

Anyone Can Learn to High Levels

by Jo Boaler

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Many people think that some students can work to high levels and some cannot because of the brains they are born with, but this idea has been resoundingly disproved. Study after study has shown the incredible capacity of brains to grow and change within a remarkably short period of time.

Some of the amazing evidence of brain plasticity comes from studies of London Black Cab drivers. To become a black cab driver in London you need to study for between two and four years and at the end of that time take a test called The Knowledge. To pass The Knowledge you must memorize over 25,000 streets and 20,000 landmarks in Central London. Scientists found that after this complex spatial training the hippocampus of the taxi drivers had grown significantly. The hippocampus is a part of the brain that specializes in acquiring and using complex spatial information. When drivers retire, many years later, the hippocampus shrinks back down again.



The studies conducted with Black Cab drivers, of which there have now been many, showed a degree of brain flexibility, or plasticity, that stunned scientists. They had not previously thought that such brain growth was possible. This led scientists to shift their thinking about ability and the possibility of the brain to change and grow.

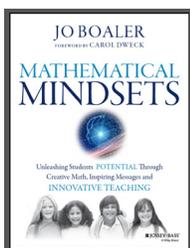
Around the time that the Black Cab studies were emerging, something happened that would further rock the scientific world. A nine-year old girl, Cameron Mott, had been having seizures the doctors could not control. Her physician, Dr. George Jello, proposed something radical. He decided he should remove half of her brain, the entire left hemisphere. The operation was revolutionary—and ultimately successful. In the days following her operation, Cameron was paralyzed. Doctors expected her to be disabled for many years, as the left side of the brain controls physical movements. But as weeks and months passed, she stunned doctors by recovering function and movement that could mean only one thing—the right side of her brain was developing the connections it needed to perform the functions of the left side of the brain.

Doctors attributed this to the incredible plasticity of the brain and could only conclude that the brain had, in effect, “regrown.”

The new brain growth had happened faster than doctors imagined possible. Now Cameron runs and plays with other children, and a slight limp is the only sign of her significant brain loss. To learn more about this story visit the Today Show website.

The new findings that brains can grow, adapt, and change shocked the scientific world and spawned new studies of the brain and learning, making use of ever-developing new technologies and brain scanning equipment. In one study that is highly significant for those of us in education, researchers at the National Institute for Mental Health gave people a 10-minute exercise to work on each day for three weeks. The researchers compared the brains of those receiving the training with those who did not. The results showed that the people who worked on an exercise for a few minutes each day experienced structural brain changes. The participants’ brains were “rewired” and grew in response to a 10-minute mental task performed for just 15 days over three weeks. Such results should prompt educators to abandon the traditional fixed ideas of the brain and learning that currently fill schools—ideas that children are smart or dumb, quick or slow.

If brains can change in three weeks, imagine what can happen in a year of math class if students are given the right math materials and receive positive messages about their potential and ability.



*This article contains excerpts from Jo Boaler’s new book, *Mathematical Mindsets: Unleashing Students’ Potential Through Creative Math, Inspiring Messages and Innovative Teaching**

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To read about studies of schools that have given students positive messages about their ability, combined with mathematics teaching that supports the brain messages, see:

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