

Invisible Talents and Overcomeable Limits in Autism Spectrum Disorder

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Abstract

Based on the Diagnostic and Statistical Manual of Mental Disorders 5th edition, Autism Spectrum Disorder is characterized by patterns of delay and deviance in the development of social, communicative, cognitive skills and the presence of repetitive and stereotyped behaviors as well as restricted interests. Some studies have shown that 50% of individuals with autism have special abilities, a higher percentage than other neurodevelopmental disorders or intellectual disabilities. Often, however, these talents are obscured by important limitations especially in daily living skills. The therapeutic challenge is represented by the use of these talents for enabling purposes to allow people with autism to achieve the best possible quality of life.

Keywords: Autism Spectrum Disorder; Savant Syndrome; Talents

Introduction

Over the course of about 70 years, the diagnostic criteria for autism have changed considerably several times [1]. In 2013, the Diagnostic and Statistical Manual of Mental Disorders 5th edition (DSM-5) [2] introduced the diagnosis of Autism Spectrum Disorder (ASD) with different levels of impairment, eliminating the diagnosis of Asperger's Disorder, incorporating it into the High-Functioning level of the ASD (HFA).

First Asperger [3] and then Kanner [4] and Rimland [5] described autistic individuals with outstanding skills. O'Connor and Hermelin in 1987 and then Treffert in 2000 [6,7] reported that 50% of individuals with savant skills had a diagnosis of autism spectrum disorder and the other 50% had other forms of developmental disability, intellectual disability and genetic conditions (e.g., Prader-Willi syndrome [8], Williams syndrome [9,10]).

Compared to the approximate male-female ratio in ASD of 4:1, savant syndrome is more frequent in males with a male-female ratio of 6:1 [11]. To explain these percentages, a "pathology of superiority" theory has been postulated and was then also used to motivate the high male-female ratio in autism [12] and other conditions such as dyslexia, delayed speech and stuttering. In 1996, Kapur [13] explained the left-brain dysfunction and the subsequent right brain compensation with a form of "paradoxical functional facilitation". Moreover, Hou et al. [14] stated:

"The anatomic substrate for the savant syndrome may involve loss of function in the left temporal lobe with enhanced function of the posterior neocortex".

The first description of savant syndrome is historically attributed to Moritz with its publication in the German psychology journal, *Gnothi Sauton*, in 1783 [15]. In 1789 Rush [16] published a case of an individual with extraordinary calculating abilities. In 1887 John Langdon Down [17] coined the term "idiot savant" to describe individuals with extraordinary abilities in specific areas associated with poor general ability. The term "idiot" referred to individuals with an IQ below 25 and the term "savant" referred to a knowledgeable person. On the other hand, savant features are often found in people with IQ greater than 40. Indeed, first O'Connor and Hermelin in 1991 and then Miller in 1999 have shown that few savant individuals have an IQ below 50 (mean overall IQ 71), with some scores within the normal range [18,19]. In 1983, The American Association on Mental Deficiency (AAMD) defined "savant" as "persons with obvious mental retardation who are capable of performing in sharply circumscribed areas (e.g., arithmetic, calendar calculating) at a remarkably high level" [20]. In 1989, Treffert differentiated two types of savants: "prodigious" ("those extraordinarily rare individuals for whom the special skill is so outstanding that it would be spectacular even if it were to occur in a non-impaired person") and "talented" ("those cognitively impaired persons in whom the musical, artistic or other

special abilities are more prominent and highly honed, usually within an area of single expertise and are very conspicuous when viewed in contrast to overall disability”) [21].

The most common areas of savant skills are mathematics, music, art and memory for dates, places, routes or facts [22-24]. Instead, the less frequent fields are pseudo-verbal skills, coordination skills and mechanical aptitude [5,23]. Moreover, in some instances, especially in people with autism, several skills exist simultaneously [24]. From a clinical point of view, aspects common to savant individuals are special skills and phenomenal memory [11]. The neurobiological bases of the mnemonic abilities of savants are reported by Mishkin et al [25], to two neural circuits: a higher-level corticolimbic circuit and a lower-level cortico-striatal circuit. These brain circuits characterize the two main types of memory: semantic memory and procedural or implicit memory.

Although savantism manifests itself during childhood, cases of savant features have been reported during adulthood following brain injury [26,27] or fronto-temporal dementia [14,28,29].

Materials and Methods

A literature search was conducted on major databases to find useful studies for the purposes of this paper.

Discussion

Taking as a starting point the high percentage of savant characteristics in individuals with autism, the question to ask now is which aspects of autism predispose to talent. Furthermore, how to use these talents for enabling purposes.

Typical characteristics of people with ASD, such as restricted interests and perseverance in deepening these interests, can be aspects that favor the practice of talent. Indeed, a tendency to repetitive behaviour and preoccupations with restricted areas of interest are fundamental features of savant individuals [18, 30]. Furthermore, if, as stated by Howe et al. [31], genius derives 99% from the application, we could ask ourselves whether genius is a more frequent aspect in autistic people who have accumulated thousands of hours of solitary practice hidden from society over the course of their lives. and to peers.

In 2009 Happé and Vital [32] took into consideration three cognitive aspects characteristic of autism to explain talent: a) mind-blindness, b) executive dysfunction and c) detail-focused cognitive style.

Mind-blindness is a theory that claims that people with autism have a lack of developmental delay of Theory of Mind meaning they are unable to attribute mental states to others [33,34]. This aspect clinically translates into less interest or greater difficulty in socializing. Waterhouse [35] suggested the idea of “cortical rededication” to explain the reallocation of neural and cognitive resources from social to areas of interest, subsequently confirmed by Grelotti et al. [36]. The lack of need to be accepted by peers to be part of a group could determine a greater ability and freedom to follow one's thoughts compared to social acceptance. While on the one hand, this aspect could predispose to originality, it could sometimes be the cause of bizarre and maladaptive behaviors [34].

Although there is a lack of certain data on the correlation between executive functions and talent, reduced cognitive flex-

ibility could be linked to obsessive pursuit and narrow interests in autism [37]. Furthermore, some studies have shown working memory may be superior in savant groups compared to non-savant groups with autism [38,39]. Moreover, Snyder [40] suggested that executive dysfunctions may facilitate the development of savant skills. Further studies are needed to establish a correlation between executive dysfunctions and talent.

In 1980, Frith [41] advanced the weak central coherence theory. The term “central coherence” refers to the “...tendency to pull information together and process information in context, looking for the “big picture” and drawing out meaning, often at the expense of details. By contrast, “weak central coherence” refers to the tendency in ASD to attend to and remember details rather than global form or meaning” [42]. Some authors have shown a link between talent and weak central coherence [43], enhanced perceptual functioning [44] and hyper-attention to detail [45].

In Happé and Vital's opinion [34], the detail-focused cognitive style would represent the starting engine, while mind blindness would act as fuel. The combination of these two aspects of people with autism could explain the greater frequency of giftedness compared to the general population.

Baron-Cohen et al. [46] proposed hyper-systemizing as an essential characteristic of giftedness in people with autism. Strong systemizing would require hyper attention to detail based on a congenital condition of sensory hypersensitivity [47]. The act of systematizing represents the ability to identify the rules that govern a system, in order to predict how that system will behave [48]. In Baron-Cohen's theory, the ability to recognize repetitive patterns in stimuli would be the basic characteristic of talent.

In our opinion, a major shift in perspective brought about by Baron-Cohen et al. [48] concerns the aspect of detail-focused cognitive style. In fact, unlike the theory of weak central coherence, which focuses on negative aspects of attention to detail, hyper-systemizing emphasizes the positivity of recognizing details as being fundamental in understanding a system.

Sometimes the management of talent appears difficult, especially for family members, risking losing sight of the person in favor of the talent. Talent should be related to the existence of the person and used in enabling aspects. In our opinion, the mission that family members, caregivers and healthcare workers should pursue is to train the talents and diminish the disability. The special abilities demonstrated by savants can be used as a tool in rehabilitative treatments aimed at overcoming or reducing the disabilities resulting from the disorder. These extraordinary skills can be used for better communication skills, better social interaction and even better mastery of daily living skills, therefore towards greater overall independence. It appears fundamental to recognize, cultivate and develop unique talents and abilities. Additionally, creating an environment that fosters their interests can help people with savant skills reach their full potential, including through specialized training, workshops or mentorship.

In the book entitled “Developing Talents: careers for individuals with Asperger Syndrome and high-functioning autism” [49] Temple Grandin stated: “...discover, cultivate and train talent so that people with autism can enjoy the important experience

of work and the satisfaction of contributing to their family and community, of being independent and economically self-sufficient". Lastly, we completely agree with Phillips' statement "...is better to eliminate the defects or train the talent?... Experience has provided a clear answer...train the talent!" [50].

Conclusion

Some studies suggested that people with autism possess extraordinary abilities with high frequency compared to other neurodevelopmental disorders or intellectual disabilities. Indeed, some typical characteristics of autism can predispose and subsequently influence the emergence of talents. These talents should be used in therapeutic paths to improve the quality of life of people with autism. In aspects of daily life, we often focus on the skills that are lacking even from a habilitation perspective, but we probably lose sight of the strengths of the person with autism and even more often the talents, genius and creativity. The message we want to give with this article is to focus more on the positive characteristics of the person and not just on the limitations linked to illness and disability.

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