

Mind over Matter

A Popular Pediatrician Stretches a Synapse or Two

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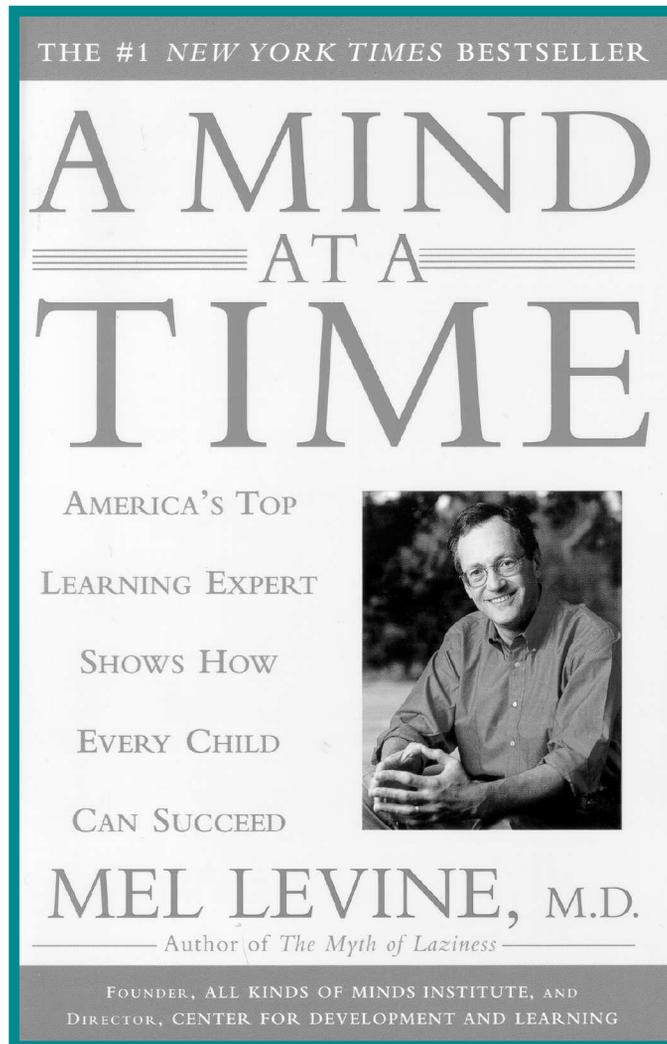
The Myth of Laziness
(Simon & Schuster, 2003)
A Mind at a Time
(Simon & Schuster, 2002)

By Mel Levine

Checked by Daniel T. Willingham

Mel Levine writes about learning disabilities in a way that sometimes invites satire. The premise of his 2003 book, *The Myth of Laziness*, for example, is that a child who appears lazy probably doesn't lack motivation, but rather suffers from "output failure." It is tempting to have a good laugh and say, "Where were you when I was in school, Doc?"

But writing Levine off as a goeey, feel-good lightweight will not do. Indeed, Levine, a professor of pediatrics at the University of North Carolina Medical School and director of UNC's Clinical Center for the Study of Development and Learning, is that rare author whose work affects not only millions of parents, but hundreds of school systems as well. While *The Myth of Laziness* had some success, his 2002 book, *A Mind at a Time*, reached #1 on the *New York Times* best-seller list and brought coverage by the national media, including (every publisher's happiest hope) an appearance on *Oprah*. And in 2005, Levine added a third work, *Ready or Not, Here Life Comes*, which tackles the transition from adolescence to adulthood. By this time, his second book's success had already given a significant



boost to All Kinds of Minds, a nonprofit organization Levine cofounded in 1995 to promote his theories. A subsidiary program, Schools Attuned, trains teachers to recognize and address learning problems in children. So far eight training centers have been set up in North America.

Levine's project got a push when state legislatures in North Carolina and Oklahoma allocated funds allowing any public school K-12 teacher to attend the course with substantial or complete

remission of the \$1,500 tuition. Then in May 2004, the New York City Department of Education signed a five-year contract with All Kinds of Minds worth about \$12.5 million to train 20,000 city teachers. By the time *60 Minutes* aired a story on the children of baby boomers last fall, Levine was called "one of the foremost authorities in the country on how children learn."

There are two questions that parents and educators should ask about Levine's program. First, Is his theory of how the mind works correct? Theories of learning disabilities (including Levine's) are theories of what happens when learning abilities have gone wrong. If you mischaracterize the abilities, your description of potential problems is inaccurate. As I'll describe, Levine's broad-strokes account of the mind agrees with that of most researchers (and for that matter, with the observant layman): there is a memory system, an attention system, and so on. But it's the detailed structure Levine claims to see within each of those systems that really drives his proposed treatments for disabled children, and on those details Levine is often wrong. The second question one should ask is, Does the evidence indicate that

his proposed treatments help? The answer is that there is no evidence, positive or negative, as to whether or not the program helps kids. Given the inaccurate description of the mind on which it is based, however, it seems unlikely that it will prove particularly effective.

Old Ideas in a New Package

Levine proposes that the human mind

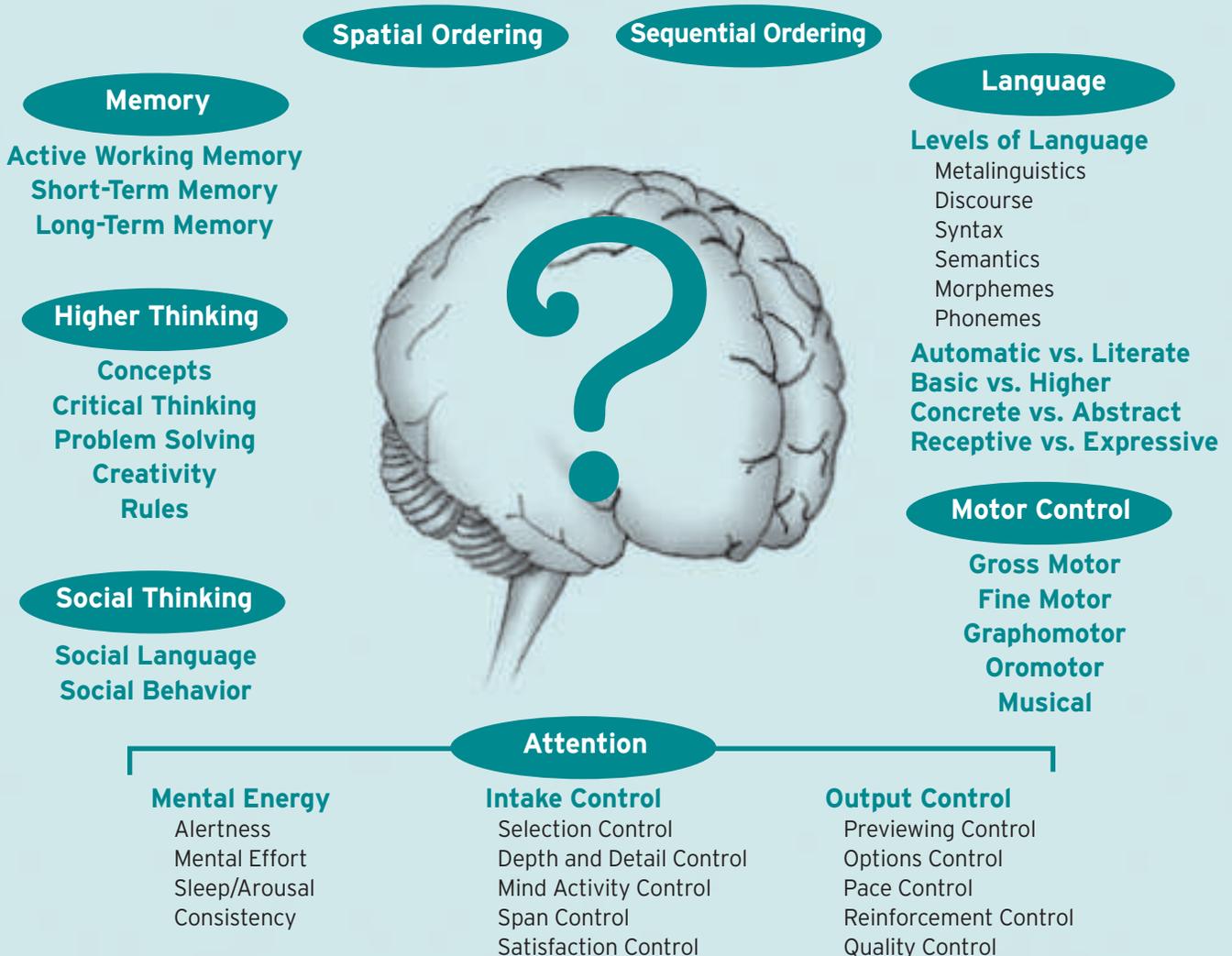
has eight major cognitive systems—and many more subsystems (see Figure 1). Much of *A Mind at a Time* describes, through case studies, what happens when one or more of these systems or subsystems fails. For example, he tells the story of Vance, who dropped out of the 9th grade. According to Levine, Vance was strong in reading and math, but he could not remember facts. Levine diagnosed Vance’s problem as a deficit in long-term

memory, one of the subsystems of memory. Despite a mind that worked well in most respects, this one glitch left Vance an academic failure, frustrated and shamed. The case typifies those described in the book: an able mind is foiled by a single weak link, and the child is failed by the school system’s inability to identify and address the problem.

Levine suggests a number of measures to help kids like Vance, some of

Levine’s View of the Mind (Figure 1)

According to Mel Levine, the mind has eight major systems and several dozen subsystems, all of which are key to understanding children’s learning disabilities—and treating them. Yet, there is very little—and sometimes no—research to support the existence of these subsystems, much less their role in learning.



SOURCE: Compiled by author, based on *A Mind at a Time*, by Mel Levine (Simon & Schuster, 2002)

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which are standard practice in the field—for example, accommodations or workarounds in the classroom. The child with a long-term memory problem might be permitted to use notes during a test; the idea is that with this long-term memory support, Vance will be able to show his cognitive strengths such as analytic skills or effective writing. Levine also suggests that teachers take care not to accidentally embarrass children with learning disabilities. For example, Vance’s teacher should ensure that other children don’t know that he has any accommodation.

In fact, the same common treatment practices that Levine suggests are rooted in assumptions about the nature of learning disabilities. For example, the strategy of allowing accommodations is based on the widely accepted belief among educational and cognitive psychologists that learning disabilities may strike a specific cognitive process, like memory, but leave others, like attention, intact. As to the emphasis on the students’ dignity, that too is based on the consensus view that learning disabilities are inborn and specific. The disabled child is not stupid or lazy and should not be blamed for his or her problem.

Levine argues forcefully that learning disabilities are inborn and specific. Both propositions, however, are already well known to those in the field. In 2002, the same year that Levine published *A Mind at a Time*, ten different national organizations, including the Department of Education and the Learning Disabilities Association of America, released a report describing points of consensus about learning disabilities. These two points—and others that Levine proposes—were among them. One could argue, on Levine’s behalf, that some parents and teachers do not share these beliefs and that *A Mind at a Time* is meant to bring important research conclusions to a broader public. The problem, however, is that Levine departs from these consensus conclusions to make a host of

claims about learning disabilities that are not supported by solid research.

Levine’s Theory

Let’s examine the architecture of the mind that Levine proposes, which serves as the theoretical backdrop for his analysis of learning disabilities. Most researchers in cognitive science (and of learning disabilities) would agree with the top level of the hierarchy in

Levine’s broad-strokes account of the mind agrees with that of most researchers. But it’s the detailed structure Levine claims to see that really drives his proposed treatments for disabled children, and is often wrong.

Figure 1: attention, memory, and motor control are separate, though interactive, systems. The separability is important because it implies that if a system is faulty, the other systems might still operate well. But these systems do interact; it’s obvious that if you don’t pay attention in class (due to a faulty attention system), you don’t learn, even if your memory system works well. (I will return to the question of interactions below.)

Although the top level of the hierarchy is standard stuff, the second and third levels of the hierarchy he proposes are anything but. And that’s the part of

the theory that Levine puts to work. Children are diagnosed and treated using concepts at the second and third level of the hierarchy. In some cases, the specific subsystems Levine identifies arguably exist—there are probably different levels of language processing much like those mentioned by Levine—but there is no research, for example, to support the existence of his 5 subprocesses of “higher order thinking” nor his 14 subprocesses of attention.

Levine’s view of sequential ordering is also inconsistent with the evidence. He appears to assign any function involving time to this process, from dribbling a basketball to punctuality. In fact, although dribbling a basketball entails timing, it is an unusual case of sequencing because the movement is largely repetitive. And there is no reason to think that keeping appointments calls on sequencing—it calls on a type of memory scientists call prospective memory. In another odd distinction, Levine argues that “automatic” language (informal speech used with peers) differs fundamentally from “literate” language (formal speech used in the classroom). These types of speech do not differ in kind, as Levine claims, but differ because the latter is more demanding than the former—formal speech is more explicit and uses a wider vocabulary. That’s why, as Levine notes, some kids can speak fluently to their friends, but are inarticulate in class. If the subsystems were separate, as he claims, one should also see the opposite pattern: kids who speak articulately in the classroom, but cannot speak informally to their parents and peers.

Seeing Is Believing

How did Levine come to his particular theory of the mind?

Since *A Mind at a Time* contains few references to the scientific literature, I telephoned All Kinds of Minds and asked the associate director of research if there was a more research-oriented

publication that I might read. She directed me to the web site of Schools Attuned, the teacher training program Levine established to promote his prescriptions for handling learning-disabled students, which lists the “research base” for the program. This research base consists of eight works, all by Levine and coauthors, none of which appeared in a peer-reviewed journal.

A review of these works reveals that they do not marshal research evidence to support their conclusions. Instead, they present the same ideas contained in *A Mind at a Time*, citing a few references that support well-accepted ideas—for example, that

attention capacity is limited—but none to shore up Levine’s particular views. Sometimes the citation makes no sense whatever, as when Levine and coauthor Martha Reed cite a 1993 paper by Richard McKee and Larry Squire for the idea that declarative knowledge is consolidated in categories, enabling growth in knowledge as the child gets older. In fact, the McKee and Squire study had nothing to do with the categorization of declarative knowledge—it was an investigation of the neural basis of a memory paradigm often used in infants.

Since Levine makes little use of existing research on the mind’s function, it

would appear that he leans heavily on his interpretations of clinical cases that he sees in his practice. Clinical case studies are always dangerous sources of evidence because there is a tendency to “see” in these cases what one’s theory leads one to expect. Even setting that problem aside, Levine makes some mistakes in interpreting his clinical observations.

One problem lies in Levine’s moving from children’s symptoms to the hypothetical disabled cognitive systems underlying them. A classic mistake in neuropsychology is assuming that the intact mind is a mirror reflection of the impaired mind. To use a well-known analogy, if you damage a transistor in a radio and the sound becomes fuzzy, it would be a mistake to assume that a normally functioning transistor is a fuzz suppressor. In the same way, it is a mistake to assume that a cognitive subsystem must lie behind every observed clinical symptom. Levine relies on such logic, however, to validate the subsystems in his theory. According to Levine, a faulty “previewing control” subsystem makes a child impulsive. A faulty “quality control” subsystem makes a child careless in monitoring how well a task is going. These behaviors are not proof of different cognitive subsystems; they are symptoms of attention deficit hyperactivity disorder (ADHD).

Levine disagrees, and he points to the fact that different children show different symptoms. If the same cognitive subsystem were impaired, he reasons, one would observe the same symptoms, but since kids have different symptoms, different cognitive subsystems must be impaired. But variability in symptoms need not indicate different disorders. For example, patients with clinical depression may show many or few of these symptoms: change in appetite, change in sleep pattern, restlessness, difficulty concentrating, and fatigue. We do not differentiate a different *type* of depression for

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each pattern of symptoms because the underlying causes of depression are the same. Similarly, there is no clear evidence for Levine's distinctions among different types of attention disorders, which he bases on different symptom patterns.

Levine also makes an error in logic when he considers motivation. He believes that all children want to succeed (which is easy to believe), but he takes that to mean that there is no variation in motivation (which is not easy to believe). In *The Myth of Laziness*, where he argues that people who appear lazy actually have "output failure," Levine says that the subsystems supporting overt behavior are faulty. Levine describes a student who had a memory problem that led to poor spelling and writing (among other problems), which in turn made his work look careless. Levine's sensitivity is to be applauded—no doubt some students who appear lazy have a learning disability. But it is just as certain that children vary in their motivation to succeed, due to a myriad of factors, including their home environment. It is a logical error to assert that because some children's apparent laziness is due to a learning disability, all children who appear to lack motivation must have a learning disability.

Another mistake of interpretation that Levine makes is diminishing the importance of the interaction of cognitive systems. Most of the systems and subsystems Levine identifies depend on attention: it is necessary for the successful deployment of memory, problem solving, reasoning, language, and so on. Similarly, a limited working memory capacity—the "workbench of the mind," where complex thought occurs—reduces one's reasoning ability, while problem solving is profoundly influenced by long-term memory, and so on. Levine acknowledges such interactions here and there, but he never comes close to giving these effects their due in specifying the implications for diagnosis and intervention.

Doubts about Diagnosis and Treatment

Learning disabilities are far from completely understood, but some facts are relatively clear. Levine's approach leads him to take a contrarian view of two of them: diagnostic categories and the effectiveness of medications for ADHD.

Levine goes into some detail on the pitfalls that diagnoses (he calls them "labels") may elicit—for example, they may be used as an excuse to prescribe medication. He argues that kids should not be "labeled," but overlooks

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the fact that categories are useful (or not) to the extent that they *mean* something. A good category allows us to make inferences about nonobvious properties: for example, categorizing an object as a dog (based on observable features such as the shape of the head, the tail) allows the inference of nonobservable features (for instance, it has lungs, it may bite). In the same way, diagnostic categories are based on observable features of the child (that is, symptoms) and tell us something about nonobservable features (such as the neural basis or associated risk factors). Refusing to use diagnostic categories is refusing to benefit from experience to infer nonobservable features. In fact, we can surmise that

Levine *must* use diagnostic categories to some extent.

If a clinician did not generalize from past cases to current patients, he or she would have to approach each case as totally novel and as though experience had no bearing on the treatment of the case. Thus what does it mean not to use "labels"? Levine does not simply mean that one should not tell the child, "You have disorder X." His comment in *A Mind at a Time*, "I have seen no convincing scientific evidence that [Asperger's syndrome] exists as a discrete disorder of some kind like a strep throat" indicates a belief that a diagnostic category must have a clear boundary of symptoms and that the relationship between the cognitive, neural, behavioral, and genetic factors must be understood before the category is useful. Psychiatry and neurology make use of diagnostic categories that initially did not meet these criteria or still do not (for example, schizophrenia, depression, Alzheimer's disease), but nevertheless prove useful. By demanding that diagnostic categories either be simple and clear or go unused, Levine throws the diagnostic baby out with the bathwater.

Levine also takes an odd position on the use of stimulant medications for kids with ADHD. Their use has been intensively studied, and the best research shows that they are more effective than behavioral therapies and that *adding* behavioral therapy to medication does not seem to work better than medication alone. It is also important to remember that untreated ADHD is associated with increased risks of substance abuse, teen pregnancy, school dropout, and other behavioral problems. These risk factors are significantly reduced by medication. You would not be aware of these facts if you read *A Mind at a Time*. Levine allows that "some children" "may benefit" from medications, and, elsewhere, that they "can have a dramatic positive impact on many." But he adds

a list of eight caveats to the use of medication, ending with this one: “After a thorough evaluation, it is often possible to avoid or at least delay the use of medication, as other therapeutic possibilities present themselves.” Trying behavioral therapy first is sensible, and it is of course appropriate to be cautious in prescribing any medication, but given existing data (and the medical community’s consensus), Levine is simply too sunny in his predictions.

Do Levine’s Interventions Work?

How effective is Schools Attuned, Levine’s teacher training program? As of this writing, the evaluation effort is in its infancy. Several research reports exist, but none is peer reviewed, and most offer qualitative, not quantitative, data with small sample sizes. All Kinds of Minds has provided grant money to independent researchers to evaluate the effectiveness of Schools Attuned, and that research is ongoing. It is worth pausing to dwell on this fact: there are virtually no data with which to evaluate the efficacy of this program, yet the program has been embraced by two states and by the largest city in the United States. Instead of reviewing studies that evaluate the program, we are left to guess at its likely effect on children.

As noted, Levine suggests that teachers make accommodations for students—for example, that the student who is slow in recalling facts be given extra time on an exam. Levine adds another prescription that is not commonplace; he suggests practice on the cognitive subsystem that is impaired. That is, some practice is directed at the faulty subsystem itself in an effort to improve its workings, practice that need not be centered on schoolwork. The child who cannot express himself well verbally, for example, is to tell stories at every opportunity and to play word games such as Scrabble. This strategy gives rise to two concerns.

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First, such intervention depends on an accurate diagnosis. If Levine’s theory of the mind and how it fails is incorrect, some percentage of children will be diagnosed incorrectly and the remediation misdirected.

Second, Levine assumes that cognitive processes are open to direct change through practice. Some of Levine’s subsystems likely don’t exist, but those that do are known to be more or less open to practice effects. For example, long-term memory cannot be changed, but students can learn tricks and strategies (such as using visual images) that will maximize the efficiency of even a poor memory system. Such strategy instruction is a typical intervention for learning-disabled children; properly applied, it can be effective. Levine offers some good suggestions in this vein, but he also makes suggestions that are known to be wrong. For example, he argues that memory would be improved if school classes were longer, when in fact study that is distributed in time is known to be superior.

But other cognitive processes are very likely resistant to remediation. Working memory can improve with practice, but the improvement is quite specific to the practiced task and does not generalize. Levine’s suggestion to

exercise it with increasingly long arithmetic problems will yield little benefit. Also, problem solving or other higher-level thinking skills are very difficult to practice in any direct sense, in part because they are so closely tied to background knowledge. There are no general-purpose tricks to be learned that can improve them as there are with long-term memory.

Some of Levine’s interventions are designed to help the child’s emotional life, and those are both simple to implement and likely to be effective. As noted, Levine suggests that teachers avoid revealing to the student’s peers that the child has a deficit. Levine also emphasizes explaining to the child why she is having trouble in school and emphasizing that the problem is self-contained; the child should not think of herself as stupid. I suspect that many sensitive teachers are already following these guidelines. Still, Levine does well to assume that they are not and to emphasize their importance.

Other Levine ideas are more novel but still deserve consideration. Students should not take the identification of a learning disability as an excuse for poor performance, Levine argues, but rather as a reason to work all the harder. Further, Levine suggests that teachers should request “payback” from the student for the accommodation. Payback could bring several benefits: it not only represents fairness to the rest of the class, but also communicates to the student that she is as responsible as anyone else in the class to work hard *and* that she has talents to draw on. These prescriptions strike me as insightful, powerful, and uncommon. Levine is at his best when he considers the emotional life of learning-disabled children.

A Final Analysis

I began by asking whether Levine’s theory is accurate and whether there is evidence that his program will help children. The answer to the first question should be clear; in scientific terms,

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A Mind at a Time and *The Myth of Laziness* are riddled with error. Even worse, there is currently no evidence regarding the effectiveness of the Schools Attuned program, and the inaccuracy of the theory makes it inevitable that some kids are going to be misdiagnosed and some interventions are going to be misapplied or faulty. Further, Levine does not acknowledge that a sizable fraction of the kids in special-education classes identified as learning disabled don't have a cognitive problem; they have an emotional disturbance or a chaotic home life.

These problems don't mean that Schools Attuned will be a disaster. The program calls for teachers to provide more individual attention, for parents to change the student's home environment, or for other professionals to be brought in to work with the child. Such emotional support and care may well have beneficial effects on the child's attitude toward school and

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subsequent effort. But I suspect that another program able to recruit the same resources from parents, teachers, and other professionals but based on solid research evidence would prove more effective.

The obstacles to recruiting these resources are not trivial. Levine is a clinician, meaning he deals with parents who care enough to bring their child in to be evaluated and therefore are prob-

ably invested enough to take on the extra work with their children that Levine prescribes. Special-education teachers in schools more often deal with parents who are not so invested. Still, motivating others may be Levine's greatest strength; he writes positively and passionately about the potential in every child.

Perhaps the greatest testimony to Levine's passion and power of persuasion is that decisionmakers in North Carolina, Oklahoma, and New York City have invested good money and staked the learning of vulnerable children on Schools Attuned, not with solid evidence of efficacy, but because it sounded good to them—they didn't have anything else to go on.

Daniel T. Willingham is a professor of psychology at the University of Virginia. Willingham thanks Rick Brigham for help in the preparation of this article.

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