



## An evidenced-based perspective on the validity of attention-deficit/hyperactivity disorder in the context of high intelligence



Nanda Rommelse (PhD)<sup>a,b,\*</sup>, Marieke van der Kruijs (MSc)<sup>b</sup>, Jochem Damhuis (BSc)<sup>c</sup>, Ineke Hoek (MSc)<sup>b</sup>, Stijn Smeets (PhD)<sup>d,e</sup>, Kevin M. Antshel (PhD)<sup>f</sup>, Lianne Hoogeveen (PhD)<sup>d</sup>, Stephen V. Faraone (PhD)<sup>g,h</sup>

<sup>a</sup> Department of Psychiatry, Donders Institute for Brain, Cognition and Behavior, Radboud University Medical Center, Nijmegen, The Netherlands

<sup>b</sup> Karakter, Child and Adolescent Psychiatry University Center, Nijmegen, The Netherlands

<sup>c</sup> Radboud University, Honours Programme, Nijmegen, The Netherlands

<sup>d</sup> Center for the Study of Giftedness, Radboud University, Nijmegen, The Netherlands

<sup>e</sup> Department of Psychology and Educational Sciences, KU Leuven, Leuven, Belgium

<sup>f</sup> Department of Psychology, Syracuse University, NY, USA

<sup>g</sup> Departments of Psychiatry and of Neuroscience and Physiology, State University of New York Upstate Medical University, New York, USA

<sup>h</sup> K.G. Jebsen Centre for Research on Neuropsychiatric Disorders, University of Bergen, Bergen, Norway

### ARTICLE INFO

#### Article history:

Received 1 December 2015

Received in revised form 14 June 2016

Accepted 27 August 2016

Available online 30 August 2016

#### Keywords:

Attention-deficit/hyperactivity disorder

(ADHD)

Intelligence

High IQ

Gifted

Validity

Behavior

Hyperactivity

Cognition

Imaging

Testosterone

Lateralization

Maturation

### ABSTRACT

The validity of Attention-Deficit/Hyperactivity Disorder (ADHD) in individuals with high intelligence is disputed, since high intelligence may 'mimic' the symptoms of ADHD in the absence of the specific pathophysiological pathways for ADHD. Conversely, increased risk of a missed ADHD diagnosis may occur due to compensatory strategies in the highly intelligent individual. A systematic literature review was performed including cognitive and behavioral studies, addressing a specific set of criteria for validating ADHD in the context of high intelligence. Albeit limited in number, available results suggest that ADHD is a valid construct in the context of high intelligence, showing characteristic clinical features (except possibly for hyperactivity being a less specific pathology marker), course and outcome and a characteristic response to treatment. Importantly, ADHD and IQ are negatively correlated on nearly all phenotypic and cognitive constructs, underlining the need for taking IQ into account as potential moderator in ADHD studies and more systematically studying ADHD in the high intelligent population.

© 2016 Elsevier Ltd. All rights reserved.

### Contents

|   |    |
|---|----|
| 1. Background .....   | 22 |
| 2. Methods .....  | 23 |
| 3. Results .....  | 23 |
| 3.1. Methodological issues .....  | 23 |
| 3.2. Can ADHD symptoms be dissociated from the behavioral characteristics of highly intelligent individuals and do these symptoms cause impairment? ..... | 24 |

\* Corresponding author at: Department of Psychiatry, Donders Institute for Brain, Cognition and Behavior, Radboud University Medical Center, Nijmegen, The Netherlands.  
E-mail address: [n.lambregts-rommelse@psy.umcn.nl](mailto:n.lambregts-rommelse@psy.umcn.nl) (N. Rommelse).

3.3. Does ADHD have a characteristic course and outcome in highly intelligent individuals? ..... 25  
 3.4. Do highly intelligent ADHD individuals show the same neuropsychological correlates as other ADHD individuals? ..... 25  
 3.5. Does ADHD show evidence of heritability from family and genetic studies when the heritability of intelligence is taken into account? ... 33  
 3.6. Does ADHD show a characteristic response to treatment in highly intelligent individuals? ..... 41  
 4. Discussion ..... 42  
 4.1. Can hyperactivity serve an adaptive role in ADHD and high intelligence? ..... 42  
 4.2. Male gender/testosterone ..... 42  
 4.3. Brain lateralization ..... 42  
 4.4. Cortical maturation ..... 43  
 5. Research agenda ..... 43  
 6. Clinical recommendations ..... 43  
 7. Financial disclosure/Acknowledgements ..... 44  
 References ..... 44

**1. Background**

Despite the fact that ADHD occurs in 6–8% of children and 2–3% of adults (Simon et al., 2009; Thomas et al., 2015) and high intelligence only in 2–5% of the population depending on the definition/cut-off, it is vigorously debated whether or not the combination of both occurs more often than expected by chance. Intelligence is a well-researched topic in ADHD literature. Meta-analyses suggest that, compared with controls, IQ is nine points lower in pediatric populations with ADHD (Frazier et al., 2004) and two points lower in adult populations with ADHD (Bridgett and Walker, 2006). However, since most ADHD studies exclude participants with an IQ < 70 but not participants with an IQ > 130, these figures may underestimate slightly the true difference in average IQ between ADHD and non-ADHD populations. In contrast, ADHD is a controversial and scarcely examined topic in the literature on highly intelligent individuals. According to the National Society for the Gifted and Talented (NSGT), the only characteristic in highly intelligent individuals that shows some resemblance with symptoms of ADHD is ‘high energy level’ (www.nsgt.org). The NSGT indicates that several behavioral characteristics appear to strongly diverge in highly intelligent individuals and those with ADHD, foremost ‘learns rapidly’, ‘self-starter’, and ‘observant’ (www.nsgt.org). Based on clinical experience rather than empirical studies, it has been argued that a differential diagnosis can be aided based on behavior during assessment: a highly intelligent child without ADHD becomes engaged when the task is challenging enough, whereas a highly intelligent child with ADHD becomes frustrated or loses rapport with the examiner (Webb et al., 2005). In addition, it has been suggested that hyperactivity in highly intelligent children diverges from that seen in individuals with ADHD. Others have suggested that hyperactivity in highly intelligent children without ADHD is specific (and not pervasive) to situations that evoke boredom and frustration by poor matching to the students’ ability level (Webb et al., 2005). As such, in theory, diagnosing ADHD in highly intelligent individuals should pose no greater challenge than in average intelligent individuals.

However, again based on clinical impressions rather than empirical work, the following referral problems of children that are suspected to be highly intelligent suggest a substantial proportion of potentially highly intelligent individuals may exhibit signs and symptoms of ADHD: high activity levels, low impulse control, interrupts others, continually asks questions, easily frustrated, poor attention span, can’t complete tasks, easily bored, suspicion of underachievement at school, academic difficulties, oppositional, argues with adults, difficulty with adherence to rules and regulations, irritable, emotional, easily frustrated, impaired motor skills, problems in peer relationships and difficulties maintaining long term romantic relationships, and frequent loss of jobs (Budding and Chidekel, 2012; Lee and Olenchak, 2014; Webb et al., 2005).

It has even been stated that ‘gifted children, just by their nature, show many behaviors that are similar to children who suffer from ADHD’ (Webb et al., 2005, p. 35). Others have suggested that very high intelligence is often associated with emotional and behavioral problems because this rare population has difficulties blending in with typical or even above average intelligent individuals (Winner, 2000). Some research has indicated that high intelligence (more specifically mathematical abilities) has been shown to be a risk factor for psychosis (Karlsson, 1999) and bipolar disorder in men (Gale et al., 2013). Given that these above-mentioned papers are based on clinical observations rather than data-driven reports, it is not known the extent to which the above described overlapping behavioral characteristics related to high intelligence and ADHD are only characteristic of poorly functioning individuals with high intelligence that seek help from health care professionals. However, the possibility of behavioral overlap was recognized in the DSM-IV-TR (American Psychiatric Association, 2000, p. 91): ‘inattention in the classroom may also occur when children with high intelligence are placed in academically understimulating environments’. Interestingly, this issue of differential diagnosis is no longer recognized in the DSM-5. In the section on differential diagnosis in ADHD, only intellectual disability is discussed.

The above described debate clearly reflects the increasing interest in the validity and reliability of diagnosing ADHD in the context of high intelligence. To advance this discussion beyond clinical anecdotes and investigate these issues from an evidenced-based perspective, the following set of specific criteria for validation of psychiatric constructs (Robins and Guze, 1970), later modified for ADHD (Faraone, 2005), will be used for this review:

- (1) Can ADHD symptoms be dissociated from the behavioral characteristics of highly intelligent individuals and do these symptoms cause impairment?;
- (2) Does ADHD have a characteristic course and outcome in highly intelligent individuals?;
- (3) Do highly intelligent individuals with ADHD show the same neuropsychological correlates as average IQ individuals with ADHD?;
- (4) Does ADHD show evidence of heritability from family and genetic studies when the heritability of high intelligence is taken into account?;
- (5) Does ADHD show a characteristic response to treatment in highly intelligent individuals?

If indeed high intelligence fully mimics the symptoms of ADHD in the absence of the specific pathophysiological pathways for ADHD and their correlates, it is expected that (1) ADHD symptoms in highly intelligent individuals will cause no impairment or to a significant lesser degree than in the average intelligent population, (2) the symptoms have a more favourable course in

Download English Version:

<https://daneshyari.com/en/article/5043732>

Download Persian Version:

<https://daneshyari.com/article/5043732>

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