

Brain School by Howard Eaton  
EXCERPT FROM THE BOOK

## Introduction

The world is full of people who have never, since childhood, met an open doorway with an open mind.

—E.B. White, author, *Charlotte's Web*

This book is about children who struggled in school and subsequently changed their cognitive functioning and altered their lives. They struggled with learning disabilities and, in many cases, attention disorders as well. This book is about their resilience and determination to improve their lives. It is about their parents, who resisted accepting the common opinion that cognitive functioning is fixed, focusing instead on giving their children futures filled with possibilities. It is about a cognitive functioning remediation approach called the Arrowsmith Program. It tells the story of an exceptional woman, Barbara Arrowsmith Young, and how she is revolutionizing the field of learning disabilities and attention disorders. It is also about a group of talented teachers at Eaton Arrowsmith School (EAS) who worked with these children to sustain active engagement in challenging cognitive exercises. Each of these children's stories provides a fascinating look into the potential of the human brain to change itself and into the educational community that is needed to support this change.

Brain School is also about an educator, a specialist in learning disabilities and attention disorders. The educator has dyslexia. Despite this disability—and not knowing the brain is “plastic”—he completed graduate school and developed a business in testing children with learning disorders. He was intent on doing his job the same way every day until he retired. He believed that children who struggle in school must all have assessments and subsequently be labelled as having a lifelong disability. They could then receive educational support services in their schools. He believed this approach was the only way to provide the necessary scaffolding to get these children through school—support that included extra tutoring, special education classes, learning strategies, and “accommodations” (accommodating the student with, for example, extra time on tests, use of a reader or scribe, use of a computer for written exams). The person I am describing above, if you haven't guessed, is me. However, I changed.

Neuroplasticity, or brain plasticity, refers to the brain's amazing ability to reorganize itself. In other words, neuroplasticity is the alteration of neuronal structure and the reorganization of neural networks and their function through environmental stimuli. Research is showing that glial cells in the human brain play an important role in neuroplasticity. For example, glial cells (also referred to as astrocytes or star-shaped glial cells) in the human brain and spinal cord increase in number when nerve cells grow through environmental stimulation. As well, they play a role in creating and sustaining the specific patterns of neural networks. Previously, glial cells were thought to only physically support neurons in the brain. (Thus the Greek reference to glia, meaning “glue.”) This new research is highlighting the fact that glial cells are critical for improving brain function.

The terms neuroplasticity or brain plasticity are not new ones, but were coined in 1948 by Jerzy Konorski, a Polish neurophysiologist, in his book, *Conditioned Reflexes and Neuron Organization* (Cambridge University Press, 1948). Around the same time, in Montreal, Quebec, psychologist Donald Hebb was also writing about his theories of neural plasticity. In 1949 he introduced the concept in his book, *The Organization of Behavior: A Neuropsychological Theory* (Lawrence Erlbaum Associates, 2002). Hebb has been described as the father of neuropsychology and neural networks.

The concept of the brain's neural functions as being malleable is much older, having been acknowledged in the early 1890s by William James, an American psychologist and philosopher (*Principles of Psychology*, Cosimo Classics, 2007) and by Santiago Ramón y Cajal, a Spanish histologist, physician, pathologist, and Nobel laureate (*New Ideas on the Structure of the Nervous System in Man and Vertebrates*, MIT Press, 1990). In fact, Dr. Mark Rosenzweig notes in *Neural Plasticity and Memory: From Genes to Brain Imaging* (Federico Bermúdez-Rattoni, ed., CRC Press, 2007) that in 1783, Michele Vincenzo Malacarne, a Piedmontese anatomist, studied the influence of mental exercise on neural growth. Malacarne found that trained animals such as dogs and birds had more folds in their cerebellums than untrained ones. Research in neuroplasticity has been going on for well over two hundred years.

Norman Doidge, in his bestselling book about neuroplasticity, *The Brain That Changes Itself* (New York: Viking Press, 2007), coined the term “the plastic paradox.” That is, the brain has the ability to change itself in both positive and negative ways. Neuroplasticity does not necessarily mean that the change that is occurring is for the benefit of that individual or society. For example, some forms of behaviour can become extremely debilitating, such as that seen in obsessive-compulsive disorders (ocds). For educators who work with children with disabilities, “the plastic paradox” can hinder their ability to see new possibilities. For decades, their ideas have been firmly set that children who struggle with cognitive functioning weaknesses will continue to struggle throughout their lives. The children's caregivers must give them all the support they need to ensure they make it through school. Learned helplessness is the term used in the fields of education and psychology to describe many children with learning difficulties. In fact, this learned helplessness does not have to be the case.

Brain School asks politicians, educational administrators, psychologists, psychiatrists, family doctors, educators, parents, and others involved in education to be open to the idea that cognitive functioning can improve and the brain can change. Many educators are not even aware of brain plasticity. In education, the establishment's common understanding is that the brain is more or less fixed; that is what many of them learned at college or university. Perhaps they have not read the latest information on brain plasticity and neuroscience. As a result, they keep practising the same instructional remediation methods for children with learning disabilities as though they are the only options available.

I was much the same; it was not easy for me to accept that the brain is plastic. I clearly recall classroom discussions about the brain during my undergraduate education in psychology and then in my graduate program in special education. The brain was fixed, unchangeable, hardwired like a computer. My professors were critical, almost mockingly so, of so-called radical scientists discussing the brain's ability to change.

They acknowledged that there are some formative years of brain development in early infancy, but that was it. This was my training and background. In fact, I co-wrote handbooks and produced educational videos advising parents and their children with learning disabilities to accept their cognitive weaknesses and view them in a positive light.

Barbara Arrowsmith Young has been working with brain plasticity for thirty years. Yet some educators disregard her program due to their inability or refusal to conceptualize what she is doing. These educators are so focused on improving skills such as spelling, reading, and writing that they fail to see it is the brain's current cognitive functioning that affects these behaviours. As well, they do not see that children who fail in school are often dealing with more significant issues with reasoning, memory, auditory processing, visual-perceptual processing, visual-motor integration, and social-perception problems—all cognitive functioning weaknesses—and that these cognitive functions can be improved. Yet Arrowsmith Young has persisted and her results outstandingly speak for themselves. She is the first neuroplastician with operating schools and licensed programs in the field of education in North America.

This is not to deny that many wonderful minds in education and psychology have provided major insights into learning disabilities and attention disorders. Nevertheless, the notions that the brain can change itself and that cognitive intervention methods can be designed to improve cognitive functioning are revolutionary to many education experts, who refuse to depart from their own entrenched neural pathways. When a dramatic change of thought is presented they become uneasy and often dismissive, preferring to stick to old ways of doing things.

The inaugural International Mind, Brain, and Education Society (IMBES) conference took place in Fort Worth, Texas, in November 2007. IMBES encourages collaboration between all fields relevant to the connection between the mind, the brain, and education.

The IMBES website states:

The mission of the International Mind, Brain, and Education Society (IMBES) is to facilitate cross-cultural collaboration in biology, education, and the cognitive and developmental sciences. Science and practice will benefit from rich, bi-directional interaction. As research contributes to usable knowledge for education, practice can help to define promising research directions and contribute to the refinement of testable hypotheses.

Two of the society's advisors are Howard Gardner, author of *Frames of Mind: Theory of Multiple Intelligences* (Basic Books, 2004), and Kurt Fisher, who is the Charles Bigelow professor of human development and psychology and director of the Mind, Brain, and Education Program at the Harvard Graduate School of Education. I attended this conference, along with several of my colleagues from Eaton Arrowsmith School, taking in numerous lectures on neuroscience and education. A common issue was raised in

all the lectures: the neuroscientists were frustrated with their universities' education departments for their reluctance to explore the benefits of their research. In essence, there was a significant gap between educational practice and the proven theories of neuroscience research. This gap existed because educators were either not seeing the relevance of neuroscience's findings or they were too set in their ways in how education should work—the plastic paradox. This has been Barbara Arrowsmith Young's reality over the past three decades.

By 2004, I had become interested in educational neuroplasticity. Prior to this, my assessment company, Eaton Learning Centre, had just completed three updated psycho-educational assessments of several Vancouver children whose parents, finding a lack of resources in Vancouver, had enrolled their children in Toronto's Arrowsmith School. The results surprised and impressed me. For the first time, I observed notable intellectual and cognitive improvements in my clients, children with learning disabilities. I had previously seen achievement improvements but never such dramatic improvements in cognitive functioning. I also realized that such changes in cognitive functioning were likely to have an enormous impact on these children's future success. My findings excited me enough to visit Barbara Arrowsmith Young and her Arrowsmith School in Toronto, Ontario, in December 2004. Upon my return to Vancouver, I conducted an updated psycho-educational assessment on Andrew, one of Arrowsmith School's students whom I had previously tested. Andrew's reassessment results were so impressive that they were the catalyst for my decision to start the Eaton Arrowsmith School in Vancouver, British Columbia.

There is no magic or quick fix for improving cognitive functioning. It is difficult and tiring work for the child with learning and attention disabilities; it takes resilience and diligence to improve. Neuroplasticity does not occur without significant active engagement over a lengthy period. Not surprisingly, some critics use this as a way to dismiss this work. They say, "Why would you make children with learning disabilities work so hard? They are already struggling enough."

Optimal cognitive functioning remediation for a severe learning disability, and in some cases an accompanying attention disorder, can take three to four years in a full-time school environment, which will be shown in the stories in Part II. Some of our most remarkable children persistently and repeatedly worked on cognitive exercises in order to achieve their noteworthy accomplishments and become honours students after transition to mainstream classrooms. The Arrowsmith Program's belief is that nothing is wrong with hard or tiring work if it has an important purpose. This is how many great minds developed breakthroughs in engineering, physics, chemistry, architecture, literature, music, mathematics, medicine, and other disciplines. They spent hours going over ideas and theories. Similar to the body's physical training, in order for the brain to become efficient at a particular task or behaviour, it must practise it repeatedly. Children with learning disabilities and attention disorders must stimulate and strengthen their brains' ability to learn with repeated cognitive exercises in order to overcome their neurological weaknesses.

Above all, Brain School is for those people concerned about children with learning issues, social problems, and underperformance at school. You will read about children and watch their progression from despair to hope to achievement in cognitive functioning. You will see educational psychometrics that will encourage you and provide you with increased awareness. The children in this book have attended Eaton Arrowsmith School and succeeded under its professional teaching staff. Their stories were assembled from assessments, school records, teachers' comments, and parent interviews. Neuroscience research is discussed, showing how it is connected to the Arrowsmith Program and why the program is so effective.

In analyzing the children's cognitive functioning, two different formats of assessments are described in this book: psycho-educational assessments and Arrowsmith assessments. The psycho-educational assessment is administered under the guidance of a registered psychologist and team of educational assessors, most often to determine if a child has a learning disability and to recommend the types of assistance needed at school. It is also used in public and private schools to aid in the writing of individual education plans or programs for children at school.

The psycho-educational assessment includes measures of intelligence, cognitive functioning, and achievement levels in reading, writing, spelling, and math. At times, it is completed prior to the children starting at Eaton Arrowsmith School. This assessment enables us to analyze improvements in cognitive functioning, as the children are given an updated assessment after the completion of their Arrowsmith Program. It also provides impartiality: we can see before-and-after cognitive improvements on an assessment not directly connected to the Arrowsmith Program itself or Eaton Arrowsmith School.

The other format is the Arrowsmith assessment, created by Barbara Arrowsmith Young, which analyzes nineteen areas of cognitive functioning. The purpose of this assessment is to determine the level of severity of each of these nineteen cognitive functions in order to individually design a child's Arrowsmith remediation program. (For a detailed list and description of the nineteen cognitive functions and their common features, see Appendix A.) The Arrowsmith assessment is re-administered yearly to assess the progress of each child, evaluate whether the child requires an additional year in the program, and re-evaluate the child's Arrowsmith remediation program design for the following school year (if the child does require an additional year).

Throughout this book, reference is made to both psycho-educational assessments and Arrowsmith assessments. The results from the updated psycho-educational assessments provide remarkable evidence of how the Arrowsmith Program affects children's lives. It is also interesting to observe that the Arrowsmith assessment often highlights the same cognitive functioning weaknesses as a psycho-educational assessment does. However, it is clear that the Arrowsmith assessment offers a broader understanding of each child's cognitive functioning abilities. At Eaton Arrowsmith School, our goal is to help parents and their children with learning and attention disabilities to find rescue, hope, and achievement. Along the way, if we are able to generate wide support for educational neuroplasticity, if we are able to increase awareness of Barbara Arrowsmith Young and her unique program, and if we can help

interest schools across North America—especially K to 12—all this will help to foster our goal.

Brain School is for:

- Parents of children with learning disabilities including dyslexia, attention deficit hyperactivity disorder (ADHD), and other disorders
- Young adults and adults with learning disabilities
- Educators, particularly those involved in special education
- Members of school boards
- Counsellors working in schools
- Neuroscientists, MDs, psychiatrists, psychologists, and therapists
- People interested in the potential of the brain to change

When it comes to children with learning difficulties, we are all responsible. A key to helping these children is to improve cognitive functioning and bring school success and a happier life within their grasp.

I thank you for your interest in Brain School and your desire to keep your mind open to the world of new possibilities neuroplasticity holds.

—Howard Eaton, Ed.M.

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[www.eatonarrowsmithschool.com](http://www.eatonarrowsmithschool.com)