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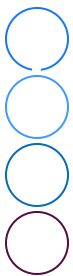
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Mysteries of brain laid bare

DREW TURNEY The West Australian

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Not since Large Hadron Collider has a buzzword so completely crossed over into the mainstream from the fields of science or technology. Since the 2007 publication of Norman Doidge's bestseller *The Brain That Changes Itself*, neuroscience has become a hot media topic.

Revelations that you can retrain yourself out of destructive or addictive behaviours or some disabilities through repetitive exercises captured the public imagination, and Doidge backed up his claims with world studies. One was of Canadian child psychologist Barbara Arrowsmith-Young, and *The Woman Who Changed Her Brain* is the incredible tale of her own rehabilitation.

Despite being lucky enough to do her work in a more enlightened world that appreciates the underlying physical causes of disabilities, Arrowsmith-Young had the unfortunate luck to have been born in the mid-1950s, when the developmental problems she suffered was taken to be misbehaviour.

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"In grade one I got the strap because my teacher thought I was just being wilful," Arrowsmith-Young says. Her mother, an educator, drilled the young Arrowsmith-Young with flash cards that got her over the worst of her reading and writing problems, and she developed an incredible memory.

But the root underlying cause meant while she remembered facts that let her bluff her way through exams and school, she had little comprehension and problems with kinaesthetics, the progress by which your brain is aware of your body's position in space. "The whole left side of my body was like an alien being," she says, "like it wasn't connected to the rest of me. I was incredibly accident-prone. I could put my left hand on a hot burner and if I wasn't looking I experienced pain but I had no idea where it was coming from."

There were few difficulties Arrowsmith-Young didn't face because of her problems as a girl - spatial problems that caused her to get lost, the clumsiness that left her battered, cut and bruised, the inability to even pick up a cup. Even following our conversation, she says, would have been impossible once as she struggled to attach meaning to words fast enough to communicate vocally.

So Arrowsmith-Young decided to change her brain. Her memory and determination got her all the way through to postgraduate study where she learnt about the principle of neuroplasticity - the brain's ability to change. Arrowsmith-Young knew she'd found the research she needed, developing an educational program of cognitive exercises that target specific developmental problems. Her abilities, cognition, co-ordination and comprehension changed dramatically and she knew it was something she had to share.

The difference in the woman at the other end of the phone is marked from the way she describes the child she once was. Unlike many people who suffered mental deficiencies as children, there's no hint of slowness or excessive concentration in her voice, and through her research she's tackled far more complicated concepts than most of us.

"You know what's most exciting about this work," she asks. "We talk about the brain like a muscle but it isn't really. Once the function is in place and has been stimulated and strengthened, it seems permanent. I've tracked people over 30 years out of the program and there's no drop off of function. When the capacity is in place the person is using it within the neural network. It's getting its own stimulation."

You read the above paragraph right. Even though neuroplasticity has been a hot topic for only the last five years or so, Arrowsmith-Young launched her pioneering program in 1978. It's taught all over the world, including a coming trial to be held by the Catholic Education Office in Sydney. In fact she says we're among the most enthusiastic early adopters. "I spoke at King's School in Parramatta (Sydney) and we had 700 educators and parents, people who'd driven two and three hours to come and hear about the work. I'm finding people here in Australia incredibly open and receptive."

Better yet, science and research is more receptive to Arrowsmith-Young and her contemporaries. Neuroscience in the 20th century evolved a very fixed-brain model but, as often as doctors and scientists have tried to define brain areas being responsible for definite, fixed functions, a case arising from an injury or birth defect has confounded them.

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"There's less and less resistance to my work " she says. "When I first developed the

energy trying to convince people or to spend my energy developing more cognitive programs."

After a time, the long track record of results from the programs started speaking for themselves and have been responsible for much of the interest and acceptance.

"The Queensland Brain Institute at Queensland University is creating a state-of-the-art neuroimaging facility. I met with two of the researchers there and they're very interested in using the brain scan technology on people in my cognitive exercises."

So with science and education convinced and more research funds being devoted to understanding the most familiar but mysterious piece of us all, the final frontier might be a lot closer than we think.

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