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Savant Syndrome: Realities, Myths and Misconceptions

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Abstract It was 126 years ago that Down first described savant syndrome as a specific condition and 70 years ago that Kanner first described Early Infantile Autism. While as many as one in ten autistic persons have savant abilities, such special skills occur in other CNS conditions as well such that approximately 50 % of cases of savant syndrome have autism as the underlying developmental disability and 50 % are associated with other disabilities. This paper sorts out realities from myths and misconceptions about both savant syndrome and autism spectrum disorders (ASD) that have developed through the years. The reality is that low IQ is not necessarily an accompaniment of savant syndrome; in some cases IQ can be superior. Also, savants can be creative, rather than just duplicative, and the skills increase over time on a continuum from duplication, to improvisation to creation, rather than diminishing or suddenly disappearing. Genius and prodigy exist separate from savant syndrome and not all such highly gifted persons have Asperger's Disorder. This paper also emphasizes the critical importance of separating 'autistic-like' symptoms from ASD especially in children when the savant ability presents as hyperlexia (children who read early) or as Einstein syndrome (children who speak late), or have impaired vision (Blindisms) because prognosis and outcome are very different when that careful distinction is made. In those cases the term 'outgrowing autism' might be mistakenly applied when in fact the child did not have ASD in the first place.

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Realities

Savant Syndrome Defined

Savant syndrome is a rare but spectacular condition in which persons with developmental disabilities, including but not limited to autism, or other CNS disorders or disease have some spectacular 'islands of genius' that stand in jarring juxtaposition to overall limitations. (Treffert 2010) The condition can be present from birth and evident in early childhood (congenital) or develop later in life after CNS injury or disease (acquired). It affects males 4–6 times more frequently than females. Typically the skills occur in five general areas—music, art, calendar calculating, mathematics or mechanical/visual-spatial skills. Other skills occur less frequently including language (polyglot), unusual sensory discrimination, athletics or outstanding knowledge in specific fields such as neurophysiology, statistics, navigation or computers, for example. Skills are usually single skills, but multiple skills can occur as well. Whatever the skill it is always associated with massive memory of a habit or procedural type—very narrow but exceedingly deep within the confines of the special skill. In some cases massive memory is the special skill.

Savant Syndrome is Not a New Disorder (Nor is Autism)

It is over 200 years ago since the first case of savant syndrome appeared in a scientific journal in Germany (Moritz 1783). And it is 126 years since Dr. J. Langdon Down first

described savant syndrome as a distinct condition. (Down 1887). In his 1887 lectures Down described ten cases of savant syndrome, including a boy who had memorized *The Rise and Fall of the Roman Empire* verbatim and could recite it backward or forward. Interestingly, in those same lectures Down described a form of mental retardation later named Down's syndrome, and he described as well a form of "developmental retardation" that unmistakably consisted of cases of what we now would term early onset and late onset autistic disorder. (Treffert 2006) And in Kanner's description of early infantile autism cases in 1944 there are several individuals who would now be considered cases of savant syndrome.

Down coined the term 'idiot savant'. He did not intend that term be degrading or insulting. At the time 'idiot' was an accepted scientific word for persons with an IQ below 25 and 'savant' was derived from the French word *savoir,* meaning 'to know'. Because of its pejorative connotation, a 1988 paper suggested it was time to discard that archaic term and substitute 'savant syndrome' instead. (Treffert 1988) Then in 1989 the movie *Rain Man* made the term "autistic savant" household words.

Not All Savants are Autistic, and Not All Autistic Persons are Savants

Rain Man was a marvelous movie. It was accurately and sensitively done. Yet some persons came away from the movie assuming that, like Raymond Babbitt, all savants are autistic. Not so. Approximately one in ten persons with autism has savant skills; so nine out of ten do not. Approximately 1 out of 1,400 persons with mental retardation or CNS deficits other than autism do have savant skills so such abilities are not limited to autistic disorder. (Saloviita 2000) Hence not all autistic persons are savants, and not all savants are autistic.

Savant Skills Represent a Spectrum of Abilities

While admittedly a subjective scale at this point, savant skills lie on a spectrum of abilities. Most common are *splinter skill* savants who have obsessive preoccupation with and memorization of music & sports trivia, birthdays, license plate numbers, historical facts, train or bus schedules, navigation abilities, or maps for example. *Talented* savants are those in whom musical, art or other special abilities are more conspicuous not only in contrast to individual limitations, but also in contrast to peer group abilities whether disabled or not. And *prodigious* savant is an extremely high threshold term reserved for those extraordinarily rare individuals in whom the special skill is so outstanding that were it to be seen in a non-impaired person such a person would be termed a "prodigy" or "genius".

The Acquired Savant: "Accidental Genius"

In 1923 Minogue reported a case in which musical genius appeared in a three-year old child following meningitis. In 1980 Brink described the case of Mr. Z who demonstrated savant mechanical skills and traits at age nine after a bullet wound to the left brain produced muteness, deafness and left sided paralysis, but precipitated the newly surfaced savant skills. Dorman in 1991 published a case in which an 8 year old boy began to show exceptional calendar calculating skills following a left hemispherectomy.

But it was Miller's reports on 12 individuals with frontotemporal dementia who developed exceptional savant art and musical skills that really brought the 'acquired savant' to prominent attention. (Miller et al. 1996, 1998, 2000) Miller had done SPECT imaging on these 12 patients, and he also did SPECT imaging on a 9 year old autistic, artistic savant. In these instances there was left anterior temporal dysfunction and evidence of what Kapur called "paradoxical functional facilitation"–dysfunction in one area of the brain which uncovered, or facilitated 'paradoxical' function in some other area of still intact brain capacity (Kapur 1996).

Since that time there have been numerous reports of what might be called "acquired savant syndrome" following a cerebral insult from stroke, a blow to the head, dementia or other CNS disease or injury accompanied by the emergence of savant skills, sometimes at a prodigious level (Treffert 2010). In most of these cases there was some sort of 'trade-off' of cognitive or other abilities for the new found savant skills. Yet in other cases, more aptly called 'accidental genius' (following being struck by lightning in one instance) there has been no trade off at all with the emergence of new found skills. These instances raise many interesting questions about dormant capacity within us all, and raise the even more challenging question of how to tap those buried abilities without enduring some CNS catastrophe. These cases of acquired savant syndrome are presented in much more detail on the savant syndrome web site at www.savantsyndrome.com.

The Most Important Question of All: How do They do It?

There have been many theories put forth to try to explain savant syndrome ranging from early heredity theories to present day Quantum theory. (Treffert 2010). Some of the neuropsychological theories such as weak central coherence, mind blindedness are interesting as they apply to the autistic savant. But 50 % of savants are not autistic. The

role of heredity is no doubt a contributor and the search for a savant 'gene' is underway, one study finding such a gene, but another not confirming that finding. Compensatory learning, reinforcement and repetition-compulsion may also play a role, but then, if those dynamics produce savant syndrome, why wouldn't that apply to all persons with autism or other CNS limitations?

The theory I favor is that what I have come to call the "three R's" and reflects the process Kapur termed "paradoxical functional facilitation" in 1996 in which one area of the brain in released from the inhibiting influence of some other brain area. In the case of savants, both congenital and acquired, there is brain damage in one area, frequently the left hemisphere, with recruitment of still intact brain tissue in another area of the brain, rewiring of circuitry to that new area, and release of dormant capacity, through a disinhibiting process, of information and skills already stored in that newly recruited area.

It is genetic memory—the genetic transfer of knowledge and skills—that accounts for the already stored dormant capacity tapped by the recruitment, rewiring and release. I address genetic memory much more fully in *Islands of Genius* as well, and on the savant syndrome web site at www.savantsyndrome.com. Genetic memory is based on the fact that some savants, particularly those severely limited in other ways, clearly "know things they never learned". The only possible way to know things one never learned—sometimes at complex levels—is for that knowledge to be factory installed, genetically transmitted.

But there is one other important element that contributes to the "how do they do it?" question. That is the role of the family or other caregivers, teachers or mentors in first discovering the special gift in the savant, then tenderly nurturing and encouraging that gift, and supporting and reinforcing it by praise coupled with copious unconditional love.

Some Mysteries Remain

There are many scientific mysteries still about savant syndrome. But two are especially intriguing. First is the conspicuous regularity in which the triad of mental impairment (often from autism) + impaired vision + musical genius occurs. Savant syndrome is rare but the frequency of this triad is very conspicuous and disproportionate throughout the history of savant cases combining blindness and mental disability with prodigious musical skills. The first of such persons was Thomas Bethune, better known as "Blind Tom", who was born in 1850 and gave his first public piano concert at age 8. From then on he became an international celebrity and was the most celebrated black concert artist of the nineteenth century. His repertoire was in the thousands of pieces including many of his own compositions, the first of which he created at age five.

Since that time a number of such cases with this triad are glaringly over-represented in savant syndrome, in itself a rare condition. Leslie Lemke in the United States, Derek, Paravicini in the United Kingdom and Hikari Oe in Japan are present day representatives of this amazing combination of ability and disability. In addition to those examples, a number of other such cases are documented in detail in *Islands of Genius*. The savant syndrome web site provides further video evidence and documentation of this extraordinary triad of mental impairment + blindness + musical genius.

A second mystery is the why calendar calculating, an obscure skill in neurotypical persons, is seemingly almost universally present in persons with savant syndrome. This ability is a clear example of how savants, sometimes severely impaired, innately "know things they never learned". Yes, there are formulas for calendar calculating. And yes, if any person puts his or her mind to it, he or she can learn (laboriously) how to calendar calculate. But savants seem to have this algorithm or formula 'unconsciously' inscribed or inculcated in their brain and in most such individuals there simply has not been any 'study' of the calendar nor the 'learning' of any formula. Why calendar calculating? And why is that so prominent in savant syndrome but generally not seen in other brain diseases or disorders? Some imaging studies are underway with calendar calculating savants, comparing them to neurotypical 'expert' calendar calculators and control groups.

Myths and Misconceptions

Savants are Not 'Creative'

Some observers, while extolling the eidetic-like ability and memory of savants, point out that in contrast to such astonishing imitative ability, savants, as a group are not very creative. In fact I was one of those observers who wrote just that in the original 1988 version of *Extraordinary People:Understanding Savant Syndrome.* I raised the question there "Is the savant creative?" I answered it this way: "In my experience, not very".

I was wrong and have corrected that perception in my later writings. What changed my mind? Some additional years of observation. There is always a tremendous advantage in having a longitudinal view of a patient and his or her 'natural history' of illness or disorder, compared to a one-time, snapshot consultation. And now, having the opportunity to observe the 'natural history' of how the savant skills emerge and develop over many years, I have noted predictable and replicable sequence of steps that

progresses from *imitation,* to *improvisation*, to *creation* in savant syndrome. Let me expand on that, using Leslie Lemke as an example.

Leslie Lemke's ability to store and replicate music, even after only a single hearing, was spectacular. Indeed at age 14 he was able to play back Tchaikovsky's First Piano concerto flawlessly having heard it for the first time as a theme song to a television movie.

Over time, however, Leslie began to show improvisational skills in a addition to replication abilities. For example at a 1989 concert a young girl came up to the stage in the challenge portion of the concert and played "Mississippi Hotdog". Leslie listened and then, when asked, dutifully played back the piece exactly as he had heard it. But toward the end of the piece he began to look a bit restless, and seemed more excited and more eager to play. After the initial playback of Mississippi Hotdog was completed, flawlessly as usual, Leslie then launched into a 5 min improvisation which could be called "Variations on a Theme of Mississippi Hotdog." He changed pitch, changed tempo and demonstrated convincingly that he does indeed have innate access to the 'rules of music', confirmed by a number of professional musicians who have observed him.

Adding to the improvisation skill now is creation and composing of entirely new pieces. One such song he calls "Down Home on the Farm in Arpin", and another he names "Bird Song". In that latter piece he duplicates, by whistling softly as he plays his new tune, the bird songs he hears as he sits for hours outside his farm home.

That same sequence from replication to improvisation to creation occurs in other savants whether musicians or artists. The artists begin their 'career' with striking replicas of what they have seen and stored, usually requiring no model or constant reference piece. Then some improvisation begins to appear—a telephone pole deleted here, or a new tree there—slightly different from the original. Then comes creation of entirely new pieces, maybe now free-form or in an entirely different art style.

So the savant can be creative. Some savants prefer to stay with replication, but many have gone beyond literal copying, as stunning as that can be, to improvisation and then creation of something entirely new.

These clinical impressions regarding creativity in the savant have been bolstered by several formal research projects. A 1987 study by Hermelin, O'Connor and Lee looked at musical inventiveness in five musical savants compared to six non-savant children who had musical training over a period of 2 years but who had not been exposed to compositional or improvisational instruction. Five tasks were used to grade for "musical inventiveness". On those tests the savant group was superior to the control group. Similarly, on tests of musical competence—timing, balance and complexity—the savants (with a mean IQ of 59) were also superior to the control group.

Hermelin and her co-workers indicated this study was consistent with earlier findings—that a series of separate intelligences, of which music is but one, exist in each person rather than a single, consistent intelligence that permeates all the skills and abilities of each person. With respect to music, they concluded that savants were able to show some creativity and improvisation in addition to mimicry.

Hermelin et al. (1989) conducted a study of improvisations by Leslie Lemke compared to a professional, non-savant musician after each had heard the same musical pieces, one lyric (Grieg) and one a-tonal (Bartok). Leslie's improvisations were described as "virtuoso embellishments with a considerable degree of musical inventiveness and pianistic virtuosity." That study concluded that "both subjects' attempts at improvisation show a high degree of generative musical ability, and what distinguishes them from each other is not so much a differential degree of musicianship but rather their own, different musical preferences as well as their respective personality characteristics." In improvisational style on the Bartok, a-tonal piece, both musicians resembled each other as well.

In summary, savants can be creative. Most savants travel along a route of first replication, then improvisation, and finally creation. As we learn more about the brain from the study of savants, we may also learn much more about talent and creativity itself through the unique window into the brain and special skills savant syndrome provides.

The "Nadia" Effect and the "Dreaded Trade-Off"

In 1977 Dr. Lorna Selfe described the case of Nadia, a prolific childhood artist, whose special abilities disappeared after she was sent away to school to increase language acquisition, socialization abilities and daily living skills. With the publication of Dr. Selfe's 2011 book—*Nadia Revisited*—we now have the benefit of long term follow-up on Nadia. Selfe describes the loss of skills this way: "In the years following my first study, and throughout her school days, Nadia was given intensive help with language development and her ability to communicate improved with the production of two/three word sentences. She also started to draw like an infant so that, for a period, two styles coexisted and sometimes on the same piece of paper. Gradually and inexorably she lost the ability to draw realistically. Unlike some savant artists such as Stephen Wiltshire, who has maintained the strength of his drawing ability, Nadia's ability appeared to peter out. She is now middle-aged and lives in a specialist care home but for many years she has simply refused to draw." But, in spite of the loss of art skills, Selfe points out, importantly, that

even though now Nadia is not interested in art and is totally dependent on others in that supervised setting there is also the "optimistic story of the love and care of the family that raised her and of the people who now care for Nadia. She is in the safe and competent hands of dedicated staff who devote themselves to the care of people who are unable to look after themselves."

We don't seem to know exactly what did happen with Nadia and why those special skills disappeared. But what I do know is that in the many, many savants with whom I have worked, or know about, such a "dreaded trade-off", or loss of skills, does not occur as the savant gets older or when exposed to more formal education and training. To the contrary, in my experience vigorously "training the talent", whatever that special skill is, leads, in and of itself, to increased language, social and daily living skills without any "dreaded trade-off" of special skills. So Nadia's experience is the exception, not the rule.

Putting aside the fear of a "dreaded trade-off" is important because parents, teachers or therapists are sometimes reluctant to venture forth with more formal education or training efforts lest the "Nadia" effect occur. The good news is that such a fear is, in my experience, unfounded and should not prevent presenting the savant with more formal education and training within his or her area of specialty, as well as in a more general educational sense. That being the case, parents and teachers can continue not only to applaud and reinforce the special skills as they surface, but can confidently add teaching and training in a more formal sense as well without fear of loss of talent, ingenuity or enthusiasm on the part of the savant.

Savant Syndrome is Always Associated with Low IQ

Perhaps stemming from Down's original description regarding low IQ and the presence of savant skills, a misconception continues that low IQ is a necessary accompaniment of savant syndrome. That in fact is not the case. While it is true that most savants have measured IQ's between 50 and 70, in some instances IQ can be as high as 125, or even higher. Thus an IQ level above 70 does not 'disqualify' someone from having savant syndrome.

One reason that many savants, or many autistic persons, have IQ scores below 70 is that IQ measurement depends so heavily on verbal scales, and many autistic individuals, including those with savant syndrome, have language (verbal) deficits as an intrinsic part of the underlying disorder.

A second reason for low IQ scores among savants is the fact that IQ tests measure only one facet of "intelligence", something termed "IQ". Savants tend to do poorly on that particular measure of "intelligence". But savants point out forcefully that there are multiple forms of "intelligence" and IQ measures only one such "intelligence". IQ tests do measure something defined as "IQ". But IQ tests fail to measure some of the other forms of "intelligence" that savants possess in greater or lesser measure as well. Some of the savants are profoundly disabled in capacities as measured by IQ, but yet they are astoundingly 'intelligent' within their "island of genius".

There is much debate among psychologists regarding single v. multiple intelligence theories. But savant syndrome, with sometimes extraordinary ability co-existing with profound disability in the same individual argues forcefully for the concept of multiple intelligence. And the fact of multiple intelligences has profound implications not just for better understanding and approaching savant syndrome, but also for implementing more effective, individualized and targeted education efforts for all segments of the population.

Thirdly, in all developmental disabilities, and savant syndrome, one has to make a distinction between "actual retardation", as classified by IQ scores, from "functional retardation"—instances in which persons with presumably normal or high IQ (if it could be accurately measured) function at levels more consistent with sub-normal IQ. In such instances, either the language and verbal deficits, or behavioral traits and symptoms, prevent accurate measurement of "IQ". These individuals, whether savants or not, "function" *as if* "retarded", but their abilities in certain other areas of function belie a below average IQ score. That is termed "functional retardation."

Leslie Lemke provides an example of how misleading IQ levels can be as a single measure of intelligence. Leslie has a measured IQ of 58 on the WAIS-R test, based solely on verbal scores; performance tests were not done because such testing relies heavily on vision, and Leslie is blind. Other tests were carried out as well including the 4th edition of the Stanford-Binet; the Tactual Performance Test; the American Association for Mental Deficiency Adaptive Behavioral Scale; and the Animal List Selective Reminding Test. By looking at the scores on these tests as a whole, the neuropsychologist concluded Leslie was functioning in the moderately retarded range of intelligence, defined as an IQ level between 35 and 55.

Yet a videotape of one of Leslie's concerts challenges the accuracy of such a low level of intelligence figures. At this particular concert Leslie was asked to play a piece he had never heard before *with* the other pianist, rather than waiting for the piece to conclude and then play it back *after hearing it* as he usually does. The other pianist began playing. Leslie waited about 3 seconds and then did indeed play the piece *with* the other pianist, separated only by those 3 seconds. In that three second delay Leslie was taking in what he heard, processing it, and simultaneously outputting the music as he played along with the other

pianist. Leslie was *parallel processing*, just as some very intelligent, but rare, interpreters are able to translate what a speaker is saying into another language simultaneously, rather than having the speaker pause from time to time while the interpreter 'catches up'.

Leslie was parallel processing. That would not be possible if the IQ level of 35–55 was an accurate barometer of his over-all intelligence. He exceeds that level by far with the parallel processing of music which signals that more than a single 'intelligence' was at work during that complex performance.

In summary, measured IQ levels in savants can range from sub-normal to exceptional and low IQ is not a prerequisite to being classified as a 'savant'. While many savants have measured IQ levels below 70, some have measured IQ's above normal which can range as high as 125 or above. In assessing IQ scores, one has to differentiate'actual' retardation from 'functional' retardation

All "Geniuses" and "Prodigies", Past and Present are Really "Aspies"

With increased interest in autism and Asperger's, and especially with the visibility given to the extraordinary skills seen in savant syndrome, it seems popular these days to apply the diagnosis of Asperger's disorder particularly to anyone considered to be a 'genius' or 'prodigy' past or present. Names such as Einstein, Rembrandt, Mozart, Jefferson and many others are bandied about in such discussions. It is difficult enough to make accurate diagnoses of autism or Asperger's disorder in real life, with face-to-face interviews and comprehensive testing, let alone trying to apply post-mortem diagnoses, sight unseen. Retrospective medical diagnoses are always problematical and suspect.

And then there are present-day *prodigies* and *geniuses.* Some, outrageously bright, but not autistic children, have composed multiple symphonies by age seven, or have mastered instruments, sometimes multiple instruments, by age three. Others show astonishing artistic, mathematical, prose or poetry skills well beyond their years. If children, we call them prodigies. They are neither autistic, nor Aspergers. If adults, we call them geniuses. They also are neither Asperger's nor autistic. Prodigies and geniuses have special, spectacular abilities in absence of any underlying disability. Typically, rather than there being simply one "island"of genius as is often the case with savants, whatever the skills of the prodigy or genius, they are associated with a high measured IQ in all areas of functioning.

In short, not every gifted child, nor every 'absent minded professor', has Asperger's disorder. Instead, "prodigy" and "genius" do exist as independent conditions separate from any underlying disability or disorder The temptation to classify all prodigies and geniuses as having autism or Asperger's seems to be part of the *disease de jour* phenomenon quite rampant these days and needs to be resisted in favor of careful analysis lest continued 'diagnosis creep' deletes all meaningful classification, all the disorders lose their specificity, and the 'spectrum' engulfs us all.

The beginning of wisdom is to call things by their right name. Asperger's, autism, and savant syndrome surely do exist. But so do the categories of "normal", "gifted", "prodigy" and "genius". The important thing is to know the difference lest every parent of a gifted child for example, whether mildly gifted or profoundly gifted, fear their child is autistic.

"Outgrowing" Autism: Separating 'Autistic-Like' Traits from Autistic Disorder in Children Who Read Early, Speak Late, or are Blind

I get many "I've got a son or daughter who……..." emails from the savant syndrome web site in which parents describe various accelerated skills in their children and inquire whether those might be forms of savant syndrome, and if so, how should those special skills, and that child, be approached educationally and otherwise. Among those many inquiries are children who read early (hyperlexia) or speak late (Einstein Syndrome). Often children in both those groups are automatically, and mistakenly, assumed to be autistic when in fact they only have 'autistic-like' behaviors and traits with very different causes and outcomes than Autistic Disorder. They tend to 'outgrow' their autism (their choice of terms), which was not autism in the first place.

Based on a number of such cases brought to my attention separating "autistic-like" behaviors and traits from "Autistic Disorder" in children who read early, or speak late, or who are blind, is a critical differential diagnosis with vast causal, treatment and outcome ramifications.

Hyperlexia I, II and III

Some neurotypical children simply read early. They may be reading, instead of the teacher, to their nursery school class, or reading at a 7th grade level at age 3 for example. There are no associated autistic or autistic-like traits or behaviors. They are entirely 'normal' (neurotypical) children. Eventually their classmates catch up with reading skills but in the meantime the advanced, precocious reading ability at such an early age draws considerable attention. I describe several such examples on the "Hyperlexia" posting on the savant syndrome web site at www.savantsyndrome.com I refer to this type of early reading ability as Hyperlexia I.

Hyperlexia II is when early reading ability presents as a 'splinter skill' as part of an Autistic Spectrum Disorder. These children read voraciously along with astonishing memory for what they read. They often have other memorization abilities sometimes linked with fascination with numbers or calendar calculating skills. These children show other characteristic language, social and behavioral symptoms seen in autistic spectrum disorder, including traits such as withdrawal, poor eye contact, lack of interest in seeking or giving affection, insistence on sameness, and obsessive compulsive behavior, for example. They usually carry a formal diagnosis of Autistic Disorder, Asperger's Disorder, or pervasive developmental disorder (PPD/NOS) with intense fascination with words and numbers presenting as a 'splinter skill'.

Hyperlexia III is a less frequently recognized form of early reading ability. It is *not* an autistic spectrum disorder even though there are some "autistic-like" traits and behaviors that gradually fade as the child gets older. Some times this is referred to as "outgrowing autism". These children read early and have striking memorization abilities sometimes coupled with precocious abilities in other areas as well. They may show unusual sensory sensitivity, echolalia, pronoun reversals, intense need for sameness, specific fears or phobias, have lining/stacking rituals and demonstrate strong visual and auditory memory. Unlike children with ASD, however, they are often very outgoing and affectionate with family, even though reserved and distant with peers and would be playmates. They do make eye contact and can be very interactive with persons close to them, especially adults. These children present as being very bright, inquisitive and precocious overall. Indeed these 'autistic-like' traits and behaviors do fade as the child gets older, but in the meantime parents are exposed to unnecessary fear and dread because the diagnosis of "autism" has been prematurely and inappropriately applied without "hyperlexia III" being considered in the differential diagnosis. Space precludes an extensive discussion of Hyperlexia III, but the savant syndrome website as www.savantsyndrome.com provides a number of example of such cases with respect to characteristics and outcome.

Einstein Syndrome: Children Who Speak Late

In his 1997 book *Late Talking Children* Thomas Sowell pointed out how often "autistic-like" symptoms, as opposed to Autistic Disorder itself, appeared in children with delayed speech based on parental reports in a group of 46 such children. In a follow-up book 4 years later—*The Einstein Syndrome:Bright Children Who Talk Late*—Sowell expanded that group to 239 late talking children who were exceptionally late in beginning to speak but were also exceptionally bright. (Sowell 2001). His book is replete with examples. As with Hyperlexia III, Sowell found in his correspondence with parents that many of the children with delayed speech had been given a diagnosis of ASD along the way but that the "autistic-like" symptoms in these children were transient, and like with the Hyperlexia III children, those traits and behaviors faded over time. He recommended careful professional evaluation for children who speak late by clinicians familiar with the various parameters and conditions involved with such children, sparing parents unnecessary worry, concern and pessimism that always accompanies a diagnosis of "autism". This condition is also discussed in more detail on the savant syndrome website.

Blindisms

Teachers and parents of visually impaired children often refer to what are called "blindisms" in such children. Ek and co-workers point out that "blindisms"—stereotypical movements, language problems and certain other behaviors—are common in children with congenital or other types of blindness. (Ek et al. 1998). Hobson described the similarities in development during pre-school age (3–4 years) between blind children and those with autism (Hobson 1993). In both groups impairments in symbolic play, confusion in the use of language and stereotypes were frequent. Many of the autistic features in the young, blind child without cerebral damage disappeared with age. As the child acquired a better understanding of the surrounding world, and with the development of language, a basis for sharing experiences and feelings with other people developed. Hobson noted "blindness seems to delay rather than prevent development in these respects." In 2010 Hobson and Lee did an 8 year follow-up study on nine congenitally blind and seven sighted children who met formal diagnostic criteria for autism. Follow-up of the nine congenitally blind children with 'autism' revealed that, in adolescence, only one such child satisfied the criteria for that disorder. In contrast, all of the seven sighted children still did meet the Autistic Disorder criteria. For the group with what turned out to be autistic-like symptoms, in the title of his report Hobson uses the interesting term "reversible autism".

Autism, autistic-like symptoms and blindisms can be confused with each other in visually impaired children. But just as with children who read early or speak late, differentiation between Autistic Disorder and "autistic-like" symptoms is critical with these children if parents are to be spared unnecessary distress from an autism diagnosis improperly applied and, equally important, if the right treatment is to be applied to the right patient.

Summary

With all the emphasis by some on the autism 'epidemic' and with it the need for early identification and a proliferation of programs, it is important to remember that not every child who reads at 18 months, draws at 2 years, hums back all the melodies he or she hears, or likes to line up railroad cars, resists certain foods, insists on routine, memorizes license plates and birthdays, has certain fear and phobias or is very late in speaking is on the autistic spectrum. If one looks up "hyperlexia" on the internet, though, most often the site links hyperlexia to autism. That simply is not so in all cases as pointed out above. That same link to autism is likewise often made for children who speak late, or are blind.

Again, not so in all cases. While early identification of autism in affected children is important, those efforts need to be balanced with sensible caution lest parents be unnecessarily frightened and overwhelmed by premature, and erroneous, diagnoses. Except in truly 'classic' cases, often some time of watchful observation needs to elapse until the 'natural history of the disorder' reveals the real diagnosis. Such 'watchful observation', diagnostic caution and separation of 'autistic-like' behaviors from Autistic Disorder can provide example of what some have called "reversible autism".

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