

**From *John the Rifleman & Other Stories: Casebook of a Consulting Psychiatrist* by Hoyle Leigh, SutroCrest, 2023**

**Chapter 20. John, the Rifle Man -How genes, early environment, and experience through life stages affect mental health and illness**

This chapter is presented as a lecture for an educated lay audience.

Greetings,

The Case of John, the Paranoid Rifle Man, was presented to me during one of my teaching rounds:

John was a 41-year-old man was brought to the hospital by the police in handcuffs. He had been pointing an assault-weapon style rifle out his second story apartment window. The emergency call was made by his father with whom he lives. The patient, was apparently hallucinating – muttering about people following him, and threatening to kill him.

At this point, what questions would you ask?

I then ask my trainees to fill in the blanks, “Major psychiatric disorders are by and large (     ) and (     ). What would you answer?”

Of course, there are not just two but many correct answers, but what I have in mind are “familial” and “chronic.” A third important answer is “stress related.”

What does familial mean? It means that there is most likely genetic and/or memetic contribution to the illness. By memetic, I mean *absorbed information* in general, including unconscious imitation, the way distress is expressed in the early environment of the patient, for example, did mom or dad complain of pain such as headaches or stomach aches when under stress? Did they habitually use alcohol or other substances to alleviate anxiety? And, of course, genes as possibly manifested by family history of major mental illness such as schizophrenia and bipolar disorder.

“Chronic” means that major psychiatric disorders tend to manifest in relatively young age – in their teens or twenties if not younger. Thus, asking about when it first began – the onset of the symptoms is important.

Now, let’s consider John. His family history was negative for major psychiatric disorders such as schizophrenia, but both his parents were heavy users of alcohol and were engaged in frequent fights. John had an older brother who

habitually used alcohol and marijuana. Thus, there is reason to suspect that there may be genetic and memetic, i.e., familial cultural, predisposition for alcohol and substance use. John was using alcohol and had started using methamphetamine around age 16 and has continued to use it though not enough to have been incarcerated. John did have a DUI arrest several times beginning with late teens, and alcohol withdrawal seizure twice. Since the last seizure about fifteen years ago, he confined his drinking to three beers and two shots of tequila a day and has been seizure free since. So, there seems to be a relatively early onset of alcohol use, and at around age 16, of methamphetamine use. According to his father, the patient had been drinking more and using methamphetamine more heavily in the last month.

At this point, what questions come to mind?

Of course, what's been happening during last month, September, when his substance use increased. Also, what was happening around age 16 when John was using both alcohol and methamphetamine? The patient is living with his father at age 41? Why?

But before we continue on this case, we will consider the general development of mental health or illness to adulthood.

The state of a person's mental health or illness is largely determined on foundations built in early stages of human life largely prior to adulthood.

Some degrees of anxiety, depression, and flight from reality in the form of depersonalization and derealization are normal and adaptive human experiences.

Imagine a child, let's say a girl, with genetic mutations such that she has no anxiety at all.

What would become of her? Without anxiety, she might have no fear of jumping from a high place or rushing into oncoming traffic – life itself would be threatened!

If you had no anxiety at all, would you have achieved your current station in life?

In certain extreme human conditions, psychotic experiences such as hallucinations and delusions may be adaptive.

What we call mental illnesses or psychiatric syndromes, such as Anxiety Disorders, Bipolar and Unipolar

depression, Substance Use Disorders, Psychotic disorders including Schizophrenia, PTSD and Personality Disorders, among others, are all extremes of normal experiences the susceptibility of which is determined by a person's genetic constitution and how it has interacted with environment.

There is recognition in the psychiatric literature that the model for psychiatric disorder is shifting from a paradigm of silos of risk factors for specific psychiatric disorders such as schizophrenia or bipolar disorder to a model of many common risk factors such as genes and their epigenetic changes interacting in a pluripotential brain especially in the early stages of development. The result may be symptoms of differing severities or no symptoms at all due to protective factors. (Arango 2019)

This lecture emphasizes the role of epigenetics – the interaction of genes with environment which may result in turning on or off of the genes. Fine brain connections and thus structure is constantly modified by information - which I call memes<sup>3</sup> – replicating bits of information, which can be stored in many containers including books,

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<sup>3</sup> Richard Dawkins coined the term *meme* in his book, *The Selfish Gene*. For more discussion of memes in psychiatry, see Leigh H: *Genes, Memes, Culture and Mental Illness: An Integrative Approach*, Springer, 2010.

electronic media, and the brain. The memes may enter the brain from the outside or arise from within the brain as in “insight”, may influence the environment and enter other brains, which in turn may be modified by the receiving individual’s already existing memes. Thus, I hope that the memes or information contained in this lecture will enter your brains and replicate and change your brain to be more enlightened than before the experiencing of this lecture.

It is of note that our brains interact with culture through the exchange and processing of memes contained in various media, e.g., lectures, books, and through activities such as political movements as well as expressive art such as literature, music, painting. For example, what memes does Picasso’s painting, Guernica, elicit in our brains? Probably of a sense of terror as expressed in the cubist faces in the painting, leading to an abhorrence of war in the informed brain that connects the painting to the Nazi German planes bombing the city of Guernica during the Spanish Civil War.

Stress showers the brain with memes (information) that interact with genes and pre-existing memes in either strengthening the individual to heroism, or to give in to post-traumatic stress disorder or PTSD. The outcome

would be the result of the interaction among genetic influences, influences of existing memes or information, representing the memories of past experiences with stressful events and whether they made the person stronger or weaker. At any given moment, a person is the sum of interactions among their genes and the memories (memes) of their experiences, both in interaction with their social and physical environment.

So, let's begin from the beginning. When does the life of a person begin?

One might say that the precursors of the seeds of a life began long before a person is formed, in the form of a pool of DNA's of the gonads (ovaries and testicles) of the parents of the person-to-be. A human cell contains 46 strands of chromosome, the thread made of DNA's. In the gonads, cells undergo divisions such that each sperm or egg contains 23, exactly one half of the parental chromosomes. The DNA's contained within each of the egg or sperm are subject to influence by the internal environment of the parents' bodies, which are, in turn, influenced by such factors as available nutrition, stress levels, and physical

environment such as temperature and presence or absence of infectious organisms and toxins.

I would divide a life's journey in the following stages:

1. Pre-Person Events including fertilization, intrauterine development of fetus,
2. Birth and beginnings of personhood,
3. Childhood, subdivided into a. Infancy and Early Childhood, b. Middle Childhood,
4. Adolescence,
5. Adulthood, subdivided into a. Early Adulthood, b. Middle Adulthood, c. Late Adulthood and Old Age, and Death.

We will discuss each stage of this journey:

**1. Pre-Person Events:**

**a. Conception**

Following ejaculation into the vagina, a lucky (or heroic) sperm with a random mixture of half of father's genes, among millions of fellow sperms, outruns the others up the Fallopian tube, meets and penetrates the egg, which contains a random mixture of half of mother's genes. Now the egg has the full complement of 46 chromosomes containing a mixture of half of father's and mother's genes. The egg is fertilized! Next, the fertilized egg flows



down the tube and becomes implanted in the soft inside lining of the uterus, the endometrium. Conception has occurred.

### **b. Sex Determination**

Among the total 46 human chromosomes is a pair of sex chromosomes, X and Y. X and Y are different in size; X, the female chromosome, is larger in size, and Y, the male chromosome, is much smaller. Females have two X chromosomes, i.e., XX, while males have one X and one Y chromosome, i.e., XY. When the reproductive cell divides into eggs or sperms, the sex chromosome pair separates. Thus, the female's XX divides into two eggs both containing one X chromosome. The male XY divides into one sperm containing the X and the other, containing the Y. Thus, all eggs have an X chromosome, and about half of the sperms have an Y chromosome while the other half, an X chromosome. Thus, depending on whether the lucky sperm carries an X or a Y chromosome, the egg that already contains X would become XX (female) or XY (male). Half of all individual's genes come from the father's sperm and depending on whether that sperm contained X or Y chromosome, the individual's sex would be female or male. The mitochondrial DNA, on

the other hand, are all from the mother as the egg always contains maternal cytoplasm.

The Y chromosome is responsible for determining the morphological development of the fetus into a male, in the absence of Y, X chromosome determines the development into a female.

*In the case of our patient, John the Rifle Man, the one sperm which outran all the other thousands of sperms and was victorious in penetrating the egg to fertilize it happened to carry his father's Y rather than X chromosome and thus made him a male. The other thousands of sperms, each carrying an X or Y chromosome, lost the race to enter the egg would be left to die. Had an X chromosome carrying sperm had been victorious and the fertilized egg eventually grew up to be Joan, would she be in the hospital now?*

### **c. Implantation and Pregnancy**

After conception, i.e., after the fertilized egg digs itself into the soft endometrium of the uterus (womb), it has to secure feeding and breathing (Oxygen!) source – from what else but the blood within the uterus? But when exposed to the blood from the mother, the egg could be discovered by the mother's immune system as a foreign body and be killed. Evolution naturally provided the egg with a barrier that sucks oxygen and nutrients from the blood of the mother without causing an immunologic attack – the placenta.

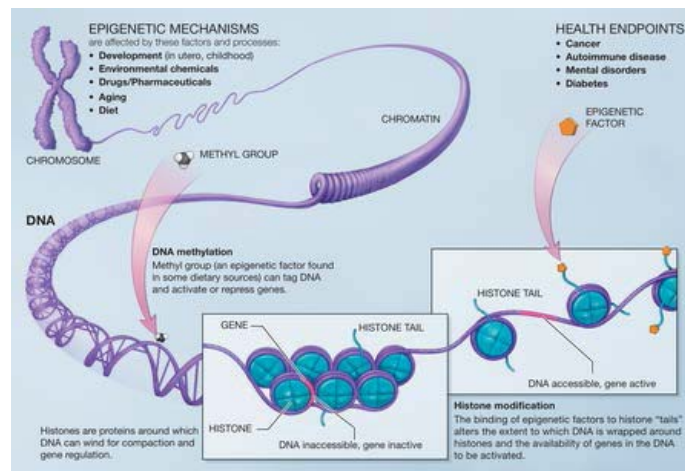
During early pregnancy, fetal organs appear and develop in an unfolding manner based on the schematics of the genes, but which genes get turned on or off (Epigenetics) is largely influenced by the intrauterine environment – oxygen, nutrients, and invasion by foreign bodies to mother and possibly to the fetus (e.g., German Measles). Fetal endocrine organs including the gonads also play a role in this process by secreting hormones, including sex hormones.

Genes are turned on or off through chemical changes in the DNA, for example, methylation, or by cutting access

to the gene through mechanical barriers such as molecules of the chemical, histone, surrounding the DNA.

Mechanisms of genes being turned off or on include **methylation and histone wrapping of the gene (DNA)**

Through such changes in the genetic makeup of



brain cells, the brain may become more or less susceptible to later responses to stress and environmental factors, determining the susceptibility to anxiety, depression, dissociation, reality-testing, as well as attention.

*In John's case, we do not have exact information concerning any intrauterine stressors, although we found, later on, that John's mother was a moderate drinker and was consuming alcohol during her pregnancy with John. Fetal alcohol syndrome can cause problems in learning,*

*social relationships, and aggression. John, however, did not have the facial features of severe fetal alcohol syndrome.*

## **2. Birth and the Beginnings of Personhood**

### **The Birthing Process**

Some psychoanalysts such as Otto Rank posited that the human birthing process through which a fetus becomes a baby is the first TRAUMATIC experience that may contribute to mental illness. The fetus is involuntarily forced (literally, squeezed) to pass through a dark and narrow canal to be dropped into a gigantic, cold, and unfamiliar, real world!

Whether it results in mental illness or not, the birthing process is certainly a great environmental change experience for the fetus, a shocking change from the comfort of the warm, familiar, secure environment of the womb where everything was provided. No wonder the baby starts to cry!

## **Change in Demand in Changed Environment after Birth**

The baby is now forced to move their chest and abdominal muscles to breathe the cold and smelly (what is this sensation that I never had in the womb?) AIR to get measly amounts of oxygen. Then the baby must use their MOUTH. What is this thing they are sticking into my mouth? I have to open it to suck on this soft thing to get nutrients called MILK? I never had to EAT or DRINK in the womb, whatever I needed was just there! And I have to PEE and POOP? I never used these parts of the body before.

## **Epigenetic Changes occur with Birth**

The genes of the baby-to-be first underwent epigenetic changes while in the womb depending on the womb's environment – nutritional and oxygen levels, sounds, pressure, potentially toxic substances including drugs and alcohol, foreign body invasions (infections), and illness or health of the mother. Now with the stress of the birthing process and neonatal environment, major epigenetic changes are superimposed on the genes in the brain cells which may lead to changes in the volume of specific areas

of the brain such as the hippocampus and amygdala, structures concerned with fear, relaxation, stress sensitivity, resilience, withdrawal, and exploratory drive. These are the paths for potential emotional dysregulation at the brain level for such disorders as anxiety and depression.

*In the case of the Paranoid Rifle Man, John, there were no gross abnormalities on head X-ray, but a more precise imaging, such as an MRI, was not done.*

### **3. Childhood**

Having endured the universal stress of the birthing process, the newborn begins their journey of personal development. Biological development is an unfolding process of the genetic information contained in the DNA which occurs in interaction with the microenvironment of the cells. The microenvironment of the cells is in turn influenced by the macroenvironment of the organism, human body and its brain, the command center. The macroenvironment contains both social interactions with other human beings which includes information transfer and learning (that changes the brain) as well as the physical environment such as environmental toxins and weather.

Human development occurs as an interaction among the biological development initiated by genetic unfolding, including changes in weight, height, and brain maturation, and psychological (memetic) development influenced by social interaction, expectations, and learning.

A widely used model of human development is **Erik Erikson' Eight Stages of Human Development (1959)**.

This model posits specific psychosocial tasks to be mastered in each stage, the failure of which resulting in distress and dysfunction.

The stages and the psychosocial tasks to be mastered versus the consequences of failure are:

Stage 1. infancy, Trust versus Mistrust.

Stage 2. toddlerhood, Autonomy versus Shame and Doubt

Stage 3. preschool years, Initiative versus Guilt

Stage 4. early school years, Industry versus Inferiority

Stage 5. Adolescence, Identity versus Identity confusion

Stage 6. young adulthood, Intimacy versus Isolation

Stage 7. middle adulthood, Generativity versus Stagnation

Stage 8. late adulthood, Integrity versus Despair



## **1) Early Childhood (Infancy, Toddlerhood, Pre-school years)**

In this talk, I'll lump infancy, toddlerhood, and pre-school years as early childhood.

During this period, in Eriksonian terms, the child has to learn to trust, develop a sense of autonomy (e.g., bladder & bowel control), initiative (exploration, 'can do' feeling). Failing these, the person develops a sense of mistrust, shame and doubt, and guilt feelings.

### **What in the brain underlies personal development?**

The brain grows in size through childhood caused by the growth of the neurons as well as of the supporting glial cells. *While some neurogenesis occurs after birth, much of the growth occurs through the growth of neuronal connections and their intensification through use.* This process may be shaped through new connections and elimination of old, no longer useful connections as will be discussed next. Thus, the process of personal development through learning, an interaction with the environment in the form of influx of information, reward and punishment,

would be a reflection of changes in the brain and neural connections.

A major mechanism of learning that results in brain changes is **synaptic pruning**, a process of shedding synaptic connections of neurons that occurs from around the time of birth, peaking around age 2 to 10, but continuing through adolescence and late 20's. By age 10 or so, about 50% of the neural synapses have been pruned. The process of pruning is influenced by genetic expressions as well as through the learning process of "use it or lose it." In schizophrenic brains, there may be an abnormal increase in the pruning process and consequent reduction in neural connections while in autism there may be a reduction in the pruning process and thus an abnormally large number of synapses.

The pruning that occurs later up to age 20's seems to be more concentrated in the prefrontal lobes of the brain, perhaps facilitating the higher cortical function such as decision making. Synaptic pruning is clearly a process determined by genetic, epigenetic, and personal psychological factors (pleasure, pain, fear, anticipation) that are in turn determined by environmental and biological

factors. For example, consider a 2–4-year-old child, in the peak of pruning process, was neglected and often punished, which enhanced neural transmission of stimuli to the amygdalae and caused their hypertrophy and enhanced fear/anxiety response, and at the same time resulted in the pruning of unused synapses that would have resulted in pleasure in nucleus accumbens. The child would thus have developed a biological neural structure susceptible to *chronic anxiety and depression*, among other psychiatric syndromes, in adolescence and adulthood. Others would include, again among others, PTSD and Substance Use Disorder.

*In our patient, John's case, considering heavy parental drug use and frequent fights, it is likely that there was neglect and possible abuse resulting in John's proneness for anxiety and depression as well as problems in attention and learning in later life.*

#### **A. Role of Parental Figures and Education**

The enhancement or reduction in neural connections of specific brain areas will result in differences in cognitive ability and emotional experience and expression, which are at the same time also influenced by the child's immediate

physical and social environment, mainly comprising of parents, siblings and peers, and teachers and the educational system. You deal with the demands of the present with the equipment you got! And with experience, you learn!

Learning occurs mostly through *conditioning, and imitation*. There are two types of conditioning, Classical conditioning, otherwise known as Pavlovian, and Operant conditioning, otherwise known as Skinnerian conditioning. Pavlovian conditioning occurs when there is a repeated close temporal association between two stimuli. If you ring a bell at the same time, you give food to a dog, eventually the dog will salivate at the sound of a bell even when no food is presented. Repeated exposure to witnessing adults fighting when going through a particular street may cause fear response to a child when crossing that street. This type of conditioning is automatic. *In John's case, it turned out that his parents fought with each other mostly at dinner time, which made him hate, or he learned to have anxiety and fear associated with being with his parents at dinner time.*

Operant or Skinnerian Conditioning is based on reward or punishment after a behavior has occurred. For example, a dog retrieves a ball and brings it to the owner and gets a treat for reward. A student gets detention at school after bullying another student. *With operant conditioning, behaviors can be shaped by rewarding a progression of more complex desired behaviors, for example, an elephant is taught to dance.* Operant conditioning shapes speech, what to say, how to say it. How certain words/babble are received- a smile or a frown?

*In John's case, he was punished often in school for his disruptive behavior, which may have been an early symptom of Attention Deficit Disorder, for which maternal alcohol and drug consumption might have been a factor. Because of ADHD, however, he may not have been successfully conditioned not to be disruptive, especially if he had not been rewarded for being not disruptive (which was rare), and for academic achievements, which were also rare. The lack of reward or reinforcement may have led to low self-esteem and tendency for depression, also contributed by his underlying tendency for anxiety and attention deficit.*

Another important phenomenon for humans and humanoids is *imitation*. A behavior that seems beneficial may be imitated by the observer, e.g., a chimp learning to use a rock to crack open a nut through observation.

Even when no immediate benefit is apparent, imitation of persons in close proximity comes naturally. A child often imitates and therefore acquires the mannerisms as well as their “way of doing things” from parental figures and teachers. Modes of emotional expression may also be imitated. For example, how is affection expressed? Through physical contact, such as embracing and kissing? By texting? How is aggression expressed? By physical fighting ? By “silent treatment?”

*In John’s case, there did not seem to have been much expression of affection by parents, and they expressed aggression by fighting, both physically and verbally. The parents seemed to have resorted to alcohol when feeling stressed, dysphoric, which may have been imitated by John.*

Related to imitation is *information (or meme) transfer*. Through language development new methods of cracking nuts or cans can be transferred from one individual to others through word of mouth, and with written language

and pictorial representation, they can be preserved and transferred to other humans in distant lands and distant times. Written language is a means of telepathy – evoking both emotions and knowledge across the expanse of space and time. A child who is encouraged to read, has access to books and reads widely has a brain that has potentially absorbed a huge amount of accumulated knowledge and empathy with a variety of hues and colors of human emotions.

### **B. Race/Nationality/Ethnicity, Cultural Memes, Socioeconomic Class**

A child grows up in the context of relationships formed with parents, family, friends, and the media which exist in interaction with the culture or meme pool determined by nationality, ethnicity, and race to varying degrees.

Socioeconomic class has a universal effect in influencing the limits of exposure to enrichment in the child's physical and informational (memetic) milieu.

A child thus absorbs the norms of behavior and emotional expression, speech, and preference for food, clothing, entertainment, and arts, including types of music, etc. of their subculture.

Did the child grow up with parents shouting at each other all the time, and streets with loud noises and even the sound of gunfire? Or in a quiet suburb where the parents listened to classical music and took the child to art museums?

Information availability both in and outside of school environment plays a crucial role in a child's intellectual and emotional development. The availability of the *internet*, the modern source of practically all information available to humans, is often determined by socioeconomic class.

The child is exposed to pools of bits of information of all sorts of varying veracity and often quite false or misleading. Developing the skill of **reasoning and critical thinking** is an absolute necessity to successfully navigate such meme pools. While the school system should provide standardized curriculum in critical thinking, parents play an important role. Can the child observe that the parents are using reason in evaluating the news? Does the mother explain why something is believable and another is not, and why some things advertised in the media are good, and others not? Do the parents seek information from a reliable source such as an encyclopedia or dictionary? Does the



family belong to a fanatical religious sect that does not “believe in” science?

The *critical thinking and reasoning “muscles”* a child develops from childhood will determine the degree of resistance or susceptibility to fads, disinformation, and delusions. Without the tools to recognize facts and falsehoods, the child may grow up to be more and more confused in the ocean of surrounding memes, which may cause extreme stress and precipitate mental illness. Alternatively, they may be “brainwashed” to join cults or delusional, fanatical, violent sects.

After being ejected from the comfort of the womb, the infant feels either secure and develops a sense of trust or fails to do so, then in toddlerhood or the Freudian Oedipal Stage of age three to six or so, as the child starts to explore and feel competitive with parents, with encouragement and support, they will develop Eriksonian initiative, or guilt in a punitive environment. A lack of the sense of trust of others and pervasive sense of guilt is likely to lead to vulnerability to later stress resulting in anxiety and depression.

There is not much we can do to ameliorate the “trauma” of the birthing process, but in early childhood, there is much we can do to reduce the risk factors that cut across different

disorders. Reducing child abuse and bullying is likely to reduce the incidence or severity of mental disorders

*Now, how about our patient, John the Paranoid Rifle Man?*

*We know that his parents frequently fought at dinner time.*

*John was disruptive in school and often punished and seldom rewarded . How about at home? We learn that John's parents seldom reasoned with John but set strict rules, such as being there for dinner every day. Why?*

*Because I told you so. The father would threaten John with a slap in the face or by being thrown out into the streets.*

*John's family's ethnicity was Mexican Hispanic. His father was an immigrant, mother was native born in the U.S. They were both Catholic, but early in their marriage, they converted into an evangelical Christian sect which had many prohibitions including alcohol. Nevertheless, the parents drank tequila to relieve tension, but drinking may have contributed to their frequent arguments and fights.*

*John's family was lower middle class - John's father worked as a guard in a construction firm, and his mother worked in a supermarket. John felt closer to his mom, who seemed to understand his learning disability, and cut him some slack, John felt angry at his father for being "dictatorial", unreasonable, and violent. It is clear that John had major problems with his "Oedipal phase" or "*

*Stage of Initiative vs. Guilt” during which John would have exercised initiative and do new things and feel competitive with father. The “dictatorial” father slapped down John’s competitiveness and/or initiative, so that John kept on feeling rebellious and angry toward his father, with attendant guilt feelings and low self-esteem.*

*They did not attend church regularly; the only times he went he was rather horrified by the attendees having what seemed to be convulsions and speaking in “tongue” during service. His mother had frequent meetings with other members of the sect, which seemed to have believed in many conspiracy theories, including being persecuted by certain unknown groups. The only books available at home were pamphlets left by mom’s friend churchgoers, which John was encouraged to read but did NOT read. John had access to very few outside books other than school textbooks, which he seldom studied. It seems clear that home was not a place where John was encouraged to read widely, absorb human knowledge or to empathize with other human beings, real or fictional, across time and space. Home was not where John could develop rational and critical thinking to be able to distinguish reality from delusions such as conspiracy theories not founded on facts.*

*Considering John's already present symptoms of ADHD, it is no wonder that he was not learning much in school, was disruptive, and, ostracized, feeling despondent and depressed. John was also bullied in school, Hispanics were a minority in the school, and John was not very strong or athletic. John hated going to school, which did not help with his learning the basic skills for future development.*

## **2) Middle Childhood – the School Years**

The period between the Freudian Oedipal period and the onset of puberty, the Freudian latency period, represents the Eriksonian stage of industry vs. inferiority.

This is a period of learning, learning of basic interpersonal skills such as social interactions, cooperation, “just getting along”, competition, conflict resolution, etc. The skills also include internal psychological ones, including analyzing, planning, delayed gratification, and “letting go”, and emotional ones, such as how to become “hepped up”, to relax, what to do when feeling sad, how to express anger constructively, how to enjoy pleasure. This is a period when serious academic learning or infusion of memes (information) into the brain begins, with increasing formal competition with peers for better grades, etc., leading to

better opportunities for better colleges, etc. Pride in accomplishments and feelings of inferiority and low self-esteem in failures enter into the formation of personality and identity in the next stage of adolescence.

How do the parents and/or the school encourage fair competition? Is defeat or failure in an exam treated as humiliation or an opportunity to learn? To what type of social group or clique does the child belong? Is the child afraid of social interaction? Isolated? Are there gangs? Is there exposure to drugs and drug culture?

Has the child been abused or traumatized psychologically, physically, and/or sexually by anyone including parents, relatives, peers, or strangers? Were the traumas discovered? Has there been support, evaluation and treatment of the effects of the trauma(s) or were they ignored or neglected?

### **Childhood Traumas and Primary Prevention of Mental Illness.**

Many mental disorders including anxiety, depression, bipolar disorder, and schizophrenia have been shown to share common genetic and experiential risk factors such as bullying or child abuse. (Arango 2019, Cross-Disorder

Group, 2013, Brain Consortium et al 2018, Teicher 2013). Childhood abuse and trauma are also strong risk factors of Borderline Personality disorder.

Bullying is associated with severe symptoms of mental health problems, including self-harm and suicidality. Bullying was shown to have detrimental effects that persist into late adolescence and contribute independently to mental health problems.

*For our patient John, the downward spiral continued through middle childhood. He continued to be bullied in school and absorbed very little skills in either home or school. He did poorly academically, and learned few social skills, being isolated much of the time. At home, the role models for any disagreement were loud arguments and physical violence and alcohol use. John's middle childhood only contributed further to his feelings of inferiority and despair, and he secretly started using alcohol which tended to ameliorate some of his anxiety and depression.*

### **3) Adolescence**

There are certain periods in one's life when major changes in outlook, attitudes to life and lifestyle, and relationships are possible (mutagenic periods). These periods include 1. Early childhood, 2. Adolescence, 3. Marriage and/or Birth of a Child, 3. Bereavement, 4. Retirement.

Among these periods, Adolescence is perhaps the most dramatic and often involves the development, preoccupation with, and fluxes and changes in body image, sexuality, sense of self, core beliefs, and career choice, among others.

Adolescence is initiated by a genetic unfolding process of puberty determined by the sex chromosomes. The appearance of secondary sex characteristics actually brings on changes in the physical appearance. With increasing physiologically determined sexual drive, romantic and sexual attraction and activity with others affect the person's sense of self, sexual identity, self-esteem, and expectations concerning others including attractiveness, self-confidence, assertiveness, or their opposites. Sexual identity may be questioned, experimented, and then firmed up, e.g., straight, gay, bi, cis, trans, etc.

With maturing brain, the adolescent may experiment with different political or religious ideologies and romantic partners. Sudden changes to previously held beliefs may occur, including frank rejection and adoption of new beliefs or ideologies. Previously held ideas about future careers may change, e.g., from wanting to be a fire person to wanting to be a climate change activist.

In Eriksonian terms, a sense of stable identity may emerge, and the turmoil would subside, or a failure may lead to identity confusion, leading to continuing insecurity and turmoil into adulthood.

The role of available information or meme pools in the environment – family, school, peers, organizations, media, and especially social media, fads, and prevailing youth culture – is of utmost importance in this process of identity formation and re-formation. Availability of recreational substances may play a major role in influencing and potentially inhibiting or altering the brain – meme interaction, i.e., how absorbed information is processed by synaptic changes – enhancement, pruning, etc.

To many adolescents, schools may provide a supportive environment for socialization and learning, but some adolescents may experience bullying which may have



serious consequences. In a recent Swedish study of all school age children ages 11 to 15, having been bullied was significantly associated with detriment in mental health, i.e., mental health problems were four times higher among boys who had been bullied compared to those not bullied. The corresponding figure for girls was 2.4 times higher (Kallman & Hallgren, 2021).

A stable sense of self identity formed during adolescence in spheres such as sexual, cultural, political and ideological, would lead to stable romantic and social relationships, a reasoned career path, and mental health.

Adolescence is also a period during which the unfolding of epigenetically determined risk genes may find phenotypic expression in interaction with permissive environment. For example, substances such as methamphetamine are known to cause paranoia with prolonged use even in normal people. Cannabis is known to precipitate psychosis in susceptible individuals. If an adolescent with risk genes for psychosis uses both substances, of course, the adolescent is likely to exhibit symptoms of psychosis, which may then be diagnosed as, depending on the phenomenology of the

symptoms and family history, drug induced psychosis, schizophrenia, or bipolar disorder.

Even without the risk genes, an unresolved sense of identity in adolescence may lead to future instability and diagnoses such as anxiety, depression, borderline personality, PTSD, and substance use disorders.

*In John's case, it was reported that he was using alcohol in his teens and started using methamphetamine around age 16, at the height of adolescence. It was noted that being a shy loner, John felt unattractive and had very few dates with girls. He felt insecure in his sexuality. On further inquiry, it turned out that John's mother became ill with cancer of the uterus when John was around age 15 but had not sought medical help because she was suspicious of doctors, a belief fueled by John's parents' conspiracy-minded religious sect. It was only when she was terminally ill that she sought help, too late. She died in September, five days before John's 16<sup>th</sup> birthday. John lost the only parent to whom he felt some love. After his wife died, the father drank more and became more abusive. John and his brother did the housekeeping for the household, and both indulged in methamphetamine heavily. Clearly, John's*

*adolescence was characterized by social isolation, stress of mother's illness and death, identity confusion, and substances known to contribute to emergence of psychotic symptoms. Indeed, John seemed to have developed increasing irritability and social isolation. He skipped school often, and when he did attend, he had more frequent bullying and fights. He dropped out at 11<sup>th</sup> grade.*

*After dropping out of school, he got odd jobs in fast food joints and supermarkets but was soon fired for using methamphetamine and cannabis at work. Adolescence is a time when epigenetic pathology often manifests itself – in John's case, intrauterine exposure to alcohol, early childhood maltreatment, lack of learning-conducive environment, parents' conspiracy-minded religious beliefs, being bullied, mother's illness and death, exposure to heavy alcohol and methamphetamine and cannabis use, likely have all contributed to his psychotic symptoms and depression, which he tried to ameliorate with more substance use resulting in a vicious cycle.*

*John's brother Victor, who shared with John many genes and childhood experiences including alcohol and drug use, had a divergent life in adolescence. Victor was four years*

*older than John and his intrauterine environment might have been different, perhaps less alcohol and substances. Victor was bigger and was more outgoing than John. Victor was not bullied, did moderately well in high school despite his drug use, and graduated from school shortly after their mother's death about the same time John dropped out of school. Victor and his girlfriend had applied to a state college out of town, were both accepted, and left home for college. Victor apparently reduced his substance use in college. Victor navigated his adolescence much more successfully than John in developing a firmer sense of identity. Unlike John, Victor had no Attention Deficit Disorder and was not bullied and was able to develop better social and academic skills which led to a healthier life course divergent from his brother John.*

#### **4) Adulthood Stages at a Glance**

If an adolescent develops a stable sense of identity which forms stable foundations for adult personality, they would be prepared to successfully navigate themselves through the adult stages with appropriate constructive responses to stress. This would further consolidate their coping skills and a sense of competence. On the other hand, without a

stable foundation, there may be uncertainty and rapid fluctuations of the sense of identity, and an inability to deal with even minor stresses resulting in deficiencies in adaptive coping responses including autonomic nervous system and endocrine activation. These changes may trip the individual into a psychiatric syndrome including anxiety and/or depressive disorders, PTSD, and psychosis, with or without substances which may have been used in an attempt to alleviate the psychological pain.

### **Early Adulthood**

In early adulthood, it is important to remember that synaptic pruning still occurs and that a more stable personality may yet to be formed. This may be especially true in persons with epigenetic risk for attention deficit disorder. In early adulthood, the Eriksonian stage of intimacy vs. isolation, social, study, and work skills learned and practiced in previous stages form the basis of stable intimate relationships as well as career. The life skills of cooperation and competition are tested here. Success in the expanding areas of endeavor may consolidate self-esteem

and a sense of competence; failures may result in isolation, low self-esteem, anxiety and depression.

Patienthood, being identified as a patient which may lead to a “career as a mental patient” may begin in early adulthood if it had not begun even earlier. The degree of acceptance of such “patienthood” may determine the patient’s sense of self, their help seeking behavior, course of illness, and the outcome, e.g., remain working and receive treatment, unable to work due to frequent or continuing serious symptoms and/or hospitalizations, be partially disabled, or permanently and severely disabled.

### **Middle Adulthood**

Middle Adulthood, the Eriksonian stage of generativity vs. stagnation, is ideally a stable period of “settling down”, having formed a stable intimate relationship and perhaps marriage and child(ren), with a stable and satisfactory career. Failing these tasks, mostly due to less than satisfactory attainment of the foundations of earlier stages of life, e.g., industry (learning), identity formation, and intimacy, the person may feel left behind compared to peers, without a sense of stability. There may be continual stresses with unsatisfactory relationships, work, and life

itself. Anxiety and despair may be omnipresent, and for those with epigenetic vulnerability, mental illness may ensue. Substance use may be frequent and contribute to the descent into illness.

### *John the Rifleman's Adulthood*

Our patient, John, was age 41 when he came to our attention, when he was observed pointing an assault rifle out his window. The father had called the police and he was brought to the psychiatric emergency room. John claimed he was trying to protect himself from the gang members who were following him and planning to attack him and kidnap him. He also said he would shoot himself rather than be kidnapped by the gang members. He was clearly delusional and had both visual and auditory hallucinations. We know that John had some early symptoms of depression and psychosis in adolescence. What happened since then?

As previously stated, John dropped out of school at 11<sup>th</sup> grade, shortly after his mother's death from cancer. He lived with his father and brother for a while, used alcohol, cannabis, and methamphetamine regularly, had a number of odd jobs but no stable employment. John had two DUIs in

his late teens and early twenties. When he attempted to reduce alcohol consumption after a DUI, he had withdrawal seizures.

Things changed considerably when John was around age 25 when he met a man some 20 years older. This man, Bill, “adopted” John as he missed his deceased son who was about the same age as John. Bill was divorced, lived alone and worked as a custodian of a storage company. Bill invited John to live with him and helped him get a job as a night custodian in the same company he worked for. It seems for the next ten years or so, John had a relatively stable, if still reclusive, life with Bill. Bill seemed to have been a “good” father figure to John though they did not see each other that much because Bill worked the day shift and John worked the night shift. During the day, John would do the housekeeping- cooking, laundry, etc. On weekends, they would go to the movies or ball games. They used alcohol and cannabis but not to excess. After John had an alcohol withdrawal seizure, Bill imposed a routine of alcohol use for both of them – each would confine his drinking to 3 cans of beer and two shots of tequila a day, to which they strictly adhered. They seldom used methamphetamine.



This relatively stable period came to an end in September six years ago when Bill died suddenly of an MI, a heart attack at age 55. Grief-stricken, John quit his job and moved back to his father's house. His brother, Victor, had long left the house, married, and was living out of town. His aging father was still working in his old job as a guard. Having moved back to his old surroundings, John began to drink heavily again, and used cannabis and methamphetamine heavily. Probably out of loneliness, and missing his mother in his old home, he was heavily involved in the social media of the conspiracy-theory oriented religious sect to which his mother had belonged. During the last month, September, John's father, age 63, started having some chest pains, and was placed on heart medications. So, what may have contributed to John's increased drinking and drug use during the past month, September? Of course, an anniversary reaction, i.e., the emergence, often unconsciously, of emotions attached to an event that happened during a particular month, day, or even a season, can underlie unexplained dysphoria leading to increased drug use. In John's case, his mother and his father substitute Bill, died in September, and September was also the month of John's birthday! And during the last month, John's father's health became worrisome!

John had a relatively stable period ages 25-35 or so when he was with a stable father figure- Bill. Although John never achieved a stable sense of identity (adolescence), intimacy (early adulthood), and generativity (middle adulthood), his life was stabilized for some ten years in adulthood through adaptation in his own way, given a supportive figure, Bill. It is unknown if John's relationship with Bill had a sexual component – one wishes it did as it would have provided some sense of intimacy for John. Whatever stability John experienced during this period crumbled with Bill's death, and thus the descent to mental illness. Methamphetamine is known to cause psychosis, especially paranoid psychosis, even in normal individuals with prolonged use. Furthermore, the social media that John devoured was conspiracy oriented, bordering on paranoid. John, who had so many risk and precipitating factors, finally developed frank paranoid psychosis requiring emergency hospitalization. Without question, John the Rifle Man was an immediate danger to others as well as to self. In addition to all the other factors, the ready availability of a lethal weapon in the environment was an additional factor in exacerbating the situation.

John is still in his middle adult life at age 41. And now, he is starting his psychiatric patienthood with the diagnoses of

Psychosis, unspecified, with substance use, Delusional Disorder, Depressive disorder, unspecified, Methamphetamine Use Disorder, Alcohol Use Disorder, Attention Deficit Disorder, Paranoid Personality Disorder. What would have happened if he had not been apprehended and brought to the hospital when he was pointing his assault rifle out the window? How dangerous was he really?

John the Paranoid Rifle Man was very dangerous! An unmarried, unemployed, socially isolated man who is paranoid, delusional, actively hallucinating, and using methamphetamine, with a deadly weapon and a declared intent to kill!

What should be the treatment approach for this patient?

Obviously, he needs emergency inpatient care and treatment for his active psychosis with antipsychotics. Then his methamphetamine use has to be managed as well as the use of cannabis and alcohol. Considering his chronic sense of isolation, loneliness, and addiction to conspiracy-oriented social media, the management plans must include outpatient psychotherapy and possible group therapy.

What is the prognosis for John? Clearly, the immediate acute psychotic symptoms can be treated and depression, managed, but intervening in the stunted personality development may be an insurmountable challenge. They include, from early childhood, the effects of bullying, lack of acquisition of social and academic skills, ADHD, inferiority feelings, identity diffusion, lack of intimacy, and isolation in early adulthood. That there was a relatively stable period while John was living with Bill for about ten years prior to Bill's death does provide some clue that there may be some hope. If the resources are available, John may be able to achieve some stability with a comprehensive and flexible management plan. Otherwise, John the Paranoid Rifle Man may rise again with unfortunate consequences.

John's brother, Victor, on the other hand, graduated from the out-of-town college, married his girlfriend and began a career in the health care field as a first responder. Victor seems to have navigated his adolescence very differently from John in spite of his substance use, developed a sense of identity, and achieved Eriksonian intimacy during early adulthood, which formed a basis for a career as an emergency health technician. His middle adulthood achieved generativity: he eventually became a physician's

assistant together with his wife, and they had a daughter who is now a medical student.

### **Late Adulthood and Old Age**

According to Erikson, in late adulthood or Old Age, the attainment of a sense of integrity of a life well lived would be the goal. Without this sense of integrity, there may be despair – regrets over life slipping by. With increasing age, there is an increased incidence and prevalence of chronic diseases such as heart disease and stroke, with attendant disability further contributing to despair. Even for those seniors who attained a sense of integrity, there may be social isolation due to the death of friends and family as well as the onset of physical or mental disability resulting in incapacity or physical dependence on caregivers.

An important task of advancing age, beginning during middle age but especially in old age, is adaptation to a general decrease in physical and mental functional capacity. “What I used to be able to do easily in my 20’s, like climbing up five flights of stairs, I cannot do today, I run out of breath on the second floor!” “I used to be able to remember exactly what I did a week ago, but now, I have trouble remembering what I did yesterday!”

Continuing to be physically active within limits, and developing new ways of helping memory function, such as voice memos on the cell phone or writing down things to remember, these and other activities to compensate for age-related decline in function can help maintain a sense of integrity.

Despair in old age may be largely situational as well as epigenetic. Such despair may naturally lead to depression, substance use, or suicide. Suicide rate generally increases with age, especially with men, while women's suicide rate tends to peak around age 65. Significant number of older persons in despair may have suicidal ideation without the physical or mental ability to carry it out.

Contemplation of the end of life and how one faces it is a prominent consideration in old age, though such contemplation is appropriate at any stage of life as when an individual's life will end is quite unpredictable. Advance directives, wills, and other legal and financial considerations toward the end of life can be a source of comfort. Supportive figures in the face of dwindling numbers of family and friends due to infirmity and death become ever more precious and necessary. Provision of

some support system, be it a companion or a nursing home may become necessary.

As many persons are in medical care or nursing home settings at end of life, death with dignity and medically assisted suicide or euthanasia are issues to be considered. Achieving and maintaining integrity at the end of life requires the collaboration with significant others including the family, the community (social, legal, spiritual, etc.), and the medical team.

### **The Ninth Stage of Joan Erikson- Psychosocial Crises in Reverse Order**

Joan Erikson, Erik Erikson's wife, wrote the last chapter, the 9<sup>th</sup> Stage of Life when Erik was 93 years old in their book, *Life Cycle Completed, Extended Version* (1997). She wrote in that chapter that in the 8<sup>th</sup> and 9<sup>th</sup> decades of life, the life challenges encountered in life occur in reverse order with declining capacities and function and increasing dependence on others. Reaching and completing this 9<sup>th</sup> stage of life with a sense of integrity and trust would be an ultimate challenge and accomplishment for us all.

**Carpe diem!**

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