



Associations of symptoms and subtypes of attention-deficit hyperactivity disorder with visuospatial planning ability in youth



Huey-Ling Chiang^{a,b}, Lin-Wan Huang^c, Susan Shur-Fen Gau^{a,d,*},
Chi-Yung Shang^a

^a Department of Psychiatry, National Taiwan University Hospital and College of Medicine, Taipei, Taiwan, No. 7, Chung-Shan South Road, Taipei, Taiwan

^b Department of Psychiatry, Far Eastern Memorial Hospital, No. 21, Section 2, Nanya South Road, Banciao District, New Taipei City, Taiwan

^c Department of Psychiatry, National Taiwan University Hospital Hsin-Chu Branch, No.25, Lane 442, Sec. 1, Jing-Guo Road, Hsinchu City, Taiwan

^d Department of Psychology, School of Occupational Therapy, Graduate Institute of Epidemiology and Preventive Medicine, and Graduate Institute of Brain and Mind Sciences, National Taiwan University, No. 1, Section 1, Jen-Ai Road, Taipei, Taiwan

ARTICLE INFO

Article history:

Received 22 April 2013

Accepted 14 June 2013

Available online 28 June 2013

Keywords:

ADHD

Inattention

Hyperactivity

Impulsivity

Visuospatial planning

ABSTRACT

Little is known about which ADHD core symptom or subtype is most associated with visuospatial planning deficit. This issue was investigated in a sample of 408 youths with current DSM-IV diagnosis of ADHD, and 332 youths without lifetime ADHD, aged 8–17 years (mean age 12.02 ± 2.24). All the participants and their mothers were interviewed using the Chinese Kiddie Epidemiologic version of the Schedule for Affective Disorders and Schizophrenia to obtain information about ADHD symptoms and diagnosis and other psychiatric disorders. In addition to clinical assessments, the participants were assessed with the WISC-III and the Stocking of Cambridge task of the Cambridge Neuropsychological Test Automated Battery. Multi-level regression models were used for data analysis. The results showed that univariate analyses revealed that inattention, hyperactivity, and impulsivity were significantly associated with visuospatial planning, and the magnitude of such association was amplified with increased task difficulties. Only inattention independently predicted visuospatial planning in a model that included all three ADHD symptoms. After further controlling for comorbidity, age of assessment, treatment with methylphenidate, and Full-scale IQ, inattention was still independently associated with visuospatial planning indexed by mean moves needed to solve problems. In subtype comparison, participants with combined subtype and those with prominently inattentive subtype, rather than prominently hyperactivity/impulsivity subtype, had poorer visuospatial planning performance. Our findings indicate that inattention is independently associated with impaired visuospatial planning, and dimensional approach retains the important distinction among ADHD symptoms than subtype approach in understanding the neuropsychological functioning of ADHD.

© 2013 Elsevier Ltd. All rights reserved.

* Corresponding author at: Department of Psychiatry, National Taiwan University Hospital, No. 7, Chung-Shan South Road, Taipei 10002, Taiwan.
Tel.: +886 2 23123456x66802; fax: +886 2 23812408.

E-mail address: gaushufe@ntu.edu.tw (S.S.-F. Gau).

1. Introduction

Attention deficit/hyperactivity disorder (ADHD) is one of the most common childhood psychiatric disorders with long-term executive function deficits and functional impairment (Bernardi et al., 2012; Biederman et al., 2007; Faraone, Sergeant, Gillberg, & Biederman, 2003; Stavro, Ettenhofer, & Nigg, 2007; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). Executive functions often include working memory, planning, organization, inhibitory control, sustained attention, and set shifting. Deficits in executive functions negatively impact functional outcome in children (Biederman et al., 2004) and adults (Biederman et al., 2006; Stavro et al., 2007) with ADHD, including declined academic performance, occupational attainments, and adaptive social/leisure functioning. Visuospatial planning deficit is one of the most evident and consistent executive function impairments in ADHD (Pennington & Ozonoff, 1996; Willcutt et al., 2005). Rinsky and Hinshaw (2011) reported that visuospatial planning ability in childhood predicted latter social function in adolescence under tight statistical control. A recent study provided evidence to support that visuospatial planning mediate the effect of ADHD on social problems (Tseng & Gau, 2013). Recent study has provided more collateral evidence that both symptom severity of ADHD and visuospatial planning dysfunction were significantly correlated with decreased integrity of the frontostriatal tracts (Shang, Wu, Gau, & Tseng, 2013).

Although children and adults with ADHD tend to have poorer visuospatial planning and associated functional impairments than healthy controls (Culbertson & Zillmer, 1998; Gau, Chiu, Shang, Cheng, & Soong, 2009; Gau & Shang, 2010; McLean et al., 2004; Nigg, Blaskey, Huang-Pollock, & Rappley, 2002; Nigg, Blaskey, Stawicki, & Sachek, 2004; Rhodes, Coghil, & Matthews, 2006; Solanto et al., 2007), impairment of visuospatial planning is not universal among all patients with ADHD as summarized in a meta-analysis (Willcutt et al., 2005). In fact, less than half of children with ADHD are impaired significantly if only a single executive function task is administered (Nigg, Willcutt, Doyle, & Sonuga-Barke, 2005). The clinical predictors for visuospatial planning deficit in children and adolescents with ADHD have not been fully understood.

According to the DSM-IV diagnostic criteria, three ADHD subtypes are categorized: predominantly inattentive subtype (ADHD-I), predominantly hyperactive/impulsive subtype (ADHD-HI) and combined subtype (ADHD-C) (American Psychiatric Association, 1994) based on three ADHD core symptoms: inattention, hyperactivity and impulsivity. Studies on visuospatial planning among the three ADHD subtypes revealed inconsistent results that the ADHD-C might have more (Klorman et al., 1999; Kopecky, Chang, Klorman, Thatcher, & Borgstedt, 2005) or similar (Nigg et al., 2002; Pasini, Paloscia, Alessandrelli, Porfirio, & Curatolo, 2007) impairment as compared with the ADHD-I, followed by the ADHD-HI, the least (Chhabildas, Pennington, & Willcutt, 2001; Schmitz et al., 2002). Using dimensional approach, inattention, rather than hyperactivity/impulsivity, was consistently associated with executive dysfunction (Martel, Nikolas, & Nigg, 2007; Martinussen & Tannock, 2006; Willcutt et al., 2012), and more related to functional impairment (Stavro et al., 2007). However, few studies controlling hyperactivity and impulsivity when examining the relations between inattention and executive deficits, or vice versa (Brocki, Eninger, Thorell, & Bohlin, 2010; Chhabildas et al., 2001); and no such study focusing on visuospatial planning has been reported.

The inconsistent results in previous studies could be explained by small sample sizes (Geurts, Verte, Oosterlaan, Roeyers, & Sergeant, 2005; Houghton et al., 1999), exclusion of ADHD-HI in subtype approach (Geurts et al., 2005; Houghton et al., 1999; Kopecky et al., 2005; Pasini et al., 2007), lack of careful control of possible confounding factors, such as age (Culbertson & Zillmer, 1998), IQ (Scheres et al., 2004; Solanto et al., 2007), gender (Seidman et al., 1997), psychiatric comorbidity (Klorman et al., 1999), and no identification of specific ADHD symptoms (using categorical approach with or without ADHD diagnosis) (Gau et al., 2009).

To the best of our knowledge, none of the previous report has comprehensively examined clinical predictors of visuospatial planning deficit. Therefore, using a large ethnic-Chinese sample, we intend to identify specific ADHD symptoms associated with visuospatial planning deficit by separating ADHD core symptoms into three dimensions, i.e., inattention, hyperactivity, and impulsivity, and by comparing the three ADHD subtypes. We also examined the effect of task difficulties, and applied stringent control of confounding factors in the statistical model. We hypothesized that inattention was mostly associated with poor visuospatial planning after controlling for all possible confounders and the magnitude of association would increase with higher task difficulties, and that youths with ADHD-C and ADHD-I who had prominent inattentive symptoms performed worse in visuospatial planning than youths without ADHD.

2. Methods

2.1. Participants

There were 790 participants in total (559 males, 70.8%) with a mean age of 12.02 (standard deviation, SD = 2.24). Among them, 422 children (aged 8–17) had parent-reported overt ADHD symptoms at the mean age of 4.83 (SD = 2.02), who were clinically diagnosed with ADHD according to the DSM-IV diagnostic criteria at the mean age of 8.51 (SD = 3.02), and were further assessed by using the Chinese version of the Kiddie epidemiologic version of the Schedule for Affective Disorders and Schizophrenia (K-SADS-E) at the mean age of 11.73 (SD = 2.06). Thirty-eight pairs came from the same families. The patients who had psychosis, autism spectrum disorders, learning disability, or a Full Scale IQ score less than 80 were excluded at the initial recruitment.

Download English Version:

<https://daneshyari.com/en/article/10317793>

Download Persian Version:

<https://daneshyari.com/article/10317793>

[Daneshyari.com](https://daneshyari.com)