

BEAUTIFUL MINDS: Is there a link between genius and madness?

by Kenneth Lyen

INTRODUCTION

In her book *A BEAUTIFUL MIND*, Sylvia Nasar writes about Nobel Prizewinner John Nash and describes how schizophrenia affected his thought processes. The biography reconfirms an age-old observation that *“There is no great genius without a tincture of madness”* (Seneca 3BC-AD65).

The idea of a link between genius and madness has long fascinated people. There are still a number of contentious issues. For example how does one define “genius” and “madness”? The boundaries between normal, abnormal, and supernormal, are arbitrary and blurred, and there may never be a satisfactory resolution. What may seem eccentric behavior to one observer may be regarded as madness by another. A crazy nut to some may be considered a genius by others. And if a genius is too far ahead of his time, his brilliant ideas might not be appreciated except posthumously. The social and cultural environment plays an important role in interpreting what is genius and what is madness. It may be prudent for one not to be sucked into the quicksands that surround the definition of madness. However one could loosely define a genius as one who is highly creative and has made a significant contribution to mankind, often through challenging established orthodoxy and establishing a new paradigm.

Some earthshaking ideas may have appeared insane when first proposed. For example, the concepts of Copernicus and Galileo’s solar-centric world, Darwin’s theory of evolution, Einstein’s space-time universe, or Picasso’s geometric paintings, all seemed quite preposterous initially. Furthermore, the revolutionaries themselves were considered by some of their contemporaries to be out of their minds as to so brazenly challenge established orthodoxy. However, one is not concerned with such matters in this article. The focus is whether or not geniuses have a propensity to psychiatric disorders, and if so, what is their impact.

IS THERE REALLY A LINK BETWEEN GENIUS AND MADNESS?

Studies in the United States have shown that up to one-third of its population will suffer from some form of mental illness during one’s life. The chances of developing a mental disorder, regardless of whether one is a genius or a mere mortal, are extraordinarily high. Is the link between genius and madness spurious and just a matter of pure coincidence?

Proponents of a positive link will point to a number of research studies. Unfortunately nearly every one of them is flawed. Criticisms include ambiguous inclusionary criteria,

the impossibility of validating historical data, the lack of control groups, small sample size, and the often unclear definitions of the highly creative (genius) and of mental illness. But despite all these shortcomings, there is growing support for the link between genius and mental illness. Research has generally followed two lines of approach:

a) Studying Creative Individuals

Eminent historical individuals have been studied by researching their biographies to see what percentage of them have psychiatric illnesses. In 1949, Adele Juda investigated 113 German artists, architects, composers and writers. She found that one third of these subjects suffered from a mental illness, which included bipolar disease (manic-depression), major depression, and schizophrenia. Colin Martindale in 1972 studied 42 English and French poets, and found significant psychiatric illness in 45% of them. Joseph Schildkraut and colleagues reported that about half of 15 American visual artists that they studied suffered from psychiatric illnesses. Arnold Ludwig (1992) in an impressive study of 1004 twentieth century artists and writers, found that 74% of them exhibited psychiatric symptoms at some stage of their lives, which compares with 32% for the national average. It must be admitted that labeling dead artists retrospectively with psychiatric diagnosis has raised many skeptical eyebrows, and hence this line of evidence has to be taken with a hefty pinch of salt.

Fortunately, there are a few studies of contemporary artists, writers and musicians. In 1974, Nancy Andreasen from the University of Iowa studied 30 faculty members attending a writers' workshop and matched them with 30 controls. She found that 80% of participating writers suffered from depression or bipolar disorder, compared to 30% of her controls.

Kay Redfield Jamison in 1989 studied 47 distinguished British writers and visual artists, and found that 38% of them had been previously treated for a mood disorder, including bipolar disorder, which compares with less than 15% of the British general population.

Arnold Ludwig studied a sample of 59 female writers attending a Women Writers Conference and found that psychiatric problems were higher in writers compared with non-writers:

DIAGNOSIS	WRITERS (%)	NON-WRITERS (%)
Depression	56	14
Mania	19	3
Panic Attacks	22	5
Eating Disorders	12	2
Drug Abuse	17	5
Childhood sexual abuse	39	12

The last category of evidence to support the link between mental illness and creativity comes from the US Bureau of the Census. The overall suicide rate among artists in the USA is three times the national average. These figures are broken down for each subcategory of artists (Figures given as number of suicides per 100,000 population):

ARTIST	RATE OF SUICIDE (per 100,000 population)
Painters and Sculptors	43.9
Musicians and Composers	32.6
Dancers	29.4
Authors	24.1
Actors and Directors	23.5
National Average	11.3

b) Studying Individuals with Mental Illnesses

From the opposite standpoint, individuals with psychiatric conditions have been studied to see if they are more creative compared to the normal population. Hagop Akiskal of the University of Tennessee studied 750 of his patients with depression, bipolar disorder and schizophrenia. He found that among the more mildly affected patients, some 10% were creative artists and writers. A study of 33 bipolar subjects was conducted by Ruth Richards and Dennis Kinney in Denmark, and they found that creativity was significantly higher in subjects with bipolar disorder compared to their controls.

There is a small body of epidemiological evidence to support a link between creativity and bipolar disorders, but this is not the same as saying between genius and madness.

WHAT SPECIFIC PSYCHIATRIC DISORDERS HAVE BEEN LINKED TO GENIUS?

Without much hard evidence many authors have credited famous people to have suffered from one or more mental disorders. Attention deficit hyperactivity disorder is notably missing from the list below because it is a condition which is hard to diagnose, and the evidence linking it to creativity is least convincing.

Dyslexia

Dyslexia is a learning disorder characterized by severe difficulties in recognizing and understanding written language resulting in reading, writing, and spelling problems. It occurs in persons with a normal intellectual capacity who has had adequate instruction to read. It affects boys three times more commonly than girls. There is a tendency for it to run in families. Currently it is believed that the primary contributing factor to dyslexia is an auditory language deficit. Eminent people thought to have suffered from dyslexia include Albert Einstein, Thomas Alva Edison, Walt Disney, Pablo Picasso and Lee Kuan Yew.

Bipolar Disorder

Also known as manic-depressive psychosis, bipolar disorder is characterized by mood swings between euphoria and depression. Many may also show such psychotic symptoms as delusions, hallucinations, paranoia, or grossly bizarre behavior. Unlike unipolar disorder (depression only) which affects females predominantly, bipolar disorder affects males and females equally. The etiology of bipolar disorder is still uncertain. Neuroimaging studies have demonstrated a larger third ventricle but smaller cerebellum

and temporal lobe. Bipolar disorder is inherited as a dominant gene, and the chromosome responsible is thought to be number 11. During manic episodes, there appears to be greater noradrenergic activity. Bipolar subjects have reduced levels of key substances involved in intraneuronal signal transduction (protein kinase C, marcks protein). Famous people thought to have bipolar disorder include Winston Churchill, Edgar Allan Poe, Sylvia Plath, Robert Schumann, Vincent Van Gogh, Tim Burton and Francis Ford Coppola.

Schizophrenia

Schizophrenia is a severe psychiatric disorder characterized by hallucinations, delusions, blunted emotions, disordered thinking, detachment from reality and withdrawal into the self. It affects males and females equally. There is a strong genetic component. While the etiology is still not fully established, the current favorite biochemical theory revolves around disordered dopamine metabolism affecting certain areas of the brain. The most prominent example of a genius affected by schizophrenia is John Nash.

Obsessive-Compulsive Disorder

Obsessive-Compulsive Disorder is a psychiatric condition characterized by obsessive thoughts and compulsive behavior, for example continual washing of the hands prompted by a feeling of uncleanliness. It can occur equally in males and females. Obsessions can also be a manifestation of bipolar disorder and schizophrenia. Famous persons who have displayed obsessive-compulsive tendencies in the absence of bipolar disorder or schizophrenia include inventor Nicola Tesla, film and airline magnate Howard Hughes, and entertainer Marc Summers.

Autistic Savant

About 10% of autistic people may have the savant syndrome in which they display outstanding talents in a certain area. This was well illustrated by the character played by Dustin Hoffman in the film Rain Man. Savant skills usually manifest within a narrow band of mental functions, such as lightning fast arithmetic calculations, calendar calculating, mechanical abilities, art (drawing or sculpting), and music (usually piano playing, perfect pitch). To date, none of the autistic savants have reached the rank of genius. However it has been conjectured that some university professors who display reclusive tendencies may be a manifestation of undiagnosed autistic savants.

Terminal Illness

Although not a psychiatric condition per se, terminal illness can precipitate tremendous emotional responses in people. John Stuart Mills suffered from tuberculosis, which was incurable and led a slow death. Upon diagnosis, he started writing the works that would make him famous. Other artists who suffered from tuberculosis included John Keats, Shelley, Edgar Allan Poe, Maxim Gorky, Robert Louis Stevenson, Eugene O'Neill, George Orwell, Albert Camus and Edvard Munch. Stephen Hawking had motor neurone disease and when he was informed of the diagnosis, he was galvanized to start his researches. There seems to be no doubt that the realization of one's imminent demise can focus the mind immeasurably.

Epilepsy

Again not a psychiatric condition, but many brilliant people have a history of epilepsy, and because it is a brain condition, it is relevant when discussing superior brain functioning. There are at least two theoretical possibilities why epilepsy may have a beneficial effect on one's thinking. Firstly the electric discharges that occur during an epileptic fit may cause flashes of new ideas. Secondly, recurrent epilepsy or the transient hypoxia it can engender might fortuitously cause minor damage to those areas of the brain that inhibit thinking, and this disinhibition of thought processes may enhance creative thinking. Famous people who suffered from epilepsy include: Julius Caesar, Alexander the Great, Napoleon Bonaparte, Pyotr Tchaikovsky, Charles Dickens, George Handel and Hector Berlioz.

DRUGS AND ALCOHOL

A few artists have admitted to experimenting with drugs to enhance their creativity. These include Sigmund Freud and Thomas Edison. Alcohol addiction has afflicted a number of creative individuals, including Jackson Pollock and Eugene O'Neill. Are drugs or alcohol a manifestation or the cause of the psychiatric disorder? Or do artists take them because they find them helpful in enhancing their creativity?

HOW CAN MADNESS PROMOTE GENIUS?

Compensatory Adaptation

Just as the blind have a heightened sense of hearing and touch, and the deaf have increased sharpness of vision, certain types of mental disability may cause compensatory adaptation. The best candidate for this is dyslexia. If a dyslexic has difficulty with language, then he compensates by increasing his powers of visual perception.

Direct Effects of Mood Swings

Mild mania has some benefits. It is associated with quicker thinking, greater verbal fluency, play on words, increased self-confidence, and greater optimism. Severe mania, on the other hand, can be counterproductive and may result in loss of concentration and wild behaviors. Mild depression can act as a sort of editor to prune the excesses of mania. But severe depression can dampen all activities and thinking.

Knight's Move Thinking

Certain mental disorders like schizophrenia and bipolar disorder are characterized by sudden jumps in one's thinking. These leaps from one idea to another can be quite unexpected and illogical, and are referred to as Knight's Move thinking. This way of thinking is important in creative thinking because it enables a person to make innovative leaps without being anchored to preconceived ideas or imprisoned by one's sense of logic.

SHOULD MILD MENTAL ILLNESS BE TREATED?

John Nash is quoted by Sylvia Nasar as saying that he often refused to take medication for schizophrenia because it blunted his creative thinking. This sentiment is reflected by a number of artists and scientists suffering from mild bipolar disorder. The medical profession is therefore faced with a dilemma of deciding whether or not to treat mild mental afflictions knowing that medical treatment may smother creativity, while untreated, a percentage of patients with bipolar disorder might become worse, and commit suicide.

CAN GENIUS BE DEVELOPED?

This is the question that all educators would like answered. Biographies of many geniuses have shown that they were once child prodigies. Unfortunately most child prodigies that we hear about in the newspapers usually fade into oblivion and never achieve their early promise. The question is why some prodigies flower into geniuses, while others wither. Clues are given in biographies and autobiographies.

Parents

Parents play a pivotal role in the upbringing of their children. They are their child's advocates, and they provide the milieu for their child's development. A stable, loving environment seems to be a key factor. Nobel Prizewinner Norbert Weiner was a child prodigy, whose parents were academics themselves, and they recognized their son's early talents. They introduced their son to other academics at Harvard University, some of whom were also Nobel Prizewinners. This is in contrast to another child prodigy contemporaneous with Norbert Weiner, Billy Sidis. At the age of 4, he taught himself Latin, and by 6 years old, he could read 8 languages, and 8 years old he had already written 4 books. He was admitted to Harvard University at the age of 11 years. However, from then onwards he petered out. The parents gave him the sort of accelerated learning that would not be out of place in a kiasu Singapore family. However, the parents were overprotective, and failed to allow him to develop his own independence. It was only by adolescence that he could clean or dress himself. Further more the parents tended to show off their son, and they allowed the press to gain access to him too readily, with the result that some of the articles written tended to ridicule his childish behavior. Furthermore the family was an unhappy one, with constant parental strife. They were unable to support their son emotionally. So despite having ample intellectual stimulation, he did not have an emotionally nurturing environment.

Teachers

Teachers can play an important role in a child's development. They can provide the balanced in a prodigy's distorted educational development. They can set challenging problems for their students to solve. Sylvia Nasar gives an interesting anecdote that when John Nash misheard his tutor and thought that his assignment was to solve some hitherto unsolved complex mathematical problems, he handed in the solutions to these

problems the next day! Bertrand Russell and Stephen Hawking enjoyed solving mathematical problems, and both had read Euclid with great fervor, establishing their own proofs of these theorems. Great minds seem to like to tackle classic problems and to work out their solutions by themselves.

Mentors

Isaac Newton and Albert Einstein both had uncles who acted as mentors and helped develop their nephew's early mathematical abilities. Half the Nobel Prizewinners had other Nobel Prizewinners as mentors when they were young. It appears that highly creative people know how to foster creativity in others.

Clusters of Excellence

It has been noted that people of genius tend to be found in clusters. For example ancient Greece produced Socrates, Plato and Aristotle. The Laboratory of Molecular Biology at Cambridge University produced 10 Nobel Prizewinners, and Bell Laboratories produced 11 Nobel Prizewinners. The fostering of centers of excellence is an important way of attracting and catalyzing talent, among whom may be found a few geniuses.

Age of First Significant Creative Achievement

It is well known that there is an optimal age at which certain disciplines can shine. Olympic swimmers and prizewinning pianists reach their pinnacle in their teens. Below is a list of scientists and inventors, and the age at which they made their first discovery or publication:

CREATOR	CREATION	AGE (yr)
Louis Braille	Invented a system of printing and writing for the blind	15
Blaise Pascal	Formulated Pascal's Theorem	16
Galileo Galilei	Discovered the laws of pendulum motion at the age of	17
	Law of falling bodies	25
Edwin Land	Patented his first polarizing light filter	19
George Westinghouse	First patent for a rotary steam engine	19
	Invented air brakes	22
Guglielmo Marconi	Invented a system of radio telegraphy	21
Joshua Lederberg	Discovered bacterial conjugation	21
Thomas Edison	Invented automated relaying communications device	22
Carl Gauss	Proved the theorem of complex coefficients	22
John Nash	Published his theory of non-cooperative games	22
Brian Josephson	Predicted the Josephson effect	22
James Hillier	Developed the electron microscope	22
Isaac Newton	Calculus, principles of optics, elements of circular motion	
	inverse square law of gravity	23
Louis Parker	Invented a low frequency receiver for radio waves	23
Srinivasa Ramanujan	Published his first mathematical papers	24
Satyendra Bose	Published his first statistical mechanics papers	24
Paul Dirac	Quantum mechanics for motion of atomic particles	24
Richard Feynman	Published his theory of electromagnetic waves	24
Walt Disney	Drew his first animated cartoon	24

Max Perutz	Crystallographic studies of glaciers	24
	Applied Xray crystallography to study hemoglobin	25
James Clerk Maxwell	Published first paper on electromagnetic lines of force	25
Enrico Fermi	Postulated his statistical laws	25
Earnest Rutherford	Discovered the alpha, beta and gamma radiation	25
George Eastman	Made commercial dry photographic plates	25
James Watson	Co-published his paper on DNA	25
Louis Pasteur	Discovered tartarate isomers	26
Henri Poincare	Created automorphic functions	26
Albert Einstein	Published 3 ground-breaking articles	26
Niels Bohr	Proposed his model of the Bohr atom	26
Werner Heisenberg	Derived his uncertainty principle	26
Nicola Tesla	Constructed his first induction motor	27
Linus Pauling	Laid down Pauling's Rules	27
Lee Tsung-Dao	Discovered the decay modes of kaon	29

A large proportion of the top scientists and inventors throughout history achieved success while quite young. If one extrapolates backwards, the years preceding the discovery or publication would be crucial. This means that the late teens and early twenties are critical periods for the flowering of highly inventive scientists. Hence the importance of protecting and nurturing this creative period of their lives.

CONCLUSIONS

Yes, there is a link between genius and madness, but it is a complex one. It appears to be the result of a fortuitous convergence of a number of factors, including a minimum level of intelligence, the ability to join ideas from different domains, the ability to record these ideas, independence and flexibility of thinking, intense focus, self-discipline, perseverance, the right social and cultural environment, all conspire to create a genius.

A tantalizing question is whether or not one can create the right physical, emotional and educational environment to produce a genius. By studying the mechanisms, both biochemical and educational, that link mental disorders and genius, one may gain insight into factors that can engender creativity and kindle future potential geniuses. But even if this were possible, would a genius thus produced be recognized?

To sum up, here is a modified quote: "You don't have to be mad to be a genius... but it helps."

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