# The Talent Code

GREATNESS ISN'T BORN.
IT'S GROWN. HERE'S HOW.

Daniel Coyle

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*Chapter 5*

# Primal Cues

*Every great and commanding moment in the annals of the world is a triumph of some enthusiasm.*
*—Ralph Waldo Emerson*

## "If She Can Do It, Why Can't I?"

Growing skill, as we've seen, requires deep practice. But deep practice isn't a piece of cake: it requires energy, passion, and commitment. In a word, it requires motivational fuel, the second element of the talent code. In this section we'll see how motivation is created and sustained through a process I call ignition. Ignition and deep practice work together to produce skill in exactly the same way that a gas tank combines with an engine to produce velocity in an automobile. Ignition supplies the energy, while deep practice translates that energy over time into forward progress, a.k.a. wraps of myelin.

When I visited the talent hotbeds, I saw a lot of passion. It showed in the way people carried their violins, cradled their soccer balls, and sharpened their pencils. It showed in the way

they treated bare-bones practice areas as if they were cathedrals; in the alert, respectful gazes that followed a coach. The feeling wasn't always shiny and happy—sometimes it was dark and obsessive, and sometimes it was like the quiet, abiding love you see in old married couples. But the passion was always there, providing the emotional rocket fuel that kept them firing their circuits, honing skills, getting better.

When I asked people in the hotbeds about the source of their passion for violin/singing/soccer/math, the question struck most of them as faintly ridiculous, as if I were inquiring when they first learned to enjoy oxygen. The universal response was to shrug and say something like "I dunno, I've just always felt this way."

Faced with these responses, it's tempting to return the shrug, to chalk up their burning motivation to the unknown depths of the human heart. But this would not be accurate. Because in many cases it is possible to pinpoint the instant that passion ignited.

For South Korea's golfers, it was the afternoon of May 18, 1998, when a twenty-year-old named Se Ri Pak won the McDonald's LPGA Championship and became a national icon. (As one Seoul newspaper put it, "Se Ri Pak is not the female Tiger Woods; Tiger Woods is the male Se Ri Pak.") Before her, no South Korean had succeeded in golf. Flash-forward to ten years later, and Pak's countrywomen had essentially colonized the LPGA Tour, with forty-five players who collectively won about one-third of the events.

For Russia's tennis players, the moment came later that same summer when seventeen-year-old Anna Kournikova reached the Wimbledon semifinals and, thanks to her supermodel looks, gained the status of the world's most downloaded

athlete. By 2004 Russian women were showing up regularly in major finals; by 2007 they occupied five of the top ten rankings and twelve of the top fifty. "They're like the goddamned Russian Army," said Nick Bollettieri, founder of his eponymous tennis academy in Bradenton, Florida. "They just keep on coming."

| Year | South Koreans on LPGA Tour | Russians in WTA Top 100 |
|---|---|---|
| 1998 | 1 | 3 |
| 1999 | 2 | 5 |
| 2000 | 5 | 6 |
| 2001 | 5 | 8 |
| 2002 | 8 | 10 |
| 2003 | 12 | 11 |
| 2004 | 16 | 12 |
| 2005 | 24 | 15 |
| 2006 | 25 | 16 |
| 2007 | 33 | 15 |

Other hotbeds follow the same pattern: a breakthrough success is followed by a massive bloom of talent. Note that in each case the bloom grew relatively slowly at first, requiring five or six years to reach a dozen players. This is not because the inspiration was weaker at the start and got progressively stronger, but for a more fundamental reason: deep practice takes time (ten thousand hours, as the refrain goes). Talent is

spreading through this group in the same pattern that dandelions spread through suburban yards. One puff, given time, brings many flowers.*

A different example of this phenomenon began on a blustery day in May 1954, when a skinny Oxford medical student named Roger Bannister became the first person to run a mile in less than four minutes. The broad outlines of his achievement are well known: how physiologists and athletes alike regarded the four-minute mile as an unbreakable physiological barrier; how Bannister systematically attacked the record; how he broke the mark by a fraction of a second, earning headlines around the world and lasting fame for what *Sports Illustrated* later called the single greatest athletic accomplishment of the twentieth century.

Less well known is what happened in the weeks after Bannister's feat: another runner, an Australian named John Landy, also broke the four-minute barrier. The next season a few more runners did too. Then they started breaking it in

* One of the useful things about this breakthrough-then-bloom pattern is that it makes it possible to forecast the rise of future talent hotbeds. I predict that one of them will be Venezuelan classical musicians. Gustavo Dudamel, a.k.a. El Dude, is the twenty-six-year-old wunderkind who now directs the Los Angeles Philharmonic. Most stories about him mention his off-the-chart skills, his signature curly hair, his charm. They don't mention the fact that Venezuela is producing lots of El Dudes through a program called the Fundación del Estado para el Sistema Nacional de las Orquestas Juveniles e Infantiles de Venezuela, known by its handier nickname of El Sistema (the system). The program enrolls poor kids into classical-training programs (250,000 kids at last count), brings the best players back as teachers, sends orchestras all over the world, and in general is starting to bear a striking resemblance to Venezuela's equally successful baseball academies. Another future hotbed will be Chinese novelists. Ha Jin (*Waiting*) looks to be the breakthrough performer of what might be a rather large contingent, including Ma Jian, Li Yiyun, Fan Wu, and Dai Sijie, which should arrive around the same time as the Chinese basketballers ignited by Yao Ming. Lastly, moviegoers should brace themselves for a wave of Romanian filmmakers, an unlikely group sparked by the four major prizes won at the Cannes Film Festival by that nation's directors over the last three years, as well as by the famously rigorous teaching at the Bucharest National University of Drama and Film.

droves. Within three years no fewer than seventeen runners had matched the greatest sporting accomplishment of the twentieth century. Nothing profound had changed. The track surfaces were the same, the training was the same, the genes were the same. To chalk it up to self-belief or positive thinking is to miss the point. The change didn't come from inside the athletes: they were responding to something outside them. The seventeen runners had received a clear signal—*you can do this too*—and the four-minute mark, once an insurmountable wall, was instantly recast as a stepping-stone.

This is how ignition works. 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*. We usually think of passion as an inner quality. But the more I visited hotbeds, the more I saw it as something that came first from the outside world. In the hotbeds the right butterfly wingflap was causing talent hurricanes.

"I remember watching [Pak] on TV," said Christina Kim, a South Korean–American golfer. "She wasn't blond or blue-eyed, and we were of the same blood . . . You say to yourself, 'If she can do it, why can't I?'" Larisa Preobrazhenskaya, the Spartak coach, remembers the moment when the spark caught. "All the little girls started wearing their hair in ponytails and grunting when they hit," she said. "They were all little Annas."

Ignition is a strange concept because it burns just out of

our awareness, largely within our unconscious mind. But that doesn't mean it can't be captured, understood, and used to produce useful heat. In the next few chapters we'll see how our built-in ignition system works, and how tiny, seemingly insignificant cues can, over time, create gigantic differences in skill. We'll visit some places that have ignited, even though they might not know it, and we'll see how myelin is really made out of love. Let's begin by taking a closer look at the ignition process.

## The Tiny, Powerful Idea

In 1997 Gary McPherson set out to investigate a mystery that has puzzled parents and music teachers since time immemorial: why certain children progress quickly at music lessons and others don't. He undertook a long-term study that sought to analyze the musical development of 157 randomly selected children. (This was the study that would generate the footage of Clarissa practicing the clarinet.) McPherson took a uniquely comprehensive approach, following the children from a few weeks before they picked out their instrument (at age seven or eight in most cases) through to high school graduation, tracking their progress through a detailed battery of interviews, biometric tests, and videotaped practice sessions.

After the first nine months of lessons the kids were a typical mixed bag: a few had zoomed off like rockets; a few had barely budged; most were somewhere in the middle. Skill was scattered along a bell curve of what we'd intuitively consider to be musical aptitude. The question was, what caused the curve? Was it inevitable, just a descriptive chart of what happens

among any randomly chosen population who are striving to master a skill? Or was there some hidden X factor that explained and predicted each child's success and failure?

McPherson started analyzing his data to try to find the reason. Was the X factor IQ? Nope. Was it aural sensitivity? Nope. Was it math skills or sense of rhythm? Sensorimotor skills? Income level? Nope, nope, nope, nope.

Then McPherson tested a new factor: the children's answers to a simple question that he'd asked them *before* they had even started their first lesson. The question was, how long do you think you'll play your new instrument?

"They mostly say 'Uh, I dunno' at first ," McPherson said. "But then when you keep digging and ask them a few times, eventually they will give you a real solid answer. They have an idea, even then. They've picked up something in their environment that's made them say, yes, that's for me."

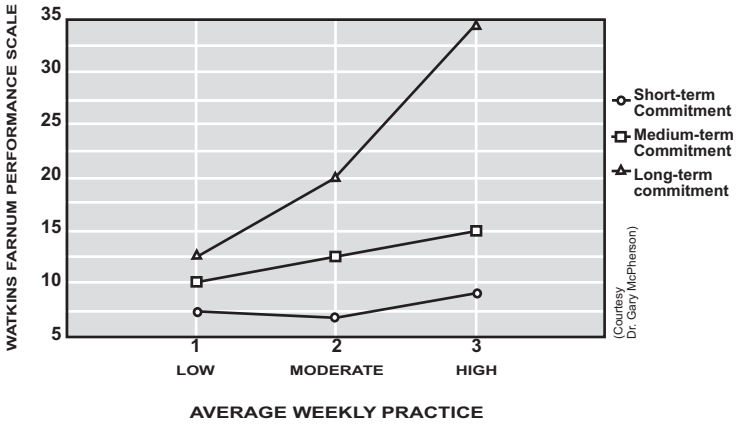
The children were asked to identify how long they planned to play (the options were: through this year, through primary school, through high school, all my life), and their answers were condensed into three categories:

Short-term commitment

Medium-term commitment

Long-term commitment

McPherson then measured how much each child practiced per week: low (20 minutes per week); medium (45 minutes per week); and high (90 minutes per week). He plotted the results against their performance on a skill test. The resulting graph looked like this:




When McPherson saw the graph, he was stunned. "I couldn't believe my eyes," he said. Progress was determined not by any measurable aptitude or trait, but by a tiny, powerful idea the child had before even starting lessons. The differences were staggering. With the same amount of practice, the long-term-commitment group outperformed the short-term-commitment group by 400 percent. The long-term-commitment group, with a mere twenty minutes of weekly practice, progressed faster than the short-termers who practiced for an hour and a half. When long-term commitment combined with high levels of practice, skills skyrocketed.

"We instinctively think of each new student as a blank slate, but the ideas they bring to that first lesson are probably far more important than anything a teacher can do, or any amount of practice," McPherson said. "It's all about their perception of self. At some point very early on they had a crystallizing experience that brings the idea to the fore, that says, *I am a musician*. That idea is like a snowball rolling downhill."

To illustrate how this snowball works, McPherson used the

example of Clarissa. The day before her high-velocity practice, Clarissa's teacher had been trying to teach her a new song called "La Cinquantaine." As usual with Clarissa, the lesson had not gone well. Out of frustration, the teacher decided to play a jazz version of "La Cinquantaine"—"Golden Wedding." He played a few bars, and the whole thing took perhaps a minute. But a minute was enough.

"When he played that, at that moment, something happened," McPherson said. "Clarissa was awestruck by the jazz version. Entranced. She saw the teacher play it, and he must have played with some style, because she got an image of herself as a performer. The teacher didn't realize it then, but everything came together, and all of a sudden while hardly knowing it, she's on fire, desperate to learn."

Note the process McPherson is describing here. The teacher's playing caused Clarissa to experience an intense emotional response. That response—call it fascination, rapture, or love—instantly connected Clarissa to a high-octane fuel tank of motivation, which powered her deep practice. It's the same thing that happened to the South Korean golfers and the Russian tennis players. In their case, they used that fuel, over a decade's time, to dominate two sports; in Clarissa's case, she used that energy to accomplish a month's worth of practice in six minutes.

McPherson's graph, like the table showing the rise of South Korean golfers and Russian tennis players, is not a picture of aptitude. It is a picture of ignition. What ignited the progress wasn't any innate skill or gene. It was a small, ephemeral, yet powerful idea: a vision of their ideal future selves, a vision that oriented, energized, and accelerated progress, and that originated in the outside world. After all, these kids weren't born wanting to be musicians. Their wanting, like Clarissa's, came

from a distinct signal, from something in their family, their homes, their teachers, the set of images and people they encountered in their short lives. That signal sparked an intense, nearly unconscious response that manifested itself as an idea: *I want to be like them*. It wasn't necessarily a logical idea for them to have. (Recall that it didn't correlate with any aural, rhythmic, or mathematic skills they possessed.) Perhaps the idea came about purely by accident. But accidents have consequences, and the consequence of this one was that they started out ignited, and that made all the difference.*

## Flipping the Trigger

Being highly motivated, when you think about it, is a slightly irrational state. One forgoes comfort now in order to work toward some bigger prospective benefit later on. It's not as simple as saying *I want X*. It's saying something far more complicated: *I want X later, so I better do Y like crazy right now*. We speak of motivation as if it's a rational assessment of cause and effect, but in fact it's closer to a bet, and a highly uncertain one at that. (What if the future benefits don't come?) This paradox is made plain in a scene in Mark Twain's *Tom Sawyer*.

Tom Sawyer is whitewashing a fence under strict orders

* At Meadowmount Music School I met a dozen kids who, when I asked them how they came to play, were vague, saying things like "I just always liked the violin/cello/piano." Then when I inquired what their parents did, it turned out that they played in symphony orchestras. In other words, these kids had spent hundreds of hours of their childhood watching the person they loved most in the world practice and perform classical music. In light of McPherson's study, this is ignition *in excelsis*. Speaking of parental cues, Meadowmount's roster included three Gabriels, named after the angel of music.

from his Aunt Polly. A neighborhood kid named Ben saunters past, teasingly informing Tom of his afternoon plans.

*[Ben] "Say—I'm going in a-swimming, I am. Don't you wish you could? But of course you'd druther work—wouldn't you? Course you would!"*

*Tom contemplated the boy a bit, and said:*

*"What do you call work?"*

*"Why, ain't that work?"*

*Tom resumed his whitewashing, and answered carelessly:*

*"Well, maybe it is, and maybe it ain't. All I know is, it suits Tom Sawyer."*

*"Oh come, now, you don't mean to let on that you like it?"*

*The brush continued to move.*

*"Like it? Well, I don't see why I oughtn't to like it. Does a boy get a chance to whitewash a fence every day?"*

*That put the thing in a new light. Ben stopped nibbling his apple. Tom swept his brush daintily back and forth—stepped back to note the effect—added a touch here and there—criticized the effect again—Ben watching every move and getting more and more interested, more and more absorbed. Presently he said:*

*"Say, Tom, let me whitewash a little."*

*Tom considered, was about to consent; but he altered his mind:*

*"No—no—I reckon it wouldn't hardly do, Ben. You see, Aunt Polly's awful particular about this fence—right here on the street, you know—but if it was the back fence I wouldn't mind and she wouldn't. Yes, she's awful particular about this fence; it's got to be done very careful;*

*I reckon there ain't one boy in a thousand, maybe two thousand, that can do it the way it's got to be done."*

We all know what happens next: Ben is ignited, setting off a contagion of motivation that ends with Tom happily observing as the neighborhood kids barter and beg for the chance to whitewash the fence in his stead. Fiction though it may be, the passage suggests the sorts of signals that work best to ignite people.

The previous section contained three examples of ignition: South Korean/Russian athletes, mile runners, and beginner musicians. In each case, their ignition was reactive. It may have *felt* like it originated within them, but in fact it did not. In each case it was a response to a signal that arrived in the form of an image: the victory of an older countrywoman, the barrier-smashing accomplishment of a fellow runner, the unexpectedly captivating performance of a teacher. The question is, what do these signals have in common?

The answer is, each has to do with identity and groups, and the links that form between them. Each signal is the motivational equivalent of a flashing red light: *those people over there are doing something terrifically worthwhile*. Each signal, in short, is about future belonging.

Future belonging is a primal cue: a simple, direct signal that activates our built-in motivational triggers, funneling our energy and attention toward a goal. The idea makes intuitive sense—after all, we've all felt motivated by the desire to connect ourselves to high-achieving groups. What's interesting, however, is just how powerful and unconscious those triggers can be.

"We're the most social creatures on the planet," says Dr. Geoff Cohen of the University of Colorado. "Everything depends on collective effort and cooperation. When we get a cue that we ought to connect our identity with a group, it's like a hair trigger, like turning on a light switch. The ability to achieve is already there, but the energy put into that ability goes through the roof."

Cohen is one of a growing group of psychologists who specialize in uncovering the unconscious mechanisms that quietly govern our choices, motivations, and goals. Officially this area of study is called automaticity, but for our purposes Cohen and his colleagues are like the garage mechanics of ignition, tracing the invisible connections between our motivations and the environmental signals that quietly activate them. One of the rudimentary truths that the automaticity experts like to point out is that our motivational wiring isn't exactly new. In fact, most of the motivational circuits in our brains go back millions of years and are located in the area of the mind called the reptilian brain.

"Pursuing a goal, having motivation—all of that predates consciousness," said John Bargh, a psychologist at Yale University who pioneered automaticity studies in the mid-1980s. "Our brains are always looking for a cue as to where to spend energy now. Now? Now? We're swimming in an ocean of cues, constantly responding to them, but like fish in water, we just don't see it."

I asked Bargh about a curious pattern I'd observed at the talent hotbeds: they tended to be junky, unattractive places. If the training grounds of all the talent hotbeds I visited were magically assembled into a single facility—a mega-hotbed, as it were—that place would resemble a shantytown. Its buildings

would be makeshift, corrugated-roofed affairs, its walls paint-bald, its fields weedy and uneven. So many hotbeds shared this disheveled ambience that I began to sense a link between the dented, beat-up state of the incubators and the sleek talent they produced. Which, in Bargh's opinion, was precisely the case, and for a reason he readily explained.

"If we're in a nice, easy, pleasant environment, we naturally shut off effort," Bargh said. "Why work? But if people get the signal that it's rough, they get motivated now. A nice, well-kept tennis academy gives them the luxury future right now—of course they'd be demotivated. They can't help it."

The research of Bargh and his colleagues adds up to a theorem that might be dubbed the Scrooge Principle, which goes as follows: our unconscious mind is a stingy banker of energy reserves, keeping its wealth locked in a vault. Direct pleas to open the vault often don't work; Scrooge can't be fooled that easily. But when he's hit with the right combination of primal cues—when he's visited by a series of primal-cue ghosts, you might say—the tumblers click, the vault of energy flies open, and suddenly it's Christmas Day.

A few years ago Cohen and his colleague Gregory Walton tried to start their own motivation explosion. They took a group of Yale freshmen and gave them an innocuous mix of magazine articles to read. Included was a one-page first-person account of a student named Nathan Jackson. Jackson's story was brief: he had arrived at college not knowing what career to pursue, had developed a liking for math, and now had a happy career in a math department of a university. The story included a small biographical profile about Jackson: hometown, education, birth date. The article, like the others,

was utterly forgettable—except for one microscopic detail: for half the students, Nathan Jackson's birth date was altered to exactly match the students' own. After they read the article, Cohen and Walton tested the students' attitudes toward math and measured their persistence; i.e., how long they were willing to work on an insoluble math problem.

When the results came in, Cohen and Walton found that the birthday-matched group had significantly more positive attitudes about math, and persisted a whopping 65 percent longer on the insoluble problem. What's more, those students did not feel any conscious change. The coincidence of the birthday, in Walton's phrase, "got underneath them."

"They were in a room by themselves taking the test. The door was shut; they were socially isolated; and yet [the birthday connection] had meaning for them," Walton said. "They weren't alone. The love and interest in math became part of them. They had no idea why. Suddenly it was *us* doing this, not just *me*.

"Our suspicion is that these events are powerful because they are small and indirect," Walton continued. "If we had told them this same information directly, if they had noticed it, it would have had less effect. It's not strategic; we don't think of it as being useful because we're not even thinking of it at all. It's automatic."

If the conceptual model for deep practice is a circuit being slowly wrapped with insulation, then the model for ignition is a hair trigger connected to a high-voltage power plant. Accordingly, ignition is determined by simple if/then propositions, with the *then* part always the same—*better get busy*. See someone you want to become? *Better get busy*. Want to catch up with a desirable group? *Better get busy*. Bargh and

his colleagues have performed a number of similarly magical-seeming experiments, where they use tiny environmental cues (such as inspirational words hidden in a crossword puzzle) to manipulate motivation and effort among unknowing experimental subjects. They possess piles of supportive data to explain why this is so effective—for instance, the fact that the unconscious mind is able to process 11 million pieces of information per second, while the conscious mind can manage a mere 40. This disproportion points to the efficiency and necessity of relegating mental activities to the unconscious—and helps us to understand why appeals to the unconscious can be so effective.

One of the better demonstrations of the power of primal cues, however, came about by accident. In the 1970s, a clinical psychologist from Long Island named Martin Eisenstadt tracked the parental histories of every person who was eminent enough to have earned a half-page-long entry in the *Encyclopaedia Britannica*—a roster of 573 subjects, spanning Homer to John F. Kennedy, a rich mix of writers, scientists, political leaders, composers, soldiers, philosophers, and explorers. Eisenstadt wasn't interested in motivation per se; in fact, he was testing a theory he'd developed relating genius and psychosis to the loss of a parent or parents at an early age. But he wound up constructing an elegant demonstration of the relationship between motivation and primal cues.

Within this accomplished group the parental-loss club turned out to be standing room only. Political leaders who lost a parent at an early age include Julius Caesar (father, 15), Napoleon (father, 15), fifteen British prime ministers, Washington (father, 11), Jefferson (father, 14), Lincoln (mother, 9), Lenin (father, 15), Hitler (father, 13), Gandhi (father, 15),

Stalin (father, 11), and (we reflexively paste in) Bill Clinton (father, infant). Scientists and artists on the list include Copernicus (father, 10), Newton (father, before birth), Darwin (mother, 8), Dante (mother, 6), Michelangelo (mother, 6), Bach (mother and father, 9), Handel (father, 11), Dostoyevsky (mother, 15), Keats (father, 8; mother, 14), Byron (father, 3), Emerson (father, 8), Melville (father, 12), Wordsworth (mother, 7; father, 13), Nietzsche (father, 4), Charlotte, Emily, and Anne Brontë (mother at 5, 3, and 1, respectively), Woolf (mother, 13), and Twain (father, 11). On average, the eminent group lost their first parent at an average age of 13.9, compared with 19.6 for a control group. All in all, it's a list deep and broad enough to justify the question posed by a 1978 French study: *do orphans rule the world*?*

The genetic explanation for world-class achievement is useless in this case, because the people on this list are linked by

* For the sake of updating Eisenstadt, here's a partial list of show business stars who lost a parent before the age of eighteen: **Comedy**: Steve Allen (1, father), Tim Allen (11, father), Lucille Ball (3, father), Mel Brooks (2, father), Drew Carey (8, father), Charlie Chaplin (12, father), Stephen Colbert (10, father), Billy Crystal (15, father), Eric Idle (6, father), Eddie Izzard (6, father), Bernie Mac (16, mother), Eddie Murphy (8, father), Rosie O'Donnell (11, mother), Molly Shannon (4, mother), Martin Short (17, mother), Red Skelton (infant, father), Tom and Dick Smothers (7 and 8, father), Tracey Ullman (6, father), Fred Willard (11, father). **Music**: Louis Armstrong, Tony Bennett, 50 Cent, Aretha Franklin, Bob Geldof, Robert Goulet, Isaac Hayes, Jimi Hendrix, Madonna, Charlie Parker. The ignition effect seems to be present in the Beatles (Paul McCartney, 14, mother, and John Lennon, 17, mother) and U2 (Bono, 14, mother, and Larry Mullen, 15, mother). **Movies**: Cate Blanchett, Orlando Bloom, Mia Farrow, Jane Fonda, Daniel Day-Lewis, Sir Ian McKellen, Robert Redford, Julia Roberts, Martin Sheen, Barbra Streisand, Charlize Theron, Billy Bob Thornton, Benicio del Toro, James Woods. This list doesn't, of course, include those who lost contact with a parent as the result of divorce, illness, or some other factor, a list that would fill a book in itself. One of the clearest expressions of the way loss causes ignition comes from composer-producer Quincy Jones, whose mother suffered from schizophrenia. "I never felt like I had a mother," he said. "I used to sit in the closet and say, 'If I don't have a mother, I don't need one. I'm going to make music and creativity my mother.' It never let me down. Never."

shared life events that have nothing to do with chromosomes. But when we look at parental loss as a signal hitting a motivational trigger, the connection becomes clearer. Losing a parent is a primal cue: *you are not safe*. You don't have to be a psychologist to appreciate the massive outpouring of energy that can be created by a lack of safety; nor do you have to be a Darwinian theorist to appreciate how such a response might have evolved. This signal can alter the child's relationship to the world, redefine his identity, and energize and orient his mind to address the dangers and possibilities of life—a response Eisenstadt summed up as "a springboard of immense compensatory energy." Or as Dean Keith Simonton wrote of parental loss in *Origins of Genius*, "[S]uch adverse events nurture the development of a personality robust enough to overcome the many obstacles and frustrations standing in the path of achievement."

If we take it one step further and presume that many of the world-class scientists, artists, and writers on Eisenstadt's list accomplished the requisite ten thousand hours of deep practice, the mechanism of their ignition becomes more apparent. Losing a parent at a young age was not what gave them talent; rather, it was the primal cue—*you are not safe*—that, by tripping the ancient self-preserving evolutionary switch, provided energy for their efforts, so that they built their various talents over the course of years, step by step, wrap by wrap. Seen this way, the superstars on Eisenstadt's list are not uniquely gifted exceptions, but rather the logical extensions of the same universal principles that govern all of us: (1) talent requires deep practice; (2) deep practice requires vast amounts of energy; (3) primal cues trigger huge outpourings of energy. And as George Bartzokis might point out, the eminent people, on average, received this signal as

young teens, during the brain's key development period, in which information-processing pathways are particularly receptive to myelin.*

The second example of ignition originates a little closer to home. In our family of six, our daughter Zoe is the youngest and, for her age (seven), the speediest. Her foot speed seems perfectly natural, and yet since I started learning about myelin, I began to wonder how much of Zoe's foot speed is innate, and how much of it stems from the combination of practice and motivation she gets from being the youngest?

I undertook a highly unscientific survey of my friends' children. The pattern seemed to hold: the youngest kids were frequently the fastest runners. It became more interesting when I broadened the sample group slightly. Here are the birth-order ranks of the world-record progression in the 100-meter dash, with the most recently set world record first, the previous world record second, and so on.

1. Usain Bolt (second of three children)
2. Asafa Powell (sixth of six)
3. Justin Gatlin (fourth of four)
4. Maurice Greene (fourth of four)
5. Donovan Bailey (third of three)
6. Leroy Burrell (fourth of five)
7. Carl Lewis (third of four)

* Of course, a parent's death or absence doesn't always lead to talent or achievement. The same event can be debilitating—hence Eisenstadt's link to psychosis—or, in cases where the deceased parent was abusive, an improvement in the child's life. The point of Eisenstadt's list is proportion: that people who lose a parent at a young age, on the whole, have more opportunity, means, and motive to use that immense compensatory energy to grow myelin and skill. Whether they use it to become John Lennon or John Wilkes Booth is a matter of fate and circumstance.

at about the same time and happened to be taught by the same instructor, David Burnett of the Harlem School for the Arts. They also make a useful comparison because one of the programs succeeded and the other did not.

To predict beforehand which program would succeed might seem easy. Wadleigh enjoyed numerous advantages over PS 233, including an arts-focused curriculum, parents who had, by enrolling their child, expressed a belief in the value of art education, students who presumably had a real interest in music, a brand-new auditorium, and a budget that permitted the school to purchase violins for every student who wanted to play. PS 233, on the other hand, was an archetypal urban public school. The students had no apparent inclination toward violins or arts in general. What's more, the foundation that funded the program could afford only fifty violins, most of which were too small, forcing Burnett to hold an Opus 118–style lottery to determine who got in. As the programs got under way, the result seemed preordained: Wadleigh would succeed, and PS 233 would fail.

And yet, a year later, it was the Wadleigh program that was sputtering and the PS 233 program that was going strong. The Wadleigh program was beset with discipline problems, and the PS 233 group was well behaved. The Wadleigh students teased the good players and discouraged them from continuing, and the PS 233 students did their practice and got steadily better. When asked to explain, Burnett can only say that the Wadleigh program "just failed to take off."

Why? I believe part of the answer can be found in *Small Wonders*, the documentary film on Opus 118. Early in the film, its makers capture the scene of Tzavaras visiting a first-grade class to perform music and tell them about a group to which they might someday belong—if they are fortunate. As she ex-

plains how the lottery works, the kids bounce up and down nervously; they clamor for applications to take home to their parents. A week or two goes by; a sense of anticipation builds. Tzavaras returns to the classroom carrying a stack of winning applications. Then, to rapt silence, she proceeds to announce the winners' names. On hearing their names, the kids react as if they'd just received an electric shock. They dance. They scream. They flail their arms in joy. They race home to tell their parents the thrilling news: they won! They don't know the A string from the A train, but it doesn't matter in the least. Like the long-term-commitment group in Gary McPherson's study, they are ignited, and it makes all the difference.

If talent is a gift sprinkled randomly through the world's children, we would naturally expect Wadleigh's program to be the one to succeed. But if talent is a process that can be ignited by primal cues, then the reason for PS 233's success is clear. The genetic potential in both schools was the same; the teaching was the same; the difference was, the students at Wadleigh received the motivational equivalent of a gentle nudge, while the PS 233 students were ignited by primal cues of scarcity and belonging. In each case the kids reacted the same way any of us would.

Let's return to the question that started the previous section. Why was Tom Sawyer able to persuade Ben to help him whitewash the fence? The answer is that Tom flung primal cues at Ben with the speed and accuracy of a circus knife-thrower. In the space of a few sentences, he managed to hit bull's-eyes of exclusivity ("All I know is, it suits Tom Sawyer . . . I reckon there ain't one boy in a thousand . . .") and scarcity ("Does a boy get a chance to whitewash a fence every day? . . . Aunt Polly's awful particular about this fence"). His gestures and body language echoed the same messages: he

"contemplated the boy a bit," and "stepped back to note the effect—added a touch here and there—criticized the effect again," as though engaged in a work of the greatest importance. If Tom had only sent one or two of these signals, or if they'd been spaced over the course of a leisurely hour, his cues would have had no effect; Ben's trigger would have remained untouched. But the rich combination of cues, peppering Ben's ignition switch one after another, succeeded in cracking open his vault of motivational energy.

We usually regard this passage as an example of a sophisticated con job: clever Tom Sawyer hoodwinking gullible yokels into doing unsavory work. Primal-cue psychology allows us to see it in a slightly different way. Tom's signals worked not because Ben was some thoughtless dupe. (Indeed, a thoughtless dupe would have shrugged and trudged on to the swimming hole.) Tom's signals worked because Ben, as Twain wrote, was "watching every move" and was "absorbed." Ben's was the response of an attentive kid who saw in Tom Sawyer's work something attractive and who was ignited—not unlike the response of attentive kids in South Korea or Russia, or of Zoe watching her siblings run ahead of her. Ignition doesn't follow normal rules because it's not designed to follow rules. It's designed only to work, to give us energy for whatever tasks we choose—or, as we'll see next, for whatever tasks fate chooses for us.