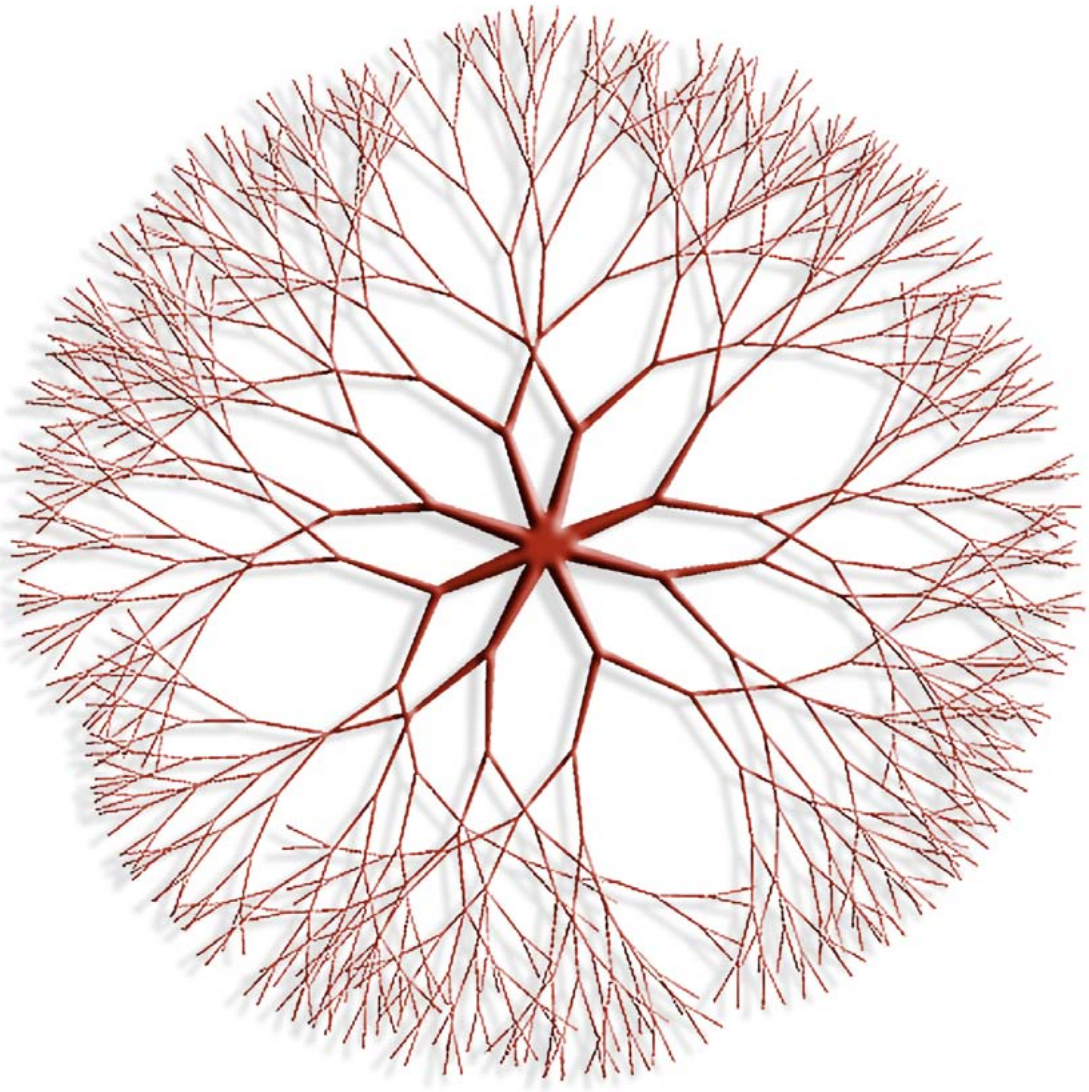
A NEURO-OPTIMISTIC FUTURE

BY FRANK FORENCICH



AN EXUBERANT ANIMAL® PUBLICATION

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"A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty."

Winston Churchill

"I'm not afraid of storms, for I'm learning how to sail my ship."

Louisa May Alcott

Looking back at my history as a student, I can distinctly recall the moment when I first began to give up hope. That day was long ago and I was a enrolled in a high school physiology class. The topic of the day was the nervous system and the characteristics of nerve cells. Our teacher was guiding us through the structure of neurons, cell bodies, axons and dendrites. He explained how action potentials travel down the axon in an electrochemical wave, releasing tiny packets of neurotransmitters into the synapse, stimulating the downstream neuron to fire. We dutifully copied this information into our notebooks and waited for more.

"Oh, and by the way," he continued. "Brain cells don't regenerate. They can only die. Be sure to remember this fact; they'll probably ask you about it on the state exam."

As he erased the chalkboard, we copied this nugget into our notebooks, scratching out phrases like "No new brain cells."

After class, I met with my friends and we joked about this disturbing new window on our bodies and the future. "Well, I guess it's all downhill from here." Ha-ha. "Not much to look forward to." "Life is just one long slide into brain damage and senility, I guess." Ha-ha.

But that was just the beginning of our disillusionment. A few weeks later, our teachers herded us into the high school auditorium and sat us down for the first in a series of standardized tests. No one ever explained what educational purpose these tests might serve, only that they were vitally important and that this was the only viable path to success in life. Clearly, this was a make-or-break moment; failure would be permanent and irreversible. As we filed into the auditorium, everyone prayed that he or she would wind up in the right pigeon hole, on the right side of the bell curve.

By the end of that year, our high school was speaking to us with a dark and cynical mixed message: "Boys and girls, you must try really hard to learn your lessons, but be sure to remember that your brain is fundamentally static and incapable of transformation. If you've got innate talent, you'll score high and get into a good school. If not, not. But be sure to try really hard anyway. Our funding depends on it."

Fortunately, I was a poor student and a contrarian. I rejected many of the teachings I was exposed to, including the dogma that personal growth was impossible and/or irrelevant. I was determined to find a more compelling story and a few years later I found one, in a local martial art dojo. Fortunately, my sensei didn't know anything about neurophysiology, brain cells, genetic determinism, IQ or scholastic aptitude tests. He was barely literate and had a completely different story to share. Not only did he believe in growth, it was fundamental to his business plan and world view. His story was woven into the culture of the dojo and it didn't take long for his white belts to get the message: "You can and will grow here. Your current abilities are irrelevant. Your body and your skills will improve. It will take a lot of hard work and many hours on the mat, but *there is no limit to what you can do here*. You are on a path to transformation."

This was a message that I had never heard before.

I was hooked.

TRAPPED INSIDE A STORY

Decades later, as I reflected on my experience and the nature of transformation, I began to appreciate the power of story to shape human attention, beliefs and behavior. I learned that our bodies and lives are open systems, highly permeable to memes, emotions and narratives. Language can penetrate our very skin and go right to the core of our being, influencing our attention, judgments and assumptions. Ultimately, stories shape the very tissue of our bodies, our health, performance and happiness.

Sadly, the story that many of us learned in the 20th century was one of fixed ability and static intelligence. Many of us became trapped inside a narrative about our brains, minds and our ability to grow and learn. Not many of us stopped to question this story, but it was always running in the background, shaping our attention, our identities, our behavior and our life trajectories.

The story had many variations, but the theme was always the same: our brains, bodies and aptitudes are static entities. Talent is a thing. Aptitude is a thing. Intelligence is a thing. These qualities determine who we are and who we will become. Growth is limited and may even be impossible. You can learn, but how far you can go is a function of where you came from.

THE OLD STORY

This narrative of innate, static capability was served up by a host of story tellers, all offering up some variation on the theme of fixed aptitude. The first thread came from the world of neuroscience. Throughout the 20th century, the official position was clear: "Neurons don't regenerate. Brain cells can only die." This view was famously expressed by the Nobel-prize winning neuroscientist Santiago Ramon y Cajal, writing at the turn of the last century. In describing the characteristics of the nervous system he wrote:

> "In the adult, the nerve paths are something fixed and immutable...
> Everything may die, nothing may be regenerated."

This, it turns out, was mere assumption. Since neurons are fantastically intricate structures, assembled into delicate, highly complex networks, few scientists believed that new nerve cells could be generated or integrated into the system. This view went almost completely unquestioned and the dogma was taught to millions of people throughout the 20th century. It was mistaken.

Meanwhile, popular media told a parallel story of fixed aptitude, passing along simplistic, cartoon-like explanations for every human trait and behavior. "Scientists announced today that they've discovered a gene for *insert trait or behavior here.*" Over time, many listeners and viewers came to the conclusion that there's a causal, deterministic gene for everything in our bodies and our lives. If there's a gene for eye color and a gene for intelligence, there's got to be a gene for music preference, a gene for hair style and a gene for success. Our lives, in other words, are hard-wired.

Sports broadcasters reinforce the story still further. Scarcely a game goes by without a description of a high-performing player who's at the top of his game. No matter the sport, top players are invariably labeled as "talented" or "gifted." On occasion, broadcasters may tell us that the star "has a strong work ethic," but this comes across as an afterthought; the athlete's training merely refines his innate capability. Great athletes are born great and once you're born great, all it takes is a little fine-tuning to make it to the Hall of Fame.

Parents, educators and intelligence testers also perpetuate the story of fixed, innate capability. "Johnny is talented." "Jane is gifted." "Nice work Bobby, you're really smart." Every student gets a number and a label, everybody winds up in a pigeon hole. Who can forget the reading groups in elementary school? Everyone accepted the notion that some kids belonged in the "eagles," while others belonged in the "crows." It just seemed to be the natural order of things.

Of course, children are particularly vulnerable to this story of static talent and native ability. With little experience to drawn upon, their attention can only function like a still camera, taking in snapshots of people around them. They don't understand growth because they haven't yet seen it or experienced it. And so, "Bobby is really smart at math," "Julie is a good artist" and "Susan is a great musician." They can't yet see how much bodies and minds can change over time. Sadly, not all of us outgrow this simplistic, grade-school cartoon. In fact, the snapshot view of human capability often lingers long into adulthood, where it becomes formalized, institutionalized and mandatory, stifling the growth of millions of students and teachers alike.

CONSEQUENCES

Even though it is often told in innocence, the story of fixed ability has been profoundly destructive to individuals and our culture at large. Taken together, the twin assumptions of fixed intelligence and a static nervous system produce a sense of resignation and apathy; the story has almost certainly contributed to the rise in depression throughout the 20th century. If we are simply the products of our genes, if our talents are static qualities that are given to us by chance, if our brain cells can only die, then what's the point of looking towards a brighter future?

We can also be sure that the story of fixed capability has added to the rising toll of presenteeism in the workplace. (*presenteeism*: the condition of being "at work" but not really engaged.) If, as so many of us have come to believe, our talents are finite and the workplace offers no opportunity for growth, what's the point in applying ourselves? Let's just go through the motions and hang on until Friday afternoon.

Ultimately, this narrative of fixed ability and a static nervous system leads us into a state of profound pessimism, not just about our individual lives, but our also for our social, cultural and environmental future. If the best that we can hope for is to be born with good genes and a good nervous system, why try for change? Why risk anything? Sadly, many millions of people remain trapped in the grip of this narrative, precisely at the time when we desperately need risk-takers, leaders, activists and life-long learners.

GROWTH: THE NEW STORY

Fortunately, there is a new and inspiring counter-narrative in the air. Not only is this new story upbeat and optimistic, it is far more accurate, nuanced, dynamic and true-to-life. This story is being told by growth advocates across the spectrum of human learning and performance: teachers, scientists, artists, athletic trainers, psychologists, workforce consultants, dance teachers and meditators. More and more people are discovering that human potential is fundamentally open-ended.

Leading the charge is a new generation of neuroscientists. The old dogma of an unchanging brain has been overthrown by the paradigm of neuroplasticity, the understanding that the brain is constantly in flux, learning and rewirng itself. Neuroplasticity has now become a mature, well-established field with a substantial body of proven findings, all pointing to incredible potential for neural and in turn, life transformation.

There are three main elements in this process. The first is *neurogenesis*, the birth of new brain cells in specific regions of the brain. As it turns out, my high school teacher was dead wrong: neurogenesis is absolutely real. Not only is it real, we know precisely how to stimulate it–vigorous physical movement, enriched environments, play, novelty and social stimulation all do the trick. Once new neurons are born, we can integrate them into our neural networks by training, striving and learning.

Growth and learning are also supported by the process of *myelination*, the wrapping of nerve cell fibers by insulating cells. This insulation serves to increase the speed of signaling, increasing both sensory and motor performance. Any time we learn a new skill or develop a new capability, we myelinate nerve fibers, especially the fibers that are involved in the circuits that are being used most frequently.

Finally, we now know that a physical transformation occurs at the synapse in a process called *long-term potentiation* or LTP. It's an intricate and elegant process, but it all boils down to this: repeated stimulation of a synapse stimulates physical changes in the post-synaptic membrane. With use, this membrane becomes more sensitive and receptive to future stimulation. Stimulate a circuit repeatedly and that circuit becomes faster and more integrated. Thus the most famous saying in modern neuroscience: "Cells that fire together, wire together."

The discovery of neuroplasticity confirms the daily experience of musicians and athletes the world over. These artists literally live by and for neuroplastic transformation; their daily effort remodels their bodies and improves their skills. Experienced mediatators also understand the process. Collaborations between experienced meditators and neuroscientists have revealed profound changes in the brain that come with long-term practice. In each of these disciplines, attention is the key element. When we focus on certain qualities of our bodies or our world, our brains literally rewire themselves to support the effort. In other words, the things that we focus on literally grow *us*.

CAROL DWECK

Discoveries in neuroplasticity are also supported by findings in the world of psychology. Carol Dweck has become a major figure in exploring our attitudes about growth and performance. In her landmark book *Mindset: The New Psychology of Success*, she begins with a simple question: "What are the consequences of thinking that your

intelligence or personality is something that you can develop, as opposed to something that is a fixed, deep-seated trait?"

In her research, Dweck primed groups of students with fixed and growth narratives and compared the outcomes. She discovered that those who believed that their capabilities are fixed tended to perform poorly when faced with novel challenges. In contrast, those who believe in their ability to grow were far more resilient and creative.

These findings may not be entirely surprising, but they are vitally important because they sharpen our awareness of the power of belief. As Dweck points out, our mindsets change the meaning of adversity, challenge and failure. "Believing that your qualities are carved in stone–the fixed mindset–creates an urgency to prove yourself over and over." On the other hand, "the growth mindset is based on the belief that your basic qualities are things you can cultivate through your efforts."

Dweck suggests that people with a fixed mindset more susceptible to depression and frustration. When challenged, they tend to become defensive and avoid situations that might reveal a weakness or draw them out of their area of supposed giftedness. In contrast, those who hold a growth orientation tend to be far more resilient when faced with novel challenges and setbacks.

EXPERT STUDIES

The modern growth narrative is also told by researchers who study mastery and expert performance. Authors such as Daniel Coyle (*The Talent Code: Greatness Isn't Born. It's Grown. Here's How*) and Geoff Colvin (*Talent is Over-Rated: What Really Separates World-class Performers from Everybody Else*) have made it abundantly clear that when it comes to developing expert performance, innate talent counts for almost nothing. It's deep, concentrated, dedicated, focused practice that produces results.

In every case of apparent talent and "giftedness," from Tiger Woods to Mozart, we have discovered a history of sustained, highly focused practice. In fact, the evidence for training is now so complete, mature and compelling, we can safely take our eyes off innate ability. Obviously, there is plenty of variation between individuals, but that variation is not particularly interesting or important for what we need to do in this world. In the grand scope of transforming our bodies, our organizations and our lives, training is what matters. As a useful concept, talent is dead.

THE NEW NEURO-OPTIMISM

The new story of human growth and capability is profound in its implications and its promise, both for individuals and for our emerging world-wide culture. This new story can and will touch millions, perhaps billions of lives. It will empower people to action, to take risks and to apply their minds and bodies in new ways. As the world of commerce and society continue to evolve at Internet speed, the ability to learn new

skills will take on an ever-increasing importance.

In fact, our emerging growth orientation constitutes nothing less than a Copernican revolution in the way that we see our bodies, our selves and our relationship to the world. The story of neuro-optimism promises to transform the way that we study, the way that we work and the way that we live.

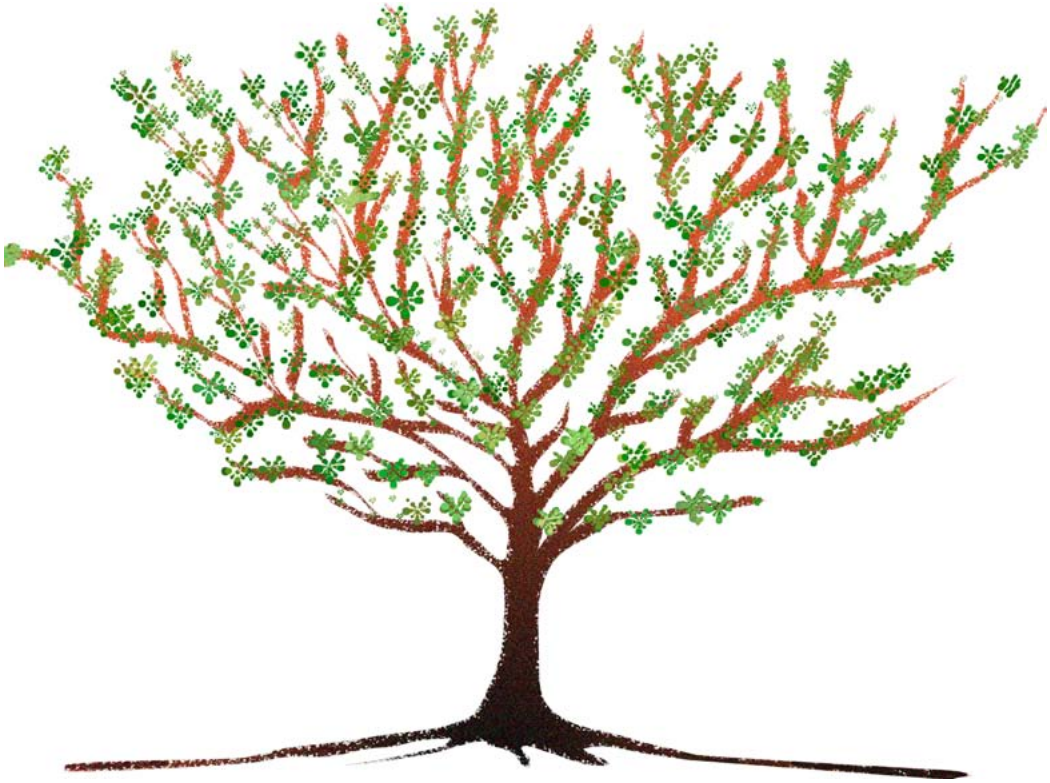
So it's time to start telling this new story, a story of growth, practice, training and transformation. Our bodies and our minds are, for practical purposes, infinitely plastic. There is no limit to what we can do, as individuals or as a culture.

The future belongs to the artists of neuroplasticity.

The future belongs to the learners.

The future belongs to those with a growth orientation.

And that is a story worth telling.



RESOURCES FOR GROWTH

Mindset: The New Psychology of Success by Carol Dweck

The Power of Story: Change Your Story, Change Your Destiny in Business and in Life by Jim Loehr

Spark: The Revolutionary New Science of Exercise and the Brain by John Ratey M.D.

The Talent Code: Greatness Isn't Born. It's Grown. Here's How by Daniel Coyle

Talent is Over-Rated: What Really Separates World-class Performers from Everybody Else by Geoff Colvin

Free Play: Improvisation in Life and Art by Stephen Nachmanovitch

Iconoclast: A Neuroscientist Reveals How to Think Differently by Gregory Burns

The Brain That Changes Itself by Norman Doidge M.D.

Brain Rules by John Medina

A General Theory of Love by Thomas Lewis, Fari Amini and Richard Lannon

The Joy of Living: Unlocking the Secret and Science of Happiness by Yongey Mingyur Rinpoche

Relaxation Revolution by Herbert Benson, M.D.

Emotional Intelligence: Why it Can Matter More than IQ by Daniel Goleman

Mirroring People: The Science of Empathy and How We Connect With Others by Marco Iacoboni

Learned Optimism: How to Change Your Mind and Your Life: by Martin Seligman Ph.D.

The Neuroscience of Psychotherapy: Building and Rebuilding the Human Brain: by Louis Cozolino

The Neurobiology of We: How Relationships, the Mind, and the Brain Interact to Shape Who We Are by Daniel Siegel, M.D. Sounds True Audio Learning Course

Narrative Medicine: The Use of History and Story in the Healing Process: by Lewis Mehl-Madrona, M.D.

The Art of Happiness by The Dali Lama

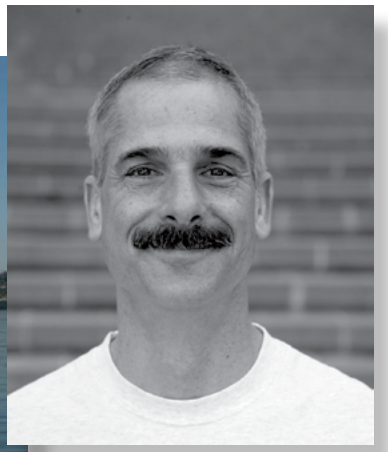
Train Your Mind, Change Your Brain by Sharon Begley

ABOUT EXUBERANT ANIMAL

Exuberant Animal is an innovative health leadership organization that promotes performance, team cohesion and physical happiness. We offer a comprehensive, multi-disciplinary approach that's invigorating, liberating and intensely meaningful.

Exuberant Animal is the creation of Frank Forencich, author of *Play as if Your Life Depends on It*, *Exuberant Animal* and *Change Your Body, Change the World*. Frank is an internationally-recognized leader in health education and performance training. He earned his B.A. at Stanford University in human biology and neuroscience and has over 30 years teaching experience in health promotion. He holds black belt rankings in both karate and aikido and has consulted to major corporations, human resource groups and health professionals.

- Partner at The National Institute for Play
- Expert consultant to WildFitness UK
- Featured presenter: First Annual Conference on The State of Play Science, October 31- November 1, 2008, Stanford University.
- Guest lecturer: Stanford University Institute of Design, April 2009 and 2010
- Featured presenter: National Applied Functional Physical Education Conference, October 2009



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