



RE-CONCEPTUALISING AUTISTIC SAVANTISM AS A SPECTRUM SYNDROMIC DISORDER: A SEQUEL TO THE CASE STUDY OF A YOUNG ADULT SAVANT ARTIST

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Abstract:

Savant syndrome is strongly linked to autism spectrum disorder (ASD) given that 50% of the cases of savant syndrome have autism as the underlying developmental disability. The *spectrum* of ASD was officially recognised in the DSM-V to reflect the wide range of symptoms, manifestations, skills, and level of disability unique to each individual. A similar heterogeneity exists among those with savant syndrome and can be examined by three core symptoms: 1) underlying disability; 2) over-excitability in one, two, or more areas of extreme interest, and; 3) underlying superior systemising ability. To more aptly reflect the levels of disability, degree of over-excitability, and manifest systemising ability, the authors of this paper propose a re-conceptualising of autistic savantism as autistic savant spectrum syndromic disorder, or ASSSD for short. This paper also serves as a sequel to a previous paper on the case study of a young adult savant artist named BKⁱⁱ, who has been diagnosed with Tuberous Sclerosis Complex (TSC) and identified as a savant artist (see Camulli, Goh, & Chia, 2018, for detail). Here in this paper, we intend to re-examine his case and to argue our points why we strongly believe he is a savant artist.

Keywords: savant syndrome, autism spectrum disorder (ASD), autistic savant spectrum syndromic disorder (ASSSD)

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ⁱⁱ The actual name of BK has been kept anonymous and those years during which he has undergone different assessments have also been changed to ensure full confidentiality in adherence to the Personal Data Protection Act (PDPA) enacted in Singapore in 2014. In light of this understanding that definitions, criteria, and new insights of developmental disorders continue to emerge, we propose a re conceptualising of autistic savantism as a spectrum syndromic disorder.

1. Introduction

The latest Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (DSM-V) (American Psychological Association, 2013) ushered in significant revisions not seen since the last publication of the DSM-IV almost 20 years earlier in 1994 and later in 2003 with its text revision resulting in the DSM-IV-TR. Largely informed by advancements in neuroscience, clinical and public health need, and identified problems with the classification system and criteria put forth in the DSM-IV, the changes to diagnostic criteria for several complex developmental disorders, including autism, have great clinical impact and reflect the evolutionary nature of pinpointing the specific criteria that hallmark such disorders (Regier, Kuhl, & Kupfer, 2013).

1.1 Evolution of the Definition of Autism

The original concept of autism was developed by Bleuler (1911, 1978) and the disorder was then a symptom of schizophrenia, which was coined by Bleuler himself. According to Bleuler (1911), autism is a symptom related to the psychopathology of (i) dementia praecoxⁱⁱⁱ (Kraepelin, 1887a, 1887b), which was believed to be primarily a disease of the brain – or (ii) the group of schizophrenias^{iv}, i.e., a cerebral disease with primary symptoms in the disturbances of four 'a's: *associations, affect, ambivalence* and *autistic isolation*.

The first version of the DSM, published by the American Psychological Association (APA), appeared in 1952, building upon the statistical data and classification system developed by the U.S. Army in post-World War II America as well as the sixth edition of International Classification of Diseases (ICD) published by the World Health Organisation. Autism first appeared in the DSM in 1980 under the label Infantile Autism (DSM History, 2018).

The diagnostic criteria used for Autism Spectrum Disorder (ASD) has changed over the past decades with improved understanding of this complex developmental disability. The DSM has responded to the evolving understanding of ASD by issuing updated definitions in each new edition to reflect the collective knowledge. Only in its most recent edition, DSM-V, was autism renamed Autism Spectrum Disorder not only to more accurately reflect the wide range [spectrum] of symptoms, manifestations, skills, and levels of disability but also to facilitate diagnosis by focussing on the shared principal characteristics of the different phenotypes of ASD rather than their differences. Table 1 shows some changes in the DSM diagnostic criteria over a period of time from 1980 to 2013 with the publication of the fifth edition DSM.

ⁱⁱⁱ Kraepelin (1887a, 1887b) distinguished dementia praecox from other forms of dementia (such as Alzheimer's disease) which typically occur late in life.

^{iv} Bleuler (1911) emphasized the notion of a fundamental disorder of thought and feeling in his concept of schizophrenia.

Table 1: Changes in the DSM diagnostic criteria for ASD 1980-2013

DSM-III (1980)	DSM-III-R (1987)	DSM-IV (1994) DSM-IV-TR (2000)	DSM-V (2013)
Infantile Autism	Autistic Disorder	Autistic Disorder	Autism Spectrum Disorder (ASD)
Onset before 30 months	Onset before 36 months	Delays or abnormal functioning in one area (social interaction, language or play) before 36 months	Symptoms in early developmental period (may not manifest until social demands exceed limited capacities)
Gross deficits in language development	Qualitative impairment in both verbal and nonverbal communication	Qualitative impairment in communication	Persistent deficits in social communication and social interaction
Pervasive lack of responsiveness to others	Qualitative impairment in reciprocal social interaction	Qualitative impairment in social interaction	Deficits in social-emotional reciprocity and social relationships

Formerly (DSM-IV and/or DSM-IV-TR), the types of autism that now fall under the collective umbrella of ASD, were listed as separate but related disorders under the broad diagnosis of Pervasive Development Disorders. These include Autistic Disorder, Asperger’s Disorder, and Pervasive Development Disorder – Not Otherwise Specified (PDD-NOS). These are now subsumed within ASD, or, in some cases of higher functioning individuals who do not exhibit all of the requisite criteria for the diagnosis of ASD, reclassified under Social Communication Disorder (SCD) (Lai, Lombardo, Chakrabarti, and Baron-Cohen, 2013). Still absent, however, is the mention of autistic savant or savant syndrome from the DSM-5. This will be addressed further on in this paper.

Studies by Gibbs, Aldridge, Chandler, Witzlsperger, and Smith (2012) and Huerta, Bishop, Duncan, Hus, and Lord (2012) have both shown that DSM-5 provides better specificity to reduce false-positive diagnoses, but at the expense of potentially reducing sensitivity, especially for older children, adolescents, and adults, individuals without intellectual disability, and individuals who previously met criteria for diagnoses of DSM-IV Asperger’s Disorder or PDD-NOS.

Although some previously distinct diagnoses have been eliminated or absorbed by the ASD designation, the DSM-V does offer distinctions within the ASD umbrella to reflect level of severity of symptoms. The three severity levels are based on the level of support needed, due to challenges with social communication and restricted interests and repetitive behaviours. Table 2 presents the descriptors used as qualitative criteria for determining the diagnostic level of ASD of an individual. The inclusion of levels of severity and the relative vagueness that prevails within each description further reflects the range (i.e., spectrum) of manifest challenges observed and experienced in the autistic population. These changes highlight the varied nature of the two primary behaviour domains of ASD, and improve the organization of symptom descriptions

with the aim of reducing or eliminating misdiagnoses or conflicting diagnoses among clinicians (Lai et al., 2013). But are they enough?

Table 2: Severity Levels in DSM-V for ASD diagnosis and coding

Severity Level for ASD	Social Communication	Restricted Interests & Repetitive Behaviours (RRBs)
Level 3 'Requiring very substantial support'	Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning; very limited initiation of social interaction and minimal response to social overtures from others.	Preoccupations, fixated rituals and/or repetitive behaviours markedly interfere with functioning in all spheres. Marked distress when rituals or routines are interrupted; very difficult to redirect from fixated interest or returns to it quickly.
Level 2 'Requiring substantial support'	Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions and reduced or abnormal response to social overtures from others	RRBs and/or preoccupations or fixated interests appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress or frustration is apparent when RRBs are interrupted; difficult to redirect from fixated interest.
Level 1 'Requiring support'	Without supports in place, deficits in social communication cause noticeable impairments. Has difficulty initiating social interactions and demonstrates clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interactions.	Rituals and repetitive behaviours (RRBs) cause significant interference with functioning in one or more contexts. Resists attempts by others to interrupt RRBs or to be redirected from fixated interest.

The changes to the DSM-5 serve clinicians in facilitating a diagnosis, in determining qualification for services, and in guaranteeing individuals with required levels of support, but how does this unitary label account for and address the specific and heterogeneous needs of each child with autism and the families, teachers, and therapists who support them? Lai et al (2013) argue that given the known massive heterogeneity within the overarching label of ASD, not just in terms of severity and combination of behavioural symptoms but also in cognition and biological mechanisms, this approach is not useful for research in general nor for identifying and addressing the partially distinct aetiologies [and comorbidities].

Lai and his team (2013) suggest that the term 'spectrum' holds several meanings and that the differences, though subtle, are not trivial. The first refers to the dimensional nature of the cardinal features of autism *within the clinical population* (i.e., differences in the severity and presentation of symptoms among those with a diagnosis of ASD). The second refers to the *continuity between the general population and the clinical population*. This perspective of the spectrum necessitates the inclusion of autistic conditions or traits or even associated features that manifest through the whole population. The third meaning refers to *subgroups*, in contrast to the DSM-V that intentionally tried to move

away from focusing on the differences by emphasising the essential shared features of the autism spectrum. His team offers an expanded, though not exhaustive, list of ‘specifiers’ to further differentiate individuals within the ASD population. Table 3 outlines examples from the list of specifiers Lai and his team propose to assist in the identification of subgroups.

Table 3: Sample list of specifiers, toward the identification of ASD subgroups

Category	Specifier	Example
Developmental patterns	Pattern of atypical development	1. Age and pattern of onset/regression 2. Trajectory of development 3. Language Onset 4. Hyperlexia
Sex/gender	Biological sex Sex/gender-adjusted autistic features	Male/female Statistical characterization of autistic trait (e.g., percentile) relative to sex/gender-specific norms
Clinical phenotype	Co-occurring condition	1. Epilepsy 2. Macrocephaly 3. Immune disorders 4. Attention deficit/hyperactivity disorder 5. Dyslexia 6. Sleep disruption
	Taxonomic formulation	1. Asperger Syndrome 2. Aloof/passive/active but odd/loners group
Cognitive profile	Intelligence	1. IQ profile 2. Savant memory 3. Savant spatial skills
	Social cognition	1. Emotion perception and understanding 2. Face recognition 3. Emotional contagion
	Executive function	1. Cognitive flexibility 2. Planning 3. Inhibitory control
Genetics	Syndromic autism	1. Fragile X syndrome 2. Rett syndrome 3. Tuberous sclerosis complex

It could be argued that with most of the examples given, a new wave of ‘spectrum’ exists. For example, the age of language onset can range from very early to late onset to not at all (i.e., the individual has remained non-verbal), or the IQ profile can be spread from moderate mental retardation to above-average intelligence, or the presence of tumours in Tuberous Sclerosis Complex can be minimal or multiple. It stands to reason why the DSM-5 opted to focus on broad similarities of cardinal behavioural domains for the myriad of other co-existing factors complicate, if not distract, the diagnostic process. Lai et al (2013) disagree, concerned that the umbrella term ASD risks

whitewashing the evident heterogeneity, simply moving us from the level of subgroups (“apples and oranges”) to the prototypical level (“fruit”).

1.2 Savant Syndrome in Autism Spectrum Disorder?

Savant syndrome (SS) is a condition hallmarked by the paradoxical special skills amidst discernible disability or handicap (Camulli, Goh, and Chia, 2018). According to Treffert (2010), “[S]avant syndrome is a rare, but extraordinary, condition in which persons with serious mental disabilities, including autistic disorder, have some ‘island of genius’ that stands in marked, incongruous contrast to overall handicap” (p. 1).

An undeniable link to the spectrum disorder of autism (or ASD), approximately 50% of cases with savant syndrome have autism as the underlying developmental disability and 50% are associated with other disabilities (Treffert, 2014). As such, this distinction fundamentally expands the operating definition of autism to include autistic savants. Autistic or not, savants can be further categorised into various types, or a ‘spectrum’ of savantism.

Although savantism (either as autistic savant or savant syndrome) is not yet included in the DSM-5, it has been observed, researched and diagnosed even before John Langdon Down first coined the term ‘idiot savant’ in a lecture before the Medical Society of London in 1887 (Treffert, 2009). The first known description of savant syndrome in a scientific paper was in the German psychology journal, *Know Thyself or Journal of Empirical psychology (Gnothi Sauton oder Magazin zur Erfahrungsseelenkunde)*, in 1783 describing the case of an Englishman Jedediah Buxton who was a ‘lightning calculator’ (Treffert, 2009). Scores of reports since that time describe individuals who have perplexed researchers by their apparent inability to comprehend scarcely anything, either theoretical or practical’ and yet demonstrate remarkable skill or talent in one, sometimes more, narrow area of interest (Treffert, 2009).

2. An Expanded Operating Definition of Autism

According to an expanded operating definition of autism or ASD proposed by Chia (2008a), the term ASD is defined “as a neurodevelopmental syndrome of constitutional origin (i.e., genetic and epigenetic causes), whose onset is usually around first three years of birth, with empathizing or mentalizing deficits that result in a triad of impairments in communication, social interaction, and imagination, but may, on the other hand, display (especially by autistic savants) or hide (especially by autistic crypto-savants) a strong systemizing drive that accounts for a distinct triad of strengths in good attention to detail, deep narrow interests, and islets of ability” (p. 10).

It is the second part of the operating definition, i.e., “may ... display (especially by autistic savants) or hide (especially by autistic crypto-savants) a strong systemizing drive that accounts for a distinct triad of strengths in good attention to detail, deep narrow interests, and islets of ability” (Chia, 2008a, p. 10), that provides us some kind of an imbedded

condition in which someone with significant mental disabilities can still demonstrate certain abilities far in excess of average (Miller, 1999; Treffert, 2009). Although it seems like there are two extreme ends apart between autistic crypto-savants per se and autistic savants per se, whatever falls in between them constitutes a spectrum of savant abilities including those with splinter skills, talented skills and prodigious skills (Exkorn, 2005). We have decided to term this spectrum disorder of autistic savants as autistic savant spectrum syndromic disorder or ASSSD for short (see Figure 1).

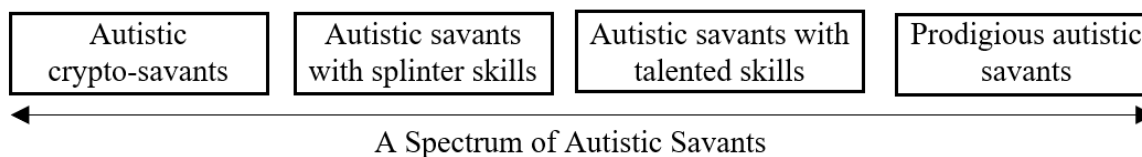


Figure 1: Autistic Savant Spectrum Syndromic Disorder

3. Autistic Savant Spectrum Syndromic Disorder

When several disabilities/disorders share certain key [autistic] symptoms, they constitute a *syndrome* (Chia & Camulli, 2017, p. 136). In ASSSD, *syndrome* is the third S-word to be added to the term with the first S-word being *savant*. According to Şıklar and Berberoğlu (2014), the term *syndrome* refers “to a group of specific features which appear to be unrelated, but which define a number of disorders when they develop together” (p. 1). Also known as *syndromic disorder* (see Figure 2), it involves a combination of symptoms resulting from a single cause or so commonly occurring together as to constitute a distinct clinical *disorder*.

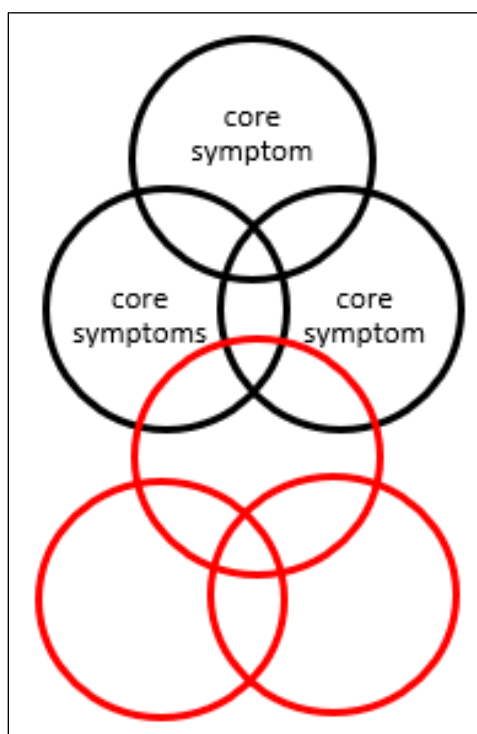


Figure 2: A Model of a Syndromic Disorder

One good example is the generalized attention behavioural syndrome (GABS) (see Figure 3). It consists of inattention as the key common symptom shared by two other disorders: (1) Attention Deficit Hyperactivity Disorder (ADHD) with three core symptoms namely, inattention, hyperactivity and impulsivity (see Rydelius, 2000, for detail); and (2) the Deficits in Attention, Motor control and Perception (DAMP)^v (see Gillberg, 2003; Landgren, Kjellman, & Gillberg, 2000, for detail). Other examples include Angelman Syndrome, Noonan Syndrome and Prader-Willi syndrome.

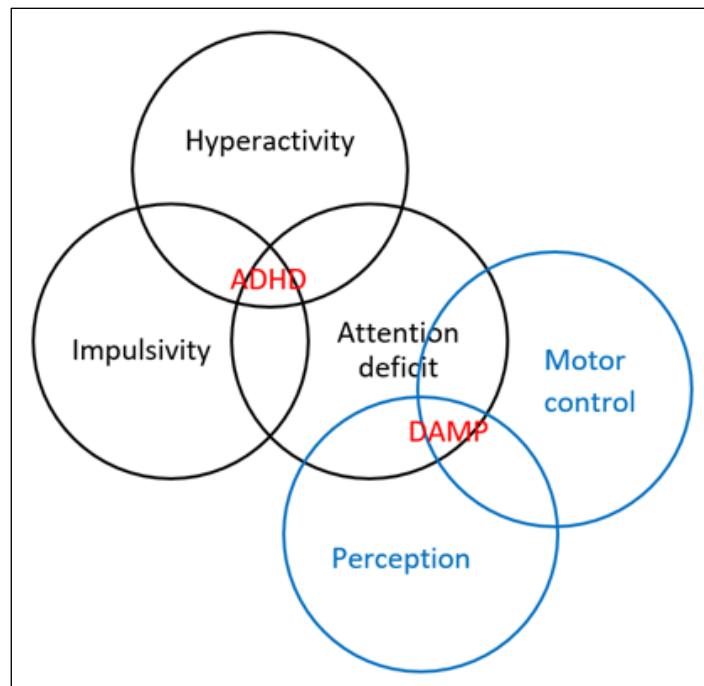


Figure 3: Generalized Attention Behavioural Syndrome

Within the syndromic disorder of autistic savants, there is spectrum of several distinct categories or classes since they fall within the same continuum. Hence, the second S-word *spectrum* is added to the ASSSD. On one end of the spectrum is a group of autistic crypto-savants, a term coined by Rimland (1990) to describe those autistic savants “because of their inability to communicate, who have savant skills that are hidden and unknown to all around them” (p.3). Very little has been written about or researched on autistic crypto-savants since the time when Rimland (1990) reported the phenomenon and backed up with three cases that he had encountered.

The next group on the spectrum is the autistic savants with splinter skills, being the most common of all. These autistic savants manifest obsessive preoccupations with and memorization of trivia and obscure information (Siegel, 1996), e.g., license plate numbers of vehicles and names of all the recent and past soccer players in the Manchester United FC, which they commit to memory. However, according to Young

^v The concept of DAMP was first introduced as a variant of minimal brain dysfunction (MBD) (Rydelius, 2000, p. 266). Up to this day, there is still no official diagnostic code for DAMP. Figure 2 shows a model of a syndromic disorder.

(2005), “[T]he term splinter skill is ... used to describe a skill that is extraordinary only in comparison to one’s overall functioning. These skills are more common among the autistic population and typically involve memory for facts. Individuals demonstrating only splinter skills do not warrant ‘savant’ classification” (p. 200).

Treffert (1989, 2000) provides a useful distinction for the savants with regard to their competence level of skill and he uses the two terms “talented savant” and “prodigious savant” to describe the two categories of savantism. In other words, falling within the savant spectrum is a group of autistic savants with talented skills who have a more highly developed and specialized skill. Often, they are found to be very artistic and paint beautiful sceneries or draw detailed images (Camulli, Goh, & Chia, 2018; Selfe, 1977; Wiltshire, 1989). For some of them, they have a fantastic memory that allows them to work out difficult mathematical calculations mentally (Chia, 2008b; Tammet, 2006). The other group that follows after and falls on the other end of the spectrum constitutes the prodigious savants, being the rarest type (see Barlow, 1952; Goldsmith, 1987). They possess spectacular skills that would be remarkable even if they were to occur in non-handicapped individuals. “It is likely, however, that a prodigious savant represents an extreme instance within a continuum of skills rather than a discrete category” (Young, 2005, p. 200). According to the Better Health Channel (February 2007), there are only about 25 such prodigious savants in the world; for instance, the capability of a prodigious savant to play an entire concerto on the piano after listening it only once (Charness, Clifton, & MacDonald, 1988).

Underlying these savant abilities or extraordinary skills is that incredible systemizing ability to analyse and build systems so as to understand and predict the functional behaviour of impersonal events or inanimate or abstract entities (Chia, 2008a, p. 3-4). Myers, Baron-Cohen and Wheelwright (2004) have listed the following six systems: (1) mechanical systems such as machines and tools (see Brink, 1979; Hoffman & Reeves, 1979); (2) natural systems such as biological processes (e.g., respiration) and geographical phenomena (e.g., earthquakes) (see Grandin, 2000; Grandin & Johnson, 2005); (3) abstract systems such as mathematical concepts (e.g., integration, 3x3 matrices) and computer programs (including digital games) (see Brill, 1940; Chia, 2008c); (4) motoric systems such as 3-D drawing, piano finger technique or a lawn tennis shot (see Charness, Clifton, & MacDonald, 1988; Selfe, 1977); (5) organizable systems such as Dewey Classification System used in library catalogue or a stamp collection (see Chia, 2007; Shah & Frith, 1993); and (6) social systems such as a business management or a football team (see Golan & Baron-Cohen, 2006; Lawson, 2001).

4. Traits of Savant Syndrome

Treffert (2010) has listed the following traits of a savant: (1) underlying disability; (2) innate ability without teaching or training; (3) talent which typically ‘explodes’ on the scene at a very early age; (4) obsessive preoccupation with the skill; (5) prolific output of product on a continuous basis; and (6) literal, eidetic-like memory with massive

capacity in the area of expertise. We have chosen to re-categorise all the six Treffertian traits under the following three core symptoms (see Figure 3):

- First core symptom: An underlying disability, e.g., tuberous sclerosis complex, hyperlexia, Heller’s syndrome, covering the Treffertian trait #1;
- Second core symptom: One or more of the underlying superior systemising abilities (Myers, Baron-Cohen, & Wheelwright, 2004) covering the Treffertian traits #2, #3 and #6; and
- Third core symptom: Over-excitability in one, two or more areas of extreme interests (see Dabrowski, 1972) covering the Treffertian traits #4 and #5.

The three core symptoms can be used to provide the behavioural topography of ASSSD.

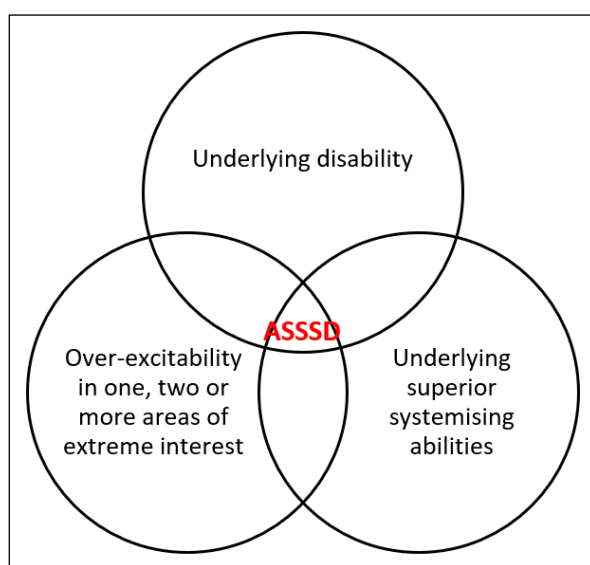


Figure 3: Three Core Symptoms of ASSSD

5. A Sequel to the Case Study of BK’s Savantism

In our previous paper on the case study of a young adult savant artist named BK, who has been diagnosed with Tuberous Sclerosis Complex (TSC) (see Camulli, Goh, & Chia, 2018, for detail), we identified BK as a savant artist. Here in this paper, we intend to re-examine his case and to argue our points why we strongly believe he is a savant artist.

5.1 Core symptom of underlying disability

This core symptom relates to Treffertian trait #1. BK is diagnosed having TSC by medical specialists both in Singapore and overseas (see medical reports provided by his parents) with autistic spectrum conditions (ASC) (based on CARS results). According to Tuberous Sclerosis Alliance (2018), 50% of individuals with TSC are also diagnosable with autism. As many as 14% of individuals with ASD and seizure disorder may also be diagnosable with TSC. Researchers aren't completely sure why ASD and TSC seem to be connected, but according to the Tuberous Sclerosis Alliance (2018), the recent finding suggests that in TSC: “... there are abnormalities in the way different parts of the brain connect

to each other, not only in the temporal lobes but in many other parts of the brain as well. These abnormal connections, which occur independent of tubers, are associated with ASD in children and adults with TSC. Additionally, many studies have shown that seizures and, particularly, early onset of seizures, are associated with delayed development and ASD. Therefore, it is likely a combination of factors that leads to the much higher chance of ASD.” (para. 3-4).

In addition, results from the Wechsler Adult Intelligence Scales (WAIS-3) could only say that BK’s Performance IQ (PIQ) was 47. His latest IQ test done in 2017 suggested that his Non-verbal IQ (NVIQ) = 42 and his Verbal IQ (VIQ) = 43. His fluid reasoning, knowledge, quantitative reasoning, visual-spatial perception, and working memory are less than 0.1 percentile rank. His Abbreviated Battery IQ based on Stanford-Binet 5th Edition (SB-5) = 47, which measures fluid reasoning and crystallized ability. His NVIQ of 64 placed him in the range of extremely impaired.

Despite having extremely impaired intellectual capacity, BK could still produce such wonderful painting with some basic facilitation, guidance and support.

5.2 Core Symptom of one or more underlying superior systemising abilities

This core symptom consists of three Treffertian traits #2, 3 and 6, i.e., innate abilities without teaching or training, talent which typically ‘explodes’ on the scene at a very early age, and literal, eidetic-like memory with massive capacity in the area of expertise, respectively.

BK, at his younger age, possessed an innate ability to play piano by just listening to the tune without being taught and had even performed at a performance concert. However, his parents did not realise this savant talent and hired a piano teacher to teach him, according to her method. It only caused BK to become resistant and lose his interest in music and especially in piano playing. Almost as soon as his musical talent was discovered, this savant ability was lost quickly. This is a clear indication of BK’s early innate ability without teaching or training. Later, he had to be coached to take up another interest of his choice... it so happened painting came into the picture. It began with a wall mural painting in the church that his talent was discovered. BK kept telling his mother “paint, paint” and an art teacher was hired to teach him. This is very typical of Singaporean parents’ expectation: if a child wants to learn music, get a music teacher or send him/her for music class; if the child wants to draw and/or paint, get an art teacher or send him/her for art class; if the child wants to write, send him/her to attend a creative writing class. In fact, there is not much the art teacher could do except to facilitate and go along with BK’s interest, e.g., he saw the blood moon and wanted to paint it, and all that could be done was to provide him with the necessary tools and materials.

Among the tests done on BK, his VABS (Vineland Adaptive Behaviour Scales) results showed that his overall adaptive behaviour composite or level is low with a standard score of 26±7 (at 95% confidence level) which is less than 1 percentile rank. Among all the VABS subdomains, i.e., Communication^{vi}, Daily Living Skills^{vii},

^{vi} Communication: standard score of 21±7 (95% conf. level) at <1%ile rank with low adaptive level.

Socialisation^{viii}, and Motor Skills, BK's highest standard score of 47±0 (at 95% confidence level), which is less than 1 percentile rank and low adaptive level is his performance in Motor Skills. According to BK's VABS report, his motor/perceptual skills have been estimated to be the best among the four adaptive behaviour subdomains.

According to the Treffertian trait #3, a savant's talent typically 'explodes' on the scene at a very early age. However, we beg to disagree with this trait. Not all savants, and especially crypto-savants, suddenly 'explode' their talents at a very early age. Those who are very severely handicapped or disabled do not exhibit such talents clearly because their talents would be masked, suppressed or hidden by their severe or profound disabilities. For example, YY is one such example of an autistic crypto-savant and it is only in 2017 that his talent was "discovered" at the age of 13 years old and the Very Special Arts (VSA) – a non-government organisation that caters to the artistic needs of individuals with special needs in Singapore – took him up only much later in that same year (see Lim & Chia, 2017, for detail).

In an art book highlighting the talents of several autistic savant artists titled "The Art of Autism: Shifting Perceptions" (Hosseini, 2013), Treffert dispels commonly held misconceptions about autistic savant artists and reminds us that "*The remarkable abilities of the artist surface because of their autism, not in spite of it.*" (p. 30-31). The works celebrated in this book profile artists who began to exhibit their talent and practice their skill at varying ages, from 3 years old to twenty years of age.

For this specific issue of "exploded talent", we would further argue that it depends on the time of onset in the same way not all individuals develop in the same way or same time or at the same developmental pace. It is also important to take note that to understand savant or crypto-savant abilities, we need to understand also gifted/talented abilities. According to the National Association for Gifted Children, "*Gifted individuals are those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence (documented performance or achievement in top 10% or rarer) in one or more domains. Domains include any structured area of activity with its own symbol system (e.g., mathematics, music, language) and/or set of sensorimotor skills (e.g., painting, dance, sports)*" (para. 5). According to Betts and Niehart (1988), there are six types of gifted individuals^{ix}: the successful, the challenging, the underground,

^{vii} Daily Living Skills: standard score of 46±8 (95% conf. level) at <1%ile rank with low adaptive level; second highest score after Motor Skills.

^{viii} Socialisation: standard score of 23±7 (95% conf. level) at <1%ile rank with low adaptive level.

^{ix} Type 1-The Successful Gifted: They display appropriate behaviour, learn well, able to score high on achievement tests and tests of intelligence and seldom manifest problematic behavior because they are eager for approval from the adults (e.g., teachers and parents).

Type 2-The Challenging Gifted: They possess a high degree of creativity, may appear to be stubborn, tactless, or sarcastic, do not conform to the system, and hence, are often at odds with the authority, be it in school or at home.

Type 3-The Underground Gifted: They hide their giftedness and deny their talent in order to feel more included with a non-gifted peer group. They frequently feel insecure and anxious.

Type 4-The Dropout Gifted: They feel rejected and are angry with adults and with themselves. They may act depressed and withdrawn or respond defensively. Their interests lie outside the realm of the regular school curriculum and they fail to receive support and affirmation for their talent and interest in these unusual areas.

the dropout, the double-labelled (also known as the twice-exceptional), and the autonomous. Most of the successful and autonomous gifted individuals can be easily identified by their overt competence. However, the challenging, the underground, the dropout and the double-labelled gifted individuals are the ones whose giftedness is masked or hidden (covert competence) from the adults (e.g., teachers and parents) as well as their peers. Similarly, for the savants and crypto-savants, although they exhibit very poor intellectual capacity (aptitude), their high competence in certain very specific skills in one or more domains can be either overt (savants) or covert (crypto-savants) (see Figure 4).

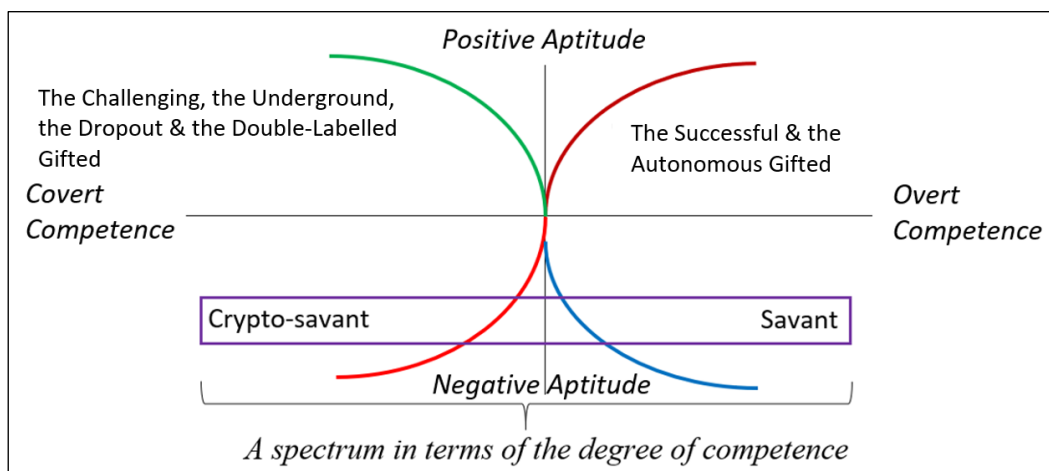


Figure 4: Aptitude-Competence Model of Savantism and Giftedness

Clark (2001) views autistic savants as ‘the underserved minority of gifted children with disabilities that require nurturing to realize their savant skill potential and, as such, trialled an educational curriculum (the Savant Skill Curriculum) using a strengths approach by combining strategies currently employed in the education of gifted children (enrichment, acceleration, and mentorship) with those used in autism education (visual supports and social stories). By focusing on the strengths of these individuals and implementing a differentiated curriculum specifically for autistic savants, results were highly successful in the functional application of savant skills and in improved traits related to autism such as behaviour, social skills, and academic self-esteem. Treffert (2000) also recommends focusing on talent, instead of eliminating the defect, as the most useful approach toward increasing socialization, language and independence of savants. In this way, the special skills of the savant become a useful treatment tool as conduit toward normalization, and nurturing the talent also improves the talent itself.

Type 5-The Double-Labelled Gifted: Also known as twice-exceptional, they are physically or emotionally handicapped in some way, or who have learning disabilities.

Type 6-The Autonomous Gifted: Independent, self-directed, and well-respected, they have learned to use the system to create new opportunities for themselves, i.e., they make the system work for them. Often serve in some leadership capacity within the school or community, they have strong, positive self-concepts because their needs are being met. Being so successful as learners, they receive positive attention and support for their accomplishments as well as for who they are.

The Treffertian trait #6 concerns literal, eidetic-like memory with massive capacity in the area of expertise. BK has an excellent eidetic-like memory. For instance, he can recall the exact route his parents and/or he himself have taken during a long travel even if that happened for one or first time, and he knows when a wrong turn is made. Although the current IQ test could not assess or confirm his eidetic-like memory because he cannot understand the oral instruction, based on several observations (not only his mother, but others, too) of his travels in foreign countries, BK's memory has a massive capacity in the area of his interest (e.g., what he saw and he could remember all the routes he took to travel to a specific location even he had been there once).

5.3 Core symptom of over-excitability in one or more areas of extreme interests

This core symptom consists of two Treffertian traits #4 and 5, i.e., obsessive preoccupation with the skill and in BK's case; his skill is painting, and a prolific output of product (i.e., paintings) on a continuous basis, respectively.

Regarding the Treffertian trait #4, BK's skill in painting is not the same as very specific skill (e.g., BK has an obsessive habit of picking up tiny circular items found on the ground anywhere) which may not seem to be related to what the savant is known for (e.g., acrylic paintings done by BK). However, it can be regarded as an essential pre-skill that is very much required in being observant for fine details in drawing or painting. Here are five general skills very important to drawing or painting:

A. Motor control

Feeling comfortable with a drawing tool in the hand is important to the drawer. For example, in pen drawings one important element or aspect is having confident and smooth lines. This is much easier with good motor control.

B. A good visual eye

Most of the time, many arts teachers have taken this skill for granted. In general, an autistic individual has always been a very visual person. He/She may stare into the leaves of the trees and appreciates the color, texture, and unique qualities of each individual leaf. He/She may stare into the clouds and look at the interesting textures and colors the sky makes. He/She may look out the window on car rides and get lost into the world of his/her own even passing by of houses. What does this have to do with drawing? It is having this visual appreciation that has helped the drawer to come up with creative, visual ideas to draw. It also helps the drawer with some layout ideas on the paper and further appreciates the art he/she is creating. For example, BK drew and painted the winter scene. He chose to draw the bare tree on the left side of the paper, not the centre or the right. That means he has some layout idea about his painting.

C. Creativity

Creativity is difficult to be measured. It actually depends on the type of art BK is interested in. Creativity is not necessarily required for art, such as in realistic pieces such as still lives. But in general, creativity is very important and necessary in drawing. It is the foundation to the message being communicated, and what makes a piece

interesting to look at. It is particularly a creative outlet if it is the sole or primary means with which one communicates. BK in his own way has spoken his voice through his painting and indicates his “sedentary” (spending time being alone or inactive) state of mind as manifested in his latest winter painting.

Treffert discusses the notion of creativity among autistic savant artists. He explains that most begin their artistic careers with striking replicas of what they have seen and stored. However, over time, improvisation begins to appear by omitting an object or inserting one that was not observed in the original image. BK’s paintings are replicas of images he and his mother find on the internet. BK indicates which images he likes and wants to paint and that is used as a guide. His paintings have begun to show more interpretation in the recent months, resulting in more personalized results in his paintings. See Figure 5 for the images used as inspiration and the final paintings BK produced as a result. Eventually, interpretation, free form style, or some other form of creativity is expressed in fresh, original work (Hosseini, 2012). See Figure 6 for free form paintings as BK’s original work.





Figure 5: BK's Paintings (right) Interpreted from Images (left) Found on the Internet



Figure 6: BK's Free Form Paintings

D. Patience

The most important skill is patience. Being able to sit down for hours on one piece is very hard. Especially when it is not coming out the way, a typical individual wants it to. Patience is required to create a good art piece. Impatience leads to a rushed unfinished job, and overall bad drawing. BK is full of patience and can go on for many hours to do his painting.

E. Tenacity

Practice is the most important element to getting better at anything, especially drawing. When drawing, the only way to improve is to draw all the time and keep practicing. Drawing and painting skills, even by the best and most renowned artists, takes continuous practice. This is also true of savant artists. It is a natural course of practicing one's craft. Eventually, with enough practice, and dedication, one will see improvement. BK has spent hours, sometimes days, working on the same painting. Typically, an individual with severe disability would get bored very quickly or easily and never stay on-task for even a few minutes. Yet BK perseveres. He is making progress over time with some facilitation, guidance and support provided to him. Anybody with normal intellectual capacity will also make progress over time with and

without facilitation, guidance and support. We do not see it as something “not right” to facilitate, guide and support a savant or crypto-savant artist especially if he/she has other handicapping condition that is interfering with the painting/drawing ability. This has to do with the degree of assistive support that is required so that the drawer can proceed with his/her drawing/painting with least disruption resulted from his/her current condition. This is termed this as Universal Design for Learning and its seven principles serve to help and not restrict someone with special needs like BK to do what he/she loves to do, i.e., painting.

BK also displays another type of tenacity when it comes to subject matter for his paintings. As seen in Figures 5 and 6, the moon is the main subject in each painting. He tends to fixate on a particular subject as the central theme for his painting and will persist in that subject matter until he indicates he has done enough and will express a new interest. In four months, BK produced seven new paintings all centered around the moon theme, initially inspired by seeing a news cast on television about the blood moon. He has since moved on to beach and clouds as the central theme to his paintings. Finally, the Treffertian trait #5 of a prolific output of product on a continuous basis is noted in BK’s production of his paintings over a period of time. Frequency will depend on his readiness and mood to do so just like a typical artist will draw or paint when there is inspiration. This is also dependent, however, on his access to materials. Since BK has very limited communication, he may not always be able to communicate his desire effectively to paint or describe the materials he needs and wants to produce a new work. For a long time, BK’s parents have not understood or recognised his talent and did little to foster it. Only more recently have they begun to facilitate his access to materials to paint more frequently. BK now paints regularly, two to three sessions per week. Each session lasts approximately 2 hours. He produces usually two, sometimes three, completed paintings per month. Given his difficulties and the coordination required by his mother to facilitate painting sessions, this is a remarkable result.

6. Conclusion

The re-conceptualising of autistic savantism as a spectrum syndromic disorder (ASSSD) reflects the complex presence of symptoms that often accompany such a diagnosis. The insertion of *spectrum* in the label is a reminder that the presentation of talent or skill (or disability) varies within the general clinical population, as a continuum into the general population, and between the subgroups within the clinical population, as described earlier and no two autistic savant artists will progress in the same manner. This reframing of the distinguishing features that characterize a savant artist (i.e., core symptoms: underlying disability, over-excitability in one or more areas of extreme interest, and underlying superior systemising abilities) includes the understanding that many autistic savants have co-morbid disorders that disrupt the artistic process in ways that are different to the autistic savants who do not.

BK's case has served to explore the operating definition of savant syndrome and consider other perspectives and conceptualizations of this rare condition. As more cases, like BK's, are examined and analysed against the defining characteristics of autistic savant or savant syndrome, and now autistic savant spectrum syndromic disorder, we broaden and advance our understanding of the manifest symptoms that hallmark this rare and enigmatic condition.

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