The 'Acquired' Savant—'Accidental' Genius

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Could such dormant potential exist within us all?

A 10-year-old boy is knocked unconscious by a baseball. Following that traumatic blow, he suddenly can do calendar calculations. He can also remember the weather, along with other autobiographical details of his daily life, from that time forward. An elderly woman who had never painted before becomes a prodigious artist after a particular type of dementia process begins and progresses. Another elderly patient with dementia has a similar sudden epiphany of ability, but this time in music. A 56-year-old builder, who had no particular prior interest or skills in art, abruptly, for the first time in his life, becomes a poet, a painter and a sculptor following a stroke that he miraculously survived. An 8-year-old boy begins calendar calculating after a left hemispherectomy for intractable seizures. These are examples of what I call the "acquired" savant, or what might also be called "accidental genius."

Is it possible such dormant potential resides in all of us but might not, except for central nervous system (CNS) injury, otherwise surface? The acquired savant suggests just that. The challenge, of course, if that is so, is how to tap those hidden abilities without having endured some CNS catastrophe.

Before 1996, most of the savants I had met, except for Alonzo Clemens, were persons who were born with autism or some other developmental disability, and in whom some marvelous talent "exploded" on the scene during infancy or childhood, most often at about age 3-4. One could refer to these cases as congenital savant syndrome (present from birth).

Acquired savant syndrome, in contrast, are instances in which dormant savant skills emerge, sometimes at a prodigious level, after a brain injury or disease in previously non-disabled (neurotypical) persons where few such skills were evident before such CNS injury or disease. This circumstance, of course, raises the question of whether such dormant capacity exists in everyone, only to surface, perhaps as a backup system, when there is such CNS injury or illness.

Alonzo Clemens is such a case of acquired savant syndrome, since, according to his mother, Alonzo's remarkable sculpting skills appeared after a head injury sustained in a childhood fall. Alonzo's incredible abilities can be seen in the profiles section of this website. After I met Alonzo in 1984, I began to review the savant syndrome literature to see if other such cases of acquired savant syndrome had been reported in the past. Indeed, there were several such reports. Minogue (1923) presented a case in which musical genius appeared in a 3-year-old child following meningitis. And Brink (1967) described the case of Mr. Z. who demonstrated savant skills, behavioral traits and abilities that emerged at age 9 after a bullet wound to the left brain left the patient with a motor paralysis on the right side, along with becoming mute and deaf. Following that traumatic brain injury, some new special mechanical abilities and other savant skills emerged. In 1991, Dorman reported a case in Brain and Cognition in which an 8-year-old boy began to show exceptional calendar calculating ability after a left hemispherectomy.

Then, in December 1996, I read a case report in *Lancet* written by Dr. Bruce Miller and colleagues in which they described three patients "who became accomplished painters after the appearance of frontotemporal dementia." They described one such case in detail, a 68-year-old gentleman with no

particular art interest or ability in whom rather spectacular artistic skills emerged as the dementia proceeded.

In the October 1998 issue of *Neurology,* Dr. Miller and coworkers described two additional patients (now a total of five) with this same type of frontotemporal dementia (FTD) who likewise displayed new artistic skills in the setting of progressive brain disease. Consistent with the findings in other "congenital" savants reported to that date, in these five older patients whose artistic skills and abilities emerged after the onset of FTD, the creativity was visual, not verbal; the images were meticulous copies that lacked abstract or symbolic qualities; episodic memory was preserved but semantic memory was devastated; and they exhibit intense obsessive preoccupation with your art skills. SPECT (single photon emission computed tomography) imaging studies showed a predominance of left brain injury.

These researchers hypothesized that selective degeneration of the anterior temporal orbitofrontal cortex decreased inhibition of visual systems involved with perception, thereby enhancing artistic interest and abilities. Such artistic interest and ability was relatively dormant until the FTD disease "released" those hidden abilities. Some would characterize that phenomenon as a release "from the tyranny of the left hemisphere."

Frontotemporal dementia accounts for about 25% of the pre-senile dementias and differs from Alzheimer's dementia in that, in FTD, the pathological processes are regional, rather than generalized, and are asymmetric, often affecting the left anterior temporal region, as in these five patients. This 1998 article discussed the five patients individually in detail, and also illustrates some of the artistic works that were produced during the progression of the dementia process.

These researchers hypothesized that "selective degeneration of the anterior temporal and orbitofrontal cortex decreased inhibition of the more posteriorly located visual systems involved with perception, thereby enhancing these patients' artistic interest and abilities." They also quote Kapur (1996), who used the term "paradoxical functional facilitation" to describe such a "release" phenomenon where loss of some skills permits emergence of others. Miller concludes this article by saying "FTD is an unexpected window into the artistic process," and indeed it is.

By 2000, Miller had increased the number of his FTD/emergent artistic ability cases to 12. But now this expanded group included some persons with previously dormant musical abilities, instead of art abilities, that surfaced with progression of the dementia process. Even more interesting, however, was the expansion of this research to compare the functional imaging findings (SPECT) on six of those older persons, previously non-disabled, with the imaging findings of a 9-year-old autistic savant artist (DB). That comparison showed "remarkable parallels" between the older FTD patients and this young autistic artist. Both involved loss of function in the left temporal lobe of the brain and enhanced function in the posterior neocortex. The similarities of neuropathology as seen on SPECT imaging in a 9-year-old autistic savant, and these older FTD patients, who share artistic skills in common with very different disabilities, is striking and intriguing.

In 2005, Lythgoe and coworkers in London documented a case in *Neurology* of a 51-year-old artist whose skills surfaced, for the first time, after a sudden-onset subarachnoid hemorrhage involving bilateral cerebral artery aneurysms. The aneurysms were repaired with coils. Following that, the patient, fortunately, showed little associated dementia or impaired verbal abilities. CT scans 16 days after

admission confirmed there was no focal injury. Neuropsychological testing revealed a normal IQ level, some verbal disinhibition, and some mild executive function impairment. The final impression was “mild frontal dysfunction.” The authors concluded that “it is possible whatever frontal damage our patient sustained led to a relative disinhibition or paradoxical functional facilitation of these areas.”

Prior to the stroke, the patient had no particular interest or ability in the creative arts. But several weeks after the corrective surgery, the patient began to “fill several notebooks with poems and verse; he had never written poetry prior to that time. Following that he began to paint expansively and expressively, spending almost all of his time painting and sculpting.” Several television documentaries have included segments on this acquired savant story. The London program *My Brilliant Brain* includes an excellent segment on this individual whose paintings and sculptures are better seen than described.

In a different, but related vein, Mel, Howard and Miller (2002) raised the question of what would happen to an already accomplished artist, in contrast to the patients above in whom new talent surfaced, with a progressive frontotemporal dementia process? They presented the case of a trained and talented art teacher who, at age 49, at the beginning of a progressive FTD process, changed her style slowly from Western watercolor and traditional Chinese brush painting to highly patterned paintings using Chinese horoscope icons. The “impressive artistic growth,” which the authors describe in much greater detail, coincided with a decline in her ability to organize class lessons or grade papers. Paintings became “wilder and freer” in which “intricate designs and patterns of the horoscope figures were replaced by large, intensely colored figures; complex patterning was pushed into the background.” Choice of colors changed and “release from the constraints of formal training became clear.” Compared to Miller’s 12 cases of “new” talent emergence patients who generally had asymmetric left anterior temporal lobe degeneration, this patient with prior artistic talent, whose style changed drastically, showed predominantly left frontal disease. Yet as with the other FTD patients, in these individuals the brain damage was predominantly left-sided. These researchers conclude: “Asymmetric left hemisphere degeneration may release previously untapped cognitive abilities. Our brain wiring appears to be a major factor in the determination of the nature of our creativity.”

Drago (2006) and coworkers carried these studies on “release” vs. “new” skills unearthed in persons with FTD a bit further. They assigned art judges to assess the artwork of a trained artist with frontotemporal lobar degeneration (FTLD), during three periods of her life: pre-symptomatic period (18 paintings), perisymptomatic period when symptoms were just beginning (6 paintings), and fully symptomatic period (16 paintings). These three time intervals ranged from before symptom onset to eight years after the diagnosis. The judges rated the paintings systematically on six different artistic qualities without knowledge of the patient’s clinical diagnosis or when the paintings were produced.

Consistent with the FTD patients described above, this patient showed an increase of some visual artistic skills over time, reflected in technique, “that might be related to sparing and disinhibition of the right posterior neocortex.” However, there was a reduction of other aspects of the paintings including closure (completeness of the painting) and evocative (emotional) impact.

In 2005, J. M. Annoni and colleagues from the Lausanne University Hospital in Lausanne, Switzerland, noted significant qualitative changes in artistic style in two professional painters as a consequence of minor strokes located in the left occipital lobe or thalamus. One of these individuals switched to a more stylized and symbolic art, and the other switched from an impressionist style to a more simplistic,

abstract art. In discussing these changes, the authors state: “The artistic changes may have been associated with a direct effect of the infarct. Since the posterior brain regions seem to play a specific role in creative thinking, it is not surprising that a minor lesion in these regions might alter an artist’s creative thought, and thus his style of painting. Besides, the fact that patients 1 and 2 had left hemispheric dysfunction may provide some support for the theory of ‘right hemisphere functional release.’ Different possible cognitive mechanisms may be considered.”

Oliver Sacks, in his 1995 book *An Anthropologist on Mars,* describes yet another case of “acquired” artistic skills in a person “who had scarcely painted or drawn before” following an illness that included “high fever, weight loss, delirium, perhaps seizures” or some other “neurological condition.” The exact nature of the illness remains unexplained. Yet following that episode, Franco Magnani began painting immaculately accurate scenes from the village of Pontito, where he had grown up, but then left at age 18. This new dawn of painting ability and digital-like memory amazed even Franco. Sacks quotes him as saying “Fantastic. How could I do it? And how could I have had the gift and not known about it before?”

What makes Franco Magnini’s case especially interesting is not just his painting epiphany in his early thirties following his illness, but also that his incredible, digital camera like recall of the tiny village where he grew up was so exact, now years later, that when compared to present day photographs of that village, each street, building and archway is reconstructed with breathtaking fidelity. So amazing was this link of exacting paintings with documented early memories of his village buildings, streets and alleys that there have been a number of exhibits of his work. The Exploritorium in San Francisco held an exhibit in 1998 titled *Memory: The Art and Science of Remembering,* in which Magnini’s work was featured. To demonstrate the remarkable memory involved, his paintings were placed side by side with recent photographs of the same scene. The accuracy, now years later in a person with no earlier formal art training, was incredible.

But one of the most dramatic and convincing instances of “acquired” savant syndrome is Orlando Serrell. At age 10, Orlando was hit in the head by a baseball. Following that, Orlando began to calendar calculate, an interest and ability he had never shown prior to the head injury. He also developed the ability to remember the weather for each day following the injury, a detail most of us, of course, “forget.” In recent years, there has been added other “autobiographical” memory including what he did on a particular day in the years following the injury. That ability is called by some “hyperthymestic syndrome,” and is described in more detail elsewhere on this site.

Orlando’s acquired savant abilities have been the topic in a number of documentaries on savant syndrome. Probably the most in depth look has been in *Beautiful Minds* by Colourfield Productions in Germany. In those clips, Orlando shows not only his calendar calculating abilities, but provides evidence of autobiographical memory as well.

One final example of acquired savant abilities is Daniel Tammet, whose skills, and their onset and development, are described by him in his very popular book *Born on a Blue Day.* After several childhood seizures, which were ultimately diagnosed as temporal lobe epilepsy, Daniel began to experience a very powerful and unique synesthesia in which every number has its own color, shape and texture. Coupled with the synesthesia was lightning calculating and calendar calculating ability, along with massive memory for numbers. Daniel was able to memorize Pi to 22,514 decimal places, for example. He also

has the ability to learn languages in a very brief time. He mastered Icelandic, for example, in seven days as chronicled in Focus Production's 2005 documentary, *Brainman.*

There are other cases of acquired savant syndrome that continue to come to my attention as well, but the above instances provide some examples of the intriguing phenomenon, with all of its broad implications, of buried potential surfacing following CNS injury or disease.

In summary, in most persons with savant syndrome, the exceptional savant skill surfaces during childhood, quite unexpectedly and often explosively. Those savant abilities are superimposed on some underlying developmental or other disability that was present at birth. This is called congenital savant syndrome. But in recent years there have been a number of cases reported in which, after some brain injury or brain disease, savant skills unexpectedly emerge, sometimes at a prodigious level, when no such skills were present before injury or illness. This is called acquired savant syndrome. In many of these cases, the special abilities emerge following left hemisphere injury, particularly left anterior temporal lobe injury. Increasingly, there is speculation that these newly emerged skills, formerly dormant, are "released," compensatory abilities rather than newly created ones.

Another way of looking at the congenital vs. acquired savant syndrome dichotomy, however, might be that all savant syndrome is "acquired" in that even in those instances where savant syndrome emerges in childhood, that emergence, or compensatory function, occurs after some CNS injury or disease process, just as with the acquired savant. It is just that such injury or disease happens at an earlier time in the congenital savant, i.e., during the prenatal, perinatal or postnatal periods of development. In the acquired savant, in contrast, the CNS injury simply occurs at a later period of life. While not universal, in both the congenital and acquired savant, such CNS injury or disease most often involves the changes in the left hemisphere with compensatory changes in the right hemisphere.

The fact that savant skills, entirely dormant before CNS injury or disease, can surface by some "release" (disinhibition) process raises intriguing questions about dormant capacity existing within us all. The challenge of course, if that is so, is how to access that hidden knowledge and skill without some sort of CNS catastrophe. And work to achieve just that is now underway.