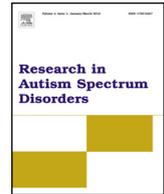




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The feature of high reading ability in high-functioning pervasive developmental disorders of childhood: Analysis of the K-ABC and WISC-3rd assessment



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ABSTRACT

We aimed to examine whether children with high-functioning pervasive developmental disorders (HFPDD) have higher reading ability and how their reading ability relates to other cognitive components. Our participants were a HFPDD group ($N = 35$) and a non-PDD clinical group ($N = 25$). We assessed reading ability with the “Reading/Decoding” and “Reading/Understanding” subtests of the Kaufman Assessment Battery for Children (K-ABC) Japanese version. To investigate the relationship with other cognitive components, we calculated correlation coefficients between the each subtest and the other K-ABC and WISC-3rd subtests scores. Analysis with a general linear model revealed significantly higher standard scores on the two subtests of the HFPDD group than the non-PDD. Pearson’s correlation coefficients showed different patterns between the two groups (the two subtests significantly related to “Word order” and, “Mazes” in the HFPDD group). These results suggest that HFPDD children have higher reading ability, but read words like symbols without adapting for inferring and comprehending contexts through semantic application of the words.

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1. Introduction

Persons with high-functioning pervasive developmental disorders (HFPDD) including autistic disorder without mental retardation, Asperger’s disorder, and PDD not otherwise specified (PDDNOS) without intellectual retardation have three main symptoms of qualitative impairment in social interactions, qualitative impairment in communication, and restricted repetitive stereotypic patterns of behaviors, interests, and activities. As recent findings have indicated the continuity between PDD and typical development (Constantino, 2011; Kamio et al., 2013), the terminology of Autistic Spectrum Disorder (ASD) nowadays is adopted in the DSM (Diagnostic and Statistical Manual of Mental Disorders)-5 by American Psychiatric Association (2013) to span the continuum.

Language in persons with PDD (or ASD) is known to include anomalies or show the results of impairments. Boucher (2012) reviewed structural language in ASD and pointed out that by school age an ‘ASD-typical’ language profile emerges

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from group studies, with articulation and syntax least affected, and comprehension, semantics, and certain facets of morphology most affected. Some hypotheses have been discussed as basic impairment of PDD person's language and communication disorders such as impairment of theory of mind (Baron-Cohen, 1988; Lind & Bowler, 2009; Mazza, Di Michele, Pollice, Casacchia, & Roncone, 2008; Pijnacker, Vervloed, & Steenbergen, 2012; Sparrevohn & Howie, 1995; Ziatas, Durkin, & Pratt, 1998) and weak central coherence (Martin & McDonald, 2003; Norbury, 2005). Detail-focused cognitive style (Happé & Vital, 2009) and excellent attention to detail and end with hyper-systemizing (Baron-Cohen, Ashwin, Ashwin, Tavassoli, & Chakrabarti, 2009) are proposed. Loucas et al. (2010) investigated phonological short-term memory (PSTM) of specific language impairment and autism spectrum disorders adolescents, and suggested there may be impaired access to PSTM resources in both groups. Active arguments have been continuing about the language of PDD or ASD still now.

As for the reading ability in persons with ASD, Nation, Clarke, Wright, and Williams (2006) reported the heterogeneous nature of reading skills in children with ASD, and showed there are the PDD children with high reading ability. Newman et al. (2007) compared reading-related skills of children with ASD with and without hyperlexia and typically developing children, and found that children with ASD with hyperlexia performed equivalently well compared to word-reading-matched typically developing children on all reading-related tasks except reading comprehension. They argued that there are some dissimilarities between these two types of reading when more elaborate cognitive and linguistic abilities were considered, and noted that the subject needs further investigation. Ricketts (2011) reviewed reading comprehension impairments in specific language impairments, Down syndrome, and ASD, and that pointed reading comprehension is typically more impaired than word recognition in these groups. As one method of settlement of issue of the reading ability in PDD (ASD), investigation into limited participants of high-functioning PDD would be needed. Furthermore, Brown, Oram-Cardy, and Johnson (2013) meta-analyzed the reading comprehension skills of individuals on the autism spectrum and concluded having ASD alone does not predict reading comprehension deficits but individuals with ASD were significantly worse at comprehending highly social texts than less social ones. Grigorenko, Klin, and Volkmar (2003) reviewed hyperlexia and insisted the necessity of multifaceted and multi-methodological approaches for the study of the phenomenon of hyperlexia. As one of the way to investigate the feature of the reading ability in ASD, it is necessary to clarify the relationship between the reading ability and other cognitive components.

The present study was designed to investigate two questions. First, we wished to examine whether children with HFPDD have higher reading ability than the children with other psychiatric disorders. Second, if these children do have higher reading ability, we wished to investigate how it relates with other cognitive components. To bring HFPDD children's reading features into relief, we compared them with non-PDD clinical samples rather than with samples of typically developing normal children.

2. Materials and methods

2.1. Participants

Participants were children examined via both the Kaufman Assessment Battery for Children (K-ABC) Japanese version (Matsubara, Hujita, Maekawa, & Ishikuma, 1993) and the Wechsler Intelligence Scale for Children, 3rd edition (WISC-3rd) Japanese version (Azuma et al., 1998) on demand by child psychiatrists at the Department of Psychiatry at Kitasato University Hospital from April 2007 to March 2011. The testers were two clinical psychologists, each of whom had greater than ten years of clinical experience. In all, 91 data sets were collected. Exclusion criteria were as follows: (a) FIQ (full intelligence quotient) was under 70; (b) the data gathered was for a child tested previously. Sixty data of testee were eligible for study inclusion. We divided them into two groups according to the DSM-4-TR (text revision) criteria (American Psychiatric Association, 2000). One was the HFPDD group, and the other was the non-PDD group. The former group included 35 children (Asperger's disorder, 9; high-functioning autistic disorder, 7; PDD-NOS, 19) and the latter group included 25 children (attention-deficit hyperactivity disorder, 13; reading disorder, 1; mathematics disorder, 2; mixed receptive-expressive language disorder, 1; tic disorders, 2; somatoform disorders, 2; adjustment disorders, 1; borderline intellectual functioning, 3). The diagnoses were performed by two child psychiatrists. HFPDD group was consisted of 24 boys and 11 girls aged from 5 to 12 years (median = 8), and non-PDD group was consisted of 21 boys and 4 girls aged 6–12 years old (median = 8). Full IQs on WISC-3rd were 94.1 (HFPDD group) and 91.5 (non-PDD group). There was no statistically significant difference between the two groups.

2.2. Measures

2.2.1. Reading ability

Reading ability was evaluated with the "Reading/Decoding" K-ABC Japanese version subtest according to the method by Grigorenko et al. (2002). This subtest requires testees to read single words. We also adopted the "Reading/Understanding" K-ABC subtest to assess simple reading comprehension. This subtest asks testees to read sentences that indicate some gestures and then to perform the gestures.

2.2.2. Cognitive components

We used the other subtests of WISC-3rd and K-ABC Japanese version for assessing cognitive components because those subsets were kind of psychological test batteries consisted of measurement of various cognitive faculties. The subtests of

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