Case Report

Intelligence and Cognition in a Child with High Functioning Autism

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ABSTRACT

Intelligence is assessed for ruling out mental retardation and to find out the relative cognitive strengths in autism. Of special interest is to know the nature of intelligence and cognition in high functioning autism. But very little is known how the assessments are carried given the deficits in communication, socialization in autism. This cross-sectional study aims to describe the nature of intelligence and cognition in a child with HFA and drawing implications for assessment in the Indian setting. Results indicate that there is no evidence for superior crystallized intelligence in HFA, though a jagged profile could be expected both across and within cognitive domains.

Key words: *Assessment process, cognition, high functioning autism, intelligence*

INTRODUCTION

A significant proportion of individuals with autism will have either comorbid mental retardation[1] or atypical cognitive processes.[2] Hence intelligence assessment is necessary to rule out both. But as in case of people with high functioning autism (HFA), defined operationally as those with an intelligence quotient (IQ) of 70 and above,[3] the same may help us understand the cognitive resources in light of autistic features. For this reason there is a considerable interest in the nature of both cognition and intelligence in HFA. There is a general view that people with HFA will have an intact or superior functioning in selective attention, rule-learning, visuospatial areas, motor learning, and perceptual motor integration.[1,4-6] With regards to intelligence, verbal quotient was usually reported to be higher than the performance quotient[7] lending support to a conventional hypothesis that probably superior crystallized intelligence is a characteristic feature of HFA.[8] Nevertheless there are no studies from India to corroborate the above findings. In this context, the present case study aimed to describe the nature of intelligence and cognition in a child with HFA and drawing implications for assessment in the Indian setting.

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CASE REPORT

SA, a 5-year and 7-month-old boy was brought by his parents with the complaints of delayed speech. Birth history was uneventful though there was significant delay in attaining meaningful speech, communicable phrases, and social skills. Medical and therapeutic assessments ruled out sensory-motor impairments and significant organic brain pathology. Behavioral observation revealed that he was neat and tidy; continuously curling up in chair, flapping, and vocalizing. He needed repeated prompts for both arousing and sustaining attention. He followed repetitive commands very mechanically. His eye contact was brief, deviant and at times, vacant. His affect ranged from normal state to an inappropriately cheerful state.

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Rapport could not be developed. He demonstrated little pragmatic social skills or any age-appropriate gestures. Based on this presentation, an International Classification of Diseases, Version 10 diagnosis of autism was made. Further rating on Childhood Autism Rating Scale[9] by psychiatrist indicated that the child had severe autism. Asperger's disorder was ruled out by applying Gilliam Asperger's Disorder Scale.[10] Special educator's report indicated that he could simplify ratios and identify degree of given area or angles in circle and triangle, respectively in written form. He could even solve some randomly selected arithmetic of grade VI and VII. But he could not apply these skills in a social context or for functional purposes. Similar performance was not reported or identified in other subjects.

Assessment procedure

Developmental Screening Test (DST)[11] and Vineland Social Maturity Scale (VSMS)[12] were administered first to reduce the test anxiety and also to gain insight about applicability of intelligence scales based on the developmental profile. On DST his developmental age was 2 year and 10 months and the developmental quotient was 52; and on VSMS his social age was 3 years and the social quotient of 55 [Figure 1].

Intelligence assessment was carried in a quiet room in a single day, with adequate breaks suiting the child's attention, motivation. Gessell's Drawing Test[13] was used as a screening measure of intelligence. Since he did not copy beyond the first design (i.e., circle) the test was suspended and his mental age was estimated to be around 3 years. Binet–Kamat Test of Intelligence (BKT)[14] yielded a basal age of 6 years, ceiling age of 19 years, and a mental age of 10 year and 6 months, though he passed items up to 16 years. The corresponding IQ was 188. He did not have any problem in attention to specific tasks nor in immediate recall and short-term memory. He failed on several visuospatial tasks whereas a better performance was noted for non-meaningful memory, conceptual thinking, social intelligence, and numerical reasoning. Further, the profile analysis of BKT based on the description of Lezak[15] indicated that the performance across various cognitive domains was very uneven albeit with relatively equal performance on verbal items (60%) and non-verbal items (57%) [Figure 2].

Nevertheless, certain adaptations were required for administering BKT. For example, items requiring verbal responses were tested through written form to understand the level and quality of his conceptual thinking. For example, he could not say a sentence with three key words, a skill expected by 9 years age, but expressed the same in writing. The only qualitative difference was that the letters were as large as two inch and were poorly aligned. However, responses were noted but not credited when they had to be in specific form. For example, no credit was given when the child failed to repeat sentences as part of testing.

DISCUSSION

Studying intelligence and cognition in persons with HFA may offer insights about cognitive resources in the backdrop of autism. Contrary to previous studies,[8] HFA may not always be characterized by superior crystallized intelligence. Rather there could be an uneven performance across subtests of IQ measures, which is already acknowledged.[1] Additionally, this study indicates that there could be intra-domain unevenness, as noted particularly in the areas of attention, short-term memory, and visuospatial skills. That is, a superior skill can be noted in these areas despite a failure on considerably lower tasks. However, further validation is required to understand whether it is a limitation of the test or a characteristic feature of HFA, though the response pattern indicates a possibility of the latter.

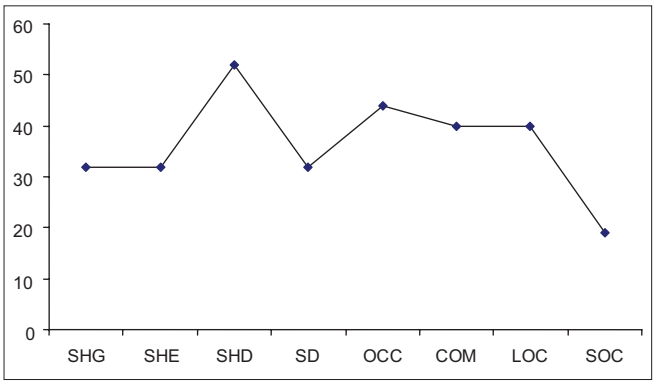

Figure 1: Vineland social maturity scale profile. SHG - Self-help general; SHE - Self-help eating; SHD - Self-help dressing; SD - Self-direction; OCC - Occupation; COM - Communication; LOC - Locomotion; SOC - Socialization

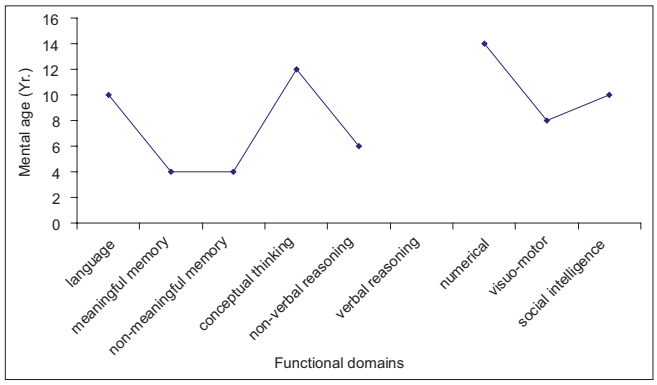

Figure 2: Binet–Kamat test of intelligence profile. The graph is not continuous as the child did not pass any item in non-verbal reasoning domain, where the items start at 12 years

A superior performance on tasks tapping selective attention together with complexity-dependent memory deficits but not modality-dependent memory deficits; and modality specific language deficits and poor social cognition only adds to the view that cognitive deficits in autism are not primarily due to attention deficits.[16] Despite a very high level of intelligence, failure on items related to repeating complex sentences, recalling stories, and adaptive behavior was also found in previous studies.[17,18]

This study also has specific implications for assessment, that is, global intelligence scales could be applied even when the screening measures and behavioral observation indicate inferior skill repertoire. Further, lack of appropriate communication skills does not rule out the ability to express concepts in writing. Therefore, clinicians may uncover the conceptual levels in HFA by allowing them to express by writing. This kind of adaptation is necessary keeping in view that age and IQ-appropriate writing skills may distinguish autism from other developmental disorders.[17]

In conclusion, intact or superior crystallized intelligence is not necessarily found in all cases of HFA. Uneven performance may be found not only across cognitive domains but also within a cognitive domain. Global intelligence scales could be applied to understand this pattern even when behavioral observations and screening measures indicate a poor response pattern. Future studies may compare the profiles of intelligence, cognition, and language in children with HFA with that of the typically developing children, and children with specific speech and language impairments to understand cognitive markers of autism.

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