Chapter 3

THE TRUTH ABOUT ABILITY AND ACCOMPLISHMENT

Try to picture Thomas Edison as vividly as you can. Think about where he is and what he's doing. Is he alone? I asked people, and they always said things like this:

"He's in his workshop surrounded by equipment. He's working on the phonograph, trying things. He succeeds! [Is he alone?] Yes, he's doing this stuff alone because he's the only one who knows what he's after."

"He's in New Jersey. He's standing in a white coat in a lab-type room. He's leaning over a lightbulb. Suddenly, it works! [Is he alone?] Yes. He's kind of a reclusive guy who likes to tinker on his own."

In truth, the record shows quite a different fellow, working in quite a different way.

Edison was not a loner. For the invention of the lightbulb, he had thirty assistants, including well-trained scientists, often working around the clock in a corporate-funded state-of-the-art laboratory!

It did not happen suddenly. The lightbulb has become the symbol of that single moment when the brilliant solution strikes, but there was no single moment of invention. In fact, the lightbulb was not one invention, but a whole network of time-consuming inventions each requiring one or more chemists, mathematicians, physicists, engineers, and glassblowers.

Edison was no naïve tinkerer or unworldly egghead. The "Wizard of Menlo Park" was a savvy entrepreneur, fully aware of the commercial potential of his inventions. He also knew how to cozy up to the press—sometimes beating others out as *the* inventor of something because he knew how to publicize himself.

Yes, he was a genius. But he was not always one. His biographer, Paul Israel, sifting through all the available information, thinks he was more or less a regular boy of his time and place. Young Tom was taken with experiments and mechanical things (perhaps more avidly than most), but machines and technology were part of the ordinary midwestern boy's experience.

What eventually set him apart was his mindset and drive. He never stopped being the curious, tinkering boy looking for new challenges. Long after other young men had taken up their roles in society, he rode the rails from city to city learning everything he could about telegraphy, and working his way up the ladder of telegraphers through nonstop self-education and invention. And later, much to the disappointment of his wives, his consuming love remained self-improvement and invention, but only in his field.

There are many myths about ability and achievement, especially about the lone, brilliant person suddenly producing amazing things.

Yet Darwin's masterwork, *The Origin of Species,* took years of teamwork in the field, hundreds of discussions with colleagues and mentors, several preliminary drafts, and half a lifetime of dedication before it reached fruition.

Mozart labored for more than ten years until he produced any work that we admire today. Before then, his compositions were not that original or interesting. Actually, they were often patched-together chunks taken from other composers.

This chapter is about the real ingredients in achievement. It's about why some people achieve less than expected and why some people achieve more.

MINDSET AND SCHOOL ACHIEVEMENT

Let's step down from the celestial realm of Mozart and Darwin and come back to earth to see how mindsets create achievement in real life. It's funny, but seeing one student blossom under the growth mindset has a greater impact on me than all the stories about Mozarts and Darwins. Maybe

because it’s more about you and me—about what’s happened to us and why we are where we are now. And about children and their potential.

Back on earth, we measured students’ mindsets as they made the transition to junior high school: Did they believe their intelligence was a fixed trait or something they could develop? Then we followed them for the next two years.

The transition to junior high is a time of great challenge for many students. The work gets much harder, the grading policies toughen up, the teaching becomes less personalized. And all this happens while students are coping with their new adolescent bodies and roles. Grades suffer, but not everyone’s grades suffer equally.

No. In our study, only the students with the fixed mindset showed the decline. The students with the growth mindset showed an *increase* in their grades over the two years.

When the two groups had entered junior high, their past records were indistinguishable. In the more benign environment of grade school, they’d earned the same grades and achievement test scores. Only when they hit the challenge of junior high did they begin to pull apart.

Here’s how students with the fixed mindset explained their poor grades. Many maligned their abilities: “I am the stupidest” or “I suck in math.” And many covered these feelings by blaming someone else: “[The math teacher] is a fat male slut…and [the English teacher] is a slob with a pink ass.” “Because the teacher is on crack.” These interesting analyses of the problem hardly provide a road map to future success.

With the threat of failure looming, students with the growth mindset instead mobilized their resources for learning. They told us that they, too, sometimes felt overwhelmed, but their response was to dig in and do what it takes. They were like George Danzig. Who?

George Danzig was a graduate student in math at Berkeley. One day, as usual, he rushed in late to his math class and quickly copied the two homework problems from the blackboard. When he later went to do them, he found them very difficult, and it took him several days of hard work to crack them open and solve them. They turned out not to be homework

problems at all. They were two famous math problems that had never been solved.

The Low-Effort Syndrome

Our students with the fixed mindset who were facing the hard transition saw it as a threat. It threatened to unmask their flaws and turn them from winners into losers. In fact, in the fixed mindset, adolescence is one big test. *Am I smart or dumb? Am I good-looking or ugly? Am I cool or nerdy? Am I a winner or a loser?* And in the fixed mindset, a loser is forever.

It's no wonder that many adolescents mobilize their resources, not for learning, but to protect their egos. And one of the main ways they do this (aside from providing vivid portraits of their teachers) is by not trying. This is when some of the brightest students, just like Nadja Salerno-Sonnenberg, simply stop working. In fact, students with the fixed mindset tell us that their main goal in school—aside from looking smart—is to exert as little effort as possible. They heartily agree with statements like this:

"In school my main goal is to do things as easily as possible so I don't have to work very hard."

This low-effort syndrome is often seen as a way that adolescents assert their independence from adults, but it is also a way that students with the fixed mindset protect themselves. They view the adults as saying, "Now we will measure you and see what you've got." And they are answering, "No you won't."

John Holt, the great educator, says that these are the games all human beings play when others are sitting in judgment of them. "The worst student we had, the worst I have ever encountered, was in his life outside the classroom as mature, intelligent, and interesting a person as anyone at the school. What went wrong?…Somewhere along the line, his intelligence became disconnected from his schooling."

For students with the growth mindset, it doesn't make sense to stop trying. For them, adolescence is a time of opportunity: a time to learn new subjects, a time to find out what they like and what they want to become in the future.

Later, I'll describe the project in which we taught junior high students the growth mindset. What I want to tell you now is how teaching them this mindset unleashed their effort. One day, we were introducing the growth mindset to a new group of students. All at once Jimmy—the most hard-core turned-off low-effort kid in the group—looked up with tears in his eyes and said, "You mean I don't have to be dumb?" From that day on, he worked. He started staying up late to do his homework, which he never used to bother with at all. He started handing in assignments early so he could get feedback and revise them. He now believed that working hard was not something that made you vulnerable, but something that made you smarter.

Finding Your Brain

A close friend of mine recently handed me something he'd written, a poem-story that reminded me of Jimmy and his unleashed effort. My friend's second-grade teacher, Mrs. Beer, had had each student draw and cut out a paper horse. She then lined up all the horses above the blackboard and delivered her growth-mindset message: "Your horse is only as fast as your brain. Every time you learn something, your horse will move ahead."

My friend wasn't so sure about the "brain" thing. His father had always told him, "You have too much mouth and too little brains for your own good." Plus, his horse seemed to just sit at the starting gate while "everyone else's brain joined the learning chase," especially the brains of Hank and Billy, the class geniuses, whose horses jumped way ahead of everyone else's. But my friend kept at it. To improve his skills, he kept reading the comics with his mother and he kept adding up the points when he played gin rummy with his grandmother.

> And soon my sleek stallion
> bolted forward like Whirlaway,
> and there was no one
> who was going to stop him.
> Over the weeks and months
> he flew forward overtaking

the others one by one.
In the late spring homestretch
Hank's and Billy's mounts were ahead
by just a few subtraction exercises, and
when the last bell of school rang,
my horse won—"By a nose!"
Then I knew I had a brain:
I had the horse to prove it.

—PAUL WORTMAN

Of course, learning shouldn't really be a race. But this race helped my friend discover his brain and connect it up to his schooling.

The College Transition

Another transition, another crisis. College is when all the students who were the brains in high school are thrown together. Like our graduate students, yesterday they were king of the hill, but today who are they?

Nowhere is the anxiety of being dethroned more palpable than in pre-med classes. In the last chapter, I mentioned our study of tense but hopeful undergraduates taking their first college chemistry course. This is the course that would give them—or deny them—entrée to the pre-med curriculum, and it's well known that students will go to almost any lengths to do well in this course.

At the beginning of the semester, we measured students' mindsets, and then we followed them through the course, watching their grades and asking about their study strategies. Once again we found that the students with the growth mindset earned better grades in the course. Even when they did poorly on a particular test, they bounced back on the next ones. When students with the fixed mindset did poorly, they often didn't make a comeback.

In this course, everybody studied. But there are different ways to study. Many students study like this: They read the textbook and their class notes. If the material is really hard, they read them again. Or they might try to memorize everything they can, like a vacuum cleaner. That's how the students with the fixed mindset studied. If they did poorly on the test, they concluded that chemistry was not their subject. After all, "I did everything possible, didn't I?"

Far from it. They would be shocked to find out what students with the growth mindset do. Even I find it remarkable.

The students with growth mindset completely took charge of their learning and motivation. Instead of plunging into unthinking memorization of the course material, they said: "I looked for themes and underlying principles across lectures," and "I went over mistakes until I was certain I understood them." They were studying to learn, not just to ace the test. And, actually, this was why they got higher grades—not because they were smarter or had a better background in science.

Instead of losing their motivation when the course got dry or difficult, they said: "I maintained my interest in the material." "I stayed positive about taking chemistry." "I kept myself motivated to study." Even if they thought the textbook was boring or the instructor was a stiff, they didn't let their motivation evaporate. That just made it all the more important to motivate themselves.

I got an e-mail from one of my undergraduate students shortly after I had taught her the growth mindset. Here's how she used to study before: "When faced with really tough material I tend[ed] to read the material over and over." After learning the growth mindset, she started using better strategies —that worked:

> Professor Dweck:
>
> When Heidi [the teaching assistant] told me my exam results today I didn't know whether to cry or just sit down. Heidi will tell you, I looked like I won the lottery (and I feel that way, too)! I can't believe I did SO WELL. I expected to "scrape" by.

> The encouragement you have given me will serve me well in life….
>
> I feel that I've earned a noble grade, but I didn't earn it alone. Prof. Dweck, you not only teach [your] theory, you SHOW it. Thank you for the lesson. It is a valuable one, perhaps the most valuable I've learned at Columbia. And yeah, I'll be doing THAT [using these strategies] before EVERY exam!
>
> Thank you very, very much (and you TOO Heidi)!
>
> No longer helpless,
>
> June

Because they think in terms of learning, people with the growth mindset are clued in to all the different ways to create learning. It's odd. Our pre-med students with the fixed mindset would do almost anything for a good grade—except take charge of the process to make sure it happens.

Created Equal?

Does this mean that anyone with the right mindset can do well? Are all children created equal? Let's take the second question first. No, some children are different. In her book *Gifted Children*, Ellen Winner offers incredible descriptions of prodigies. These are children who seem to be born with heightened abilities and obsessive interests, and who, through relentless pursuit of these interests, become amazingly accomplished.

Michael was one of the most precocious. He constantly played games involving letters and numbers, made his parents answer endless questions about letters and numbers, and spoke, read, and did math at an unbelievably early age. Michael's mother reports that at four months old, he said, "Mom, Dad, what's for dinner?" At ten months, he astounded people in the supermarket by reading words from the signs. Everyone assumed his mother was doing some kind of ventriloquism thing. His father reports that at three, he was not only doing algebra, but discovering and proving

algebraic rules. Each day, when his father got home from work, Michael would pull him toward math books and say, “Dad, let’s go do work.”

Michael must have started with a special ability, but, for me, the most outstanding feature is his extreme love of learning and challenge. His parents could not tear him away from his demanding activities. The same is true for every prodigy Winner describes. Most often people believe that the “gift” is the ability itself. Yet what feeds it is that constant, endless curiosity and challenge seeking.

Is it ability or mindset? Was it Mozart’s musical ability or the fact that he worked till his hands were deformed? Was it Darwin’s scientific ability or the fact that he collected specimens nonstop from early childhood?

Prodigies or not, we all have interests that can blossom into abilities. As a child, I was fascinated by people, especially adults. I wondered: *What makes them tick?* In fact, a few years back, one of my cousins reminded me of an episode that took place when we were five years old. We were at my grandmother’s house, and he’d had a big fight with his mother over when he could eat his candy. Later, we were sitting outside on the front steps and I said to him: “Don’t be so stupid. Adults like to think they’re in charge. Just say yes, and then eat your candy when you want to.”

Were those the words of a budding psychologist? All I know is that my cousin told me this advice served him well. (Interestingly, he became a dentist.)

Can Everyone Do Well?

Now back to the first question. Is everyone capable of great things with the right mindset? Could you march into the worst high school in your state and teach the students college calculus? If you could, then one thing would be clear: With the right mindset and the right teaching, people are capable of a lot more than we think.

Garfield High School was one of the worst schools in Los Angeles. To say that the students were turned off and the teachers burned out is an understatement. But without thinking twice, Jaime Escalante (of *Stand and Deliver* fame) taught these inner-city Hispanic students college-level

calculus. With his growth mindset, he asked, "*How* can I teach them?" not "*Can* I teach them?" and "*How* will they learn best?" not "*Can* they learn?"

But not only did he teach them calculus, he (and his colleague, Benjamin Jimenez) took them to the top of the national charts in math. In 1987, only three other public schools in the country had more students taking the Advanced Placement Calculus test. Those three included Stuyvesant High School and the Bronx High School of Science, both elite math-and-science-oriented schools in New York.

What's more, most of the Garfield students earned test grades that were high enough to gain them college credits. In the whole country that year, only a few hundred Mexican American students passed the test at this level. This means there's a lot of intelligence out there being wasted by underestimating students' potential to develop.

Marva Collins

Most often when kids are behind—say, when they're repeating a grade—they're given dumbed-down material on the assumption that they can't handle more. That idea comes from the fixed mindset: These students are dim-witted, so they need the same simple things drummed into them over and over. Well, the results are depressing. Students repeat the whole grade *without learning any more than they knew before.*

Instead, Marva Collins took inner-city Chicago kids who had failed in the public schools and treated them like geniuses. Many of them had been labeled "learning disabled," "retarded," or "emotionally disturbed." Virtually all of them were apathetic. No light in the eyes, no hope in the face.

Collins's second-grade public school class started out with the lowest-level reader there was. By June, they reached the middle of the fifth-grade reader, studying Aristotle, Aesop, Tolstoy, Shakespeare, Poe, Frost, and Dickinson along the way.

Later when she started her own school, *Chicago Sun-Times* columnist Zay Smith dropped in. He saw four-year-olds writing sentences like "See the physician" and "Aesop wrote fables," and talking about "diphthongs"

and “diacritical marks.” He observed second graders reciting passages from Shakespeare, Longfellow, and Kipling. Shortly before, he had visited a rich suburban high school where many students had never heard of Shakespeare. “Shoot,” said one of Collins’s students, “you mean those rich high school kids don’t know Shakespeare was born in 1564 and died in 1616?”

Students read huge amounts, even over the summer. One student, who had entered as a “retarded” six-year-old, now four years later had read twenty-three books over the summer, including *A Tale of Two Cities* and *Jane Eyre*. The students read deeply and thoughtfully. As the three- and four-year-olds were reading about Daedalus and Icarus, one four-year-old exclaimed, “Mrs. Collins, if we do not learn and work hard, we will take an Icarian flight to nowhere.” Heated discussions of *Macbeth* were common.

Alfred Binet believed you could change the quality of someone’s mind. Clearly you can. Whether you measure these children by the breadth of their knowledge or by their performance on standardized tests, their minds had been transformed.

Benjamin Bloom, an eminent educational researcher, studied 120 outstanding achievers. They were concert pianists, sculptors, Olympic swimmers, world-class tennis players, mathematicians, and research neurologists. Most were not that remarkable as children and didn’t show clear talent before their training began in earnest. Even by early adolescence, you usually couldn’t predict their future accomplishment from their current ability. Only their continued motivation and commitment, along with their network of support, took them to the top.

Bloom concludes, “After forty years of intensive research on school learning in the United States as well as abroad, my major conclusion is: What any person in the world can learn, *almost* all persons can learn, *if* provided with the appropriate prior and current conditions of learning.” He’s not counting the 2 to 3 percent of children who have severe impairments, and he’s not counting the top 1 to 2 percent of children at the other extreme that include children like Michael. He *is* counting everybody else.

Ability Levels and Tracking

But aren’t students sorted into different ability levels for a reason? Haven’t their test scores and past achievement shown what their ability is? Remember, test scores and measures of achievement tell you where a student is, but they don’t tell you where a student could end up.

Falko Rheinberg, a researcher in Germany, studied schoolteachers with different mindsets. Some of the teachers had the fixed mindset. They believed that students entering their class with different achievement levels were deeply and permanently different:

“According to my experience students’ achievement mostly remains constant in the course of a year.”

“If I know students’ intelligence I can predict their school career quite well.”

“As a teacher I have no influence on students’ intellectual ability.”

Like my sixth-grade teacher, Mrs. Wilson, these teachers preached and practiced the fixed mindset. In their classrooms, the students who started the year in the high-ability group ended the year there, and those who started the year in the low-ability group ended the year there.

But some teachers preached and practiced a growth mindset. They focused on the idea that all children could develop their skills, and in their classrooms a weird thing happened. It didn’t matter whether students started the year in the high- or the low-ability group. Both groups ended the year way up high. It’s a powerful experience to see these findings. The group differences had simply disappeared under the guidance of teachers who taught for improvement, for these teachers had found a way to reach their “low-ability” students.

How teachers put a growth mindset into practice is the topic of a later chapter, but here’s a preview of how Marva Collins, the renowned teacher, did it. On the first day of class, she approached Freddie, a left-back second grader, who wanted no part of school. “Come on, peach,” she said to him, cupping his face in her hands, “we have work to do. You can’t just sit in a seat and grow smart….I promise, you are going to *do,* and you are going to *produce.* I am not going to let you fail.”

Summary

The fixed mindset limits achievement. It fills people's minds with interfering thoughts, it makes effort disagreeable, and it leads to inferior learning strategies. What's more, it makes other people into judges instead of allies. Whether we're talking about Darwin or college students, important achievements require a clear focus, all-out effort, and a bottomless trunk full of strategies. Plus allies in learning. This is what the growth mindset gives people, and that's why it helps their abilities grow and bear fruit.

IS ARTISTIC ABILITY A GIFT?

Despite the widespread belief that intelligence is born, not made, when we really think about it, it's not so hard to imagine that people can develop their intellectual abilities. The intellect is so multifaceted. You can develop verbal skills or mathematical-scientific skills or logical thinking skills, and so on. But when it comes to artistic ability, it seems more like a God-given gift. For example, people seem to naturally draw well or poorly.

Even I believed this. While some of my friends seemed to draw beautifully with no effort and no training, my drawing ability was arrested in early grade school. Try as I might, my attempts were primitive and disappointing. I was artistic in other ways. I can design, I'm great with colors, I have a subtle sense of composition. Plus I have really good eye–hand coordination. Why couldn't I draw? I must not have the gift.

I have to admit that it didn't bother me all that much. After all, when do you really *have* to draw? I found out one evening as the dinner guest of a fascinating man. He was an older man, a psychiatrist, who had escaped from the Holocaust. As a ten-year-old child in Czechoslovakia, he and his younger brother came home from school one day to find their parents gone. They had been taken. Knowing there was an uncle in England, the two boys walked to London and found him.

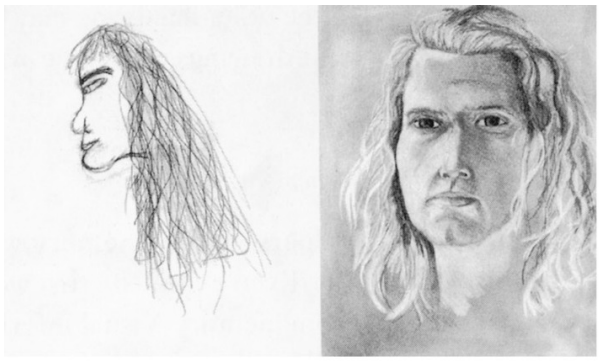
A few years later, lying about his age, my host joined the Royal Air Force and fought for Britain in the war. When he was wounded, he married

his nurse, went to medical school, and established a thriving practice in America.

Over the years, he developed a great interest in owls. He thought of them as embodying characteristics he admired, and he liked to think of himself as owlish. Besides the many owl statuettes that adorned his house, he had an owl-related guest book. It turned out that whenever he took a shine to someone, he asked them to draw an owl and write something to him in this book. As he extended this book to me and explained its significance, I felt both honored and horrified. Mostly horrified. All the more because my creation was not to be buried somewhere in the middle of the book, but was to adorn its very last page.

I won't dwell on the intensity of my discomfort or the poor quality of my artwork, although both were painfully clear. I tell this story as a prelude to the astonishment and joy I felt when I read *Drawing on the Right Side of the Brain.* Below are the before-and-after self-portraits of people who took a short course in drawing from the author, Betty Edwards. That is, they are the self-portraits drawn by the students when they entered her course and *five days later* when they had completed it.

Aren't they amazing? At the beginning, these people didn't look as though they had much artistic ability. Most of their pictures reminded me of my owl. But only a few days later, everybody could really draw! And Edwards swears that this is a typical group. It seems impossible.



Edwards agrees that most people view drawing as a magical ability that only a select few possess, and that only a select few will ever possess. But this is because people don't understand the components—the *learnable* components—of drawing. Actually, she informs us, they are not drawing skills at all, but *seeing* skills. They are the ability to perceive edges, spaces, relationships, lights and shadows, and the whole. Drawing requires us to learn each component skill and then combine them into one process. Some people simply pick up these skills in the natural course of their lives, whereas others have to work to learn them and put them together. But as we can see from the "after" self-portraits, everyone can do it.

Here's what this means: *Just because some people can do something with little or no training, it doesn't mean that others can't do it (and sometimes do it even better) with training.* This is so important, because many, many people with the fixed mindset think that someone's early performance tells you all you need to know about their talent and their future.

Jackson Pollock

It would have been a real shame if people discouraged Jackson Pollock for that reason. Experts agree that Pollock had little native talent for art, and when you look at his early products, it showed. They also agree that he became one of the greatest American painters of the twentieth century and that he revolutionized modern art. How did he go from point A to point B?

Twyla Tharp, the world-famous choreographer and dancer, wrote a book called *The Creative Habit.* As you can guess from the title, she argues that creativity is not a magical act of inspiration. It's the result of hard work and dedication. *Even for Mozart.* Remember the movie *Amadeus*? Remember how it showed Mozart easily churning out one masterpiece after another while Salieri, his rival, is dying of envy? Well, Tharp worked on that movie and she says: Hogwash! Nonsense! "There are no 'natural' geniuses."

Dedication is how Jackson Pollock got from point A to point B. Pollock was wildly in love with the idea of being an artist. He thought about art all the time, and he did it all the time. Because he was so gung ho, he got others to take him seriously and mentor him until he mastered all there was to master and began to produce startlingly original works. His "poured"

paintings, each completely unique, allowed him to draw from his unconscious mind and convey a huge range of feeling. Several years ago, I was privileged to see a show of these paintings at the Museum of Modern Art in New York. I was stunned by the power and beauty of each work.

Can anyone do *anything*? I don't really know. However, I think we can now agree that people can do a lot more than first meets the eye.

THE DANGER OF PRAISE AND POSITIVE LABELS

If people have such potential to achieve, how can they gain faith in their potential? How can we give them the confidence they need to go for it? How about praising their ability in order to convey that they have what it takes? In fact, more than 80 percent of parents told us it was necessary to praise children's ability so as to foster their confidence and achievement. You know, it makes a lot of sense.

But then we began to worry. We thought about how people with the fixed mindset already focus too much on their ability: "Is it high enough?" "Will it look good?" Wouldn't praising people's ability focus them on it even more? Wouldn't it be telling them that that's what we value and, even worse, that we can read their deep, underlying ability from their performance? Isn't that teaching them the fixed mindset?

Adam Guettel has been called the crown prince and savior of musical theater. He is the grandson of Richard Rodgers, the man who wrote the music to such classics as *Oklahoma!* and *Carousel*. Guettel's mother gushes about her son's genius. So does everyone else. "The talent is there and it's major," raved a review in *The New York Times.* The question is whether this kind of praise encourages people.

What's great about research is that you can ask these kinds of questions and then go get the answers. So we conducted studies with hundreds of students, mostly early adolescents. We first gave each student a set of ten fairly difficult problems from a nonverbal IQ test. They mostly did pretty well on these, and when they finished we praised them.

We praised some of the students for their ability. They were told: "Wow, you got [say] eight right. That's a really good score. You must be smart at

this.” They were in the Adam Guettel *you’re-so-talented* position.

We praised other students for their effort: “Wow, you got [say] eight right. That’s a really good score. You must have worked really hard.” They were not made to feel that they had some special gift; they were praised for doing what it takes to succeed.

Both groups were exactly equal to begin with. But right after the praise, they began to differ. As we feared, the ability praise pushed students right into the fixed mindset, and they showed all the signs of it, too: When we gave them a choice, they rejected a challenging new task that they could learn from. They didn’t want to do anything that could expose their flaws and call into question their talent.

When Guettel was thirteen, he was all set to star in a Metropolitan Opera broadcast and TV movie of *Amahl and the Night Visitors.* He bowed out, saying that his voice had broken. “I kind of faked that my voice was changing….I didn’t want to handle the pressure.”

In contrast, when students were praised for effort, 90 percent of them wanted the challenging new task that they could learn from.

Then we gave students some hard new problems, which they didn’t do so well on. The ability kids now thought they were not smart after all. If success had meant they were intelligent, then less-than-success meant they were deficient.

Guettel echoes this. “In my family, to be good is to fail. To be *very* good is to fail….The only thing *not* a failure is to be great.”

The effort kids simply thought the difficulty meant “Apply more effort or try new strategies.” They didn’t see it as a failure, and they didn’t think it reflected on their intellect.

What about the students’ enjoyment of the problems? After the success, everyone loved the problems, but after the difficult problems, the ability students said it wasn’t fun anymore. It can’t be fun when your claim to fame, your special talent, is in jeopardy.

Here’s Adam Guettel: “I wish I could just have fun and relax and not have the responsibility of that potential to be some kind of *great man.*” As with the kids in our study, the burden of talent was killing his enjoyment.

The effort-praised students still loved the problems, and many of them said that the hard problems were the most fun.

We then looked at the students' performance. After the experience with difficulty, the performance of the ability-praised students plummeted, even when we gave them some more of the easier problems. Losing faith in their ability, they were doing worse than when they started. The effort kids showed better and better performance. They had used the hard problems to sharpen their skills, so that when they returned to the easier ones, they were way ahead.

Since this was a kind of IQ test, you might say that praising ability lowered the students' IQs. And that praising their effort raised them.

Guettel was not thriving. He was riddled with obsessive-compulsive tics and bitten, bleeding fingers. "Spend a minute with him—it takes only one—and a picture of the terror behind the tics starts to emerge," says an interviewer. Guettel has also fought serious, recurrent drug problems. Rather than empowering him, the "gift" has filled him with fear and doubt. Rather than fulfilling his talent, this brilliant composer has spent most of his life running from it.

One thing is hopeful—his recognition that he has his own life course to follow that is not dictated by other people and their view of his talent. One night he had a dream about his grandfather. "I was walking him to an elevator. I asked him if I was any good. He said, rather kindly, 'You have your own voice.' "

Is that voice finally emerging? For the score of *The Light in the Piazza*, an intensely romantic musical, Guettel won the 2005 Tony Award. Will he take it as praise for talent or praise for effort? I hope it's the latter.

There was one more finding in our study that was striking and depressing at the same time. We said to each student: "You know, we're going to go to other schools, and I bet the kids in those schools would like to know about the problems." So we gave students a page to write out their thoughts, but we also left a space for them to write the scores they had received on the problems.

Would you believe that almost 40 percent of the ability-praised students *lied* about their scores? And always in one direction. In the fixed mindset,

imperfections are shameful—especially if you're talented—so they lied them away.

What's so alarming is that we took ordinary children and made them into liars, simply by telling them they were smart.

Right after I wrote these paragraphs, I met with a young man who tutors students for their College Board exams. He had come to consult with me about one of his students. This student takes practice tests and then lies to him about her score. He is supposed to tutor her on what she doesn't know, but she can't tell him the truth about what she doesn't know! And she is paying money for this.

So telling children they're smart, in the end, made them feel dumber and act dumber, but claim they were smarter. I don't think this is what we're aiming for when we put positive labels—"gifted," "talented," "brilliant"—on people. We don't mean to rob them of their zest for challenge and their recipes for success. But that's the danger.

Here is a letter from a man who'd read some of my work:

> Dear Dr. Dweck,
>
> It was painful to read your chapter…as I recognized myself therein.
>
> As a child I was a member of The Gifted Child Society and continually praised for my intelligence. Now, after a lifetime of not living up to my potential (I'm 49), I'm learning to apply myself to a task. And also to see failure not as a sign of stupidity but as lack of experience and skill. Your chapter helped see myself in a new light.
>
> Seth Abrams

This is the danger of positive labels. There are alternatives, and I will return to them later in the chapter on parents, teachers, and coaches.

NEGATIVE LABELS AND HOW THEY WORK

I was once a math whiz. In high school, I got a 99 in algebra, a 99 in geometry, and a 99 in trigonometry, and I was on the math team. I scored up there with the boys on the air force test of visual-spatial ability, which is why I got recruiting brochures from the air force for many years to come.

Then I got a Mr. Hellman, a teacher who didn't believe girls could do math. My grades declined, and I never took math again.

I actually agreed with Mr. Hellman, but I didn't think it applied to *me. Other* girls couldn't do math. Mr. Hellman thought it applied to me, too, and I succumbed.

Everyone knows negative labels are bad, so you'd think this would be a short section. But it isn't a short section, because psychologists are learning *how* negative labels harm achievement.

No one knows about negative ability labels like members of stereotyped groups. For example, African Americans know about being stereotyped as lower in intelligence. And women know about being stereotyped as bad at math and science. But I'm not sure even they know how creepy these stereotypes are.

Research by Claude Steele and Joshua Aronson shows that even checking a box to indicate your race or sex can trigger the stereotype in your mind and lower your test score. Almost anything that reminds you that you're black or female before taking a test in the subject you're supposed to be bad at will lower your test score—a lot. In many of their studies, blacks are equal to whites in their performance, and females are equal to males, when no stereotype is evoked. But just put more males in the room with a female before a math test, and down goes the female's score.

This is why. When stereotypes are evoked, they fill people's minds with distracting thoughts—with secret worries about confirming the stereotype. People usually aren't even aware of it, but they don't have enough mental power left to do their best on the test.

This doesn't happen to everybody, however. It mainly happens to people who are in a fixed mindset. It's when people are thinking in terms of fixed traits that the stereotypes get to them. Negative stereotypes say: "You and

your group are permanently inferior." Only people in the fixed mindset resonate to this message.

So in the fixed mindset, both positive and negative labels can mess with your mind. When you're given a positive label, you're afraid of losing it, and when you're hit with a negative label, you're afraid of deserving it.

When people are in a growth mindset, the stereotype doesn't disrupt their performance. The growth mindset takes the teeth out of the stereotype and makes people better able to fight back. They don't believe in permanent inferiority. And if they *are* behind—well, then they'll work harder, seek help, and try to catch up.

The growth mindset also makes people able to take what they can and what they need even from a threatening environment. We asked African American students to write an essay for a competition. They were told that when they finished, their essays would be evaluated by Edward Caldwell III, a distinguished professor with an Ivy League pedigree. That is, a representative of the white establishment.

Edward Caldwell III's feedback was quite critical, but also helpful—and students' reactions varied greatly. Those with a fixed mindset viewed it as a threat, an insult, or an attack. They rejected Caldwell and his feedback.

Here's what one student with the fixed mindset thought: "He's mean, he doesn't grade right, or he's obviously biased. He doesn't like me."

Said another: "He is a pompous asshole….It appears that he was searching for anything to discredit the work."

And another, deflecting the feedback with blame: "He doesn't understand the conciseness of my points. He thought it was vague because he was impatient when he read it. He dislikes creativity."

None of them will learn anything from Edward Caldwell's feedback.

The students with the growth mindset may also have viewed him as a dinosaur, but he was a dinosaur who could teach them something.

"Before the evaluation, he came across as arrogant and overdemanding. [After the evaluation?] 'Fair' seems to be the first word that comes to mind….It seems like a new challenge."

"He sounded like an arrogant, intimidating, and condescending man. [What are your feelings about the evaluation?] The evaluation was

seemingly honest and specific. In this sense, the evaluation could be a stimulus…to produce better work."

"He seems to be proud to the point of arrogance. [The evaluation?] He was intensely critical….His comments were helpful and clear, however. I feel I will learn much from him."

The growth mindset allowed African American students to recruit Edward Caldwell III for their own goals. They were in college to get an education and, pompous asshole or not, they were going to get it.

Do I Belong Here?

Aside from hijacking people's abilities, stereotypes also do damage by making people feel they don't belong. Many minorities drop out of college and many women drop out of math and science because they just don't feel they fit in.

To find out how this happens, we followed college women through their calculus course. This is often when students decide whether math, or careers involving math, are right for them. Over the semester, we asked the women to report their feelings about math and their sense of belonging in math. For example, when they thought about math, did they feel like a full-fledged member of the math community or did they feel like an outsider; did they feel comfortable or did they feel anxious; did they feel good or bad about their math skills?

The women with the growth mindset—those who thought math ability could be improved—felt a fairly strong and stable sense of belonging. And they were able to maintain this even when they thought there was a lot of negative stereotyping going around. One student described it this way: "In a math class, [female] students were told they were wrong when they were not (they were in fact doing things in novel ways). It was absurd, and reflected poorly on the instructor not to 'see' the students' good reasoning. It was alright because we were working in groups and we were able to give & receive support among us students….We discussed our interesting ideas among ourselves."

The stereotyping was disturbing to them (as it should be), but they could still feel comfortable with themselves and confident about themselves in a math setting. They could fight back.

But women with the fixed mindset, as the semester wore on, felt a shrinking sense of belonging. And the more they felt the presence of stereotyping in their class, the more their comfort with math withered. One student said that her sense of belonging fell because "I was disrespected by the professor with his comment, 'that was a good guess,' whenever I made a correct answer in class."

The stereotype of low ability was able to invade them—to define them—and take away their comfort and confidence. I'm not saying it's their fault by any means. Prejudice is a deeply ingrained societal problem, and I do not want to blame the victims of it. I am simply saying that a growth mindset helps people to see prejudice for what it is—*someone else's* view of them—and to confront it with their confidence and abilities intact.

Trusting People's Opinions

Many females have a problem not only with stereotypes, but with other people's opinions of them in general. They trust them too much.

One day, I went into a drugstore in Hawaii to buy dental floss and deodorant, and, after fetching my items, I went to wait in line. There were two women together in front of me waiting to pay. Since I am an incurable time stuffer, at some point I decided to get my money ready for when my turn came. So I walked up, put the items way on the side of the counter, and started to gather up the bills that were strewn throughout my purse. The two women went berserk. I explained that in no way was I trying to cut in front of them. I was just preparing for when my turn came. I thought the matter was resolved, but when I left the store, they were waiting for me. They got in my face and yelled, *"You're a bad-mannered person!"*

My husband, who had seen the whole thing from beginning to end, thought they were nuts. But they had a strange and disturbing effect on me, and I had a hard time shaking off their verdict.

This vulnerability afflicts many of the most able, high-achieving females. Why should this be? When they're little, these girls are often so perfect, and they delight in everyone's telling them so. They're so well behaved, they're so cute, they're so helpful, and they're so precocious. Girls learn to trust people's estimates of them. "Gee, everyone's so nice to me; if they criticize me, it must be true." Even females at the top universities in the country say that other people's opinions are a good way to know their abilities.

Boys are constantly being scolded and punished. When we observed in grade school classrooms, we saw that boys got *eight* times more criticism than girls for their conduct. Boys are also constantly calling each other slobs and morons. The evaluations lose a lot of their power.

A male friend once called me a slob. He was over to dinner at my house and, while we were eating, I dripped some food on my blouse. "That's because you're such a slob," he said. I was shocked. It was then that I realized no one had ever said anything like that to me. Males say it to each other all the time. It may not be a kind thing to say, even in jest, but it certainly makes them think twice before buying into other people's evaluations.

Even when women reach the pinnacle of success, other people's attitudes can get them. Frances Conley is one of the most eminent neurosurgeons in the world. In fact, she was the first woman ever given tenure in neurosurgery at an American medical school. Yet careless comments from male colleagues—even assistants—could fill her with self-doubt. One day during surgery, a man condescendingly called her "honey." Instead of returning the compliment, she questioned herself. "Is a honey," she wondered, "especially *this* honey, good enough and talented enough to be doing this operation?"

The fixed mindset, plus stereotyping, plus women's trust in other people's assessments of them: All of these contribute to the gender gap in math and science.

That gap is painfully evident in the world of high tech. Julie Lynch, a budding techie, was already writing computer code when she was in junior high school. Her father and two brothers worked in technology, and she loved it, too. Then her computer programming teacher criticized her. She had written a computer program and the program ran just fine, but he didn't

like a shortcut she had taken. Her interest evaporated. Instead, she went on to study recreation and public relations.

Math and science need to be made more hospitable places for women. And women need all the growth mindset they can get to take their rightful places in these fields.

When Things Go Right

But let's look at the times the process goes right.

The Polgar family has produced three of the most successful female chess players ever. How? Says Susan, one of the three, "My father believes that innate talent is nothing, that [success] is 99 percent hard work. I agree with him." The youngest daughter, Judit, is now considered the best woman chess player of all time. She was not the one with the most talent. Susan reports, "Judit was a slow starter, but very hardworking."

A colleague of mine has two daughters who are math whizzes. One is a graduate student in math at a top university. The other was the first girl to rank number one in the country on an elite math test, won a nationwide math contest, and is now a neuroscience major at a top university. What's their secret? Is it passed down in the genes? I believe it's passed down in the mindset. It's the most growth-mindset family I've ever seen.

In fact, their father applied the growth mindset to *everything.* I'll never forget a conversation we had some years ago. I was single at the time, and he asked me what my plan was for finding a partner. He was aghast when I said I didn't have a plan. "You wouldn't expect your *work* to get done by itself," he said. "Why is this any different?" It was inconceivable to him that you could have a goal and not take steps to make it happen.

In short, the growth mindset lets people—even those who are targets of negative labels—use and develop their minds fully. Their heads are not filled with limiting thoughts, a fragile sense of belonging, and a belief that other people can define them.

Grow Your Mindset

- Think about your hero. Do you think of this person as someone with extraordinary abilities who achieved with little effort? Now go find out the truth. Find out the tremendous effort that went into their accomplishment—and admire them *more.*
- Think of times other people outdid you and you just assumed they were smarter or more talented. Now consider the idea that they just used better strategies, taught themselves more, practiced harder, and worked their way through obstacles. You can do that, too, if you want to.
- Are there situations where you get stupid—where you disengage your intelligence? Next time you're in one of those situations, get yourself into a growth mindset—think about learning and improvement, not judgment—and hook it back up.
- Do you label your kids? *This one is the artist and that one is the scientist.* Next time, remember that you're not helping them—even though you may be praising them. Remember our study where praising kids' ability lowered their IQ scores. Find a growth-mindset way to compliment them.
- More than half of our society belongs to a negatively stereotyped group. First you have all the women, and then you have all the other groups who are not supposed to be good at something or other. Give them the gift of the growth mindset. Create an environment that teaches the growth mindset to the adults and children in your life, especially the ones who are targets of negative stereotypes. Even when the negative label comes along, they'll remain in charge of their learning.