). ?CGAS was two times higher in the mood disorder group compared with the ADHD group. In the mood disorder group, several psychotherapies were associated with better outcome but not medication. In the ADHD group, psychotherapeutic interventions were also associated with better outcome, but those who received treatment with central stimulants received less non-medical interventions.

Conclusion: Whereas the functional impairment and the level of improvement in mood disorder corresponded to previous efficacy studies, the ADHD patients were more impaired and improved less after treatment. This should prompt a critical discussion as to whether ADHD patients receive the best available treatment in CAMHS in Stockholm and elsewhere.

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BMC Psychiatry. 2013 May;13.

PREVALENCE OF OBESITY AND OVERWEIGHT AMONG CHINESE CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER: A SURVEY IN ZHEJIANG PROVINCE, CHINA.

Yang R, Mao S, Zhang S, et al.

Background: Attention Deficit Hyperactivity Disorder (ADHD) is often comorbid with psychiatric and developmental disorders. This study aimed to investigate the prevalence of obesity and overweight among Chinese children with ADHD, and to explore which subtypes of the disorder may specifically be associated with obesity/overweight.

Methods: Children meeting the DSM-IV criteria for ADHD were enrolled in the study. Weight, weight z-score, height, height z-score, BMI, and BMI z-score were used to evaluate growth status. Obesity and overweight were determined using the National Growth Reference for Chinese Children and Adolescents. Relations between the prevalence of obesity/overweight and different ADHD subtypes and pubertal development were analyzed.

Results: A total of 158 children with ADHD (mean age: 9.2 years) were recruited for the study. The prevalences of obesity, overweight, and combined obesity/overweight were 12.0%, 17.1%, and 29.1%, respectively, which were significantly higher than in the general Chinese population (2.1%, 4.5%, and 6.6%, respectively). Multivariable analysis showed that the children with the combined subtype of ADHD and the onset of puberty were at a higher risk of becoming obese or overweight.

Conclusions: The prevalence of obesity in Chinese children with ADHD is higher than that of the general population. Children with the ADHD combined subtype who were at the onset of puberty were more likely to be overweight or obese.

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Developmental Medicine & Child Neurology. 2013 Jul;55:654-60.

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

Santos K, Palmi A, Radziuk AL, et al.

Aim: Difficult-to-treat epilepsies and attention-deficit—hyperactivity disorder (ADHD) often co-occur. Because of concerns about the use of stimulants in children with this comorbidity, the impact of ADHD

treatment on seizure frequency and severity is not known. This pilot study evaluated the safety and efficacy of methylphenidate in this population.

Method: After a 3 month period in which antiepileptic drugs were adjusted, 22 patients recruited from a specialist outpatient clinic for severe epilepsy (16 males, six females; mean age 11y 2mo, SD 3y 2mo) received methylphenidate for 3 months in an open label, non-controlled trial; four with generalized or multifocal (symptomatic/cryptogenic) epilepsy, one with generalized (idiopathic) epilepsy, 17 with partial (symptomatic/cryptogenic) epilepsy; five with partial seizures only, 17 with primarily or secondarily generalized seizures). Epilepsy, ADHD symptoms, and side effects were assessed using the Swanson, Nolan, and Pelham Questionnaire, the Child Behavior Checklist, the Hague Seizure Severity Scale, and the Side Effects Rating Scale.

Results: Methylphenidate significantly improved ADHD. After 3 months of treatment, 73% of patients no longer had clinically significant symptoms. Methylphenidate also reduced seizure severity (9-point median decrease on the Hague Seizure Severity Scale). Seizure frequency increased in four out of 22 patients, but only one patient withdrew from the study for this reason. Most patients experienced no major side effects.

Interpretation: These data are among the first showing that low doses of methylphenidate are safe and effective to treat ADHD symptoms in patients with difficult-to-treat epilepsies. Randomized controlled trials are needed to replicate the findings.

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International Journal of Nursing Studies. 2013 Jun;50:797-806.

ATTENTION DEFICIT HYPERACTIVITY DISORDER AMONG CHILDREN EXPOSED TO SECONDHAND SMOKE: A LOGISTIC REGRESSION ANALYSIS OF SECONDARY DATA.

Max W, Sung HY, Shi Y.

Background: A growing body of literature examines the association of postnatal secondhand smoke exposure with attention deficit hyperactivity disorder (ADHD) in children, but the findings are mixed.

Objective: We compare prevalence of ADHD in children aged 4–15 years who were exposed to postnatal secondhand smoke with prevalence in those who were not exposed, and examine the association of postnatal secondhand smoke exposure with ADHD using both reported and cotinine-measured secondhand smoke exposure.

Design and setting: We analyze secondary data from the 1999–2004 U.S. National Health and Nutrition Examination Surveys.

Participants: Analyses using reported secondhand smoke exposure and cotinine-measured exposure included 6283 and 6033 children aged 4–15 respectively, including 419 and 404 children who either had a reported physician diagnosis of ADHD or were taking stimulant medications.

Methods: The association of secondhand smoke exposure with ADHD was examined by two multiple logistic regression models that differ in the secondhand smoke measurement used.

Results: After controlling for maternal smoking during pregnancy, gender, age, race/ethnicity, preschool attendance, health insurance coverage, and exposure to lead, children with reported secondhand smoke exposure at home were more likely to have ADHD (adjusted odds ratio = 1.5, 95% confidence interval: 1.1-2.0) than those who were not exposed. After controlling for these covariates, children with detectable cotinine levels were more likely to have ADHD (adjusted odds ratio = 1.8, 95% confidence interval: 1.3-2.5) than those with non-detectable levels.

Conclusions: Our findings suggest that secondhand smoke exposure in children is strongly associated with ADHD independent of other risk factors and this association is robust using both measurements of secondhand smoke exposure. Further research is needed to understand the mechanism underlying this association. Nurses and other healthcare professionals can play an important role in encouraging parents to quit smoking to reduce children's exposure to secondhand smoke and their risk of ADHD.

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International Journal of Play Therapy. 2013 Jul;22:159-72.

USE OF MANDALAS IN JUNGIAN PLAY THERAPY WITH ADOLESCENTS DIAGNOSED WITH ADHD.

Green EJ, Drewes AA, Kominski JM.

Adolescent males diagnosed with attention-deficit/hyperactivity disorder (ADHD) typically present with symptoms related to social difficulties, low self-esteem, and externalizing behavior problems. The unique developmental and diagnostic-specific characteristics of adolescent males with ADHD make a verbal approach to abstractions often difficult. Jungian Play Therapy (JPT) provides a creative, potentially beneficial alternative to traditional talk or cognitive therapy to remediate concerns associated with the ADHD diagnosis. The current literature maintains a paucity of creative, developmentally appropriate play (or activity) therapies that mediate typical issues associated with this population. The JPT techniques of drawing and coloring mandalas offer a therapeutic alternative for exploration when counseling adolescents (Baggerly & Green, 2013; Green, 2011). This article features an overview of the current mental health literature of working with adolescents diagnosed with ADHD, as well as illustrates a clinical case study to demonstrate coloring of mandalas may be a beneficial intervention in JPT.

J Abnorm Child Psychol. 2013 Jul;41:837-50.

INTEGRATING IMPAIRMENTS IN REACTION TIME AND EXECUTIVE FUNCTION USING A DIFFUSION MODEL FRAMEWORK.

Karalunas SL, Huang-Pollock CL.

Using Ratcliff's diffusion model and ex-Gaussian decomposition, we directly evaluate the role individual differences in reaction time (RT) distribution components play in the prediction of inhibitory control and working memory (WM) capacity in children with and without ADHD. Children with (n = 91, \bar{x} age = 10.2 years, 67% male) and without ADHD (n = 62, \bar{x} age = 10.6 years, 46% male) completed four tasks of WM and a stop signal reaction time (SSRT) task. Children with ADHD had smaller WM capacities and less efficient inhibitory control. Diffusion model analyses revealed that children with ADHD had slower drift rates (v) and faster non-decision times (T_{er}), but there were no group differences in boundary separations (a). Similarly, using an ex-Gaussian approach, children with ADHD had larger t values than non-ADHD controls, but did not differ in μ or s distribution components. Drift rate mediated the association between ADHD status and performance on both inhibitory control and WM capacity. t also mediated the ADHD-executive function impairment associations; however, models were a poorer fit to the data. Impaired performance on RT and executive functioning tasks has long been associated with childhood ADHD. Both are believed to be important cognitive mechanisms to the disorder. We demonstrate here that drift rate, or the speed at which information accumulates towards a decision, is able to explain both.

J Abnorm Child Psychol. 2013 May;41:597-612.

EXAMINING THE VALIDITY OF ADHD AS A DIAGNOSIS FOR ADOLESCENTS WITH INTELLECTUAL DISABILITIES: CLINICAL PRESENTATION.

Neece CL, Baker BL, Crnic K, et al.

Children with intellectual and developmental disabilities are at heightened risk for mental disorders. Using current diagnostic criteria, disruptive behavior disorders, specifically Attention-Deficit/Hyperactivity Disorder (ADHD), appear to be the most prevalent co-occurring disorders. However, the validity of ADHD as a diagnosis for children and adolescents with intellectual disabilities remains unclear. The present study examined the clinical presentation of ADHD (prevalence, sex differences, and comorbidity) among adolescents with and without intellectual disability (ID) as well as investigated the validity of ADHD for adolescents with ID by examining similarities in terms of symptom presentation, developmental course, and associated functional impairment. The sample included 142 adolescents and their families, about a third of whom were classified in the ID group and the remaining were in the typically developing (TD) group. Findings indicated that adolescents with ID continue to be at elevated risk for ADHD (risk ratio: 3.38:1) compared to their typically developing peers. Additionally, the presentation of ADHD appeared similar

among adolescents with and without ID, supporting the validity of an ADHD diagnosis for this population of adolescents. Implications for public policy and intervention are discussed.

Journal of Behavioral Education. 2013 Jun;22:139-56.

TEACHING PARAGRAPH COMPOSITION TO STUDENTS WITH EMOTIONAL/BEHAVIORAL DISORDERS USING THE SIMULTANEOUS PROMPTING PROCEDURE.

Hudson TM, Hinkson-Lee K, Collins B.

The purpose of this study was to examine the effectiveness of the simultaneous prompting procedure in teaching paragraph composition to 4, 5th grade students identified with emotional behavioral disorder (EBD) and attention-deficit hyperactivity disorder (ADHD). The instructor taught students how to construct and proofread a 5-sentence paragraph using the simultaneous prompting procedure with embedded non-targeted information related to the writing process. A multiple probe design across participants assessed effectiveness of the procedure. Results indicated that all students learned to compose a paragraph, acquired the nontargeted information, maintained the skills up to 6 weeks later, and generalized the skills to other writing tasks.

Journal of Child Psychology and Psychiatry. 2013 Jun;54:619-27.

MULTIPLE DEFICITS IN ADHD: EXECUTIVE DYSFUNCTION, DELAY AVERSION, REACTION TIME VARIABILITY, AND EMOTIONAL DEFICITS.

Sjöwall D, Roth L, Lindqvist S, et al.

Background: The notion that ADHD constitutes a heterogeneous disorder is well accepted. However, this study contributes with new important knowledge by examining independent effects of a large range of neuropsychological deficits. In addition, the study investigated whether deficits in emotional functioning constitute a dissociable component of ADHD.

Method: The study included children with ADHD ($n = 102$; 7–13 years) and a control sample individually matched with regard to age and gender. The administered tasks were designed to tap into three different neuropsychological domains: executive functions (i.e., working memory, inhibition, and shifting), delay aversion, and reaction time variability. Parent ratings of emotion regulation and a test of emotion recognition were also included.

Results: Children with ADHD differed significantly from controls on all measures, except for delay aversion and recognition of disgust. No main effects of gender or interaction effects of gender and group were found. More importantly, executive functioning, reaction time variability, and emotional functioning all contributed independently to distinguishing between children with ADHD and controls.

Conclusions: The current study supports the view of ADHD as a heterogeneous disorder related to multiple neuropsychological deficits. In addition, emotional functioning appears to be an area of importance for ADHD that needs to be incorporated into future theoretical models.

Journal of Child Psychology and Psychiatry. 2013 Jul;54:800-09.

DO DIFFERENT ADHD-RELATED ETIOLOGICAL RISKS INVOLVE SPECIFIC NEUROPSYCHOLOGICAL PATHWAYS? AN ANALYSIS OF MEDIATION PROCESSES BY INHIBITORY CONTROL AND DELAY AVERSION.

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

Background: Inhibitory control (IC) has been regarded as a neuropsychological basic deficit and as an endophenotype of attention deficit/hyperactivity disorder (ADHD). Implicated here are mediation processes between etiological factors and ADHD symptoms. We thus analyze whether and to what extent executive IC and delay aversion (DA; i.e., reward-related IC) performance mediate the associations of familial, prenatal, and psychosocial risks with ADHD symptoms.

Methods: The study sample consisted of 130 preschool children (3–6 years; 50% boys), including 20% (n = 26) with a positive family history of ADHD (familial risk). Prenatal risks were mainly taken from medical records. Psychosocial risks were assessed by a structured interview. ADHD symptoms were assessed by structured interviews and questionnaires completed by parents and teachers. A set of neuropsychological tasks on IC and DA was conducted with the children.

Results: Familial, prenatal, and psychosocial risks were significantly associated with ADHD symptoms. IC and DA also correlated significantly with ADHD symptoms. While the familial risk significantly correlated with IC and DA, psychosocial and prenatal risks were only weakly associated with these measures. The link between the familial risk and ADHD symptoms was partially mediated by IC and DA.

Conclusions: The results indicate different neuropsychological pathways related to 'positive family history of ADHD' and prenatal risks. Given a cross-validation in future studies, the results underscore the endophenotypic character of IC and DA in preschool ages.

Journal of Child Psychology and Psychiatry. 2013 May;54:527-35.

RANDOMIZED CONTROLLED DOUBLE-BLIND TRIAL OF OPTIMAL DOSE METHYLPHENIDATE IN CHILDREN AND ADOLESCENTS WITH SEVERE ATTENTION DEFICIT HYPERACTIVITY DISORDER AND INTELLECTUAL DISABILITY.

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

Background: Attention deficit hyperactivity disorder is increased in children with intellectual disability. Previous research has suggested stimulants are less effective than in typically developing children but no studies have titrated medication for individual optimal dosing or tested the effects for longer than 4 weeks.

Method: One hundred and twenty two drug-free children aged 7–15 with hyperkinetic disorder and IQ 30–69 were recruited to a double-blind, placebo-controlled trial that randomized participants using minimization by probability, stratified by referral source and IQ level in a one to one ratio. Methylphenidate was compared with placebo. Dose titration comprised at least 1 week each of low (0.5 mg/kg/day), medium (1.0 mg/kg/day) and high dose (1.5 mg/kg/day). Parent and teacher Attention deficit hyperactivity disorder (ADHD) index of the Conners Rating Scale-Short Version at 16 weeks provided the primary outcome measures. Clinical response was determined with the Clinical Global Impressions scale (CGI-I). Adverse effects were evaluated by a parent-rated questionnaire, weight, pulse and blood pressure. Analyses were by intention to treat. Trial registration: ISRCTN 68384912.

Results: Methylphenidate was superior to placebo with effect sizes of 0.39 [95% confidence intervals (CIs) 0.09, 0.70] and 0.52 (95% CIs 0.23, 0.82) for the parent and teacher Conners ADHD index. Four (7%) children on placebo versus 24 (40%) of those on methylphenidate were judged improved or much improved on the CGI. IQ and autistic symptoms did not affect treatment efficacy. Active medication was associated with sleep difficulty, loss of appetite and weight loss but there were no significant differences in pulse or blood pressure.

Conclusions: Optimal dosing of methylphenidate is practical and effective in some children with hyperkinetic disorder and intellectual disability. Adverse effects typical of methylphenidate were seen and medication use may require close monitoring in this vulnerable group.

Journal of Child Psychology and Psychiatry. 2013 May;54:591-600.

PARENTAL DEPRESSIVE AND ANXIETY SYMPTOMS DURING PREGNANCY AND ATTENTION PROBLEMS IN CHILDREN: A CROSS-COHORT CONSISTENCY STUDY.

Van Batenburg-Eddes T, Brion MJ, Henrichs J, et al.

Background: Maternal depression and anxiety during pregnancy have been associated with offspring-attention deficit problems.

Aim: We explored possible intrauterine effects by comparing maternal and paternal symptoms during pregnancy, by investigating cross-cohort consistency, and by investigating whether parental symptoms in early childhood may explain any observed intrauterine effect.

Methods: This study was conducted in two cohorts (Generation R, n = 2,280 and ALSPAC, n = 3,442). Pregnant women and their partners completed questionnaires to assess symptoms of depression and anxiety. Child attention problems were measured in Generation R at age 3 with the Child Behavior Checklist, and in ALSPAC at age 4 with the Strengths and Difficulties Questionnaire.

Results: In both cohorts, antenatal maternal symptoms of depression (Generation R: OR 1.23, 95% CI 1.05–1.43; ALSPAC: OR 1.33, 95% CI 1.19–1.48) and anxiety (Generation R: OR 1.24, 95% CI 1.06–1.46; ALSPAC: OR 1.32, 95% CI 1.19–1.47) were associated with a higher risk of child attention problems. In ALSPAC, paternal depression was also associated with a higher risk of child attention problems (OR 1.11, 95% CI 1.00–1.24). After adjusting for maternal symptoms after giving birth, antenatal maternal depression and anxiety were no longer associated with child attention problems in Generation R. Moreover, there was little statistical evidence that antenatal maternal and paternal depression and anxiety had a substantially different effect on attention problems of the child.

Conclusions: The apparent intrauterine effect of maternal depression and anxiety on offspring-behavioural problems may be partly explained by residual confounding. There was little evidence of a difference between the strength of associations of maternal and paternal symptoms during pregnancy with offspring-attention problems. That maternal symptoms after childbirth were also associated with offspring-behavioural problems may indicate a contribution of genetic influences to the association.

Journal of Learning Disabilities. 2013 Jul;46:363-76.

EFFECTS OF A PSYCHOSOCIAL INTERVENTION ON THE EXECUTIVE FUNCTIONING IN CHILDREN WITH ADHD.

Miranda A, Presentación MJ, Siegenthaler R, et al.

The purpose of this study was to analyze the effects of an intensive psychosocial intervention on the executive functioning (EF) in children with ADHD. The treatment was carried out in a coordinated manner over a period of 10 weeks with 27 children with ADHD aged 7 to 10, their parents, and their teachers. A battery of neuropsychological tasks was applied to evaluate attention, interference control, verbal and visuospatial working memory, planning ability, and flexibility. The comparative analysis of the treated group of ADHD children and an untreated ADHD group showed significant differences that were especially important in visuospatial memory and planning in favor of the treated children, even when the scores in the pretreatment phase were included as covariables. Likewise, improvements were observed in the parents' and teachers' behavioral ratings of hyperactivity or impulsivity and inattention. The conclusion was drawn that psychosocial interventions with children with ADHD can have a positive effect on some executive functions.

J Neural Transm. 2013 Jul;120:1127-33.

ADRENERGIC NEUROTRANSMITTER SYSTEM TRANSPORTER AND RECEPTOR GENES ASSOCIATED WITH ATOMOXETINE RESPONSE IN ATTENTION-DEFICIT HYPERACTIVITY DISORDER CHILDREN.

Yang L, Qian Q, Liu L, et al.

Atomoxetine, a selective inhibitor of the norepinephrine transporter, exerts its therapeutic effect for attention-deficit hyperactivity disorder (ADHD) by increasing the concentration of synaptic norepinephrine. The objective of this study was to evaluate the association of the genetic variants of multiple genes of the noradrenergic neurotransmitter system with atomoxetine response. One hundred and eleven ADHD children and adolescents were enrolled in a prospective, open-label study of atomoxetine for 8–12 weeks. The dose was titrated to 1.2–1.4 mg/kg per day and maintained for at least 4 weeks. The primary efficacy measure was the investigator-rated ADHD Rating Scale-IV. Two categorical evaluations of treatment effects (defined as response and remission) were used. Twelve SNPs in SLC6A2, ADRA2A, and ADRA1A were genotyped to analyze their association with response or remission status. rs3785143 in SLC6A2 was associated with responder status (nominal P = 0.0048; corrected by multiple test, P = 0.0416; OR 2.66, 95 % confidence interval (CI) 1.35–5.26). rs2279805 of SLC6A2 was nominally significantly associated with the remission status. (P = 0.0221, OR 2.32, 95 % CI 1.13–4.75, multiple test P = 0.2130). The GG

haplotype of rs1800544 and rs553668 in ADRA2A achieved nominal significance for association with non-remission ($P = 0.0219$, OR 2.82, 95 % CI 1.16–6.85, multiple test, $P = 0.2076$). The results of this study suggest that DNA variants of both SLC6A2 and ADRA2A in the adrenergic neurotransmitter system might alter the response to atomoxetine, though further replication study in larger sample for validation of these findings is still needed.

J Psychopathol Behav Assess. 2013;35:142-52.

FRIENDSHIP INTIMACY EXCHANGE BUFFERS THE RELATION BETWEEN ADHD SYMPTOMS AND LATER SOCIAL PROBLEMS AMONG CHILDREN ATTENDING AN AFTER-SCHOOL CARE PROGRAM .

Becker SP, Fite PJ, Luebbe AM, et al.

The friendships of children displaying symptoms of attention-deficit/ hyperactivity disorder (ADHD) have been understudied, particularly in comparison to the domain of peer rejection. This study tested whether friendship intimacy exchange buffers the prospective relation between ADHD symptoms and social problems 1 year later in a sample of children attending a community-based after-school program. Children ($N = 131$; 53 % boys; 66 % African American) ranging from 5 to 13 years of age participated in this study. At baseline, children reported on friendship intimacy exchange with their identified best friend, and program staff rated children on ADHD symptoms and social problems. Staff ratings of children's social problems were collected again 1 year later. Multiple regression analyses indicated that, after controlling for demographic variables and baseline social problems, friendship intimacy exchange significantly moderated the association between ADHD symptoms and social problems at the one-year follow-up. Specifically, the relation between ADHD and social problems was no longer significant for children reporting high levels of friendship intimacy exchange. This moderation was not further qualified by either child age or sex, although boys were more likely than girls to report low rates of friendship intimacy exchange. These findings indicate the importance of friendship intimacy for children displaying ADHD symptoms, who often experience significant peer problems. Friendship quality may be a promising target for prevention and intervention efforts in mitigating some of the long-term social problems associated with ADHD symptomatology, and future research is needed to extend these findings to other domains of friendship quality and clinical samples of children with ADHD.

J Int Neuropsychol Soc. 2013 Jul;19:686-94.

AUTOMATIC PROCESSING OF DURATION IN CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER.

Gomes H, Duff M, Flores A, et al.

Individuals with attention-deficit/hyperactivity disorder (ADHD) often exhibit deficits in processing information about time. Most studies, however, have required participants to perform active tasks and consequently it is unclear if performance deficits are due to impaired processing of temporal information, attentional deficits, or to impairments at a later stage of decision-making. This study used mismatch negativity (MMN) to examine automatic processing of temporal information in children with ADHD. The sample consisted of 11 children with typical development (8 boys; mean age/SD = 9.3/0.6 years) and 12 with ADHD (10 boys; mean age/SD = 8.9/0.8 years). Using the MMN paradigm, responses to standards and four deviants (hard/easy frequency, hard/easy duration) were elicited during the same sequence. The children's ability to actively discriminate each deviant was also assessed. Both groups exhibited MMNs to all deviants suggesting successful automatic discrimination. Furthermore, amplitude and latency measures were roughly comparable across groups. No group differences were seen on the active discrimination task, but performance was worse for duration than for frequency deviants. These results suggest that children with ADHD are able to automatically process temporal information, so deficits reported in active discrimination paradigms are likely due to deficits in subjective perception or usage of temporal information.

The Journal of Neuroscience. 2013 Jun;33:10676-87.

PROBABILISTIC DIFFUSION TRACTOGRAPHY AND GRAPH THEORY ANALYSIS REVEAL ABNORMAL WHITE MATTER STRUCTURAL CONNECTIVITY NETWORKS IN DRUG-NAIVE BOYS WITH ATTENTION DEFICIT/HYPERACTIVITY DISORDER.

Cao Q, Shu N, An L, et al.

Attention-deficit/hyperactivity disorder (ADHD), which is characterized by core symptoms of inattention and hyperactivity/impulsivity, is one of the most common neurodevelopmental disorders of childhood. Neuroimaging studies have suggested that these behavioral disturbances are associated with abnormal functional connectivity among brain regions. However, the alterations in the structural connections that underlie these behavioral and functional deficits remain poorly understood. Here, we used diffusion magnetic resonance imaging and probabilistic tractography method to examine whole-brain white matter (WM) structural connectivity in 30 drug-naive boys with ADHD and 30 healthy controls. The WM networks of the human brain were constructed by estimating inter-regional connectivity probability. The topological properties of the resultant networks (e.g., small-world and network efficiency) were then analyzed using graph theoretical approaches. Nonparametric permutation tests were applied for between-group comparisons of these graphic metrics. We found that both the ADHD and control groups showed an efficient small-world organization in the whole-brain WM networks, suggesting a balance between structurally segregated and integrated connectivity patterns. However, relative to controls, patients with ADHD exhibited decreased global efficiency and increased shortest path length, with the most pronounced efficiency decreases in the left parietal, frontal, and occipital cortices. Intriguingly, the ADHD group showed decreased structural connectivity in the prefrontal-dominant circuitry and increased connectivity in the orbitofrontal-striatal circuitry, and these changes significantly correlated with the inattention and hyperactivity/impulsivity symptoms, respectively. The present study shows disrupted topological organization of large-scale WM networks in ADHD, extending our understanding of how structural disruptions of neuronal circuits underlie behavioral disturbances in patients with ADHD.

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DİKKAT EKSİKLİĞİ HIPERAKTLVİTE BOZUKLUĞUNDA SOSYAL CEVAPLILIKTA GÖRÜLEN DEĞİŞİKLİKLER.

Ayaz AB, Ayaz M, Yazgan Y.

Objective: Social interactions in children with attention deficit-hyperactivity disorder (ADHD) are inappropriate and such social problems may originate from a failure to attend to the appropriate cues of affect. The present study aimed to determine the factors predictive of social reciprocity in ADHD and their relationship to sociodemographics.

Materials and Methods: Participants were required to interpret emotional cues depicted in pictures of facial expressions with a test that was adopted from the Reading Mind in the Eyes Test (RMET). Diagnoses were established based on the Kiddie Schedule for Affective Disorders, and Schizophrenia (K-SADS-PL). Moreover, a detailed sociodemographic form, the Child Behavior Checklist (CBCL), and the Social Reciprocity Scale (SRS) were used for assessment.

Results: This study included 133 children; 64 in the ADHD group and 69 in the control group. There wasn't a significant difference in mean age between the ADHD group (13.22 ± 1.28 years) and control group (12.97 ± 1.27 years). In all, 50% of the ADHD group and 49.3% of the control group were male. The mean RMET-score was significantly lower in the ADHD group than in the control group (ADHD group: 20.52 ± 3.95; control group: 23.70 ± 3.55) and the mean SRS score was significantly higher in the ADHD group than in the control group (ADHD group: 65.84 ± 18.83; control group: 36.04 ± 16.32). In the ADHD group attention problems and lower level of ability to interpret emotional facial expressions were predictive of impaired social reciprocity.

Conclusion: The findings show that both the ability to decode facial expressions and social reciprocity were impaired in the ADHD group. These findings highlight the difficulty children with ADHD have with social functioning and interpretation of emotions based on facial expressions.

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Research in Developmental Disabilities



Prevalence of ADHD in a sample of Italian students: A population-based study



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ABSTRACT

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common diagnosis for children and adolescents, although the reported estimates for prevalence are extremely variable worldwide. In the present work we investigate the prevalence of ADHD in a sample of Italian students in a study divided in two phases. In Phase I, a total of 6183 schoolchildren (3178 males and 3005 females, aged range 5–15 years) were screened using the SDAI rating scale for teachers. In Phase II, the parents of children and adolescents who met high screen criteria according to SDAI (cut-off > 14; $n = 471$, 7.3%) were invited to complete a specific clinical-diagnostic assessment for ADHD with the help of an experienced clinician. Within the entire sample, 107 children dropped out and 12 had mental retardation, whereas 332 subjects (278 males and 54 females, age range 5–14 years) completed the Phase II of the study. One hundred ninety subjects (163 males and 27 females, male: female ratio 6:1, mean age 8 years) were diagnosed with ADHD, indicating a prevalence of 3%. ADHD subtypes included the following: combined ($n = 108$; 56.8%), inattentive ($n = 48$; 25.2%) and hyperactive/impulsive ($n = 33$; 17.3%).

Our findings are in line with other reports of ADHD prevalence in the European Countries, and may contribute to underline the impact of this phenomenon in the population, and the need of achieving an improvement in the quality of the public health mental service for the prevention and treatment of ADHD.

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1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is one of the most common diagnosis worldwide for children and adolescents and, according to DSM-IV-TR, it is characterized by pervasive and impairing symptoms of inattention, hyperactivity and impulsivity (APA, 2000; Biederman & Faraone, 2005; Swanson et al., 1998). ADHD comprises a broad spectrum of clinical manifestations highly heterogeneous in terms of presence and level of symptoms. Longitudinal studies showed that ADHD is not restricted to childhood and adolescence, but it tends to persist also in adulthood, although with

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variable rates across the lifespan (Biederman et al., 2000, 2006; Cahill et al., 2012; Hill & Schoener, 1996; Simon, Czobor, & Bitter, 2012).

Studies published so far, have reported highly variable rates for ADHD prevalence worldwide during childhood and adolescence, ranging from 0.9% to 20%, raising concerns about the consistency of estimates and the validity of diagnoses (Bener, Qahtani, & Abdelaal, 2006; Cardo, Servera, & Llobera-Canaves, 2007; Cornejo et al., 2005; de la Barra, Vicente, Saldivia, & Melipillan, 2012; Goodman et al., 2005; Harzke et al., 2012; Montiel, Pen, Montiel-Barbero, & Polanczyk, 2008; Skounti, Philalithis, & Galanakis, 2007; Skounti, Philalithis, Mpitzaraki, Vamvoukas, & Galanakis, 2006; Wolraich et al., 2012). Overall, the reported rates for ADHD prevalence are lower for Europe as compared to North America, and this brought many authors to hypothesize that the ADHD may be typical of the western countries as a result of some demographic characteristics (Anderson, 1996; Bird, 2002; Timimi & Taylor, 2004). However, it has to be pointed out that all the studies have applied different methodologies, including rating scales and checklists, as well as diagnostic interviews, and this may represent another possible explanation for these discrepancies (Faraone, Sergeant, Gillberg, & Biederman, 2003; Swanson et al., 1998; Timimi, 2005). Indeed, this variability would likely disappear by applying similar instruments, as suggested by a review study on epidemiology of ADHD across the lifespan showing similar estimates for North America and Europe upon adjustment for methodological issues (5.29%) (Polanczyk & Rohde, 2007). From other studies, an incidence of ADHD, ranging from 5.29% to 7.5%, was found in different socio-cultural settings, such as Switzerland, Brazil, England, Holland, Venezuela, Taiwan, and Congo (Ford, Goodman, & Meltzer, 2003; Gau, Chong, Chen, & Cheng, 2005; Kashala, Tylleskar, Elgen, Kayembe, & Sommerfelt, 2005; Rohde et al., 1999; Steinhausen, Metzke, Meier, & Kannenberg, 1998).

To our knowledge, only three studies so far were conducted in Italy, reporting variable prevalence rates (Frigerio et al., 2009, 2006; Mugnaini et al., 2006). Specifically, Mugnaini et al. (2006), evaluating 1891 first-graders, aged 6.6–7.4 years, throughout teacher rating scales and without a specific clinical-diagnostic assessment for ADHD, reported an ADHD rate of 7.1%. On the other hand, Frigerio et al. (2009), in the preadolescent mental health project (PrISMA), evaluated 3418 adolescents, aged 10–14 years, throughout parents rating scales for the prevalence of mental disorders at large, and estimated a much lower rate of externalizing disorders (1.2%).

Studies in children consistently suggest that the ADHD prevalence is higher in boys than in girls with a male to female ratio from 3:1 to 9:1, depending on the origin of the sample ascertainment: indeed, the prevalence in girls seems to be higher in community samples than in clinical samples (Staller & Faraone, 2006). The impact of ethnic and socio-economic issues on the ADHD prevalence rates has not been extensively addressed.

ADHD can often be found in comorbidity with other psychiatric disorders. Indeed, a recent study on the prevalence of psychiatric disorders in young children, showed that 12.5% of 4-years-olds had at least one psychiatric disorder, and that when a child had an ADHD, an oppositional defiant disorder, a conduct disorder or a depressive disorder, it was more likely than not that she or he had another emotional or behavioral disorder in comorbidity (Wichstrom et al., 2011).

Finally, an epidemiological study on pharmacologically treated ADHD children, adolescents and adults in the UK, revealed a trend of increasing prescription of ADHD treatment drugs over the period 2003–2008 for all age groups, further highlighting the urgent need to deeply investigate the prevalence of this disorder in order to plan appropriate treatment strategies (McCarthy et al., 2012).

The aim of the present study was to investigate ADHD prevalence in a sample of Italian students, at first, by using a screening for attention deficit and hyperactivity/impulsivity symptoms completed by teachers, and afterwards, by applying a more specific clinical-diagnostic assessment for ADHD, completed by children, parents and teachers with the help of an experienced clinician.

2. Materials and methods

2.1. Sampling population of Phase I

During Phase I of the study, children attending primary and middle schools were submitted to a screening for attention deficit and hyperactivity/impulsivity symptoms. All elementary and middle schools (36 schools for 9151 children) in the urban area of Syracuse (Italy) were asked to participate. Out of them, 24 schools agreed to the study, whereas 12 schools (6 elementary and 6 middle) did not participate: a total of 6183 schoolchildren (3178 males and 3005 females, age range 5–15 years) were, therefore, included in the study. The informed consent, during Phase I, was not required because the primary aim of this phase was to assess the health status of the population.

2.2. Phase I: screening for attention deficit and hyperactivity/impulsivity symptoms

For every schoolchild, the teachers were asked to fill out the “SDAI” Rating Scale (*ADHD Rating Scale for Teachers* [*Scala per i Disturbi di Attenzione/Iperattività per Insegnanti*]), for the presence of ADHD symptoms (Cornoldi, Gardinale, Masi, & Pattenò, 1996; Cornoldi & Marzocchi, 2000). The SDAI is a 18-item four-point Likert scale, requiring the teacher to rate the child frequency/intensity of symptoms (from 0 = no problem to 3 = severe problem). The SDAI includes three subscales: one for Inattentive symptoms, one for Hyperactive/Impulsive symptoms, and one for Inattention and Hyperactive Combined symptoms. Conventionally, a score above 14, with a mean score of 1.5, for the three subscales, indicates a high presence of symptoms. The SDAI scale has been validated and standardized for the Italian population and shows an interrater reliability

of 0.80 and 0.74, for the Inattentive subscale and the Hyperactive/Impulsive subscale, respectively. The test–retest reliability is 0.83 and 0.81, for Inattentive and Hyperactive/Impulsive, respectively (Cornoldi & Marzocchi, 2000).

Data from teachers were used to identify the subjects eligible for Phase II of the study: children resulting above the cut-off (>14) for ADHD symptoms, as evaluated by SDAI, were classified as “high screen” and included in Phase II.

2.3. Sampling procedure of Phase II

The school staff contacted the families whose children were categorized as “high screen” (SDAI cut-off >14), and requested a written informed consent to participate in the study. Families who returned their permission to participate in the study (n = 451) were invited to take part into the clinical-diagnostic phase (Phase II) at the Child and Adolescent Psychiatric Unit of Syracuse, where children, parents and teachers completed a clinical-diagnostic assessment for ADHD symptoms with an experienced clinician. This assessment started on September 2010 and ended on December 2011. A total of 332 children (73.6% of those invited) participated in Phase II. A flow-chart describing the recruitment procedure and the participation rates is depicted in Fig. 1.

2.4. Phase II: clinical-diagnostic assessment to evaluate the presence of Attention-deficit/hyperactivity disorder (ADHD)

The Schedule for Affective Disorders and Schizophrenia for School-Age Children/Present and Lifetime Version (K-SADS-PL) was completed by all the children and parents included in the study with an experienced trained clinician (Kaufman et al., 1997). The K-SADS-PL is a semi-structured psychiatric interview that ascertains both lifetime and current diagnostic status based on DSM-IV-TR criteria (APA, 2000). The K-SADS-PL includes three components: introductory interview (demographic, health, and other background information), screen interview (82 symptoms related to 20 diagnostic areas), and five diagnostic supplements including affective disorders (major depression, dysthymia, mania, hypomania), psychotic disorders, anxiety disorders (social phobia, agoraphobia, specific phobia, obsessive-compulsive disorder, separation anxiety disorder, generalized anxiety disorder, panic disorder, post-traumatic stress disorder), disruptive behavioral disorders (attention deficit and hyperactivity disorder, conduct disorder, oppositional defiant disorder), substance abuse, and other disorders (tic disorders, eating disorders, and elimination disorders). The skip-out criteria in the screen interview specify which sections of the supplements, if any, should be completed. The Italian version of this tool has been shown to have good psychometric properties, as demonstrated by an excellent interrater reliability of 0.80, for the age group between 6 and 17 years. Indeed, a recent study (Birmaher et al., 2009) have established the psychometric properties of the K-SADS-PL in preschool children (aged 2–5 years,) reporting an excellent discriminant validity (a p-value ≤0.02 for ADHD), and an excellent internal consistency of Cronbach's α ranging between 0.80 and 0.90.

The Swanson, Nolan and Pelham Scale-Version IV (SNAP-IV) was completed by teachers and parents (Bussing et al., 2008; Swanson et al., 2001). This is a 26-item questionnaire, in a 4-point Likert scale, that is used to evaluate ADHD symptoms and severity. The 26 items include 18 items for ADHD symptoms (9 for Inattentive, 9 for Hyperactive/Impulsive), and 8 items for

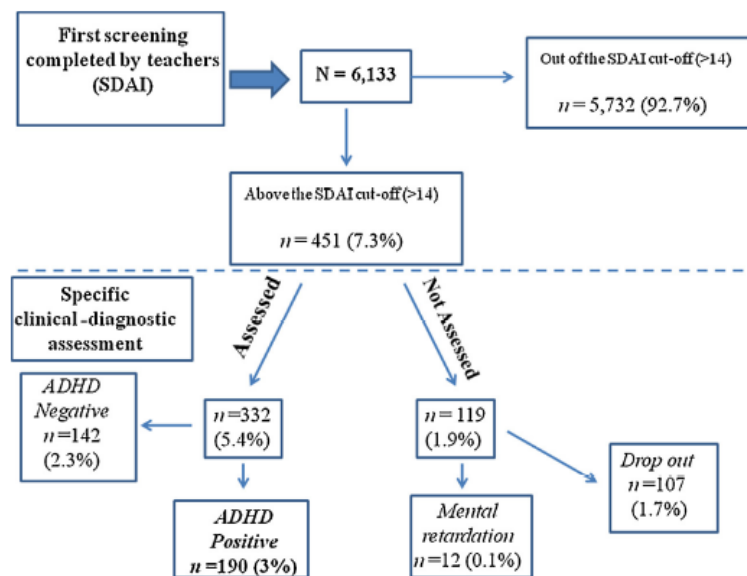


Fig. 1. Recruitment procedure and participation rates.

oppositional defiant disorder (ODD) symptoms, as defined in the DSM-IV-TR. Each item is rated on a 0–3 score scale (0 = not at all, 1 = just a little, 2 = quite a bit and 3 = very much). The *SNAP-IV* consists of the Inattention, Hyperactive/Impulsive, Inattention and Hyperactive/Impulsive Combined, and Oppositional subscales. Each subscale has a different cut-off score that can be considered indicative of clinical impairment: 1.78 for Inattention subscale, 1.44 for Hyperactive/Impulsive subscale, 1.67 for Inattention and Hyperactive/Impulsive Combined, and 1.88 for Oppositional Defiant Disorder. The *SNAP-IV* has been shown to have a good internal consistency for all domains (Inattentive: $\alpha = 0.88$ – 0.89 , Hyperactive/Impulsive: $\alpha = 0.76$ – 0.80 , and Oppositional Defiant Disorder: $\alpha = 0.87$ – 0.90) (Bussing et al., 2008).

All the subjects were examined by an experienced clinician, and the diagnoses of ADHD were established following the three different definitions of impairment, as stated in the DSM-IV-TR criteria (APA, 2000).

Moreover, all the children were assessed for cognitive function by the Italian validated version of *Wechsler Intelligence Scale for Children-III* (*WISC-III*) (Orsini & Picone, 1995; Wechsler, Golombok, & Rust, 1992). The *WISC-III* comprises 10 subtests (5 verbal and 5 performance subtests) that sum to the Verbal Intelligence Quotient and Performance Intelligence Quotient, and produce a Full-Scale Intelligence Quotient. Scores were age standardized according to the Italian validated version of the *WISC-III* manual.

Finally, to evaluate the presence of comorbidity with a Specific Learning Disorder, the children were assessed with the *Battery for Evaluating Dyslexia and Dysorthography* (*DDE*), and the *M.T. reading test* (Cornoldi & Colpo, 1998; Sartori, Job, & Tressoldi, 1995). The *DDE* comprises 12 tests (9 to evaluate reading abilities and 3 to assess writings abilities). On each test, the examiner should note reading accuracy, determined by the number of correctly decoded words, and test execution speed, measured by the relationship between the total number of syllables read and total time in seconds. The *M.T. reading test* is a text, varying for each grade and phase of the scholastic year (initial, middle and final), that the participants are asked to read. Errors made and time needed to read the entire text are taken into account. For each text, normative data, means, standard deviations, and percentiles were provided.

2.5. Data analysis

The data were analyzed using the statistical software package SPSS, Version 16.0. Descriptive analyses were used, and variables are presented as either mean \pm standard deviation (SD), or frequency. Prevalence rates were calculated on the total number of children assessed. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among DSM-IV-TR criteria and *K-SADS-PL* diagnoses. Group comparisons (ADHD versus non-ADHD) were conducted using chi-square test for categorical variables (gender), and analysis of covariance (ANCOVA) for continuous variables (age and IQ). For binary variables the effect size is provided as odds ratio, whereas for continuous or discrete variables as difference between means. The degree of uncertainty around each effect size is provided in terms of 95% confidence interval. Comparisons within the ADHD group for categorical variables were performed using chi-square tests. An alpha level of 0.05 was set for statistical significance.

3. Results

3.1. Phase I: screening for attention deficit and hyperactivity/impulsivity symptoms

The teachers completed the *SDAI* for a total of 6183 Caucasian schoolchildren (age range 5–15 years, mean age 8.9 years), 3178 of whom were males (51.4%) and 3005 females (48.6%). Three thousand, seven hundred and thirty-two children resulted out of the *SDAI* cut-off (>14), whereas 451 children, corresponding to 7.3% of total, were above the cut-off (mean age 8.3 years, age range from 5 to 14 years). Among them, 356 were males (78.9%), and 95 were females (21.0%), and 55 (12.7% of the 451 children) benefitted from a scholastic support. In more detail, the *SDAI* results for these 451 children showed that 248 of them (204 males and 44 females) were above the cut-off for "Inattentive and Hyperactive/Impulsive Combined symptoms" (54.9%), 162 (127 males and 35 females) for "Inattentive symptoms" (35.9%), and 41 (25 males and 16 females) for "Hyperactive/Impulsive symptoms" (9.0%). None of the participants had ever used any psychotropic medication at the time of the study. The demographic characteristics of the children included in the survey are summarized in Table 1.

Table 1
Demographic characteristics of the total sample.

Groups	Total screened schoolchildren (N=6183 ^a)	Schoolchildren above the <i>SDAI</i> ^b cut-off (N=451)
<i>Gender</i>		
Males N (%)	3178 (51.4)	356 (78.9)
Females N (%)	3005 (48.6)	95 (21.0)
Age range (mean)	5–15 (8.9)	8–14 (8.3)

^a Number of subjects.

^b ADHD rating scale for teachers.

Table 2
Comparisons of demographic characteristics of children with ADHD versus children without ADHD.

Groups	ADHD children (N = 190 ^a)	Non-ADHD children (N = 142)	p	Effect size
<i>Gender</i>			NS ^b	
Males N (%)	163 (85.7)	115 (80.9)		1.42 (0.79–2.54) ^c
Females N (%)	27 (14.2)	27 (19.0)		0.71 (0.39–1.27)
Age (mean ± SD ^d)	8.0 ± 2.30	8.1 ± 2.14	NS	–0.10 (–0.59; 0.39) ^e
IQ ^f (mean ± SD)	87.54 ± 9.59	88.16 ± 9.43	NS	–0.62 (–2.70; 1.46)

^a Number of subjects.

^b Not significant for $p > 0.05$.

^c For binary variables the effect size (ADHD versus non-ADHD children) is provided as odds ratio and 95% confidence interval.

^d Standard deviation.

^e For continuous variables the effect size is given as difference between means and 95% confidence interval of the corresponding point estimate.

^f Intelligence quotient.

3.2. Phase II: clinical-diagnostic assessment to evaluate the presence of Attention-deficit/hyperactivity disorder (ADHD)

Among the 451 children and adolescents that scored above the cut-off for *SDAI* symptoms, 332 subjects (278 males and 54 females, age range 5–14 years, mean age 8.4 years) were submitted to the specific clinical-diagnostic assessment for ADHD, whereas 119 were excluded, either because they dropped out ($n = 107$), or had a mental retardation ($n = 12$, Full-Scale IQ < 70 assessed with *WISC-III*). All the subjects were evaluated by an experienced children and adolescents psychiatrist according to DSM-IV-TR ADHD criteria. Moreover, all the parents and children completed the *K-SADS-PL* with a trained clinician. An interrater reliability analysis using the Kappa statistic was performed to determine consistency among DSM-IV-TR criteria and *K-SADS-PL* diagnoses, returning an almost perfect agreement (Kappa = 0.913, $p < 0.001$). Finally, ADHD diagnosis was considered completed by symptoms positivity in the *SNAP-IV* teachers and parents version.

One hundred ninety subjects out of the 332 tested (163 males and 27 females, with a male: female ratio of 6:1, mean age of 8 years) resulted positive for ADHD, corresponding to a prevalence of 3%. ADHD subtypes included the following: combined ($n = 108$; 56.8%); inattentive ($n = 48$; 25.2%); hyperactive/impulsive ($n = 33$; 17.3%).

Gender ($X^2: 3.742$, $p = 0.293$), age (F: .718, $p = 0.709$) and IQ (F: 2.328, $p = 0.554$) distribution were similar between children with ($n = 190$) and without ($n = 142$) diagnosis of ADHD (Table 2). Accordingly, analysis carried out by calculating the effect size showed that the 95% confidence interval of each point estimates, crossed one for binary variables and zero for continuous or discrete variables, indicating no significant associations between gender, age, IQ, and the presence/absence of ADHD diagnosis (Table 2).

Analysis of comorbidities revealed that 143 children (75.2%) affected by ADHD had a comorbidity with one other disorder. In more detail, the following disorders were found in comorbidity: Oppositional Defiant Disorder ($n = 42$), Specific Learning Disorder ($n = 36$), Conduct Disorder ($n = 22$), Generalized Anxiety Disorder ($n = 17$), Depressive Disorder ($n = 9$), a different comorbid diagnosis (such as Tourette Syndrome, Tic Disorders, Eating Disorder and Enuresis) ($n = 17$). Moreover, of these 143 children, 47 (24.7%) had two comorbid disorders. Specifically: Oppositional Defiant Disorder ($n = 20$), Specific Learning Disorder ($n = 10$), Generalized Anxiety Disorder ($n = 4$), a different comorbid diagnosis (such as Tourette Syndrome, Tic Disorders, Eating Disorder and Enuresis) ($n = 13$).

No significant differences were found between ADHD males ($n = 163$) and females ($n = 27$) according to age, IQ, ADHD subtypes, comorbidity, *SDAI* subscales, *SNAP-IV* Parents and Teachers version. The clinical characteristics of the subjects with ADHD are shown in Table 3.

4. Discussion

Epidemiological studies on ADHD prevalence during childhood and adolescence have reported highly variable rates worldwide, ranging from 0.9% to 20% (Bener et al., 2006; Cardo et al., 2007; Comejo et al., 2005; de la Barra et al., 2012; Goodman et al., 2005; Harzke et al., 2012; Montiel et al., 2008; Skounti et al., 2007, 2006; Wolraich et al., 2012). In our sample, 3% of the screened children and adolescents met the criteria for ADHD, indicating a slightly lower rate as compared to the ADHD worldwide pooled prevalence of 5.29% (Faraone et al., 2003; Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007). However, our results are in line with other epidemiological reports investigating the prevalence of ADHD in Europe, which is generally lower than in North America (Faraone et al., 2003; Polanczyk et al., 2007). The DSM-IV-TR reports that ADHD prevalence rates vary from 3% to 5%, whereas studies based on the ADHD DSM-IV-TR criteria report a proportion of children affected by ADHD ranging from 3.7% to 8.9%, with lower rates when applying a more rigorous impairment criterion (APA, 2000; Baumgaertel, Wolraich, & Dietrich, 1995; Canino et al., 2004; Wolraich, Hannah, Pinnock, Baumgaertel, & Brown, 1996). Moreover, ADHD prevalence seems to depend on the source evaluating the symptoms (Breton et al., 1999; Magnusson, Smari, Gretarsdottir, & Prandardottir, 1999; Stanger & Lewis, 1993). For instance, Breton et al. (1999) reported estimate rates varying from 3.3% to 5% and 8.9%, according to children's, parents', and teachers' reports, respectively. In our study, diagnosis of ADHD required the three different definitions of impairment, as stated in the DSM-IV-TR. Furthermore, to be in receipt of an ADHD diagnosis, different tools, such as *K-SADS-PL*, and *SNAP-IV*, completed by different sources (children,

Table 3
Distribution of ADHD subtypes, comorbidity and clinical characteristics of the ADHD group.

	Males (N = 163 ^a)	Females (N = 27)	Total (N = 190)
IQ ^b (mean ± SD)	87.82 ± 9.62	85.89 ± 9.44	87.54 ± 9.59
<i>Subtypes of ADHD</i>			
Inattentive N (%)	38 (20.0)	11 (5.8)	49 (25.8)
Hyperactive/Impulsive N (%)	27 (14.2)	6 (3.2)	33 (17.4)
Combined N (%)	98 (51.6)	10 (5.3)	108 (56.8)
<i>SDAI^c subscales</i>			
Inattentive (mean ± SD) ^d	19.87 ± 5.49	18.89 ± 4.72	19.73 ± 5.39
Hyperactive/Impulsive (mean ± SD)	16.82 ± 6.92	13.67 ± 8.37	16.37 ± 7.20
Combined (mean ± SD)	36.68 ± 9.19	32.56 ± 9.27	36.09 ± 9.29
<i>SNAP-IV-parents^e subscales</i>			
Inattentive (mean ± SD)	2.03 ± 0.50	2.04 ± 0.39	2.03 ± 0.49
Hyperactive/Impulsive (mean ± SD)	1.88 ± 0.62	1.67 ± 0.69	1.85 ± 0.63
Combined (mean ± SD)	3.91 ± 0.74	3.71 ± 0.68	3.88 ± 0.73
<i>SNAP-IV-teachers^f subscales</i>			
Inattentive (mean ± SD)	2.48 ± 0.48	2.47 ± 0.32	2.48 ± 0.46
Hyperactive/Impulsive (mean ± SD)	1.77 ± 0.61	1.54 ± 0.72	1.74 ± 0.63
Combined (mean ± SD)	4.26 ± 9.19	4.02 ± 0.67	4.22 ± 0.72

^a Number of subjects.

^b Intelligence quotient.

^c SDAI-ADHD rating scale for teachers.

^d Standard deviation.

^e Swanson, Nolan and Pelham Scale-Version IV for parents.

^f Swanson, Nolan and Pelham Scale-Version IV for teachers.

parents and teachers) had to result positive for ADHD symptoms all at once. Therefore, the lower prevalence that we found in our sample could be due to the rigorous exclusionary methodology.

To our knowledge, our study is the first epidemiological survey on ADHD in a large sample of Italian children and adolescents. The preadolescent mental health project (PrISMA), described by Frigerio et al. (2009) evaluated adolescents for the prevalence of mental disorders in general, and Mugnaini et al. (2006), reporting an ADHD prevalence of 7.1%, applied only teachers' reports, without a specific clinical-diagnostic assessment for ADHD. Indeed, this percentage is similar to the rate that we found by teachers' reports in the first phase of our study (7.3%) (Frigerio et al., 2009, 2006; Mugnaini et al., 2006).

Moreover, these surveys were carried out in the North of Italy, whereas the children included in our study were attending schools in the South (Sicily), indicating that there may be dissimilarities also according to cultural and geographical differences.

The results reported in our study are in line with those by other studies, in terms of prevalence of ADHD subtypes (combined more frequent, and hyperactive/impulsive less frequent), gender ratio (6:1), and presence of a comorbid internalizing or externalizing disorder (Baumgaertel et al., 1995; Biederman et al., 2002; Ersan, Dogan, Dogan, & Somer, 2004; Frigerio et al., 2006; Gomez, Harvey, Quick, Scharer, & Harris, 1999; Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001; Kashala et al., 2005; Staller & Faraone, 2006; Timimi, 2005; Wolraich et al., 1996; Wolraich, Hannah, Baumgaertel, & Feurer, 1998).

Our findings have to be interpreted in light of certain limitations. First, we did not analyze the negative predictive value of the screening test used, which could have been evaluated by including in Phase II of the study a certain number of children that had scored negatively on SDAI within Phase I. Second, children from only one region of the country were included. Third, participant selection was conducted throughout schools, rather than public registers, due to the Italian personal data privacy law, which not allow public registers to be viewed (DL 30 July 1999, n. 281 and 282), and fourth, socio-economic status and parental education variables were not considered, although the schools included in the study represented areas of both high and low socio-economic status.

5. Conclusion

In conclusion, besides to these limitations, our study has added a new insight into the existing knowledge on ADHD prevalence, documenting the rates of a European country for which these data were missing. Shed light on the epidemiology of ADHD is a fundamental issue for researchers in order to better define methodological and conceptual problems that need to be further addressed. Moreover, these results underline the importance of applying a screening methodology in the school context that could easily be applied to other mental disorders and the need of developing a thorough assessment. Finally, understanding the impact of ADHD in the general population, may also help the clinicians to develop an adequate service, in terms of both psychological screening, and treatment procedure, and possibly to prevent the onset of other disorders in comorbidity during lifespan.

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Conflict of interest

The authors have no conflicts of interest to disclose.

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VENERDÌ 13 SETTEMBRE

Ore 8,45 REGISTRAZIONE

Ore 9,15 SALUTI

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RELAZIONI

Moderatore: Serafino BUONO (IRCCS Oasi)

La via Italiana all'Inclusione:
strumenti di intervento per i BES
Raffaele CIAMBRONE (Miu)

La dislessia e le dislessie.
Un unico fattore e molteplici manifestazioni
Giacomo STELLA (Università di Modena e Reggio Emilia)

Caratteristiche del disturbo della scrittura
nella lingua italiana
Pierluigi ZOCCOLOTTI (Università di Roma)

L'errore intelligente
Daniela LUCANGELI (Università di Padova, Presidente CNIS)

Ore 12,00 - 13,00 DIBATTITO

Ore 13,00 - 14,30 Pausa

Ore 14,30 - 16,30 SIMPOSII PARALLELI

SIMPOSIO A - EZIOLOGIA E COMORBIDITÀ NEI DSA
Moderatore: Orazio LICCIARDELLO (Università di Catania)

Correlazione tra Disturbi Specifici del Linguaggio e DSA
Biagio RIZZO (UOC di ORL e Foniatria IRCCS Oasi)

DSA e ADHD: comorbidità o continuum?
Antonella GAGLIANO (Università di Messina)

Genetica e DSA
Corrado ROMANO (UOC di Pediatria e Genetica Medica IRCCS Oasi)

Aspetti neuropsichiatrici dei DSA
Mariagrazia FIGURA (UOC di Neurologia IRCCS Oasi)

SIMPOSIO B - DIAGNOSI E SUPPORTI
Moderatore: Mariella DE CAROLI (Università di Catania)

DSA e BES: diritti e supporti
Carolina TOMASI (Ufficio Formazione IRCCS Oasi)

Riabilitazione dei DSA e attività teatrali
Sergio MESSINA (UO NPI Caltagirone)

Assessment neuropsicologico nei DSA
Santina CITTÀ (UOC Psicologia IRCCS Oasi)

Valutazione e trattamento degli aspetti metafonologici nei DSA
Silvana SURANITI (UOC di ORL e Foniatria IRCCS Oasi)

SIMPOSIO C - RICERCHE

Moderatore: Rosalba LARCAN (Università di Messina)

Attività motoria e sportiva e... successo scolastico
Marianna ALESI (Università di Palermo)

Comprensione del testo scritto in bambini poor comprehenders.
Cognizione verso metacognizione
Pina FILIPPETTO (Università di Messina)

Abilità di decodifica e decisione lessicale
in bambini e adolescenti con BES
Francesco DI BLASI (UOS di Pedagogia IRCCS Oasi)

DSA e Immagini Mentali
Marina GUARNERA (Università Enna-Kore)

Ore 16,30 - 18,00 SESSIONI PARALLELE
TEM: Ricerca, Diagnosi, Intervento, Screening,
Scuola, Famiglia

Moderatori e discussant:
Franco DI MARTINO (ASP Ragusa)
Maria Teresa AMATA (IRCCS Oasi)

Ore 18,15 - 19,00 SPETTACOLO di Pupi siciliani
del "Centro diurno adolescenti Caltagirone"

SABATO 14 SETTEMBRE

Ore 8,30 SESSIONE POSTER

Ore 9,30 RELAZIONI
Moderatore: Santo DI NUOVO (Università di Catania)

How dyscalculia differs from other
mathematics difficulties
Michele MAZZOCCO (University of Minnesota, Institute
of Child Development)

Funzionamento Intellettivo
Limite e Disturbi Specifici dell'Apprendimento
Renzo VIANELLO (Università di Padova)

Bisogni educativi speciali e ICF
Dario IANES (Libera Università di Bolzano, Edizioni Centro
Studi Erickson)

Ore 12,00 TAVOLA ROTONDA
DSA e BES criticità e punti di forza
In ambito scolastico
Moderatore: Anna Maria PEPI

Interventi: Giombattista AMENTA, Raffaele CIAMBRONE,
Agata DI LUCA, Maurizio GENTILE,
Tonino MARU, Giuseppe ZANNIELLO

Ore 13,30 CHIUSURA LAVORI E RITIRO ATTESTATI

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