







# GRIT

THE POWER *of* PASSION  
*and* PERSEVERANCE

ANGELA  
DUCKWORTH

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*For Jason*



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## PREFACE

Growing up, I heard the word *genius* a lot.

It was always my dad who brought it up. He liked to say, apropos of nothing at all, “You know, you’re no genius!” This pronouncement might come in the middle of dinner, during a commercial break for *The Love Boat*, or after he flopped down on the couch with the *Wall Street Journal*.

I don’t remember how I responded. Maybe I pretended not to hear.

My dad’s thoughts turned frequently to genius, talent, and who had more than whom. He was deeply concerned with how smart he was. He was deeply concerned with how smart his family was.

I wasn’t the only problem. My dad didn’t think my brother and sister were geniuses, either. By his yardstick, none of us measured up to Einstein. Apparently, this was a great disappointment. Dad worried that this intellectual handicap would limit what we’d eventually achieve in life.

Two years ago, I was fortunate enough to be awarded a MacArthur Fellowship, sometimes called the “genius grant.” You don’t apply for the MacArthur. You don’t ask your friends or colleagues to nominate you. Instead, a secret committee that includes the top people in your field decides you’re doing important and creative work.

When I received the unexpected call telling me the news, my first

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reaction was one of gratitude and amazement. Then my thoughts turned to my dad and his offhand diagnoses of my intellectual potential. He wasn't wrong; I didn't win the MacArthur because I'm leagues smarter than my fellow psychologists. Instead, he had the right answer ("No, she's not") to the wrong question ("Is she a genius?").

There was about a month between the MacArthur call and its official announcement. Apart from my husband, I wasn't permitted to tell anyone. That gave me time to ponder the irony of the situation. A girl who is told repeatedly that she's no genius ends up winning an award for being one. The award goes to her because she has discovered that what we eventually accomplish may depend more on our passion and perseverance than on our innate talent. She has by then amassed degrees from some pretty tough schools, but in the third grade, she didn't test high enough for the gifted and talented program. Her parents are Chinese immigrants, but she didn't get lectured on the salvation of hard work. Against stereotype, she can't play a note of piano or violin.

The morning the MacArthur was announced, I walked over to my parents' apartment. My mom and dad had already heard the news, and so had several "aunties," who were calling in rapid succession to offer congratulations. Finally, when the phone stopped ringing, my dad turned to me and said, "I'm proud of you."

I had so much to say in response, but instead I just said, "Thanks, Dad."

There was no sense rehashing the past. I knew that, in fact, he *was* proud of me.

Still, part of me wanted to travel back in time to when I was a young girl. I'd tell him what I know now.

I would say, "Dad, you say I'm no genius. I won't argue with that. You know plenty of people who are smarter than I am." I can imagine his head nodding in sober agreement.

"But let me tell you something. I'm going to grow up to love my

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work as much as you love yours. I won't just have a job; I'll have a calling. I'll challenge myself every day. When I get knocked down, I'll get back up. I may not be the smartest person in the room, but I'll strive to be the grittiest."

And if he was still listening: "In the long run, Dad, grit may matter more than talent."

All these years later, I have the scientific evidence to prove my point. What's more, I know that grit is mutable, not fixed, and I have insights from research about how to grow it.

This book summarizes everything I've learned about grit.

When I finished writing it, I went to visit my dad. Chapter by chapter, over the course of days, I read him every line. He's been battling Parkinson's disease for the last decade or so, and I'm not entirely sure how much he understood. Still, he seemed to be listening intently, and when I was done, he looked at me. After what felt like an eternity, he nodded once. And then he smiled.



 *Part I*

# WHAT GRIT IS AND WHY IT MATTERS



## Chapter 1

# SHOWING UP

By the time you set foot on the campus of the United States Military Academy at West Point, you've earned it.

The admissions process for West Point is at least as rigorous as for the most selective universities. Top scores on the SAT or ACT and outstanding high school grades are a must. But when you apply to Harvard, you don't need to start your application in the eleventh grade, and you don't need to secure a nomination from a member of Congress, a senator, or the vice president of the United States. You don't, for that matter, have to get superlative marks in a fitness assessment that includes running, push-ups, sit-ups, and pull-ups.

Each year, in their junior year of high school, more than 14,000 applicants begin the admissions process. This pool is winnowed to just 4,000 who succeed in getting the required nomination. Slightly more than half of those applicants—about 2,500—meet West Point's rigorous academic and physical standards, and from that select group just 1,200 are admitted and enrolled. Nearly all the men and women who come to West Point were varsity athletes; most were team captains.

And yet, one in five cadets will drop out before graduation. What's more remarkable is that, historically, a substantial fraction of dropouts

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leave in their very first summer, during an intensive seven-week training program named, even in official literature, Beast Barracks. Or, for short, just Beast.

Who spends two years trying to get into a place and then drops out in the first two months?

Then again, these are no ordinary months. Beast is described in the West Point handbook for new cadets as “the most physically and emotionally demanding part of your four years at West Point . . . designed to help you make the transition from new cadet to Soldier.”

### A Typical Day at Beast Barracks

5:00 a.m.	Wake-up
5:30 a.m.	Reveille Formation
5:30 to 6:55 a.m.	Physical Training
6:55 to 7:25 a.m.	Personal Maintenance
7:30 to 8:15 a.m.	Breakfast
8:30 to 12:45 p.m.	Training/Classes
1:00 to 1:45 p.m.	Lunch
2:00 to 3:45 p.m.	Training/Classes
4:00 to 5:30 p.m.	Organized Athletics
5:30 to 5:55 p.m.	Personal Maintenance
6:00 to 6:45 p.m.	Dinner
7:00 to 9:00 p.m.	Training/Classes
9:00 to 10:00 p.m.	Commander's Time
10:00 p.m.	Taps

The day begins at 5:00 a.m. By 5:30, cadets are in formation, standing at attention, honoring the raising of the United States flag. Then follows a hard workout—running or calisthenics—followed by a non-stop rotation of marching in formation, classroom instruction, weapons



training, and athletics. Lights out, to a melancholy bugle song called “Taps,” occurs at 10:00 p.m. And on the next day the routine starts over again. Oh, and there are no weekends, no breaks other than meals, and virtually no contact with family and friends outside of West Point.

One cadet’s description of Beast: “You are challenged in a variety of ways in every developmental area—mentally, physically, militarily, and socially. The system will find your weaknesses, but that’s the point—West Point toughens you.”

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So, who makes it through Beast?

It was 2004 and my second year of graduate school in psychology when I set about answering that question, but for decades, the U.S. Army has been asking the same thing. In fact, it was in 1955—almost fifty years before I began working on this puzzle—that a young psychologist named Jerry Kagan was drafted into the army, ordered to report to West Point, and assigned to test new cadets for the purpose of identifying who would stay and who would leave. As fate would have it, Jerry was not only the first psychologist to study dropping out at West Point, he was also the first psychologist I met in college. I ended up working part-time in his lab for two years.

Jerry described early efforts to separate the wheat from the chaff at West Point as dramatically unsuccessful. He recalled in particular spending hundreds of hours showing cadets cards printed with pictures and asking the young men to make up stories to fit them. This test was meant to unearth deep-seated, unconscious motives, and the general idea was that cadets who visualized noble deeds and courageous accomplishments should be the ones who would graduate instead of dropping out. Like a lot of ideas that sound good in principle, this one didn’t work so well in practice. The stories the cadets told were colorful and fun to listen to, but they had absolutely nothing to do with decisions the cadets made in their actual lives.

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Since then, several more generations of psychologists devoted themselves to the attrition issue, but not one researcher could say with much certainty why some of the most promising cadets routinely quit when their training had just begun.

Soon after learning about Beast, I found my way to the office of Mike Matthews, a military psychologist who's been a West Point faculty member for years. Mike explained that the West Point admissions process successfully identified men and women who had the potential to thrive there. In particular, admissions staff calculate for each applicant something called the Whole Candidate Score, a weighted average of SAT or ACT exam scores, high school rank adjusted for the number of students in the applicant's graduating class, expert appraisals of leadership potential, and performance on objective measures of physical fitness.

You can think of the Whole Candidate Score as West Point's best guess at how much talent applicants have for the diverse rigors of its four-year program. In other words, it's an estimate of how easily cadets will master the many skills required of a military leader.

The Whole Candidate Score is the single most important factor in West Point admissions, and yet it *didn't* reliably predict who would make it through Beast. In fact, cadets with the highest Whole Candidate Scores were just as likely to drop out as those with the lowest. And this was why Mike's door was open to me.

From his own experience joining the air force as a young man, Mike had a clue to the riddle. While the rigors of his induction weren't quite as harrowing as those of West Point, there were notable similarities. The most important were challenges that exceeded current skills. For the first time in their lives, Mike and the other recruits were being asked, on an hourly basis, to do things they couldn't yet do. "Within two weeks," Mike recalls, "I was tired, lonely, frustrated, and ready to quit—as were all of my classmates."

Some did quit, but Mike did not.

What struck Mike was that rising to the occasion had almost nothing to do with talent. Those who dropped out of training rarely did so from lack of ability. Rather, what mattered, Mike said, was a “never give up” attitude.

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Around that time, it wasn’t just Mike Matthews who was talking to me about this kind of hang-in-there posture toward challenge. As a graduate student just beginning to probe the psychology of success, I was interviewing leaders in business, art, athletics, journalism, academia, medicine, and law: *Who are the people at the very top of your field? What are they like? What do you think makes them special?*

Some of the characteristics that emerged in these interviews were very field-specific. For instance, more than one businessperson mentioned an appetite for taking financial risks: “You’ve got to be able to make calculated decisions about millions of dollars and still go to sleep at night.” But this seemed entirely beside the point for artists, who instead mentioned a drive to create: “I like making stuff. I don’t know why, but I do.” In contrast, athletes mentioned a different kind of motivation, one driven by the thrill of victory: “Winners love to go head-to-head with other people. Winners hate losing.”

In addition to these particulars, there emerged certain commonalities, and they were what interested me most. No matter the field, the most successful people were lucky and talented. I’d heard that before, and I didn’t doubt it.

But the story of success didn’t end there. Many of the people I talked to could also recount tales of rising stars who, to everyone’s surprise, dropped out or lost interest before they could realize their potential.

Apparently, it was critically important—and not at all easy—to keep going after failure: “Some people are great when things are going well, but they fall apart when things aren’t.” High achievers described

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in these interviews really stuck it out: “This one guy, he wasn’t actually the best writer at the beginning. I mean, we used to read his stories and have a laugh because the writing was so, you know, clumsy and melodramatic. But he got better and better, and last year he won a Guggenheim.” And they were constantly driven to improve: “She’s never satisfied. You’d think she would be, by now, but she’s her own harshest critic.” The highly accomplished were paragons of perseverance.

Why were the highly accomplished so dogged in their pursuits? For most, there was no realistic expectation of ever catching up to their ambitions. In their own eyes, they were never good enough. They were the opposite of complacent. And yet, in a very real sense, they were satisfied being unsatisfied. Each was chasing something of unparalleled interest and importance, and it was the chase—as much as the capture—that was gratifying. Even if some of the things they had to do were boring, or frustrating, or even painful, they wouldn’t dream of giving up. Their passion was enduring.

In sum, no matter the domain, the highly successful had a kind of ferocious determination that played out in two ways. First, these exemplars were unusually resilient and hardworking. Second, they knew in a very, very deep way what it was they wanted. They not only had determination, they had *direction*.

It was this combination of passion and perseverance that made high achievers special. In a word, they had grit.

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For me, the question became: How do you measure something so intangible? Something that decades of military psychologists hadn’t been able to quantify? Something those very successful people I’d interviewed said they could recognize on sight, but couldn’t think of how to directly test for?

I sat down and looked over my interview notes. And I started writ-

ing questions that captured, sometimes verbatim, descriptions of what it means to have grit.

Half of the questions were about perseverance. They asked how much you agree with statements like “I have overcome setbacks to conquer an important challenge” and “I finish whatever I begin.”

The other half of the questions were about passion. They asked whether your “interests change from year to year” and the extent to which you “have been obsessed with a certain idea or project for a short time but later lost interest.”

What emerged was the Grit Scale—a test that, when taken honestly, measures the extent to which you approach life with grit.

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In July 2004, on the second day of Beast, 1,218 West Point cadets sat down to take the Grit Scale.

The day before, cadets had said good-bye to their moms and dads (a farewell for which West Point allocates exactly ninety seconds), gotten their heads shaved (just the men), changed out of civilian clothing and into the famous gray and white West Point uniform, and received their footlockers, helmets, and other gear. Though they may have mistakenly thought they already knew how, they were instructed by a fourth-year cadet in the proper way to stand in line (“Step up to my line! Not on my line, not over my line, not behind my line. Step up *to* my line!”).

Initially, I looked to see how grit scores lined up with aptitude. Guess what? Grit scores bore absolutely no relationship to the Whole Candidate Scores that had been so painstakingly calculated during the admissions process. In other words, how talented a cadet was said nothing about their grit, and vice versa.

The separation of grit from talent was consistent with Mike’s observations of air force training, but when I first stumbled onto this finding it came as a real surprise. After all, why *shouldn’t* the talented endure? Logically, the talented should stick around and try hard, because when

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they do, they do phenomenally well. At West Point, for example, among cadets who ultimately make it through Beast, the Whole Candidate Score is a marvelous predictor of every metric West Point tracks. It not only predicts academic grades, but military and physical fitness marks as well.

So it's surprising, really, that talent is no guarantee of grit. In this book, we'll explore the reasons why.

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By the last day of Beast, seventy-one cadets had dropped out.

Grit turned out to be an astoundingly reliable predictor of who made it through and who did not.

The next year, I returned to West Point to run the same study. This time, sixty-two cadets dropped out of Beast, and again grit predicted who would stay.

In contrast, stayers and leavers had indistinguishable Whole Candidate Scores. I looked a little closer at the individual components that make up the score. Again, no differences.

So, what matters for making it through Beast?

Not your SAT scores, not your high school rank, not your leadership experience, not your athletic ability.

Not your Whole Candidate Score.

What matters is grit.

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Does grit matter beyond West Point? To find out, I looked for other situations so challenging that a lot of people drop out. I wanted to know whether it was just the rigors of Beast that demanded grit, or whether, in general, grit helped people stick to their commitments.

The next arena where I tested grit's power was sales, a profession in which daily, if not hourly, rejection is par for the course. I asked hundreds of men and women employed at the same vacation time-share

company to answer a battery of personality questionnaires, including the Grit Scale. Six months later, I revisited the company, by which time 55 percent of the salespeople were gone. Grit predicted who stayed and who left. Moreover, no other commonly measured personality trait—including extroversion, emotional stability, and conscientiousness—was as effective as grit in predicting job retention.

Around the same time, I received a call from the Chicago Public Schools. Like the psychologists at West Point, researchers there were eager to learn more about the students who would successfully earn their high school diplomas. That spring, thousands of high school juniors completed an abbreviated Grit Scale, along with a battery of other questionnaires. More than a year later, 12 percent of those students failed to graduate. Students who graduated on schedule were grittier, and grit was a more powerful predictor of graduation than how much students cared about school, how conscientious they were about their studies, and even how safe they felt at school.

Likewise, in two large American samples, I found that grittier adults were more likely to get further in their formal schooling. Adults who'd earned an MBA, PhD, MD, JD, or another graduate degree were grittier than those who'd only graduated from four-year colleges, who were in turn grittier than those who'd accumulated some college credits but no degree. Interestingly, adults who'd successfully earned degrees from two-year colleges scored slightly higher than graduates of four-year colleges. This puzzled me at first, but I soon learned that the dropout rates at community colleges can be as high as 80 percent. Those who defy the odds are especially gritty.

In parallel, I started a partnership with the Army Special Operations Forces, better known as the Green Berets. These are among the army's best-trained soldiers, assigned some of the toughest and most dangerous missions. Training for the Green Berets is a grueling, multistage affair. The stage I studied comes *after* nine weeks of boot camp, four weeks of infantry training, three weeks of airborne school,

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and four weeks of a preparation course focused on land navigation. All these preliminary training experiences are very, very hard, and at every stage there are men who don't make it through. But the Special Forces Selection Course is even harder. In the words of its commanding general, James Parker, this is "where we decide who will and who will not" enter the final stages of Green Beret training.

The Selection Course makes Beast Barracks look like summer vacation. Starting before dawn, trainees go full-throttle until nine in the evening. In addition to daytime and nighttime navigation exercises, there are four- and six-mile runs and marches, sometimes under a sixty-five-pound load, and attempts at an obstacle course informally known as "Nasty Nick," which includes crawling through water under barbed wire, walking on elevated logs, negotiating cargo nets, and swinging from horizontal ladders.

Just getting to the Selection Course is an accomplishment, but even so, 42 percent of the candidates I studied voluntarily withdrew before it was over. So what distinguished the men who made it through? Grit.

What else, other than grit, predicts success in the military, education, and business? In sales, I found that prior experience helps—novices are less likely to keep their jobs than those with experience. In the Chicago public school system, a supportive teacher made it more likely that students would graduate. And for aspiring Green Berets, baseline physical fitness at the start of training is essential.

But in each of these domains, when you compare people matched on these characteristics, grit still predicts success. Regardless of specific attributes and advantages that help someone succeed in each of these diverse domains of challenge, grit matters in all of them.

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The year I started graduate school, the documentary *Spellbound* was released. The film follows three boys and five girls as they prepare for and compete in the finals of the Scripps National Spelling Bee.



To get to the finals—an adrenaline-filled three-day affair staged annually in Washington, DC, and broadcast live on ESPN, which normally focuses its programming on high-stakes sports matchups—these kids must first “outspell” thousands of other students from hundreds of schools across the country. This means spelling increasingly obscure words without a single error, in round after round, first besting all the other students in the contestant’s classroom, then in their grade, school, district, and region.

*Spellbound* got me wondering: To what extent is flawlessly spelling words like *schottische* and *cymotrichous* a matter of precocious verbal talent, and to what extent is grit at play?

I called the Bee’s executive director, a dynamic woman (and former champion speller herself) named Paige Kimble. Kimble was as curious as I was to learn more about the psychological makeup of winners. She agreed to send out questionnaires to all 273 spellers just as soon as they qualified for the finals, which would take place several months later. In return for the princely reward of a \$25 gift card, about two-thirds of the spellers returned the questionnaires to my lab. The oldest respondent was fifteen years old, the absolute age limit according to competition rules, and the youngest was just seven.

In addition to completing the Grit Scale, spellers reported how much time they devoted to spelling practice. On average, they practiced more than an hour a day on weekdays and more than two hours a day on weekends. But there was a lot of variation around these averages: some spellers were hardly studying at all, and some were studying as much as nine hours on a given Saturday!

Separately, I contacted a subsample of spellers and administered a verbal intelligence test. As a group, the spellers demonstrated unusual verbal ability. But there was a fairly wide range of scores, with some kids scoring at the verbal prodigy level and others “average” for their age.

When ESPN aired the final rounds of the competition, I watched

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all the way through to the concluding suspenseful moments when, at last, thirteen-year-old Anurag Kashyap correctly spelled A-P-P-O-G-G-I-A-T-U-R-A (a musical term for a kind of grace note) to win the championship.

Then, with the final rankings in hand, I analyzed my data.

Here's what I found: measurements of grit taken months before the final competition predicted how well spellers would eventually perform. Put simply, grittier kids went further in competition. How did they do it? By studying many more hours and, also, by competing in more spelling bees.

What about talent? Verbal intelligence also predicted getting further in competition. But there was no relationship at all between verbal IQ and grit. What's more, verbally talented spellers did not study any more than less able spellers, nor did they have a longer track record of competition.

The separation of grit and talent emerged again in a separate study I ran on Ivy League undergraduates. There, SAT scores and grit were, in fact, inversely correlated. Students in that select sample who had higher SAT scores were, on average, just slightly less gritty than their peers. Putting together this finding with the other data I'd collected, I came to a fundamental insight that would guide my future work: *Our potential is one thing. What we do with it is quite another.*

## Chapter 2

# DISTRACTED BY TALENT

Before I was a psychologist, I was a teacher. It was in the classroom—years before I'd even heard of Beast—that I began to see that talent is not all there is to achievement.

I was twenty-seven when I started teaching full-time. The month before, I'd quit my job at McKinsey, a global management consulting firm whose New York City office occupied several floors of a blue-glass skyscraper in midtown. My colleagues were a bit bewildered by my decision. Why leave a company that most of my peers were dying to join—one regularly singled out as one of the world's smartest and most influential?

Acquaintances assumed I was trading eighty-hour workweeks for a more relaxed lifestyle, but of course, anyone who's been a teacher knows that there's no harder job in the world. So why leave? In some ways, it was consulting, not teaching, that was the detour. Throughout college, I'd tutored and mentored kids from the local public schools. After graduation, I started a tuition-free academic enrichment program and ran it for two years. Then I went to Oxford and completed a degree in neuroscience, studying the neural mechanisms of dyslexia. So when I started teaching, I felt like I was back on track.

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Even so, the transition was abrupt. In a single week, my salary went from *Seriously? I actually get paid this much?* to *Wow! How the heck do teachers in this city make ends meet?* Dinner was now a sandwich eaten hurriedly while grading papers, not sushi ordered in at the client's expense. I commuted to work on the same subway line but stayed on the train past midtown, getting off six stops farther south: the Lower East Side. Instead of pumps, pearls, and a tailored suit, I wore sensible shoes I could stand in all day and dresses I wouldn't mind getting covered in chalk.

My students were twelve and thirteen years old. Most lived in the housing projects clustered between Avenues A and D. This was before the neighborhood sprouted hip cafés on every corner. The fall I started teaching there, our school was picked for the set of a movie about a rough-and-tumble school in a distressed urban neighborhood. My job was to help my students learn seventh-grade math: fractions and decimals and the rudimentary building blocks of algebra and geometry.

Even that first week, it was obvious that some of my students picked up mathematical concepts more easily than their classmates. Teaching the most talented students in the class was a joy. They were, quite literally, “quick studies.” Without much prompting, they saw the underlying pattern in a series of math problems that less able students struggled to grasp. They'd watch me do a problem once on the board and say, “I get it!” and then work out the next one correctly on their own.

And yet, at the end of the first marking period, I was surprised to find that some of these very able students weren't doing as well as I'd expected. Some did very well, of course. But more than a few of my most talented students were earning lackluster grades or worse.

In contrast, several of the students who initially struggled were faring better than I'd expected. These “overachievers” would reliably come to class every day with everything they needed. Instead of playing around and looking out the window, they took notes and asked

questions. When they didn't get something the first time around, they tried again and again, sometimes coming for extra help during their lunch period or during afternoon electives. Their hard work showed in their grades.

Apparently, aptitude did *not* guarantee achievement. Talent for math was different from excelling in math class.

This came as a surprise. After all, conventional wisdom says that math is a subject in which the more talented students are expected to excel, leaving classmates who are simply “not math people” behind. To be honest, I began the school year with that very assumption. It seemed a sure bet that those for whom things came easily would continue to outpace their classmates. In fact, I expected that the achievement gap separating the naturals from the rest of the class would only widen over time.

*I'd been distracted by talent.*

Gradually, I began to ask myself hard questions. When I taught a lesson and the concept failed to gel, could it be that the struggling student needed to struggle just a bit longer? Could it be that I needed to find a different way to explain what I was trying to get across? Before jumping to the conclusion that talent was destiny, should I be considering the importance of effort? And, as a teacher, wasn't it my responsibility to figure out how to sustain effort—both the students' and my own—just a bit longer?

At the same time, I began to reflect on how smart even my weakest students sounded when they talked about things that genuinely interested them. These were conversations I found almost impossible to follow: discourses on basketball statistics, the lyrics to songs they really liked, and complicated plotlines about who was no longer speaking to whom and why. When I got to know my students better, I discovered that all of them had mastered any number of complicated ideas in their very complicated daily lives. Honestly, was getting  $x$  all by itself in an algebraic equation all that much harder?

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My students weren't equally talented. Still, when it came to learning seventh-grade math, could it be that if they and I mustered sufficient effort over time, they'd get to where they needed? Surely, I thought, they were all talented *enough*.

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Toward the end of the school year, my fiancé became my husband. For the sake of his own post-McKinsey career, we packed up and moved from New York to San Francisco. I found a new job teaching math at Lowell High School.

Compared to my Lower East Side classroom, Lowell was an alternate universe.

Tucked away in a perpetually foggy basin near the Pacific Ocean, Lowell is the only public high school in San Francisco that admits students on the basis of academic merit. The largest feeder to the University of California system, Lowell sends many of its graduates to the country's most selective universities.

If, like me, you were raised on the East Coast, you can think of Lowell as the Stuyvesant of San Francisco. Such imagery might bring to mind whiz kids who are leaps and bounds smarter than those who lack the top-notch test scores and grades to get in.

What I discovered was that Lowell students were distinguished more by their work ethic than by their intelligence. I once asked students in my homeroom how much they studied. The typical answer? Hours and hours. Not in a week, but in a single day.

Still, like at any other school, there was tremendous variation in how hard students worked and how well they performed.

Just as I'd found in New York, some of the students I expected to excel, because math came so easy to them, did worse than their classmates. On the other hand, some of my hardest workers were consistently my highest performers on tests and quizzes.

One of these very hard workers was David Luong.

David was in my freshman algebra class. There were two kinds of algebra classes at Lowell: the accelerated track led to Advanced Placement Calculus by senior year, and the regular track, which I was teaching, didn't. The students in my class hadn't scored high enough on Lowell's math placement exam to get into the accelerated track.

David didn't stand out at first. He was quiet and sat toward the back of the room. He didn't raise his hand a lot; he rarely volunteered to come to the board to solve problems.

But I soon noticed that every time I graded an assignment, David had turned in perfect work. He aced my quizzes and tests. When I marked one of his answers as incorrect, it was more often my error than his. And, wow, he was just so hungry to learn. In class, his attention was rapt. After class, he'd stay and ask, politely, for harder assignments.

I began to wonder what the heck this kid was doing in *my* class.

Once I understood how ridiculous the situation was, I marched David into the office of my department chair. It didn't take long to explain what was going on. Fortunately, the chair was a wise and wonderful teacher who placed a higher value on kids than on bureaucratic rules. She immediately started the paperwork to switch David out of my class and into the accelerated track.

My loss was the next teacher's gain. Of course, there were ups and downs, and not all of David's math grades were A's. "After I left your class, and switched into the more advanced one, I was a little behind," David later told me. "And the next year, math—it was geometry—continued to be hard. I didn't get an A. I got a B." In the next class, his first math test came back with a D.

"How did you deal with that?" I asked.

"I did feel bad—I did—but I didn't dwell on it. I knew it was done. I knew I had to focus on what to do next. So I went to my teacher and asked for help. I basically tried to figure out, you know, what I did wrong. What I needed to do differently."

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By senior year, David was taking the harder of Lowell's two honors calculus courses. That spring, he earned a perfect 5 out of 5 on the Advanced Placement exam.

After Lowell, David attended Swarthmore College, graduating with dual degrees in engineering and economics. I sat with his parents at his graduation, remembering the quiet student in the back of my classroom who ended up proving that aptitude tests can get a lot of things wrong.

Two years ago, David earned a PhD in mechanical engineering from UCLA. His dissertation was on optimal performance algorithms for the thermodynamic processes in truck engines. In English: David used math to help make engines more efficient. Today, he is an engineer at the Aerospace Corporation. Quite literally, the boy who was deemed "not ready" for harder, faster math classes is now a "rocket scientist."

During the next several years of teaching, I grew less and less convinced that talent was destiny and more and more intrigued by the returns generated by effort. Intent on plumbing the depths of that mystery, I eventually left teaching to become a psychologist.

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When I got to graduate school, I learned that psychologists have long wondered why some people succeed and others fail. Among the earliest was Francis Galton, who debated the topic with his half cousin, Charles Darwin.

By all accounts, Galton was a child prodigy. By four, he could read and write. By six, he knew Latin and long division and could recite passages from Shakespeare by heart. Learning came easy.

In 1869, Galton published his first scientific study on the origins of high achievement. After assembling lists of well-known figures in science, athletics, music, poetry, and law—among other domains—he gathered whatever biographical information he could. Outliers, Galton concluded, are remarkable in three ways: they demonstrate unusual



“ability” in combination with exceptional “zeal” and “the capacity for hard labor.”

After reading the first fifty pages of Galton’s book, Darwin wrote a letter to his cousin, expressing surprise that talent made the short list of essential qualities. “You have made a convert of an opponent in one sense,” wrote Darwin. “For I have always maintained that, excepting fools, men did not differ much in intellect, only in zeal and hard work; and I still think this is an *eminently* important difference.”

Of course, Darwin himself was the sort of high achiever Galton was trying to understand. Widely acknowledged as one of the most influential scientists in history, Darwin was the first to explain diversity in plant and animal species as a consequence of natural selection. Relatedly, Darwin was an astute observer, not only of flora and fauna, but also of people. In a sense, his vocation was to observe slight differences that lead, ultimately, to survival.

So it’s worth pausing to consider Darwin’s opinion on the determinants of achievement—that is, his belief that zeal and hard work are ultimately more important than intellectual ability.

On the whole, Darwin’s biographers don’t claim he possessed supernatural intelligence. He was certainly intelligent, but insights didn’t come to him in lightning flashes. He was, in a sense, a plodder. Darwin’s own autobiography corroborates this view: “I have no great quickness of apprehension [that] is so remarkable in some clever men,” he admits. “My power to follow a long and purely abstract train of thought is very limited.” He would not have made a very good mathematician, he thinks, nor a philosopher, and his memory was subpar, too: “So poor in one sense is my memory that I have never been able to remember for more than a few days a single date or a line of poetry.”

Perhaps Darwin was too humble. But he had no problem praising his power of observation and the assiduousness with which he applied it to understanding the laws of nature: “I think I am superior to the common run of men in noticing things which easily escape attention,

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and in observing them carefully. My industry has been nearly as great as it could have been in the observation and collection of facts. What is far more important, my love of natural science has been steady and ardent.”

One biographer describes Darwin as someone who kept thinking about the same questions long after others would move on to different—and no doubt easier—problems:

The normal response to being puzzled about something is to say, “I’ll think about this later,” and then, in effect, forget about it. With Darwin, one feels that he deliberately did not engage in this kind of semi-willful forgetting. He kept all the questions alive at the back of his mind, ready to be retrieved when a relevant bit of data presented itself.

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Forty years later, on the other side of the Atlantic, a Harvard psychologist named William James took up the question of how people differ in their pursuit of goals. Toward the end of his long and distinguished career, James wrote an essay on the topic for *Science* (then and now the premier academic journal, not just for psychology but for all of the natural and social sciences). It was titled “The Energies of Men.”

Reflecting on the achievements and failures of close friends and colleagues, and how the quality of his own efforts varied on his good and bad days, James observed:

Compared with what we ought to be, we are only half awake. Our fires are damped, our drafts are checked. We are making use of only a small part of our possible mental and physical resources.

There is a gap, James declared, between potential and its actualization. Without denying that our talents vary—one might be more musi-

cal than athletic or more entrepreneurial than artistic—James asserted that “the human individual lives usually far within his limits; he possesses powers of various sorts which he habitually fails to use. He energizes below his maximum, and he behaves below his optimum.”

“Of course there *are* limits,” James acknowledged. “The trees don’t grow into the sky.” But these outer boundaries of where we will, eventually, stop improving are simply irrelevant for the vast majority of us: “The plain fact remains that men the world over possess amounts of resource, which only very exceptional individuals push to their extremes of use.”

These words, written in 1907, are as true today as ever. So, why do we place such emphasis on talent? And why fixate on the extreme limits of what we might do when, in fact, most of us are at the very beginning of our journey, so far, far away from those outer bounds? And why do we assume that it is our talent, rather than our effort, that will decide where we end up in the very long run?

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For years, several national surveys have asked: Which is more important to success—talent or effort? Americans are about twice as likely to single out effort. The same is true when you ask Americans about athletic ability. And when asked, “If you were hiring a new employee, which of the following qualities would you think is most important?” Americans endorse “being hardworking” nearly five times as often as they endorse “intelligence.”

The results of these surveys are consistent with questionnaires that psychologist Chia-Jung Tsay has given to musical experts, who, when asked, reliably endorse effortful training as more important than natural talent. But when Chia probes attitudes more indirectly, she exposes a bias that tips in exactly the opposite direction: we love naturals.

In Chia’s experiments, professional musicians learn about two pianists whose biographies are identical in terms of prior achieve-

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ments. The subjects listen to a short clip of these individuals playing piano; unbeknownst to the listeners, a single pianist is, in fact, playing different parts of the same piece. What varies is that one pianist is described as a “natural” with early evidence of innate talent. The other is described as a “striver” with early evidence of high motivation and perseverance. In direct contradiction to their stated beliefs about the importance of effort versus talent, musicians judge the natural to be more likely to succeed and more hireable.

As a follow-up study, Chia tested whether this same inconsistency would be evident in a very different domain where hard work and striving are celebrated: entrepreneurship. She recruited hundreds of adults with varying levels of experience in business and randomly divided them into two groups. Half of her research subjects read the profile of a “striver” entrepreneur, described as having achieved success through hard work, effort, and experience. The other half read the profile of a “natural” entrepreneur, described as having achieved success through innate ability. All participants listened to the same audio recording of a business proposal and were told the recording was made by the specific entrepreneur they’d read about.

As in her study of musicians, Chia found that naturals were rated higher for likelihood of success and being hireable, and that their business proposals were judged superior in quality. In a related study, Chia found that when people were forced to choose between backing one of two entrepreneurs—one identified as a striver, the other a natural—they tended to favor the natural. In fact, the point of indifference between a striver and a natural was only reached when the striver had four more years of leadership experience and \$40,000 more in start-up capital.

Chia’s research pulls back the curtain on our ambivalence toward talent and effort. What we *say* we care about may not correspond with what—deep down—we actually *believe* to be more valuable. It’s a little like saying we don’t care at all about physical attractiveness in a roman-