

Neuroplasticity and The *Feldenkrais Method*®

By Eileen Bach-y-Rita, GCFP

Your brain loves to learn. In fact it thrives on acquiring new skills such as playing a musical instrument, learning a new dance or a new language. Your brain also thrives when engaged in an inner awareness activity, like meditation or a *Feldenkrais*® *Awareness Through Movement*® lesson.

In order to learn anything, you need to focus and pay attention to the task at hand. You need to move slowly and deliberately and think about what you are doing when learning a new motor skill. Without this focus and attention, you wouldn't acquire the new skill, or deepen knowledge in the field of your choice. The focus on and practice of these new activities causes the brain to morph, to grow new connections between billions of cells, and to create new motor and sensory-motor maps for each new activity. Even when you pretend that you are moving, visualizing your movements in your mind, brain changes can be measured and seen in PET scans. Your brain's ability to change itself is called "neuroplasticity." It allows brain cells and nerves to change their appearance and function, to grow, shrink, connect, disconnect and re-connect to each other in entirely new ways, to exchange duties and functions, to use unexpected parts of the brain for novel tasks, and to be malleable and accessible to new needs as they arise during an experience-driven life.

Science has shown that the brain is not only capable of this rich and surprising re-organization but that it also produces new neurons throughout our life. It was thought, until 1998, that we were born with billions of brain cells that would die off as we got older, and that no new cells would ever be born. In fact we are born and we die with millions of unused, unformed stem-cells in our brain. The potential for birthing these cells into live neurons exists throughout our life-time, pushing the boundaries of what we previously thought possible, especially in the fields of health and the recovery from injuries and illnesses.

Two scientists from very different fields thought the brain was capable of much more than it was given credit for, and set out to prove it in their own ways. The first was Moshe Feldenkrais, D.Sc. (1904-1984), a mechanical engineer, physicist and Judo martial artist, who taught himself how to walk again in the 1940's, after a serious knee injury and against all odds.

Through his own self generated exploratory learning process, he created an elegant and economical system of focused attention and unique movements that led thousands of individuals to overcome the results of accidents, illness and disabilities. He would not have succeeded if the brain wasn't plastic. His novel movements were sequential, a property which has been shown to stimulate plasticity in the brain; they required attention, which has also been shown to change the brain, and they reproduced the complex non-linear strategies that are involved in our motor development from birth through age ten, which lead the brain to self-organize and spontaneously produce higher levels of organization and skill. Moshe inferred the plasticity of the brain from his voracious readings in the fields of health and sciences, his common sense and his observations of infants and small children learning to move. The concept remained unproved until he met another scientist, Dr. Paul Bach-y-Rita, in the late 1970's.

Paul Bach-y-Rita, Ph.D, M.D. (1934-2006), a neuro-physiologist, was convinced of the plastic properties of the brain long before it was possible to prove that they existed, and long before neuroplasticity was a respected field of brain research. Paul "...was in many ways the father of the idea of neuroplasticity."

I met Paul in 1960, five years before he proved that the brain can substitute one missing sense for another. He shared his hunch about sensory-substitution the day we met and I was hooked. We were married between 1960 and 1976. During that time I witnessed his experiments first-hand. After his father recovered from a devastating stroke, Paul decided to study plasticity in brain-injured individuals. I started to help him in his work, first by designing a recovery program for brain injured individuals who had been

diagnosed as “permanently paralyzed” by their doctors, and soon after, by leading the program myself. We remained friends and colleagues throughout his life.

I met Moshe in 1977, 30 years before research in neuroplasticity would show that the act of thinking, as well as the act of imagining movement and feelings, changes the brain and produces new measurable skills and results. Moshe’s movements and hands-on approach to learning reproduced the conditions we all experienced as infants. We taught ourselves how to move, experiencing and developing movement as a sense, along with all our other senses which were developing concurrently: hearing, seeing, feeling, smelling and tasting.

Paul Bach-y-Rita’s experiment in sensory substitution followed earlier experiments during which he proved that all sensory cells have the capacity to respond to every incoming sensory stimulus. His work disproved the theory that auditory cells are only used for sound reception, visual cells can only respond to light and shapes and colors, and the skin and its sensory receptors are only used for touch. Another of his experiments proved that you don’t even need brain cells connecting in synaptic patterns to allow an electrical spike from cell A to arrive to cell B. Even after lesions in the brain destroyed thousands of cell nuclei or groups and destroyed their communication loops, one cell’s electrical output would and could travel very slowly through the fluid in the brain and cause a response far from the original cell, at a much longer delay than usual. He called this brain property volume transmission. The implications of these results in neural plasticity were neither recognized nor applied in the various fields of science and rehabilitation in the late 1970’s early 80’s except in the case of the *Feldenkrais Method*, and in the two pilot projects in stroke and head injury recovery that I designed and led for Paul between 1975 and 1978. In fact, until the 1990s, “neuroplastic research was considered of little interest by other scientists.”

Finally, In 2004 Paul set up a pilot project using *Feldenkrais Awareness Through Movement* lessons as the primary modality for global functional recovery after long-term head injury. The program was held at a resort and also included the daily use of a computer pong game which he had developed for stroke victims and lots of time off to rest and play.

I led the pilot in Florida in 2004. Six people participated. They had all been discharged from physical therapy centers at least a year before coming to us, and given no hope for future recovery. The group met for two weeks. I led the participants through the developmental sequences of the *Feldenkrais Method*, for an hour, twice a day and taught them how to imagine the movements that were too difficult or impossible to do at first. Every person there relearned at least two if not several motor skills and reduced or eliminated pain that had been present since their head injuries. The participants also expressed gratitude for the new awareness they had gained of how their bodies moved and felt.

For Moshe Feldenkrais, recognition for his brilliant pioneering work has been late in coming. Most of the research that validates his work was published after his death in 1984. His is an idea whose time has finally come....

...meanwhile we were all busy doing our work!

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Condensed excerpt from Eileen’s upcoming book: “Neuroplasticity and the *Feldenkrais Method*®.