



A Brief Update on Intelligence in Autism Spectrum Disorders



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Abstract

Autism Spectrum Disorders (ASD) and Intellectual Disability have been commonly associated with prevalence rates of comorbidity being around 70%. However, in the last few years, not only these rates have been dropping, but also research is experiencing a great shift regarding intelligence in ASD individuals. Here the authors provide a brief state-of-the-art update on what is changing and try to foresee future directions.

Keywords: Autism spectrum disorders; Intellectual disability; Child and adolescent psychiatry

Introduction

Autism spectrum disorders (ASD) share features of impaired social-communicative interactions, focused interest and repetitive behaviors. Intellectual disability (IQ score <70) is commonly associated with ASD. Historically, the prevalence rates were around 70% of autistic individuals with intellectual disability [1]. But these rates have been dropping in the last decade. According to the CDC, in 2012, the prevalence of autistic children with intellectual disability was 31.6%, 24.5% were on the borderline range (IQ: 70-85) and 43.9% were classified in the average and above average range (IQ>85) [2]. This finding is not limited to the US, in the United Kingdom corresponding prevalence rates have been reported as well [3]. Although changes in awareness and clinical practice, driven by the evolving definition of the disorder, are probably underlying this process, there are other important factors that should be taken into account. As scientific knowledge expands, genetic studies have gained increased importance in understanding the disorder.

The genetic link between Intellectual Disability and ASD is not clear. Certain genetic syndromes (Fragile X, Rett, Tuberous Sclerosis, Down, phenylketonuria, CHARGE, and Angelman) are associated with severe Intellectual Disability and also have a high incidence of ASD [4,5]. There is evidence linking genes of intellectual disability, ASD epilepsy and schizophrenia [6-8]. However, in a study conducted by Hoekstra and colleagues [9] the genetic correlation between autistic traits and intellectual disability was only modest. And, other studies have reported significant overlap between the alleles that are associated with high intelligence [10] and educational level (strongly correlated

to intelligence) and autism risk [11,12], among neuro typical individuals.

Another interesting finding in the last few years in the research field concerning intelligence in autistic individuals is that it may be underestimated. Early descriptions and quantifications of their intelligence highlight the discrepancy of their abilities [13]. Findings of strong performance on specific tests have been considered abnormal areas of abilities emerging from a multitude of deficiencies [14,15]. But, since autism is characterized by atypical information processing due to sensorial abnormalities, researchers have questioned their evaluation methods. A handful of studies have compared individuals with ASD performances on Wechsler scales of intelligence and Raven's Progressive Matrices (RPM) [3,16-18]. RPM is a test that minimizes spoken instruction and avoids speech production [19].

It is regarded as the best marker of fluid intelligence, which comprehends abilities to reason and novel problem-solving [20]. While typical individuals display similar performance in both tests, for autism that is not upheld, with consistent findings reporting advantages in RPM scores compared to Wechsler scores. These results have even been reported for individuals with Asperger's Syndrome, who have less impairment in social-communicative behaviors [21]. A third important factor that should be considered is that the cognitive profile of autistic children can change through time. A few studies have shown that IQ increases in ASD children from early to middle childhood [22,23], with comparable development between non-verbal

IQ and verbal IQ [24]. One study followed the developmental trajectories of ASD children between ages 2 and 8 years of age and reported almost 57% of participants presenting improvements in IQ measures through time [25].

Conclusion

While there is still a lot to understand regarding autism and intelligence, a growing body of literature has currently started pointing to a different direction than previously consolidated. As the research field advances, prevalence rates of autism co morbid with intellectual disability tend to decrease not only because of new definition parameters. The methods of evaluating intelligence in these individuals should be revised, leading to perhaps more drops in these rates. Crespi, recently, hypothesized that autism might be a disorder of high intelligence, but with imbalanced components [26]. It is not possible to confirm this theory yet, but it emphasizes the great shift the area has been having the last few years.

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