

How Talent Can Be Grown

In his intriguing and important book, Daniel Coyle takes us on a journey to the world's "talent hotspots" – places from which extraordinary achievement has emerged, seemingly by magic. The conventional wisdom, says Coyle, is that "without warning, in the midst of ordinary, everyday life, a Kid from Nowhere appears. The Kid possesses a mysterious natural gift for painting/math/baseball/physics, and through the power of that gift, he changes his life and the lives of those around him." But it's not magic, Coyle found. It's not genes. Our brains are set up to develop talent – if we just know how. By studying each hotspot carefully, Coyle found a consistent formula:

- *Ignition* – An event or role model that provides powerful motivation to work hard and a belief that excellent performance is achievable.

- *Master coaching* – These teachers are "talent whisperers" who help develop a love for doing something, fuel passion, inspire deep practice, and bring out the best in students.

- *Deep practice* – Hard, sustained work at the outer limits of one's current ability, developing physical or mental skill to the next level.

Coyle starts with a vivid example of deep practice – 13-year-old Clarissa practicing a new song, "Golden Wedding," on her clarinet. Clarissa is not particularly musically talented; she doesn't have a good ear, only an average sense of rhythm, and hasn't been super-motivated (she practices, she says, "because I'm supposed to"). Here's how the practice session goes.

"Clarissa draws a breath and plays two notes. Then she stops. She pulls the clarinet from her lips and stares at the paper. Her eyes narrow. She plays seven notes, the song's opening phrase. She misses the last note and immediately stops, fairly jerking the clarinet from her lips. She squints again at the music and sings the phrase softly. 'Dah dah dum *dah*,' she says. She starts over and plays the riff from the beginning, making it a few notes farther into the song this time, missing the last note, backtracking, patching in the fix. The opening is beginning to snap together – the notes have verve and feeling. When she's finished with this phrase, she stops again for six long seconds, seeming to replay it in her mind, fingering the clarinet as she thinks. She leans forward, takes a breath, and starts again... Clarissa leans into the sheet music, puzzling out a G-sharp that she's never played before. She looks at her hand, then at the music, then at her hand again. She hums the riff. Clarissa's posture is tilted forward; she looks as though she is walking into a chilly wind; her sweetly freckled face tightens into a squint. She plays the phrase again and again. Each time she adds a layer of spirit, rhythm, swing."

"This is not ordinary practice," says Coyle. "This is something else: a highly targeted, error-focused practice. Something is growing, being built. The song begins to emerge, and with it, a new quality within Clarissa... This is not a picture of talent created by genes; it's something far more interesting. It is six minutes of an average person entering a magically productive zone, one where more skill is created with each passing second." The girl practices for six minutes, but because it was *deep practice*, her skills improved tenfold. It was the equivalent of a month of practice.

When she's finished with "Golden Wedding" (for the time being), Clarissa zips through "The Blue Danube," a song she's played many times. This is not deep practice, and it does almost nothing for her clarinet-playing ability. What's the difference? The struggle. The mistakes. The regressions. The scrunched-up face. The learning curve. And the myelin in her brain. With every

labored effort toward competence, this neural insulator wraps around nerve fibers, making the signals stronger and faster by preventing the electrical impulses from leaking out. “When we fire our circuits in the right way,” says Coyle, “– when we practice swinging the bat or playing that note – our myelin responds by wrapping layers of insulation around that neural circuit, each new layer adding a bit more skill and speed. The thicker the myelin gets, the better it insulates, and the faster and more accurate our movements and thoughts become... The more time and energy you put into the right kind of practice – the longer you stay in the Clarissa zone, firing the right signals through your circuits – the more skill you get, or, to put it a slightly different way, the more myelin you earn.”

“Deep practice is built on a paradox,” he continues: “struggling in certain targeted ways – operating at the edges of your ability, where you make mistakes – makes you smarter. Or to put it a slightly different way, experiences where you’re forced to slow down, make errors, and correct them – as you would if you were walking up an ice-covered hill, slipping and stumbling as you go – end up making you swift and graceful without your realizing it... When you are practicing deeply, the world’s usual rules are suspended. You use time more efficiently. Your small efforts produce big, lasting results. You have positioned yourself at a place of leverage where you can capture failure and turn it into skill. The trick is to choose a goal just beyond our present abilities; to target the struggle. Thrashing blindly doesn’t help. Reaching does.”

In Coyle’s visits to one talent hotspot after another, he found the same basic process: a lot of slow, difficult work (in the neighborhood of 10,000 hours, the amount that some researchers say is necessary for high proficiency), excellent coaches or teachers (soft and loving at first, then more demanding), and a spark of inspiration – all producing amazing achievement. Here are some of the hotspots:

- *The Link Trainer* – In the mid-1930s, lots of American military pilots were dying in crashes. The bedrock belief at the time was that good pilots were born, not made, but the birthrate couldn’t keep up with the fatal accidents. Then Edwin Albert Link developed a flight simulator that allowed pilots to engage in deep practice – taking off, landing, messing up, diving, stalling, and recovering – without getting killed. The Link Trainer revolutionized pilot training and was an important factor in the Allied victory in World War II. “The Air Corps pilots who trained in Links were no braver or smarter than the ones who crashed,” says Coyle. “They simply had the opportunity to practice more deeply.”

- *Brazilian soccer* – With five World Cup victories, 900 young players signed by professional European clubs each year, and a procession of stars (Pelé, Zico, Socrates, and others), there’s no question that Brazil is a talent hotspot. The conventional explanation is that it’s the climate, a traditional love of the sport, and the drive to escape poverty – but those factors were in place in the 1940s and 50s when Brazil did not excel internationally. Coyle found the real reason: since the 1950s, Brazilians have trained in a particular way that improves ball-handling faster than anywhere else in the world. Young Brazilians play thousands of hours of *futsal* – a shrunk-down version of soccer played with a smaller, heavier ball in an enclosed space. Players touch the ball six times more often than in the conventional game and the emphasis is on ball handling and ball control. It’s all about sharp passing, looking for angles, and working quick combinations with teammates. *Futsal*, combined with other factors, led to the takeoff of Brazilian soccer.

• *The Bronte sisters* – Charlotte, Emily and Anne, living in the middle of nowhere with their tyrannical father and no mother, wrote some of the greatest works of English literature – among them *Jane Eyre*, *Wuthering Heights*, *Agnes Grey*, and *The Tenant of Windfell Hall* – before dying at a young age. The explanation? The sisters spent countless hours writing “immature and imitative” children’s books just for fun before settling down to write more serious literature. “Their childhood writings were collaborative deep practice,” says Coyle, “where they developed their storytelling muscles... Written far from parental eyes, removed from any formal pressure, the little books functioned as the equivalent of the Link trainer, a place where the Bronte sisters fired and honed millions upon millions of circuits, tangled and untangled thousands of authorial knots, and created hundreds of works that were utter artistic failures except for two redeeming facts: each one made them happy, and each one quietly earned them a bit of skill.”

• *The Z-Boys* – In the mid-1970s, this group of teenagers from California turned the skateboarding world upside down. They did aerial maneuvers, scraped their boards along curbs and handrails, and dazzled the Bahne-Cadillac Skateboard Championship in Del Mar. Their secret? The Z-Boys were experienced ocean surfers who skateboarded when the waves weren’t suitable, and they happened upon the ideal myelin-developing practice turf – empty swimming pools – where they spent hundreds of hours practicing. “Once inside the pool, sliding along the steep surface, the Z-Boys had to play by the rules of the new game,” says Coyle. “From a deep-practice point of view, the empty swimming pool created a world not unlike that of the little books of the Bronte sisters or the *futsal* courts of Brazil. Circuits fired and were honed. Mistakes were made, then corrected. Myelin flourishes. Talent blooms... [M]yelin doesn’t care about who you are. It only cares about what you do.”

• *The Renaissance* – How did the sleepy town of Florence in the 1400s accomplish so much? “[A] city with a population slightly less than that of present-day Stillwater, Oklahoma, produced the greatest outpouring of artistic achievement the world has ever known,” says Coyle. “A solitary genius is easy to understand, but dozens of them, in the space of two generations? How did it happen?” The answer: A longstanding system of apprentices who were required to spend thousands of hours “solving problems, trying and failing and trying again, within the confines of a world built on the systematic production of excellence,” says Coyle. “Their life was roughly akin to that of a twelve-year-old intern who spends a decade under the direct supervision of Steven Spielberg, painting sets, sketching storyboards, setting cameras.” Michelangelo said it best: “If people knew how hard I had to work to gain my mastery, it would not seem so wonderful at all.”

• *Japanese schools* – “The Japanese want their kids to struggle,” says Jim Stigler, the UCLA professor who wrote about the success of Japan’s schools (with James Hiebert) in *The Teaching Gap*. “American teachers, though, worked like waiters. Whenever there was a struggle, they wanted to move past it, make sure the class kept gliding along. But you don’t learn by gliding.” One study found that Japanese 8th graders spend 44 percent of their class time inventing, thinking, and actively struggling with underlying concepts. American students spend less than one percent on similar activities.

• *Babies learning to walk* – Norwegian researchers studied the key improvement factors in babies as they struggled to stand up. It wasn’t height, weight, age, brain development, or innate ability. It was the amount of time they spent trying to walk. Coyle says this is the most vivid

example of what deep practice feels like – “intently, clumsily lurching toward a goal and toppling over. It’s a wobbly, discomfiting sensation that any sensible person would instinctively seek to avoid. Yet the longer the babies remained in that state – the more willing they were to endure it and to permit themselves to fail – the more myelin they built and the more skill they earned. The staggering babies embody the deepest truth about deep practice: to get good, it is helpful to be willing, or even enthusiastic, about being bad. Baby steps are the royal road to skill.”

What is the motivational fuel that leads people to make this kind of effort? That’s where ignition comes in. For babies, it’s the burning desire to move around like all the other people they see around them. For South Korean golfers, ignition happened the afternoon of May 18, 1998, when a 20-year-old named Se Ri Pak won the McDonald’s LPGA Championship and became a national hero. Hundreds of young Koreans thought to themselves, “If she can do it, why can’t I?” For runners, it happened in 1954 when a skinny Oxford medical student named Roger Bannister broke the four-minute mile barrier. For Clarissa, it was her teacher playing a few bars of a jazz version of “Golden Wedding.” Clarissa was entranced by that version and in an instant, saw herself as a performer; everything came together, and suddenly she was on fire. The next day, Clarissa did her six minutes of practice and began to grow exponentially as a clarinetist.

“This is how ignition works,” says Coyle. “Where deep practice is a cool, conscious act, ignition is a hot, mysterious burst, an awakening. Where deep practice is an incremental wrapping, ignition works through lightning flashes of image and emotion, evolution-built neural programs that tap into the mind’s vast reserves of energy and attention. Where deep practice is all about staggering-baby steps, ignition is about the set of signals and subconscious forces that create our identity; the moments that lead us to say *that is who I want to be...* Accordingly, ignition is determined by simple if/then propositions, with the *then* part always the same – *better get busy.*” The language of ignition is the language of effort, not talent. In every talent hotspot he visited, Coyle heard the teachers and coaches talking about struggle and hard work.

Coyle’s prime exemplar of the master teacher is John Wooden, the legendary UCLA basketball coach. Two educational psychologists spent a year watching Wooden in action and recorded 2,326 discrete acts of teaching. Of those, only 6.9 percent were compliments and 6.6 percent were expressions of displeasure. Fully 75 percent were “pure information” – countless injunctions: *This, not that. Here, not there.* “His words and gestures served as short, sharp impulses that showed his players the correct way to do something,” says Coyle. “He was seeing and fixing errors. He was honing circuits. He was a virtuoso of deep practice, a one-man Link trainer... A coach’s true skill consists not in some universally applicable wisdom that he can communicate to all, but rather in the supple ability to locate the sweet spot on the edge of each individual student’s ability, and to send the right signals to help the student reach toward the right goal, over and over.” Wooden summed up his approach this way: “Don’t look for the big, quick improvement. Seek the small improvement one day at a time. That’s the only way it happens – and when it happens, it lasts.” As vocal coach Linda Septien said: “I’m always checking, because I need to know when they don’t know.”

Parents, of course, are the ultimate teachers. Carol Dweck’s advice to parents boils down to two rules: Pay attention to what your children are fascinated by, and praise them for their effort.

The Talent Code by Daniel Coyle (Bantam Books, 2009)