How Kids Learn Resilience

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In 2013, for the first time, a majority of public-school students in this country—51 percent, to be precise—fell below the federal government's low-income cutoff, meaning they were eligible for a free or subsidized school lunch. It was a powerful symbolic moment—an inescapable reminder that the challenge of teaching low-income children has become the central issue in American education.

The truth, as many American teachers know firsthand, is that low-income children can be harder to educate than children from more-comfortable backgrounds. Educators often struggle to motivate them, to calm them down, to connect with them. This doesn't mean they're impossible to teach, of course; plenty of kids who grow up in poverty are thriving in the classroom. But two decades of national attention have done little or nothing to close the achievement gap between poor students and their better-off peers.

In recent years, in response to this growing crisis, a new idea (or perhaps a very old one) has arisen in the education world: Character matters. Researchers concerned with academic-achievement gaps have begun to study, with increasing interest and enthusiasm, a set of personal qualities—often referred to as noncognitive skills, or character strengths—that include resilience, conscientiousness, optimism, self-control, and grit. These capacities generally aren't captured by our ubiquitous standardized tests, but they seem to make a big difference in the academic success of children, especially low-income children.

My last book, *How Children Succeed*, explored this research and profiled educators who were attempting to put it into practice in their classrooms. Since the book's publication, in 2012, the idea that educators should be teaching grit and self-control along with addition and subtraction has caught on across the country. Some school systems are embracing this notion institutionally. In California this spring, for example, a coalition of nine major school districts has been trying out a new school-assessment system that relies in part on measurements of students' noncognitive abilities, such as self-management and social awareness.

But here's the problem: For all our talk about noncognitive skills, nobody has yet found a reliable way to teach kids to be grittier or more resilient. And it has become clear, at the same time, that the educators who are best able to engender noncognitive abilities in their students often do so without really "teaching" these capacities the way one might teach math or reading—indeed, they often do so without ever saying a word about them in the classroom. This paradox has raised a pressing question for a new generation of researchers: Is the teaching paradigm the right one to use when it comes to helping young people develop noncognitive capacities?

What is emerging is a new idea: that qualities like grit and resilience are not formed through the traditional mechanics of "teaching"; instead, a growing number of researchers now believe, they are shaped by several specific environmental forces, both in the classroom and in the home, sometimes in subtle and intricate ways.

The process begins in early childhood, when the most important force shaping the development of these skills turns out to be a surprising one: stress. Over the past decade, neuroscientists have demonstrated with increasing clarity how severe and chronic stress in childhood—what doctors sometimes call toxic stress—leads to physiological and neurological adaptations in children that affect the way their minds and bodies develop and, significantly, the way they function in school.

Each of us has within us an intricate stress-response network that links together the brain, the immune system, and the endocrine system (the glands that produce and release stress hormones). In childhood, and especially in early childhood, this network is highly sensitive to environmental cues; it is constantly looking for signals from a child's surroundings that might tell it what to expect in the days and years ahead. When those signals suggest that life is going to be hard, the network reacts by preparing for trouble: raising blood pressure, increasing the production of adrenaline, heightening vigilance. Neuroscientists have shown that children living in poverty experience more toxic stress than middle-class children, and that additional stress expresses itself in higher blood pressure and higher levels of certain stress hormones.

In the short term, these adaptations may have benefits, especially in a dangerous environment. When your threat-detection system—sometimes referred to as your fight-or-flight response—is on high alert, you can react quickly to trouble. But in the longer term, they can cause an array of physiological problems and impede development of the prefrontal cortex, the part of the brain that controls our most complex intellectual functions, as well as our ability to regulate ourselves both emotionally and cognitively.

On an emotional level, toxic stress can make it difficult for children to moderate their responses to disappointments and provocations. A highly sensitive stress-response system constantly on the lookout for threats can produce patterns of behavior that are self-defeating in school: fighting, talking back, acting up, and, more subtly, going through each day perpetually wary of connection with peers or teachers.

On a cognitive level, chronically elevated stress can disrupt the development of what are known as executive functions: higher-order mental abilities that some researchers compare to a team of air-traffic controllers overseeing the workings of the brain. Executive functions, which include working memory, attentional control, and cognitive flexibility, are exceptionally helpful in navigating unfamiliar situations and processing new information, which is exactly what we ask children to do at school every day. When a child's executive functions *aren't* fully developed, school days, with their complicated directions and constant distractions, can become a never-ending exercise in frustration.

Executive functions also serve as the developmental building blocks—the neurological infrastructure—underpinning the noncognitive capacities that educators are now so focused on. What this suggests is that if we want to help children demonstrate these qualities in school, there are two places where we need to change our approach. One is the classroom, where right now many fundamental practices of modern American pedagogy ignore this science of adversity. The second is where children's neurobiological identity begins to be formed, long before they ever set foot in kindergarten: the home.

THE MOST IMPORTANT environmental factor in children's early lives, researchers have shown, is the way their parents and other adults interact with them. Beginning in infancy, children rely on responses from their parents to help them make sense of the world. Researchers at Harvard's Center on the Developing Child have labeled these "serve and return" interactions. An infant makes a sound or looks at an object—that's the serve—and her parents return the serve by responding to her babbles and cries with gestures, facial expressions, and speech. More than any other experiences in infancy, these rudimentary interactions trigger the development and strengthening of connections among the regions of the brain that control emotion, cognition, language, and memory.

A second crucial role that parents play early on is as external regulators of their children's stress. When parents behave harshly or unpredictably—especially at moments when their children are upset—the children are less likely over time to develop the ability to manage strong emotions and respond effectively to stressful situations. By contrast, when a child's parents respond to her jangled emotions in a sensitive and measured way, she is more likely to learn that she herself has the capacity to cope with her feelings, even intense and unpleasant ones.

But if a home environment can have a positive impact on a child's development, it can also do the opposite. One of the most influential studies of the long-term effect of a stressful early home life is the ongoing Adverse Childhood Experiences Study, which was launched in the 1990s by Robert F. Anda, a physician at the Centers for Disease Control and Prevention, and Vincent J. Felitti, the founder of the preventive-medicine department at Kaiser Permanente. Anda and Felitti identified 10 categories of childhood trauma: three categories of abuse, two of neglect, and five related to growing up in a "seriously dysfunctional household." They found that the number of these traumas a person experiences in childhood (a number that has come to be known as a person's ACE score) correlates in adulthood with health problems ranging from heart disease to cancer.

More recently, researchers using variations on Anda and Felitti's ACE scale have found that an elevated ACE score also has a negative effect on the development of a child's executive functions and on her ability to learn effectively in school. A study conducted by Nadine Burke Harris, a pediatrician and trauma researcher in San Francisco, found that just 3 percent of children in her clinic with an ACE score of zero displayed learning or behavioral problems. But among children who had an ACE score of four or more, 51 percent had learning or behavioral problems. A separate national study published in

2014 found that children with two or more ACEs were eight times as likely as children with none to demonstrate behavioral problems and more than twice as likely to repeat a grade in school. According to this study, slightly more than half of all children have never experienced a serious adverse event—but the other half, the ones with at least one ACE, account for 85 percent of the behavioral problems that children exhibit.

FOR CHILDREN WHO grow up without significant experiences of adversity, the skill-development process leading up to kindergarten generally works the way it's supposed to: Calm, consistent, responsive interactions in infancy with parents and other caregivers create neural connections that lay the foundation for a healthy array of attention and concentration skills. Just as early stress sends signals to the nervous system to maintain constant vigilance and prepare for a lifetime of trouble, early warmth and responsiveness send the opposite signals: *You're safe; life is going to be fine. Let down your guard; the people around you will protect you and provide for you. Be curious about the world; it's full of fascinating surprises.* These messages trigger adaptations in children's brains that allow them to slow down and consider problems and decisions more carefully, to focus their attention for longer periods, and to more willingly trade immediate gratification for promises of long-term benefits.

We don't always think of these abilities as academic in nature, but in fact they are enormously beneficial in helping kids achieve academic success in kindergarten and beyond. Without them, the transition from home or day care to kindergarten is likely to be fraught, and the challenge of learning the many things we ask kindergarten students to master can be overwhelming. In the classroom, neurocognitive difficulties can quickly turn into academic difficulties. Students don't learn to read on time, because it is harder for them to concentrate on the words on the page. They don't learn the basics of number sense, because they are too distracted by the emotions and anxieties overloading their nervous systems. As academic material becomes more complicated, they fall further behind. The more they fall behind, the worse they feel about themselves and about school. That creates more stress, which tends to feed into behavioral problems, which lead to stigmatization and punishment in the classroom, which keep their stress levels elevated, which makes it still harder to concentrate—and so on, throughout elementary school.

Fast-forward a few years, to the moment when those students arrive in middle or high school, and these executive-function challenges are now typically perceived to be problems of attitude or motivation. When teachers and administrators are confronted with students who find it hard to concentrate, manage their emotions, or deal calmly with provocation, the first instinct often is not to look at them as children who, because of a lifetime of stress, haven't yet developed a healthy set of self-regulation mechanisms. Instead, the adults see them as kids with behavioral problems who need, more than anything, to be disciplined.

When children and adolescents misbehave, we usually assume that they're doing so because they have considered the consequences of their actions and calculated that the benefits of misbehavior outweigh the costs. So our natural response is to increase the cost of misbehavior, by ratcheting up punishment. One of the chief insights that recent

neurobiological research has provided, however, is that young people, especially those who have experienced significant adversity, are often guided by emotional and psychological and hormonal forces that are far from rational. This doesn't mean that teachers should excuse or ignore bad behavior. But it does explain why harsh punishments so often prove ineffective in motivating troubled young people to succeed.

Most American schools today operate according to a philosophy of discipline that has its roots in the 1980s and '90s, when a belief that schools would be safer and more effective if they had "zero tolerance" for violence, drug use, and other types of misbehavior led to a sharp rise in suspensions. In 2010, more than a tenth of all public-high-school students nationwide were suspended at least once. And suspension rates are substantially higher among certain demographic groups. African American students, for example, are suspended three times as often as white students. In Chicago public high schools (which have particularly good and well-analyzed data on suspensions), 27 percent of students who live in the city's poorest neighborhoods received an out-of-school suspension during the 2013–14 school year, as did 30 percent of students with a reported personal history of abuse or neglect.

Sixty percent of Chicago's out-of-school suspensions in public high schools are for infractions that don't involve violence or even a threat of violence: They are for talking back to teachers, violating school rules, and disruptive behavior. With the neurobiological research in mind, it's easy to see that kind of behavior—refusing to do what adults tell you to do, basically—as an expression not of a bad attitude or a defiant personality but of a poorly regulated stress-response system. Talking back and acting up in class are, at least in part, symptoms of a child's inability to control impulses, de-escalate confrontations, and manage anger and other strong feelings—the whole stew of self-regulation issues that can usually be traced to impaired executive-function development in early childhood.

The guiding theory behind much of the school discipline practiced in the United States today—and certainly behind the zero-tolerance, suspension-heavy approach that has dominated since the 1990s—is behaviorism, which is grounded in the idea that humans respond to incentives and reinforcement. If we get positive reinforcement for a certain behavior, we're likely to do it more; if we get negative reinforcement, we're likely to do it less.

Clearly, on some level, behaviorism works. People, including children, respond well to behavioral cues, at least in the short term. But researchers are coming to understand that there are limits to the effectiveness of rewards and punishments in education, and that for young people whose neurological and psychological development has been shaped by intense stress, straightforward reward systems are often especially ineffective.

ROLAND G. FRYER JR., a celebrated economics professor at Harvard, has spent the past decade testing out a variety of incentive schemes with public-school students in Houston, New York, Chicago, and other American cities that have school systems with high poverty rates. Fryer has paid parents for attending parent-teacher conferences, students for reading books, and teachers for raising test scores. He has given kids

cellphones to inspire them to study harder. Altogether, he has handed out millions of dollars in rewards and prizes. As a body of work, Fryer's incentive studies have marked one of the biggest and most thorough educational experiments in American history.

And yet in almost every case, Fryer's incentive programs have had no effect. From 2007 to 2009, Fryer distributed a total of $9.4 million in cash incentives to 27,000 students, to promote book reading in Dallas, to raise test scores in New York, and to improve course grades in Chicago —all with no effect. "The impact of financial incentives on student achievement," Fryer reported, "is statistically 0 in each city." In the 2010–11 school year, he gave cash incentives to fifth-grade students in 25 low-performing public schools in Houston, and to their parents and teachers, with the intent of increasing the time they spent on math homework and improving their scores on standardized math tests. The students performed the tasks necessary to get paid, but their average math scores at the end of eight months hadn't changed at all. When Fryer looked at their reading scores, he found that they actually went *down*.

The stark fact that complicates incentive studies like Fryer's is that children who grow up in difficult circumstances already have a powerful set of material incentives to get a good education. Adults with a high-school degree fare far better in life than adults without one. They not only earn more, on average, but they also have more-stable families, better health, and less chance of being arrested or incarcerated. Those with college degrees similarly do much better, on average, than those without. Young people know this. And yet when it comes time to make any of the many crucial decisions that affect their likelihood of reaching those educational milestones, kids growing up in adversity often make choices that seem in flagrant opposition to their self-interest, rendering those goals more distant and difficult to attain.

Within the field of psychology, one important body of thought that helps explain this apparent paradox is self-determination theory, which is the life's work of Edward L. Deci and Richard M. Ryan, two professors at the University of Rochester. Deci and Ryan came up with the beginnings of their theory in the 1970s, when the field was mostly dominated by behaviorists, who believed that people's actions are governed solely by their motivation to fulfill basic biological needs and thus are highly responsive to straightforward rewards and punishments.

In early childhood, the most important force shaping the development of qualities such as grit and resilience turns out to be a surprising one: stress.

Deci and Ryan, by contrast, argued that we are mostly motivated not by the material consequences of our actions but by the inherent enjoyment and meaning that those actions bring us, a phenomenon called intrinsic motivation. They identified three key human needs—our need for competence, our need for autonomy, and our need for relatedness, meaning personal connection—and they posited that intrinsic motivation can be sustained only when we feel that those needs are being satisfied.

In their writing on education, Deci and Ryan acknowledge that many of the tasks that teachers ask students to complete each day are not inherently fun or satisfying; learning

anything, be it painting or computer programming or algebra, involves a lot of repetitive practice. It is at these moments, they write, that *extrinsic* motivation becomes important: when tasks must be performed not for the inherent satisfaction of completing them, but for some separate outcome. When teachers are able to create an environment that fosters competence, autonomy, and relatedness, Deci and Ryan say, students are much more likely to feel motivated to do that hard work.

The problem is that when disadvantaged children run into trouble in school, either academically or behaviorally, most schools respond by imposing more control on them, not less. This diminishes their fragile sense of autonomy. As these students fall behind their peers academically, they feel less and less competent. And if their relationships with their teachers are wary or even contentious, they are less likely to experience the kind of relatedness that Deci and Ryan describe as being so powerfully motivating for young people in the classroom. Once students reach that point, no collection of material incentives or punishments is going to motivate them, at least not in a deep or sustained way.

All of which brings me back to the question of how to help children develop those mysterious noncognitive capacities. If we want students to act in ways that will maximize their future opportunities—to persevere through challenges, to delay gratification, to control their impulses—we need to consider what might motivate them to take those difficult steps. What Deci and Ryan's research suggests is that students will be more likely to display these positive academic habits when they are in an environment where they feel a sense of belonging, independence, and growth—or, to use Deci and Ryan's language, where they experience relatedness, autonomy, and competence.

So what do those academic environments look like? And how do we help teachers to create them?

A FEW YEARS AGO, a young economist at Northwestern University named C. Kirabo Jackson began investigating how to measure educators' effectiveness. In many school systems these days, teachers are assessed based primarily on one data point: the standardized-test scores of their students. Jackson suspected that the true impact teachers had on their students was more complicated than a single test score could reveal. So he found and analyzed a detailed database in North Carolina that tracked the performance of every single ninth-grade student in the state from 2005 to 2011—a total of 464,502 students. His data followed their progress not only in ninth grade but throughout high school.

Jackson had access to students' scores on the statewide standardized test, and he used that as a rough measure of their cognitive ability. This is the number that education officials generally look at when trying to assess teachers' impact. But then Jackson did something new. He created a proxy measure for students' *noncognitive* ability, using just four pieces of existing administrative data: attendance, suspensions, on-time grade progression, and overall GPA. Jackson's new index measured, in a fairly crude way, how engaged students were in school—whether they showed up, whether they misbehaved,

and how hard they worked in their classes. Jackson found that this simple noncognitive proxy was, remarkably, a better predictor than students' test scores of whether the students would go on to attend college, a better predictor of adult wages, and a better predictor of future arrests.

Just as early stress sends signals to the nervous system to prepare for trouble, early warmth and responsiveness send the opposite signals: *You're safe; life is going to be fine.*

Jackson's proxy measure allowed him to do some intriguing analysis of teachers' effectiveness. He subjected every ninth-grade English and algebra teacher in North Carolina to what economists call a value-added assessment. First he calculated whether and how being a student in a particular teacher's class affected that student's standardized-test score. Then, separately, he calculated the effect that teachers had on their students' noncognitive proxy measure: on their attendance, suspensions, timely progression from one grade to the next, and overall GPA.

Jackson found that some teachers were reliably able to raise their students' standardized-test scores year after year. These are the teachers, in every teacher-evaluation system in the country, who are the most valued and most rewarded. But he also found that there was another distinct cohort of teachers who were reliably able to raise their students' performance on his noncognitive measure. If you were assigned to the class of a teacher in this cohort, you were more likely to show up to school, more likely to avoid suspension, more likely to move on to the next grade. And your overall GPA went up—not just your grades in that particular teacher's class, but your grades in your other classes, too.

Jackson found that these two groups of successful teachers did not necessarily overlap much; in every school, it seemed, there were certain teachers who were especially good at developing cognitive skills in their students and other teachers who excelled at developing noncognitive skills. But the teachers in the second cohort were not being rewarded for their success with their students—indeed, it seemed likely that no one but Jackson even realized that they *were* successful. And yet those teachers, according to Jackson's calculations, were doing more to get their students to college and raise their future wages than were the much-celebrated teachers who boosted students' test scores.

Jackson's study didn't reveal whether these teachers increased their students' grit or optimism or conscientiousness and by how many percentage points. Instead, it suggested that that's probably the wrong question to be asking. Jackson's data showed that spending a few hours each week in close proximity to a certain kind of teacher changed *something* about students' behavior. And that was what mattered. Somehow these teachers were able to convey deep messages—perhaps implicitly or even subliminally—about belonging, connection, ability, and opportunity. And somehow those messages had a profound impact on students' psychology, and thus on their behavior.

The environment those teachers created in the classroom, and the messages that environment conveyed, motivated students to start making better decisions—to show up to class, to persevere longer at difficult tasks, and to deal more resiliently with the countless small-scale setbacks and frustrations that make up the typical student's school day. And those decisions improved their lives in meaningful ways. Did the students learn new skills that enabled them to behave differently? Maybe. Or maybe what we are choosing to call "skills" in this case are really just new ways of thinking about the world or about themselves—a new set of attitudes or beliefs that somehow unleash a new way of behaving.

SO WHICH MESSAGES most effectively motivate young people to persevere? And how does a teacher convey them to students? These are particularly lively questions in education right now, and the scholar trying most comprehensively to answer them is Camille A. Farrington, a former inner-city high-school teacher who now works at the University of Chicago Consortium on School Research. When she was teaching, Farrington sometimes felt mystified by the choices that some of her students made. Why weren't they more consistently motivated to work hard and thus reap the benefits of a good education? As a researcher, Farrington has carefully investigated this question, and in 2012, she and a team of colleagues published a report titled "Teaching Adolescents to Become Learners," which offered some novel answers.

The report was in many ways a reaction to the recent push among educators to identify, assess, and teach noncognitive skills. While Farrington agreed with the growing consensus that a student's ability to persevere in school was important, she was skeptical of the idea that perseverance could be taught in the same way that we teach math, reading, or history. "There is little evidence that working directly on changing students' grit or perseverance would be an effective lever for improving their academic performance," Farrington and her colleagues wrote. "While some students are more likely to persist in tasks or exhibit self-discipline than others, *all* students are more likely to demonstrate perseverance if the school or classroom context helps them develop positive mindsets and effective learning strategies."

They went on to identify a phenomenon they called academic perseverance—the tendency to maintain positive academic behaviors despite setbacks. What distinguishes students with academic perseverance, they wrote, is their resilient attitude toward failure. These students continue to work hard in a class even after failing a few tests; when they are stumped or confused by complex material, they look for new ways to master it rather than simply giving up. Academic perseverance, in Farrington's formulation, shares certain qualities with noncognitive capacities such as grit and self-control and delay of gratification. But unlike those personality traits, which psychologists have shown to be mostly stable over time, a student's academic perseverance, according to Farrington, is highly dependent on context. A student might be inclined to persevere in school in 10th grade but not in 11th grade. He might persevere in math class but not in history.

In essence, what Farrington found was this: If you are a teacher, you may never be able to get your students to *be* gritty, in the sense of developing some essential character trait

called grit. But you can probably make them *act* gritty—to behave in gritty ways in your classroom. And those behaviors will help produce the academic outcomes that you (and your students and society at large) are hoping for.

What makes a student persevere in any given classroom on any given day? Farrington's answer is that it depends on his academic mind-set: the attitudes and self-perceptions and mental representations that are bouncing around inside his head. That mind-set is the product of countless environmental forces, but research done by Carol S. Dweck, a Stanford psychologist, and others has shown that teachers can have an enormous impact on their students' mind-sets, often without knowing it. Messages that teachers convey—large and small, explicit and implicit—affect the way students feel in the classroom, and thus the way they behave there.

Farrington has distilled this voluminous mind-set research into four key beliefs that, when embraced by students, seem to contribute most significantly to their tendency to persevere in the classroom:

1. I belong in this academic community.

2. My ability and competence grow with my effort.

3. I can succeed at this.

4. This work has value for me.

If students hold these beliefs in mind as they are sitting in math class, Farrington concludes, they are more likely to persevere through the challenges and failures they encounter there. And if they don't, they are more likely to give up at the first sign of trouble.

The problem, of course, is that students who grow up in conditions of adversity are primed, in all sorts of ways, not to believe *any* of Farrington's four statements when they're sitting in math class. This is in part due to the neurobiological effects of adversity, beginning in early childhood. Remember that one of the signal results of toxic-stress exposure is a hyperactive fight-or-flight mechanism, which does not encourage in students the soothing belief *I belong here*. Instead, it conveys opposite warnings, at car-alarm volume: *I* don't *belong here. This is enemy territory. Everyone in this school is out to get me.* Add to this the fact that many children raised in adversity, by the time they get to middle or high school, are significantly behind their peers academically and disproportionately likely to have a history of confrontations with school administrators. These students, as a result, tend to be the ones placed in remedial classes or subjected to repeated suspensions or both—none of which makes them likely to think *I belong here* or *I can succeed at this*.

MOST AMERICAN SCHOOLS don't do a particularly good job of creating environments that convey to students, especially low-income students, the four beliefs that Farrington identified. What Kirabo Jackson seems to have discovered is that certain educators have

been able to create such an environment in their own classroom, regardless of the climate in the school as a whole. Until recently, though, school-wide strategies that encouraged these positive mind-sets in students were rare.

Now, however, some new, more comprehensive approaches are emerging. Many of them draw on the neurobiological research that explains how a childhood full of toxic stress can produce obstacles to school success. They take as their premise that in order to help students overcome those obstacles, it may be necessary to alter some basic practices and assumptions within an entire school. These efforts target students' beliefs in two separate categories, each one echoing items on Farrington's list: first, students' feelings about their place in the school (*I belong in this academic community*), and then their feelings about the work they are doing in class (*my ability and competence grow with my effort; I can succeed at this; this work has value for me*).

One example of this comprehensive approach is Turnaround for Children, a school-transformation nonprofit that works in high-poverty schools in New York City; Newark, New Jersey; and Washington, D.C. According to research done by the organization, many of the behavior-management challenges that educators in high-poverty schools face are due to the combustible combination, in the classroom, of two cohorts of students. The first is a small group of students who have experienced high levels of toxic stress (and likely have high ACE scores) and as a result are angry and rebellious and disruptive. This group, Turnaround estimates, represents between 10 and 15 percent of the student body in most high-poverty schools. Students in the second cohort have also experienced adversity and stress, but not to the same intense degree. These students are less likely to start trouble, but their highly sensitive fight-or-flight mechanisms are easily triggered when trouble arrives.

When Turnaround is contracted to work at a particular school, its intervention team, usually three or four people, begins by addressing the psychological needs of potentially disruptive students, sometimes offering them on-site counseling and mentoring, often referring them and their families to mental-health services. At the same time, the organization's team works to improve the classroom environment as a whole, coaching teachers in behavior-management techniques that dial confrontations down rather than up, and giving them strategies to help create a climate of belonging and engagement in the classroom.

Turnaround then expands its intervention to focus not just on the emotional atmosphere of the classroom but also on the teaching and learning that happens there. Last spring, I visited Middle School 45, in the Bronx, a high-poverty public school where Turnaround had been working for about a year. During my visit, much of the intervention team's focus was on encouraging teachers in what it called cooperative learning, a pedagogical approach that promotes student engagement in the learning process: less lecture time; fewer repetitive worksheets; more time spent working in small groups, solving problems, engaging in discussions, and collaborating on long-term creative projects. It's a style of teaching and classroom organization that is relatively common in independent schools and in wealthy suburbs but quite unusual in inner-city public schools.

For many teachers at MS 45, embracing this part of the Turnaround model was a challenge. Giving students more autonomy in their learning meant giving up control. And like many teachers at other high-poverty schools, those at MS 45 had come to believe that with students as potentially disruptive as theirs, strong, dominant teacher control was the only way to keep the classroom calm and orderly; handing over the reins would mean chaos. But Turnaround's coaches eventually convinced the teachers—or most of them, anyway—that giving students more opportunity to experience autonomy and to engage deeply in their own learning would improve their motivation and mind-set. When the teachers tried these new methods, they discovered, often to their surprise, that they worked.

THAT PROCESS WAS also in evidence at another school I visited recently: Polaris Charter Academy, on Chicago's West Side. Polaris is affiliated with a national nonprofit called EL Education. (The organization was known as Expeditionary Learning until October, when it changed its name.) The EL Education network is made up of more than 150 schools: urban, suburban, and rural; charter and traditional public; high-poverty and middle-class. Polaris, which enrolls students from kindergarten through eighth grade, has one of the more disadvantaged student bodies in the network: 94 percent of the students are eligible for free or reduced-price lunch, and the neighborhood where the school is located, West Humboldt Park, has high rates of violent crime, unemployment, and poverty.

Like Turnaround, EL Education uses two parallel strategies to try to develop the most beneficial academic mind-set in its students. The first strategy has to do with belonging and relationships; the second has to do with work and challenges. On the relationship side, the most important institution at EL schools is Crew, an ongoing, multiyear discussion and advisory group for students. Each EL student belongs to a crew, which typically meets every day for half an hour or so to discuss matters important to the students, both academic and personal. In middle school and high school, the groups are relatively intimate—10 or 15 kids—and students generally stay in the same crew for three years or longer, with the same teacher leading the group year after year. Many EL students will tell you that their crew meeting is the place where they most feel a sense of belonging at school; for some of them, it's the place where they most feel a sense of belonging, period.

The central premise of EL schools is that character is built not through lectures or direct instruction from teachers but through the experience of persevering as students confront challenging academic work.

Crew is the centerpiece of EL's strategy for immersing students in an environment of supportive relationships. But just as significant an element of the EL formula is its pedagogical strategy. Classrooms at EL schools are by design much more engaging and interactive than classrooms in most other American public schools. They are full of student discussions and group activities large and small; teachers guide the conversation, but they spend considerably less time lecturing than most other public-school teachers do. EL students complete a lot of rigorous and demanding long-term projects, often going through extensive and repeated revisions based on critiques from

teachers and peers. They frequently work on these projects in collaborative groups, and many projects conclude with students giving a presentation in front of the class, the school, or even a community group. In addition, students are responsible, whenever possible, for assessing themselves; two or three times a year, at report-card time, parents or other family members come to the school for meetings known as student-led conferences, in which students as young as 5 narrate for their parents and teachers their achievements and struggles over the past semester.

The pedagogical guru behind EL's instructional practices and curriculum is Ron Berger, the organization's chief academic officer. Berger, who spent 28 years working as a public-school teacher in rural Massachusetts and an educational consultant before joining EL Education, clearly feels a special connection with those EL schools, like Polaris, that enroll high numbers of students growing up in adversity. When we spoke, he explained that this feeling of connection is rooted in his own childhood: He grew up with four siblings in a chaotic and unstable family. He knows firsthand how stress and trauma at home can unsettle and derail a child's development, and he understands that without the right intervention, the child may never recover from those early setbacks.

EL schools have been shown in independent studies to have a significant positive effect on academic progress. A 2013 study by Mathematica Policy Research revealed that students at five urban EL middle schools advanced ahead of peers at comparison schools by an average of 10 months in math and seven months in reading over the course of three years. The research also shows that an EL education has a greater positive impact on low-income students than it does on other students.

Berger said he is not surprised by that latter fact; he has a clear sense of the barriers that keep some low-income students from learning, and how and why the EL model might be able to help them overcome those barriers. "Some kids get withdrawn and protective," he told me. "Other kids get this kind of shell of being a tough guy, and they're frozen in school. Either way, it restricts them from being able to contribute in class, to be a part of discussions, to raise their hand, to show that they care about their learning. It holds back any kind of passion or interaction. They can't take risks in school, and you can't learn if you're not taking risks." Berger recognizes these behaviors, he said, because they are exactly what he himself did when he was a kid.

Students at EL schools, Berger said, can't hide the way that he did. Crew helps pull them out of their shell, and in class they're compelled daily to interact with their peers and teachers in group discussions and to collaborate on group projects, and before long that kind of interaction begins to feel natural. When I visited another EL school last spring, the Washington Heights Expeditionary Learning School (known as WHEELS), in Upper Manhattan, almost every classroom I observed was engaged in some kind of elaborate discussion or creative project that demanded involvement from every student. In one seventh-grade social-science class, the students were clustered in groups of four, working together with markers on a big poster. They had been assigned to represent either the Federalist or the Republican Party during the political debates of the 1790s, and they covered their posters with slogans and arguments supporting the case for their vision of government, preparing for a class-wide debate. The teacher glided from table

to table, asking questions and offering advice, but for the most part the students managed themselves. I was struck by the unusual fact that these were middle-school students studying U.S. history who seemed genuinely to be having fun.

What's more, these students were among the most disadvantaged in the New York City public-school system. Eighty-eight percent of the student population at WHEELS has a family income that falls below the federal cutoff for a free lunch, and almost all are Latino or African American. They belong to a demographic, in other words, that in many big-city middle and high schools is seen as a behavioral challenge and an academic liability. In social-science class that day, however, they were learning complex material and behaving perfectly well—and not because they were incentivized with rewards or threatened with punishments, but because school was, for that period at least, actually kind of interesting.

Teachers and administrators at EL schools talk quite a bit about character—their term for noncognitive skills. The central premise of EL schools is that character is built not through lectures or direct instruction from teachers but through the experience of persevering as students confront challenging academic work. This, to me, is the most significant innovation in the work that is going on at EL schools. In general, when schools do try to directly address the impact that a stress-filled childhood might have on disadvantaged students, the first—and often the only—approach they employ has to do with their students' emotional health, with relationships and belonging. And while those students certainly need the sense of connection that comes from feeling embedded within a web of deep and close relationships at school, the crucial insight of EL Education is that belonging isn't enough on its own. For a student to truly feel motivated by and about school, he also has to perceive that he is doing work that is challenging, rigorous, and meaningful.

APPROACHES LIKE THOSE employed by Turnaround for Children and EL Education are growing in attention and prominence. But they are still quite rare. Most low-income students in the United States today are enrolled in schools where they are frequently disciplined but seldom challenged. That strategy clearly doesn't work very well for those students, and the research that psychologists, economists, and neuroscientists have been amassing in recent years now allows us to understand, more clearly than ever before, exactly *why* it doesn't work.

What is exciting to me about visiting schools like WHEELS and Polaris and MS 45 is that you can see the possibility, however embryonic, that a new approach to educating low-income children—one rooted in what we're discovering about brain development, human psychology, and the science of adversity—might now be emerging.

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In December, the much-criticized No Child Left Behind Act, which dominated federal education policy for the past decade and a half, was finally euthanized, replaced by a new law that mostly shifts down to the states the accountability for student success that

No Child Left Behind centralized in Washington, D.C. For all its flaws, No Child Left Behind had as its guiding principle a noble and important idea: that the academic-achievement gap between low-income children and their better-off peers could and must be closed. The law was spectacularly unsuccessful at accomplishing that goal—the gap in eighth-grade reading and math test scores has barely budged since 2003—but the failure of its methods doesn't diminish the urgency of its central goal.

Here's a hopeful thought: Perhaps with the demise of the law, the education debates that raged so furiously during the No Child Left Behind era—on charter schools and Common Core, teacher contracts and standardized testing—might now give way to more-productive discussions about what low-income children need to succeed. We know a lot more than we did when the law was passed about the powerful environmental forces that are acting on many low-income children, beginning in infancy. And we know a lot more than we used to about what interventions and strategies—both at home and in the classroom—most effectively help these young people thrive in school and beyond. A national conversation that starts from this growing scientific consensus and moves forward into policy might be our best chance to improve the lives of the 51 percent of American public-school students who most need our help.

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