

VIDEO PLACEHOLDER

THE WOMAN WHO CHANGED HER BRAIN: BARBARA ARROWSMITH-YOUNG

Barbara Arrowsmith-Young is the Director of Arrowsmith School and Arrowsmith Program. She holds a B.A.Sc. in Child Studies from the University of Guelph, and a Master's degree in School Psychology from the University of Toronto (Ontario Institute for Studies in Education). Arrowsmith-Young is recognized as the creator of one of the first practical applications of the principles of neuroplasticity to the treatment of learning disorders. Her program is implemented in 40 schools internationally.

I want to share a little secret, which I hope will not be a secret by the end of the talk. I am truly, madly, deeply, passionate about the human brain. Science has taught us that our brain shapes us, that it makes us uniquely who we are. And if we think about our brain it has 200 billion neurons. Think about the world's population - that is a mere 7 billion and we have hundreds of trillions of connections in our brain. If we imagine all the stars in the Milky Way galaxy, there are more connections in our brain than all of those stars combined. So this incredibly complex organ that we carry with us everywhere we go, it does shape who we are. »»

It is a filter. It filters our perceptions and our understanding of ourselves, of others, of our world and of our place in that world. And what is incredibly amazing is no two brains are exactly alike. If you look at the person next to you and you note all the physical differences between you - the shape of your nose, the color of your eyes, your height - there are more differences between your two brains than all of those physical differences in combination. So, our brain does make us uniquely us. I am here today to share with you my story; and it is a story of how I came to learn that, not only does our brain shape us, but we can actually shape our brain. And my story began at Grade one.

In Grade one I was identified as having a mental block. I was told I had a defect and I was told I would never learn like other children. And really the message at that time was loud and clear. I was told I needed to learn to live with those limitations. This was 1957 and it was the time of the unchangeable brain. And childhood was a profound struggle for me. I couldn't tell time. I couldn't understand the relationship between an hour hand and a minute hand on a clock.



I couldn't understand language. Most of what I read or heard was really as intelligible as *The Jabberwocky*.

I could understand concrete things. If somebody said to me the man is wearing a black coat, I could paint a picture in my head and I could understand that. But what I couldn't do was understand concepts or ideas or relationships. So lots of things were confusing. I pondered how my aunt could also be my mother's sister and what did that fraction $\frac{1}{4}$ really mean? Any kind of abstract concept was hard for me. Irony and jokes - that was impossible for me. So I learned to laugh when other people did. Cause and effect - it did not exist in my world. »

There were no reasons behind why things happened. My world was a series of disconnected bits and pieces, of unrelated fragments, and eventually my fragmented view of the world ended up causing a very fragmented sense of myself.

And that wasn't all. This whole left side of my body was like an alien being, unconnected to the rest of me. I would bang and bump into things on the left side of my body. If I picked up anything in this left hand I would drop it. If I put this left hand on a hot burner I would feel pain, but I had no idea where it was coming from. I was truly a danger to myself. My mother was convinced I would be dead by the age of five - and then if that wasn't enough, I had a spatial problem.

I couldn't imagine three-dimensional space. I couldn't create maps in my head. I would constantly get lost, even in my friend's house. Crossing the street instilled terror. I could not judge how far away was that car. Geometry was a nightmare. I felt incredible shame. I felt there was something horribly, horribly wrong with me and in my child's mind, when I had heard that diagnosis of having a mental block, I actually thought I had a wooden cube in my head that made learning difficult.



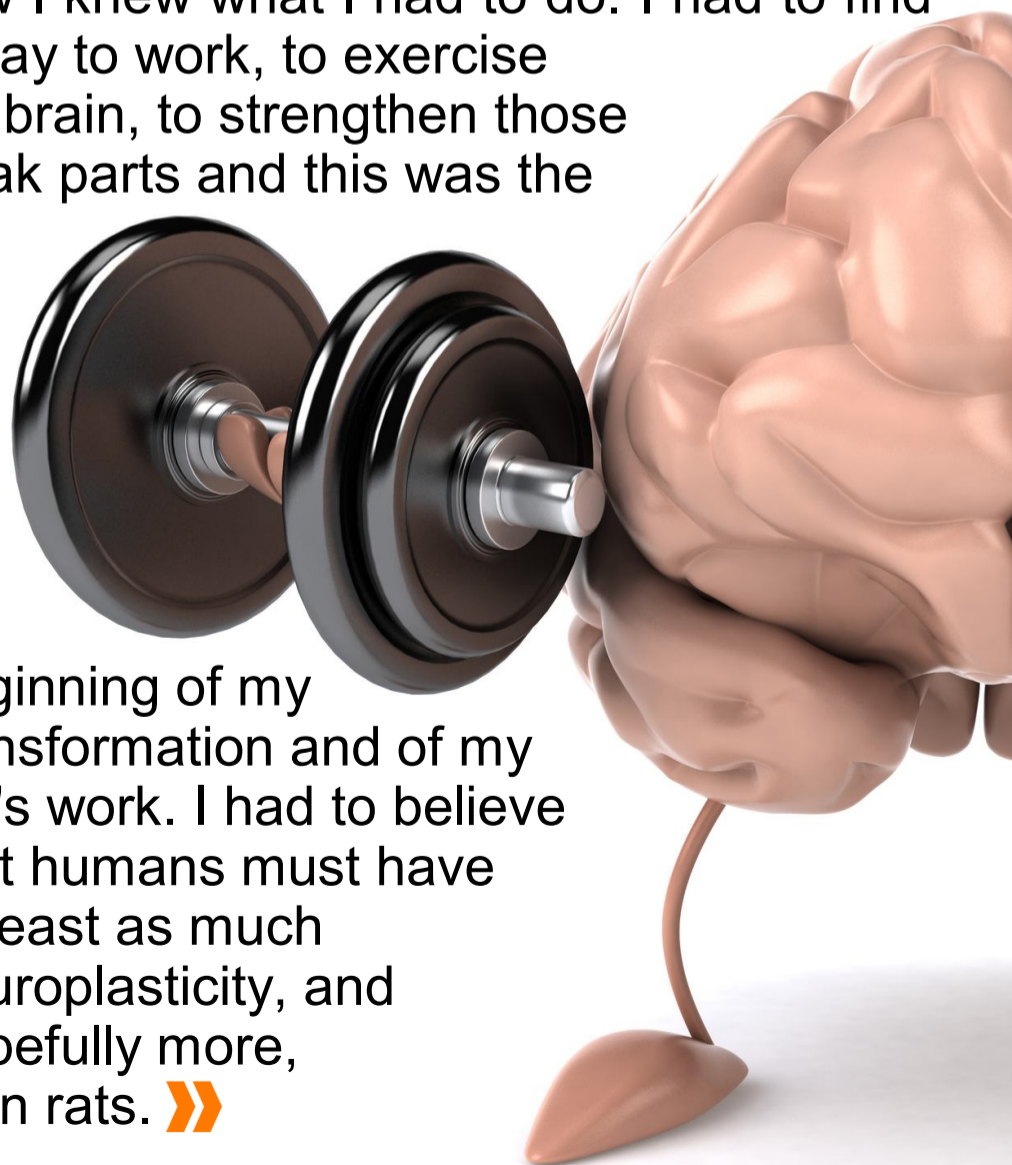
And I didn't have a piece of wood in my head. But I wasn't far wrong. I had blockages, as I was later to learn, in very critical parts of my brain. I tried all the traditional approaches. They were all about compensation and about working around the problem - finding a strength to support a weakness. They were not about trying to address the source of the problem. And they took heroic effort and led to rather limited results for me. »»

Then in Grade eight I hit the wall. I could not imagine how I could go on to high school and handle more complex curriculum. The only option I could see was ending my life. So, I decided to end the pain and the next morning when I woke up after my failed suicide attempt, I berated myself for not even being able to get that right. So, I soldiered on. And part of what kept me going was an attitude that I learned from my father. He was an inventor and he was passionate about the creative process and he taught me that if there is a problem and there is no solution, YOU go out and create a solution. And the other thing that he taught me was that before you can solve the problem, you have to identify its nature. So I continued my hunt. I went on to study psychology to try to understand what was wrong with me, what was the source of my problem. And then, in the summer of 1977, something life-altering happened. I met a mind like my own - a Russian soldier Levar Zazetsky, the only difference being his mind was shaped by a bullet and mine had been that way since birth. I met Zazetsky on the pages of a book, "The Man with a Shattered World" written by the brilliant Russian neuropsychologist Alexander Luria.

As I read Zazetsky's story, he couldn't tell time, he described living in a dense fog. All he got was fragments, bits and pieces. This man was living my life. So now, at the age of 25 in 1977, I knew the source of my problem. It was a part of my brain in the left hemisphere that wasn't working.

And then I came across the work of Mark Rosenzweig and he showed me a solution. Rosenzweig was working with rats and he found that rats in an enriched and stimulating environment were better learners. Then when he looked at their brains, their brains had changed physiologically to support that learning. This was neuroplasticity in action. ***Neuroplasticity simply put - the brain's ability to change physiologically and functionally as a result of stimulation.*** So now I knew what I had to do. I had to find a way to work, to exercise my brain, to strengthen those weak parts and this was the

beginning of my transformation and of my life's work. I had to believe that humans must have at least as much neuroplasticity, and hopefully more, than rats. >>

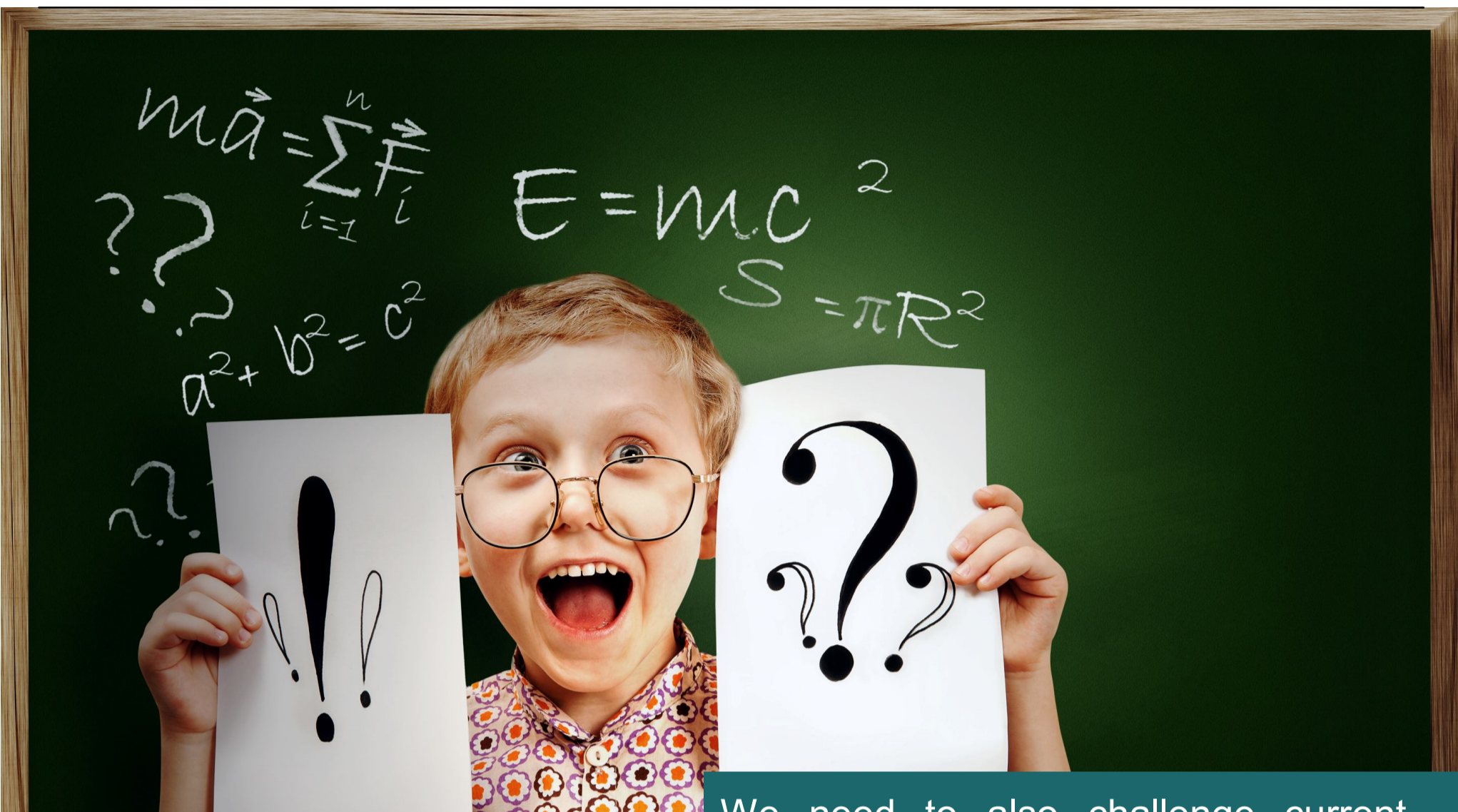


So I went on to create my first exercise and I used clocks, because clocks are form of relationship and I had never been able to tell time. So I started with the two-handed clock to force my brain to process relationships and then I added a third hand and then a fourth hand, because I wanted to make my brain work harder and harder and harder, to pull together concepts and understand their connection. And in about three to four months I knew something significant had changed. I had always wanted to read philosophy and had never been able to understand it and I just happened to have access to a philosophy library. So I went in and I pulled a book off the shelf and I opened it to a page at random and I read that page and I understood it as I was reading it. This had never happened in my entire life. Then I thought maybe it is a fluke, maybe that was just an easy book. So I pulled another book off the shelf, opened it, read it and understood it. And by the time I was finished, I was surrounded by a pile of a hundred books and I had been able to read and understand each page. So I knew that something had changed.

My experiment had worked. The human brain was capable of change. Then I decided to create an exercise for that alien part of my body and for that I knew I had to work on an area in the right hemisphere, the somatosensory cortex, that registers sensation.



I created an exercise for that and I am no longer a danger to myself. Then I decided that spatial problem - because I was really tired of getting lost - and so I created another exercise for that and I don't get lost. I can actually read maps. I don't like GPS's because I like to read maps now, because I can. So I knew now that the brain could change. I was living proof of human neuroplasticity and what really breaks my heart, is that I still meet people today - children, individuals that are struggling with learning problems. They are still being told what I was told in 1957 - that they need to learn to live with their limitations. »»



They don't dare to dream. And what I have learned since 1977 when I met Zazetsky and Luria and Rosenzweig is that yes, our brain does shape us. It impacts how we can engage and participate and be in the world, and every single one of us has our own unique profile of cognitive strengths and weaknesses. If there is a limitation we don't necessarily have to live with it. We now know about neuroplasticity and we can harness the brain's changeable characteristics to create programs, to actually strengthen and stimulate and change our brain. In 1966 Rosenzweig threw down a gauntlet. He said his challenge was "let's take what he learned with rats and apply it to human learning". We need to embrace that challenge.

We need to also challenge current practices that are still operating out of that paradigm of the unchangeable brain.

We need to work together to take what we know now about neuroplasticity and develop programs that actually shape our brains, to change the future of learning. My vision is of a world that we create in which no child has to live with the ongoing struggle and pain of a learning disability. My vision is that cognitive exercises become just a normal part of curriculum. My vision is that school becomes a place that we go to strengthen our brain, to become really efficient and effective learners engaged in a learning process, where not only as learners can we dare to dream, but we can realize our dream. And to me this is the perfect marriage between neuroscience and education. >>>



Barbara Arrowsmith-Young, founder of the Arrowsmith Program, and Director of Arrowsmith School Toronto and Arrowsmith School Peterborough, tells her story in her 2012 TEDx Toronto presentation of how she used neuroplasticity to change her brain and leave her learning disabilities behind.

In 2012, Barbara Arrowsmith-Young's book *The Woman Who Changed Her Brain* was released in Canada, the US, the UK, and Australia. In *The Woman Who Changed Her Brain, A Note to Readers*, Barbara shared her sources of inspiration and continued determination with her readers:

“In my new book *The Woman Who Changed Her Brain*, I combine my own personal journey with case histories from three decades as a researcher and educator, unraveling the mystery of how our brain mediates our functioning in the world. This book details the brain's incredible ability to change and overcome learning problems and deepens our understanding of the workings of the brain and its profound impact on how we participate in the world. My work has been and continues to be a labour of love and I am honored to share with you through this book my journey and life's work. I sincerely hope you enjoy this book and that it will inspire you to change the way you think about the mind.”

Barbara Arrowsmith-Young will return to Australia and New Zealand in summer and fall 2013, to present at events and conferences, including the Mind and Its Potential Conference, and the Brisbane Writers Festival.

More tour dates and venues to be determined; please keep an eye on <http://www.barbaraarrowsmithyoung.com/events> for more information.