

CONCEPTION TO AGE TWO:

THE KEY TO BETTER EDUCATION, HEALTH & LOWERING CRIME

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You may find the following facts of interest:

--The well-being of American children ranks twentieth among the twenty-one richest democracies. In 2005, over 15 percent of all babies born in the U.S. were low-birth weight and/or preterm at delivery.

--Nearly five children in the U.S. die every day as the result of child abuse. Three-fourths of them are under four, and 90 percent of the perpetrators are a biological parent.

--One percent of infants in the Western World are born with fetal alcohol spectrum disorder, the leading known preventable cause of mental retardation and birth defects and a leading known cause of learning disabilities. More children have this alcohol induced disorder than are affected by autism, Down syndrome, cerebral palsy, cystic fibrosis, spina bifida, and sudden infant death syndrome combined. (*Scared Sick* at xv-xvi.)

--The United States has the highest rate of incarceration of any country in the world. Our justice system spends over \$100 billion per year to arrest, prosecute, and house criminals. [Wikipedia—U. S. Bureau of Justice Statistics]

--For children with special needs, ADHD, out-of-control behavior and truancy issues, the Fresno Unified School District estimates it spends over \$100 million, or one-sixth of its budget, to help meet the needs of these students in its schools. [*FUSD 2012-2013 Budget Information*]

For over 40 years, I was a lawyer by profession. Eighteen of those years were spent representing Child Protective Services in Juvenile Dependency Court. These cases involved protecting abused and neglected children. After handling my first few hundred cases, I came to two initial conclusions. First, the key goal of CPS was to break the cycle of child abuse and neglect. Most abusing parents had poor role models and were abused themselves as children. The second conclusion was the need to greatly expand Head Start and pre-kindergarten classes, so that all children are ready for kindergarten.

In 1998, I had an epiphany and my second conclusion changed. I attended a Marjaree Mason Center luncheon that featured as a keynote speaker, a child psychologist named Robin Karr-Morse. She had recently co-authored a book entitled, *Ghosts from the Nursery: Tracing the Roots of Violence*.

She spoke of the critical need to address at-risk children from conception to age two if we want to significantly reduce crime, violence, delinquency, child abuse, and many other related social problems.

The basic premise of the book is that the vast majority of people in prison and juvenile detention facilities, as well as those engaged in other anti-social activities, started on a path to those outcomes because of what happened to them from the day they were conceived until age two. I have since read the book twice, as well as the authors' more recent book, *Scared Sick: The Role of Childhood Trauma in Adult Disease*. I view the importance of these two books, which address issues critical to the quality of human life, as analogous to the importance of Rachel Carson's book, *Silent Spring*, which addressed issues critical to the quality of our environment.

***Ghosts from the Nursery* synthesizes hundreds of research studies that demonstrate the need for, and cost-benefit of, early education and intervention long before a child is ready for Head Start or kindergarten. As the book explains, it is in the womb when most brain cells develop for a newborn. A mother's stress or use of drugs, alcohol, or tobacco can adversely affect this brain development.**

***Scared Sick* similarly synthesizes hundreds of research studies to explain that, while not all early cases of child abuse and neglect lead to prison, they do lead to the early onset of many illnesses and diseases later in life.**

The quick overview is that from birth to age two, the child's brain cell wiring--the synapses and dendrites--and the foundation for the child's emotional development occur. A positive, nurturing home creates a significantly better adjusted child and future adult than does a home where an infant is subject to isolation, yelling, or hitting. As noted in *Ghosts*,

Far from the present, isolated, and independently functioning organ pictured in our biology texts of [decades] ago, the brain is, in fact, a dynamic organism that is constantly reflecting and adjusting to the environment the individual is experiencing. While genetics do set the broad parameters, actual matter in the brain is built--or not--by sound, sight, smell, touch, and movement from the outside environment. By the eighteenth week of gestation, when the brain is still primitive, the fetus has developed all of the one hundred to two hundred billion basic brain cells or neurons that it will ever have in a lifetime. But by birth, connecting structures between those nerve cells have just started to form. Those connections now depend on the outside environment for completion. Stimulation from the baby's world actually generates the building of the corresponding systems to process that stimulation in the baby's brain. Seeing people and objects, for example, generates the building growth in the visual cortex; hearing sounds builds the auditory cortex; and so forth. (*Ghosts* at 24.)

How the brain develops depends in good measure on its environment. The brain learns and adapts to what is going on around it as perceived by the body's five senses. Our DNA and genes provide the blueprints and lay down the basic framework of the brain, but the shaping and finishing within that framework, is facilitated by the environment.

How a person develops literally begins at conception. Maternal nutrition is critical to the fetus's development. A low-nutrient environment in the womb causes the fetus to slow down its rate of growth to help it survive, so that full-term baby will likely have low birth weight. Prenatal undernourishment can lead to weakened internal organs like the heart, kidney, and lungs due to their competition for the limited nutrition. This will place the baby at a higher risk of coronary heart disease, stroke, diabetes, and obesity in adulthood. (*Scared Sick* at 58-59.)

Engaging a newborn by talking, holding, singing, and other encouraging stimuli have a positive effect on the child's brain. When such stimulation is nonexistent or hostile, opportunities are lost. Many studies of animals and of infants and young children show this result. In one study, young rats were exposed to a rich environment full of toys, exercise equipment, food and playmates. A later autopsy of these enriched rats showed they had larger and heavier brains with a 25

percent increase in connections between brain cells compared to those rats raised in standard laboratory cages without the extra stimuli. (*Ghosts* at 27.)

In a study of newborn monkeys, those who nursed through a cloth-covered wire-substitute “mother” received nourishment but no mutual emotional exchange. As a result, the neurons available for reciprocal social communication were not stimulated. These baby monkeys became agitated and withdrawn and had difficulties relating to other monkeys. Their inability to socially interact with other monkeys continued throughout their lives. (*Ghosts* at 29-30)

Numerous studies show that the earlier the enrichment intervention, the stronger and more long-lasting were the positive results for children’s brain development and IQ ratings. In fact, after age five, making positive changes to the child’s brain structure and function becomes much more difficult. (*Ghosts* at 27-29.)

One of the reasons for this is that, as the child produces the millions of nerve connections, those that are not used or stimulated are discarded. (*Ghosts* at 29)

Other studies show that “[r]egardless of the words used, exposure to the sounds of human speech builds the circuitry in the infant brain that creates the path for more words to be absorbed. Repeated exposure actually builds the physiological capacity. The more words the child hears by age one, the larger the vocabulary at age two. From the earliest months of life, babies who are encouraged by caregivers to take an interest in their environments and to explore their world through vision, touch, and hearing, score higher on cognitive and language tests both at preschool and at grade school. The linkages between neurons are the connections that make the brain work.” These connections are most prolific to age one and taper off by age twelve. (*Ghosts* at 30-31.)

Medical researchers across the world are unveiling in biological terms how it is that our experiences affect our biology, particularly when these experiences are chronic, happen early in life, and remain unrecognized.” Fear and trauma in early childhood impact the child’s central nervous, endocrine, and immune systems. More recent studies now show that while not all children with this negative experience will end up in prison, most all of them will end up with significant health issues as adults. (*Scared Sick* at xvi.)

For example, when one is under stress, the body generates a hormone called cortisol. The cortisol activates the brain’s flight or fight mechanisms. When the stress event is over, the body stops producing the cortisol and the body returns to a normal, stable condition. The problem arises when the stress is not just acute, but is chronic. In the latter situation, the cortisol does not ease up and the body can gradually lose its ability to return to normalcy. This adversely impacts the child as she or he goes on through life. (*Scared Sick* at 40-43)

How does this happen? Well, as I recall from my high school biology class, we are all born with a combination of the DNA and genes of our biological parents and with lots of chemicals and hormones. At the time, there was a question of whether our grown up results came from nature or nurture. Turns out, it was like asking if a rectangle is determined by its width or its length—it is both.

While our DNA and genes give us many of our attributes, they can be changed by our environment. Every cell in our body has the same DNA and genes as every other cell in our body. However, some cells become muscle or bones, while others become hair, organs, skin, et cetera. How this happens is that our genes have receptors that are turned on or off by a complex chemical process influenced by our hormones. When some of the receptors are overwhelmed, the affected cells

can lose the ability to act normally. This impacts how a child or adult responds to his or her environment.

Much like soldiers returning from combat with PTSD, traumatized children, especially very young ones, can have their feelings of trauma triggered by simply a reminder or thought of the original event. If this triggering occurs often enough, it can generalize so that even subtle reminders—just fragments of the original event—are enough to trigger a full emotional response, restimulating such children’s sense of helplessness each time. The child being over stimulated by such reminders is distracted from other forms of learning. (*Scared Sick* at 39-52)

As observed in *Scared Sick*, such children become those “who can’t sit still in school because they are busy subliminally monitoring the environment for signs of danger rather than calmly listening to the teacher. They will often perceive even benign behaviors as hostile—and they are ready to respond. ... Because the memory of early trauma is frozen in the brain of a young child as an emotional feeling, stored without words, it will most likely not be [understandable] either through language or rational thought” (*Id.* at 38)

A nurturing environment is critical to a child’s development. An unfortunate example received international note as a result of media coverage of Romanian orphanages in the early 1990’s. While the babies were kept clean and fed, they received virtually no loving human emotional interaction. When they cried, no one came to comfort, rock, sing, or soothe them. No holding, singing, reading, teaching, playing, or laughing. The babies and children were found to be listless, withdrawn and showed limited or nonexistent capacities to attach and interact with their later adoptive parents in America. (*Scared Sick* at 96-97)

If a baby is not held, touched, rocked, comforted, talked to and played with, the neurons waiting for stimulation do not connect. It is like having seeds, but no soil, no sun, and no water to grow the seeds, so the like the seeds, the neurons wither away undeveloped. (*Id.* at 136)

The importance of an infant having a secure attachment cannot be over-emphasized. “Once attachment is securely accomplished, children ... are more likely to explore their environment, reflect curiosity, be persistent in complex tasks, be less fearful of change, and show less frustration while solving problems. They are more comfortable and cooperative with peers and less likely to respond aggressively. The quality of the attachment relationship with the primary caregiver has far more bearing on the child’s cognitive, emotional and physical health than the alternative, negative child care experience, which tends to get far more press. Countless studies have demonstrated that secure attachment is the best defense against later social and behavioral problems, including both aggressive behavior and victim-prone behavior.” (*Id.* at 193)

Scared Sick described a case of a mother who had a fun and engaging baby boy born during World War II. At nine months, he developed a severe case of hives and had to be hospitalized. Per hospital practices at that time, the baby was kept in total isolation for a full week, with his mother getting only one short visit. Later, when the mother got to take her son home, she found him limp like a rag doll, withdrawn, and no longer engaging. His personality had changed and even later counseling did not change him. What was most memorable to me about this case was the boy made national headlines decades later. His name is Ted Kaczynski, better known as the Unabomber. We will never know everything that led to his serial killings, but the facts show his emotionally deprived hospital stay dramatically changed his personality at a very early age. (*Scared Sick.* at 93)

So having been given some examples of the critical importance of caregiver nurturing and a positive experience from conception to age two, you may be asking, “So what is the science behind this?” The answer is “epigenetics,” which literally means “above the genome.” (*Id.* at 152)

“Epigenetics is a recently emerging branch of biology that deals with the effects of external influences on gene expression. At the biological level, this is where nature and nurture become indistinguishable. The *genome* contains DNA--the blueprints or codes for making the proteins that are the building blocks of life. But DNA is not all that the genome carries. Even more of the genome is made up of non-coding regions that circulate around DNA and regulate how the DNA functions, causing certain genes to be [activated] while others are shut down. (*Id.* at 152-153)

“The influences on our DNA include both developmental and environmental factors. If one thinks of the genome as a computer, the epigenome is equivalent to the software that tells the genome how and when to work. [...] It is biochemical activities driven by environmental factors like diet and lifestyle—that silence or activate genes in a given cell as they divide to form a given organ.” (*Ibid*)

Genes are in fact amazingly plastic, so that an organism can take in information from its surroundings and adopt a survival strategy. The result is a unique developmental course that affects growth patterns, chances of survival, and reproductive success. (*Ibid.*)

The importance of epigenetics is underscored by studying identical twins, who share the exact same genes and DNA. With the help of powerful microscopes, geneticists can view increasing differences between their cells as they age. This can explain why one twin may develop cancer and the other does not. (*Id.* at 154)

A classic example of this occurred in research involving “agouti mice.” The name reflects the “agouti” gene in a breed of mice. Those mice with the gene active are golden in color and fat, constantly ravenous and prone to cancer and diabetes. When the gene is dormant, the mice are brown and skinny, weighing about half as much as golden color mice, but like identical twins, all agouti mice are genetically identical. The difference is that in the fat, golden mice, the agouti gene stays permanently “on,” while in the skinny brown siblings, the agouti gene is “silenced” or shut down by epigenetic processes. (*Scared Sick.* at 155)

In the agouti mice twins, “a pregnancy diet rich in folic acid and vitamin B-12 turns off the agouti gene and makes a huge difference in both the appearance and health of the offspring without altering a single letter in their DNA.” An important take away from this is: good nutrition for pregnant mothers can have a dramatic impact on the future health and well-being of the baby at birth and as that baby grows older. Numerous other studies confirm this finding and also show that the impact can appear in later generations. (*Ibid* at 156-158)

A classic example is the “Dutch Hunger Winter.” In the final months of 1944, the Nazis banned the use of railroads to transport food to western Holland in retaliation for a transportation strike staged by Dutch citizens to demonstrate their opposition to the Nazis. While the Dutch did get some food, shortages were severe and the resulting hunger lasted several months. “Throughout the famine, some Dutch hospitals still kept detailed medical records and followed the health of the affected population and their children over several generations. The records showed that the girls who were malnourished in utero during the first trimester of their mothers’ pregnancy were born at normal size, but often, as adults, gave birth to smaller than normal babies.” Monitoring of this next generation continued into their middle ages. They showed a much higher rate of chronic diseases, including

diabetes, kidney disease, and almost triple the rate of heart disease, than was seen in individuals born before or after the Dutch Hunger Winter. (*Scared Sick* at 159-160)

Similar results were found in a study of pregnant women in America during the flu pandemic in 1918. The adult offspring of women who had been pregnant during the epidemic had more illness, especially diabetes. These offspring attained less education, had lower incomes, and were more likely to be on welfare. The effects were seen across race, across incomes, and in both male and female offspring. Saying the data “spoke for itself,” the researcher also concluded that “what happens before age two permanently affects our health, including the aging process.” (*Id.* at 160)

Research establishes and documents that how children are treated registers at the cellular level and also complements the results of a major study undertaken by Kaiser Permanente in San Diego.

Known as the ACE Study for “Adverse Childhood Experiences,” the study came about when Kaiser doctors joined with a doctor from the Centers for Disease Control and Prevention, to develop a detailed history questionnaire completed by several thousand patients. While covering a broad range of topics, many of the questions related to possible childhood abuse or dysfunctional family history. After following the group for 15 years, the ACE study looked at the correlations between adverse childhood experiences and ten risk factors associated with the leading causes of death in the United States. The single most stunning finding in the ACE Study was the sheer prevalence of adverse childhood experiences. Two-thirds of the patients reported one or more such experiences and the higher their ACE score, the worse were the patients’ health outcomes. A later review of death records showed that those with a relatively high ACE score died around the age of 60 years, while those with a zero score lived nearly 20 years longer. (*Scared Sick* at 7-10; *ACE Study*) The study also showed strong correlations between addictions to nicotine, alcohol, or illicit drugs and early adverse experiences and that this correlation was more attributable to characteristics intrinsic to early life experiences than to characteristics within the drugs themselves. (*Scared Sick* at 10-11)

- Alcohol and drug abuse, including cigarette smoking;
- Obesity
- PTSD and dissociative disorders
- Many forms of mental illness [anxiety, depression, PTSD, etc.]
- Respiratory illness
- Memory loss/Alzheimer’s
- Chronic pain
- Heart and liver disease
- Digestive disorders, and
- Asthma and allergies.

All of these health issues have a significant correlation with childhood trauma or mistreatment. (*Id.* at 255)

So, given all of this scientific information showing that conception to age two is the most critical period of time to positively impact a child’s life and future, what do we need to do to make use of this knowledge?

Both *Ghosts from the Nursery* and *Scared Sick* list several successful programs. First, though, I would note that having children is one of the most significant things most people do in their lives. However, unlike driving a car or going hunting or fishing, one is not required to have any training or a license in order to become a parent. Only when the parent causes child abuse or neglect, does

our legal system attempt to intervene. We can do better, much better, but we must act before children and their parents face legal proceedings.

For example, here is a list of programs described in the two books:

--Comprehensive Pregnancy Prevention It is ironic that federal funding for Planned Parenthood likely does more to reduce unwanted pregnancies and abortions than any other federal program.

--Comprehensive Prenatal Health Care & Home Visitation for all Newborns: to assess if any parenting training or intervention programs would be of help. There would need to be affordable resources in the community available for the parents to attend. The billions of dollars spent on reducing crime seldom addresses the real root causes. When such funds are used for home visitation programs, the greatest results are shown. (*Ibid.*)

A key example of this type of program is the Positive Parenting Program or "Triple P," which delivers parenting tools and techniques to parents for constructive child behavior management. This can include implementing Fresno's First Five "Talking is Teaching: Talk Read Sing" campaign, where parents are encouraged to talk, read, and sing to their children daily from birth.

--Affordable Access to Day Care/Preschool Education: including expanding early Head Start and Pre-Kindergarten classes.

--Educating all students and prospective parents on why conception to age two is so critical to a child's future.

Our city, county, state, and nation are at a fork in the road without the resources to travel both forks forever. We as a society need to hold criminals and others engaged in anti-social behavior accountable for their conduct. I believe we also need to have a healthy, productive population. Our current policies and priorities cannot accomplish either goal. Instead, by changing our spending priorities as a society to fully fund the many educational and prevention programs previously noted, we can significantly reduce in the future tens of billions of dollars now spent on our criminal justice and health care systems. We can evolve to a place where we have a dramatic increase in tax producers and a decrease in tax consumers. Such a shift will also greatly enhance the quality of life for a much larger proportion of our population.

This is not just some pipe dream. The Federal Reserve Bank of Minneapolis issued an analysis concluding that "early childhood development programs" are a form of "economic development." "The Federal Reserve officials concluded that "the benefits achieved from [such programs] far exceed their costs." They further stated that the rate of return far exceeded the rate of return from most economic development projects. (*Fedgazette*)

This result is also supported in a study by researchers from the CDC which concluded that the total lifetime economic burden resulting from new cases of child maltreatment in the United States in 2008 alone will be approximately \$124 billion. (*Breaking the Cycle* at 5, fn. 29)

Every time I hear or read about another homicide, mass shooting or drunk driving accident, I cannot help but think about our need to positively impact the critical time period from conception to age two. If the killer of Mike Reynolds' daughter had had the benefit of the prevention programs mentioned in this paper, I wonder if Kimber might still be alive and our prisons not so overcrowded.

This paper represents just some of the more significant highlights of *Ghosts from the Nursery* and *Scared Sick*. If you are interested in this topic, I encourage you to read these two books, and use your influence with others, including our

elected officials and policy makers, especially our school boards, to dramatically increase the funding of programs and policies that implement the recommendations in the two books. We can be wiser in how we spend our resources. The choice is yours.

Thank you.

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MISCELLANEOUS:

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