

THE CHRONICLE REVIEW

## Bringing Up Genius

Is every healthy child a potential prodigy?

By Paul Voosen | NOVEMBER 08, 2015



Illustration by Polly Becker for The Chronicle

**B**efore Laszlo Polgár conceived his children, before he even met his wife, he knew he was going to raise geniuses. He'd started to write a book about it. He saw it moves ahead.

By their first meeting, a dinner and walk around Budapest in 1965, Laszlo told Klara, his future bride, how his kids' education would go. He had studied the lives of geniuses and divined a pattern: an adult singularly focused on the child's success. He'd raise the kids outside school, with intense devotion to a subject, though he wasn't sure what. "Every healthy child," as he liked to say, "is a potential genius." Genetics and talent would be no obstacle. And he'd do it with great love.

Fifty years later in a leafy suburb of St. Louis, I met one of Laszlo's daughters, Susan Polgár, the first woman ever to earn the title of chess grandmaster. For several years, Susan had led the chess team of Webster University — a small residential college with a large international and online footprint — to

consecutive national titles. Their spring break had just begun, and for the next few days, in a brick-and-glass former religious library turned chess hall, the team would drill for a four-team tournament in New York City to defend the title.

The students, sporting blue-and-yellow windbreakers and polos, huddled around a checked board of white and black, a queen, rook, and pawn stacked in a row. They had started with the King's Indian Defense, a well-mapped terrain. Now they were in the midgame. Polgár sat to the side, behind a laptop synced to the game, algorithms whirring. What should be the next move? she asked. "Be active and concrete."

Jocular debate broke out, accents betraying origins: Ukraine, Azerbaijan, Colombia, Brazil, Cuba, Vietnam, Hungary. "This is not human," one student said. "It looks magical," said another. Computers have long since outclassed humans in chess; they're vital in training, but their recommended moves can seem quixotic. "No, it's very human," Polgár assured them. The students, most of them grandmasters, grew quiet, searching the more than 100,000 positional situations they had ingrained over their lifetimes, exploring possible moves and the future problems they implied — moving down the decision tree. It's the knot at the heart of chess: Each turn, you must move; when you move, a world of potential vanishes.

"Bishop G4?"

"Bishop G4," Polgár confirmed.

"That's not a human move!"

"It's a human move," she said. "It's actually very pretty." The arrangement is close to a strategy she used before, against her sister. "I beat Judit on that."

The students murmured. This demanded respect. Susan Polgár may be the first woman ever to earn the grandmaster title, but her younger sister is the best female chess player of all time.

There are three Polgár sisters, Zsuzsa (Susan), Zsofia (Sofia), and Judit: all chess prodigies, raised by Laszlo and Klara in Budapest during the Cold War. Rearing them in modest conditions, where a walk to the stationery store was a great event, the Polgárs homeschooled their girls, defying a skeptical and chauvinist Communist system. They lived chess, often practicing for eight hours a day. By the end of the 1980s, the family had become a phenomenon: wealthy, stars in Hungary and, when they visited the United States, headline news.

The girls were not an experiment in any proper form. Laszlo knew that. There was no control. But soon enough, their story outgrew their lives. They became prime examples in a psychological debate that has existed for a century: Does success depend more on the accidents of genetics or the decisions of upbringing? Nature or nurture? In its most recent form, that debate has revolved around the position, advanced by K. Anders Ericsson, a psychologist at Florida State University, that intense practice is the most dominant variable in success. The Polgárs would seem to suggest: Yes.

You may have heard of Ericsson. His work was popularized by Malcolm Gladwell in his 2008 best seller, *Outliers*, which spawned the notion of 10,000 hours of practice, in particular, as a mythical threshold to success. It's a cultural fixture. Turn on the radio and you'll hear a musician talking about "getting his 10,000 hours" in. This popularization also caused a backlash — documented in David Epstein's book *The Sports Gene* and elsewhere — of researchers arguing that genetics and other factors are as important as practice. It's a value-laden struggle, with precious few facts. In a globalized world where returns concentrate to top

performers, research showing the primacy of practice is a hopeful, democratic message. "The scientific formulation of the American dream," as one psychologist told me. The Polgárs embody that hope. Is it a false hope?

"Truth is not going to be simple-minded when it comes to greatness," says Scott Barry Kaufman, a University of Pennsylvania psychologist who has tried to rework the terms of the debate. It's a nuance many don't want to hear. Everyone remembers the names of scientists who take a hard line on the nature-nurture debate; in academia, the spoils and the press go to those on the extremes. The Polgár story, in particular, seems to yield a clear lesson. "The world wants a simple story," Kaufman says, "and a story that you can apply to your own life."

Susan, for one, is happy to play the exemplar. If her life is evidence of anything, it's that "nurture is a lot more important than nature," she said in her office after practice. Magazine covers and prizes coated the walls, including a black-and-white photo of the sisters, in 1989, with George and Barbara Bush. She sees it with her students, she says. The best have both talent and fanatical practice habits. But if one student is lazier, talent can't compensate — the one who practices more comes out ahead.

Susan has never been accused of laziness. From St. Louis, she oversees a small chess empire: books, websites, and, of course, her chess team. Talking to the press, which she's dealt with for nearly her entire life, she speaks like a canny politician — cautious, mulling the implications of what she might say. Webster recruited Susan and some of her students from Texas Tech University, where she had won two consecutive national titles. The move to Webster was controversial. Both are part of a community of small universities that have discovered that, by offering scholarships to chess players, many of them from abroad, they can raise the institution's academic prestige for relatively little expense. None of the colleges had poached a coach before, let alone students.

Equipped with celebrity and influence, Susan is an excellent recruiter. Many of her students are ranked higher than her; three have topped even Judit. Yet despite their great individual skill, the team members enjoy camaraderie. They visit the gym together. They've absorbed the Polgár way.

"Life and chess, they are similar in some points," Andre Diamant, a Brazilian graduate student and the team's longest-tenured player, said during a break from practice. "Chess players know they need to study. They need to work. They need to improve. And they do that. In life, they have this same thing."

You're probably nodding your head. Few would dismiss the value of hard work. But if there's a snag to the Polgár method of success, it might arise from a simple question: Susan and her sisters had similar childhoods. So why was Judit so much better?



Dak Dillon for The Chronicle Review

Susan Polgár is the first woman ever to earn the grandmaster title. Her younger sister is the best female chess player in history.

Chess has long been a subject of scholarly interest. Partially, that's thanks to its ubiquity — by one estimate, 700 million people in the world know how to play. Many of them are researchers, some of whom have had great success. Kenneth Rogoff was a chess prodigy before he was a famed economist. It's a complex game that takes years to master, resembling many professions. It has a tradition of archiving every move: grandmasters today are haunted by a public, digital cloud of their past games. And most important, chess players have their skill precisely ranked by a single rating scheme. They can be tracked.

By the late 1980s, researchers had established that, contrary to what you might imagine, chess masters don't tend to anticipate more moves as they gain skill. Rather, they gain expertise in recognizing patterns of the board, and patterns built out of those patterns. A question remained, however: How do they gain those skills?

Ericsson had demonstrated the remarkable way people can train their memory to recall more than 100 consecutive digits. This made him wonder: While many liked to chalk up success to innate talent — especially intelligence, however you define it — perhaps pure practice was more important? Certainly in chess it takes years of grueling memorization to achieve a high level of skill, even for prodigies. Leading researchers had even proposed a "10-year rule" for developing grandmaster expertise.

But how to prove it? Ericsson, it turned out, had the opportunity to survey the violinists of the Music Academy of West Berlin. Asked to recall how many hours they had practiced since taking up the instrument, the best musicians, as ranked by their professors, had accumulated several thousand more hours of practice, on average, than their second-tier counterparts. The researchers then found that pianists seemed to have the same divide, with the best players, on average, accruing 10,000 hours of practice before they turned 20. Similar patterns seemed to emerge in chess.

Hidden in these averages was a yawning variance. Some brilliant students studied far fewer than 10,000 hours; some far more. "It's obviously no magical boundary," Ericsson says. "More than half of our top musicians would not have qualified to be exemplars of the 10,000-hour rule."

This work was not just about extreme performance, adds Neil Charness, one of Ericsson's close collaborators. "It's important to look at top performers to look at the limits of human abilities — the maximum adaptations people can undergo."

By looking to the best, we can understand the rest.

Ericsson's observations became influential. They were welcome results for behaviorists, a branch of psychology with its origins in the work of John Watson, who once boasted: "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in, and I'll guarantee to take any one at random and train him to become any type of specialist I might select." (His caveat — "I am going beyond my facts and I admit it" — is often cut.) Ericsson was well on his way to becoming a modern-day Watson. He made polarizing statements that the only difference between elite performers and everyday people was a "lifelong period of deliberate effort to improve performance." Genetics played almost no role. It was an extreme position, and one that may have buoyed his career; in conversation, he's more nuanced.

Ericsson and Charness summed up their views in an influential article in 1994. "The role of early instruction and maximal parental support appears to be much more important than innate talent," they wrote, "and there are many examples of parents of exceptional performers who successfully designed optimal environments for their children without any concern about innate talent."

For a concrete example, they added, let us tell you about the Polgárs.

**T**he official story, as Susan tells it, is that she chose chess. Tottering around their cramped Budapest flat as a 3-year-old, she pulled open a drawer and found a set. "Let's play!" she said to her mother. Klara didn't know how. "Wait till Dad comes home," she said. When Laszlo returned, he was delighted to see Susan's interest. He was no chess expert, but this could be the venue for his experiment. It was cheap and intellectual; it shouldn't matter if you were a girl or boy, tall or short. Plus, the game was so dominated by men that a talented woman might achieve great acclaim.

It's a narrative that suits the family, which was long hounded by suspicions that the girls had little choice in their upbringing. Sofia, the middle sister, complicates the story on the phone from Israel, where she lives now. Their father, she says, always had chess in mind. He also had Susan study math, but when they needed to pick a specialty, he encouraged chess, Sofia says. The ranking system was one draw; it'd be easier to measure the experiment's success.

However she came to it, like most prodigies, Susan took chess as her own. She learned the pieces — the knight with its hurdling ambush, the bishop's chevron surprise — and fought Laszlo in pawn wars. By 4, she had a tutor and belonged to a club. At 5, she swept through a citywide tournament open to girls under 10, besting players twice her age. The Polgárs had arrived.

"It set the tone for the rest of my life," Susan says. She fell into a fortunate cycle. "Hard work creates results. Results enhance motivation. And, all around, when you're motivated, working is more enjoyable and fun. The more you work, the more results you have. I got into this very nice circle of success, motivation, work."

It was not that easy, of course. The government objected to the Polgárs' homeschooling Susan and her sisters, and threatened to seize custody of the girls. Klara lost her teaching job under dubious circumstances. For some years, even after Susan became the world's highest-ranked female player, in 1984, government officials banned her from international travel, vexed that the family insisted on playing in "male" tournaments rather than contests limited to women. (They also feared the family's fleeing to the West.) The family became a little business, supported by Susan's winnings and appearance fees.

It was natural for Sofia and Judit to follow Susan's lead. (Their parents considered naming Judit *Zseni* —





Polgár Family Photo

With his daughters as the test subjects, Laszlo Polgár set out to prove that genius is made, not born. He appears in an undated family photo with two of his three girls, Judit (left) and Sofia.

"genius" — if she had been a boy.) The younger sisters, peering through a small window in the door of the back room where Susan practiced, hated being excluded; chess was their way in. Laszlo believed that physical fitness was vital to intellectual success, so the girls played table tennis several hours a day, on top of their full day of chess and schooling. The parents were tireless in their devotion, buying every chess book they could, cutting out pages with past

games, gluing them to cards, and storing it all in an old card catalog. They assembled more than 100,000 games; at the time, only the Soviet Union's restricted chess archive could match it.

This was no normal childhood — the girls knew that. But what family is easily understood from the outside? "We realized people were skeptical about the way our parents were raising us," Judit says on the phone from Budapest, where she lives. "People were looking at us in a strange way." They had few neighborhood friends. Chess masters were frequent visitors, stopping by to see how "the little ones" were doing. For her younger sisters, Susan served as an in-house tutor. This was a happy home, Judit says. "A warm atmosphere that was full of love." Some nights, their mother sang them a favorite lullaby: "One hundred roads are open to you," it went. "One hundred byways are open to you. Anything is possible."

By 1988, Judit's ascension was clear. She was a risk taker, an overpowering attacker; Susan was more defensive, while Sofia, also aggressive, was distracted by a blossoming interest in art and design — she was often caught reading books in the bathroom late at night. That year, Judit won the World Under-12

Championship, the first woman at any level to win an overall world championship. Months later the sisters accounted for three-fourths of Hungary's team in the Women's Chess Olympiad; "Polgária," people called them. Judit dominated, winning 12 of 13 matches. She was on her way to becoming one of the world's top players, man or woman. The family went home heroes. Passers-by stopped them on the street. It seemed Laszlo had discovered the secret to success.

"Everyone said, OK, your dad is not a lunatic or just this weirdo who wants to ruin the life of their children," Sofia says. "Actually, it's something very special that he's doing."

Laszlo even got his book published. Its title? *Bringing Up Genius*.

**B**acked by the Polgár exemplar, Ericsson's theory on the overwhelming importance of deliberate practice soon became dogma. But for a group of researchers, it never sat well. Going back to Francis Galton, in the 19th century, a branch of psychology has focused more on why people are different, rather than looking for why we're the same. Those who study the latter see individual variation as experimental noise; the former see differences that must be explained. Just look at chess, they say.

A decade ago, Guillermo Campitelli, a doctoral student working with Fernand Gobet, a Swiss psychologist and the world's leading chess researcher, conducted another survey, this time of Argentine chess players. They found astonishing variation: it took one player 3,000 hours to reach the master level; another took 23,000 hours; and some, despite more than 25,000 hours, never reached that level. If you wanted to be an expert, you needed to practice — that was clear. But even then, there was a strong chance you'd plateau.

It was difficult to publish the paper, Gobet says. Most of its reviewers followed

Ericsson's paradigm and mounted, in Gobet's view, superficial critiques to hold it back. He and Campitelli shopped it journal to journal. "People didn't want to hear the message of the data," he says. Even after the study came out, in 2007, it was mostly ignored.

After the success of *Outliers*, though, researchers paid notice. They began to hear stories of people, inspired by Gladwell's tales, tailoring their lives to the Polgár model of practice, anticipating, one day, that they'd be rewarded with a "genius" performance in their field of choice. (Most prominently, a 30-year-old photographer quit his job to spend 10,000 hours mastering golf, which he had barely played. You can follow his progress online.) It was particularly galling for these researchers that Ericsson seemed to rule out any role for native intelligence or genetics in success, except for specialized examples, like genes influencing height for basketball players.

Most scientists are prone to resist a nurture-heavy view, says Kaufman, the Penn psychologist. "People who have tied up IQ as their identity, as most scientists do," he says, "they love the idea of emphasizing all the genetic components, because it makes them feel superior."

Whatever their motivation, over the past few years these scientists have put out a series of studies, many reanalyzing past work, to empirically dismantle the practice paradigm. One influential analysis in particular found that deliberate practice could explain only one-third of success, a step down from Ericsson's view that practice "largely" accounts for these differences, though, really, not a step that far down. Ericsson has countered, debating the methods used to make these estimates, and — I'll spare you the details. If anything, this back-and-forth shows how difficult it is for social science to firmly know anything about human behavior. Expect more debate next spring, with the publication of Ericsson's new book, *Peak: Secrets From the New Science of Expertise*.

It's undeniable that Ericsson identified an important mechanism behind success: feedback. Without feedback, "it's very hard to imagine how people would get better," he says. Feedback is rare. Life is not like chess. Most real-world situations don't yield immediate returns. We're free to make the same mistakes again and again. Take medicine, where Ericsson is trying to apply his insights. Many doctors will diagnose a patient and then not see that patient again. They'll never know if they were right. "In those environments," he says, "would you be able to learn?"

There's no simple story here. "I do believe that there are differences in talent," Gobet says. "But I do believe it's not simply talent plus practice." Other explanations? Much as with language, some evidence seems to point toward early exposure as helpful. Other candidates include working memory, general intelligence, and a drive to succeed — all elements that could be influenced by nature *and* nurture. One of Gobet's students has unpublished data that seems to find IQ as the most important factor in early success in chess, only to be supplanted by practice as the player grows older.

Until there's more evidence to support these other factors, Ericsson warns against a message downplaying practice. "It's unfair to go around telling people that you have to be extraordinarily intelligent to have success," he says.

Gobet agrees. Many people use the vagaries of birth to ignore how much they can improve in any given subject. How many of us are fond of saying, "I'm not a math person"? He just worries that some parents will take the wrong lesson from stories like the Polgárs. Intense practice and an early start may help, but they still involve making a bet with your children. For every Polgár, there are countless unknown chess players.

Gobet, who was once one of the best chess players in Switzerland — he played Judit twice — has seen it. "I know some people who tried to do the same thing as the Polgár family," he says. "But most of them failed."

Questions will always chase the Polgárs; such is the price of their peculiar type of fame. But for a time, at least, it looked as if they might answer the biggest question of them all. The family has always known that genes undermined their can-do message. Laszlo and Klara were smart and determined. Isn't it natural their girls were, too? In the 1990s, to test that, Laszlo almost began raising another set of kids; an eccentric Dutch benefactor would cover the costs. But the plan foundered due to Laszlo's insistence on adoption. He feared raising prodigies, then not benefiting from their success, Susan says. And Klara made it clear: She did not want more kids. No more experiments.

**T**he Webster players arrived in New York with targets on their backs. Susan's teams had won the past four tournaments, and this year's team was the favorite again: the only one composed entirely of grandmasters. The players had drilled for months, exploring how to counter openings preferred by the University of Texas at Dallas, their top opponent. They trained, against one another and the computer, generating novel plays that might throw their opponents off, siphoning valuable time off the clock. This was far different training than the sisters had: Once, information and coaching were scarce; now they are ubiquitous, and the best players are those who can sift these data, resisting addiction to the tendencies of one program.

Whatever the secret to their success, Webster dominated in New York, nearly doubling the score of the second-place team. Some in the chess world have questioned how much Susan could improve the skills of such high-caliber players — an untestable question, and a churlish one. Certainly, few people have had a life that better prepared them for coaching. And there she was, tweeting a picture of their celebratory ride from the tournament in a limousine.

The Polgárs are now an international clan. All of the daughters have retired from professional play. Their lives still center on the game: Judit and Sofia collaborate on a foundation that fosters chess in schools; Susan has her American empire. Laszlo has invented a new form of chess built around a star-shaped board, and they've opened a storefront Polgár museum in Budapest. Laszlo might finally publish his book in English, too, having at last given up hopes of a six-figure advance. He and his wife have begun wintering in Florida, and they're planning to meet with Ericsson, for the first time, this year.

When they meet, they'll probably discuss another lingering question: What accounts for the sisters' differing ratings? How could Judit, seven years Susan's junior, overtake her sister despite far less practice? All three, of course, practiced more than almost anyone else in the world. There are family theories. Though Sofia was often said to have the most talent, in chess and elsewhere — during one 1989 tournament, in Rome, she went on a legendary run, beating a murderers' row of Soviet grandmasters — she was never driven enough to focus on one thing, Susan says.

Judit, meanwhile, had a killer instinct.

"Out of the three of us, I was the most fit to the kind of life required to be on the top," Judit says. Losses fueled her determination. "I had this drive in me that I wanted to show it was possible and I can do it."

Judit's drive or talent could have a genetic basis. But there are other possibilities, Ericsson says. Susan faced more societal obstacles, while Judit, from a young age, had access to top coaches and a master chess player — her sister. Their parents could have improved their teaching methods. Or there could be no reason.

Whatever the source of its success, the Polgár experiment will last only one generation. None of the sisters has raised her children in the same fashion. All the kids attend school. For Sofia, it was important for her two boys to learn chess for its life lessons — making decisions under pressure, avoiding paralysis by analysis. But they didn't have to be champions. Eventually the boys lost interest. She didn't push them back into it.

"I also enjoy having a life, you know," Sofia says. "For my parents, this was everything."

Sometimes she wonders what it would mean if their father is right. That the Polgár upbringing would work in any discipline. "In a way, I'm sorry it wasn't something else," she says. "It would have been better to find a cure for AIDS or cancer rather than just being a chess champion."

The Polgárs were dedicated. The Polgárs were talented. The Polgárs were lucky. Those statements are all true. When it comes to expertise, science can't yet parse which is more true. Still, we can learn from their story. Boundaries on talent exist, but they manifest with reluctance. Dream big. Train hard. Find limits. And don't bet your life on success.

*Correction (11/13/2015, 3:52 p.m.):* This article originally misstated the position of a chess piece. It was "G4," not "J4." The article has been corrected.

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