

Even Einstein was dubbed dopey – so what really makes a gifted child?

Most Nobel laureates were unexceptional in their youth. A new book questions our fixation with IQ and claims almost everyone can become a high performer

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When Maryam Mirzakhani died at the tragically early age of 40 this month, the news stories talked of her as a genius. The only woman to win the Fields Medal – the mathematical equivalent of a Nobel prize – and a Stanford professor since the age of 31, this Iranian-born academic had been on a roll since she started winning gold medals at maths Olympiads in her teens.



It would be easy to assume that someone as special as Mirzakhani must have been one of those gifted children who excel from babyhood. The ones reading Harry Potter at five or admitted to Mensa not much later. The child that takes maths GCSE while still in single figures, or a rarity such as Ruth Lawrence, who was admitted to Oxford while her contemporaries were still in primary school.

But look closer and a different story emerges. Mirzakhani was born in Tehran, one of three siblings in a middle-class family whose father was an engineer. The only part of her childhood that was out of the ordinary was the Iran-Iraq war, which made life hard for the family in her early years. Thankfully it ended around the time she went to secondary school.

Mirzakhani, did go to a highly selective girls' school but maths wasn't her interest – reading was. She loved novels and would read anything she could lay her hands on; together with her best friend she would prowl the book stores on the way home from school for works to buy and consume.

As for maths, she did rather poorly at it for the first couple of years in her middle school, but became interested when her elder brother told her about what he'd learned. He shared a famous maths problem from a magazine that fascinated her – and she was hooked. The rest is mathematical history.

Is her background unusual? Apparently not. Most Nobel laureates were unexceptional in childhood. Einstein was slow to talk and was dubbed the dopey one by the family maid. He failed the general part of the entry test to Zurich Polytechnic – though they let him in because of high physics and maths scores. He struggled at work initially, failing to get academic post and being passed over for promotion at the Swiss Patent Office because he wasn't good enough at machine technology. But he kept plugging away and eventually rewrote the laws of Newtonian mechanics with his theory of relativity.

Lewis Terman, a pioneering American educational psychologist, set up a study in 1921 following 1,470 Californians, who excelled in the newly available IQ tests, throughout their lives. None ended up as the great thinkers of their age that Terman expected they would. But he did miss two future Nobel prize winners – Luis Alvarez and William Shockley, both physicists – whom he dismissed from the study as their test scores were not high enough.

There is a canon of research on high performance, built over the last century, that suggests it goes way beyond tested intelligence. On top of that, research is clear that brains are malleable, new neural pathways can be forged, and IQ isn't fixed. Just because you can read Harry Potter at five doesn't mean you will still be ahead of your contemporaries in your teens.

According to my colleague, Prof Deborah Eyre, with whom I've collaborated on the book *Great Minds and How to Grow Them*, the latest neuroscience and psychological research suggests most people, unless they are cognitively impaired, can reach standards of performance associated in school with the gifted and talented. However, they must be taught the right attitudes and approaches to their learning and develop the attributes of high performers – curiosity, persistence and hard work, for example – an approach Eyre calls “high performance learning”. Critically, they need the right support in developing those approaches at home as well as at school.

So, is there even such a thing as a gifted child? It is a highly contested area. Prof Anders Ericsson, an eminent education psychologist at Florida State University, is the co-author of *Peak: Secrets from the New Science of Expertise*. After research going back to 1980 into diverse achievements, from music to memory to sport, he doesn't think unique and innate talents are at the heart of performance. Deliberate practice, that stretches you every step of the way, and around 10,000 hours of it, is what produces the expert. It's not a magic number – the highest performers move on to doing a whole lot more, of course, and, like Mirzakhani, often find their own unique perspective along the way.

Ericsson's memory research is particularly interesting because random students, trained in memory techniques for the study, went on to outperform others thought to have innately superior memories – those you might call gifted.

He got into the idea of researching the effects of deliberate practice because of an incident at school, in which he was beaten at chess by someone who used to lose to him. His opponent had clearly practised.

But it is perhaps the work of Benjamin Bloom, another distinguished American educationist working in the 1980s, that gives the most pause for thought and underscores the idea that family is intrinsically important to the concept of high performance.

Bloom's team looked at a group of extraordinarily high achieving people in disciplines as varied as ballet, swimming, piano, tennis, maths, sculpture and neurology, and interviewed not only the individuals but their parents, too.

He found a pattern of parents encouraging and supporting their children, in particular in areas they enjoyed themselves. Bloom's outstanding adults had worked very hard and consistently at something they had become hooked on young, and their parents all emerged as having strong work ethics themselves.

While the jury is out on giftedness being innate and other factors potentially making the difference, what is certain is that the behaviours associated with high levels of performance are replicable and most can be taught – even traits such as curiosity.

Eyre says we know how high performers learn. From that she has developed a high performing learning approach that brings together in one package what she calls the advanced cognitive characteristics, and the values, attitudes and attributes of high performance. She is working on the package with a group of pioneer schools, both in Britain and abroad.

But the system needs to be adopted by families, too, to ensure widespread success across classes and cultures. Research in Britain shows the difference parents make if they take part in simple activities pre-school in the home, supporting reading for example. That support shows through years later in better A-level results, according to the Effective Pre-School, Primary and Secondary study, conducted over 15 years by a team from Oxford and London universities.

Eye-opening spin-off research, which looked in detail at 24 of the 3,000 individuals being studied who were succeeding against the odds, found something remarkable about what was going on at home. Half were on free school meals because of poverty, more than half were living with a single parent, and four in five were living in deprived areas.

The interviews uncovered strong evidence of an adult or adults in the child's life who valued and supported education, either in the immediate or extended family or in the child's wider community. Children talked about the need to work hard at school

It would be easy to assume someone as special as Maryam Mirzakhani [above] must have excelled since babyhood, and been admitted to Mensa at age five

and to listen in class and keep trying. They referenced key adults who had encouraged those attitudes.

Einstein, the epitome of a genius, clearly had curiosity, character and determination. He struggled against rejection but was undeterred. Did he think he was a genius or even gifted? No. He once wrote: "It's not that I'm so smart, it's just that I stay with problems longer. Most people say that it is the intellect which makes a great scientist. They are wrong: it is character."

And what about Mirzakhani? Her published quotations show someone who was curious and excited by what she did and resilient. One comment sums it up. "Of course, the most rewarding part is the 'Aha' moment, the excitement of discovery and enjoyment of understanding something new – the feeling of being on top of a hill and having a clear view. But most of the time, doing mathematics for me is like being on a long hike with no trail and no end in sight."

The trail took her to the heights of original research into mathematics in a cruelly short life. That sounds like unassailable character. Perhaps that was her gift.