

The Case for Limitlessness Has Its Limits

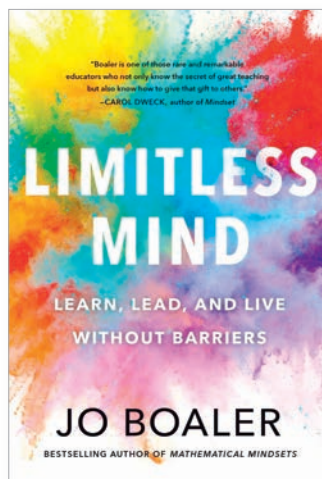
Limitless Mind: Learn, Lead, and Live without Barriers
by Jo Boaler

HarperCollins, 2019, \$26.99; 256 pages.

As reviewed by Daniel Ansari

PERHAPS IT'S TRUE that you can't judge a book by its cover—but the bright splashes of color on the cover of *Limitless Mind* certainly suggest that this book will be full of positive messages. And it is. Jo Boaler, a professor of mathematics education at Stanford, devotes a chapter to each of six “learning keys.” Each key is a variation on the overall theme of the book, which sets out to make the case that intelligence is not a fixed entity, and that most everyone has the potential to learn most anything. In parts, this volume reads like a self-help book for developing positive self-beliefs and unleashing one's previously unknown intellectual powers. It contains touching anecdotes and examples of how to apply the keys to achieving a “limitless mind,” with particular attention to math. However, while the book's content is a mile wide, its substance is little more than an inch deep.

The central themes of the book are aligned with Boaler's previous volume, *Mathematical Mindsets*, but here she recasts her message to address audiences beyond K–12 math educators. As in the earlier book, Boaler grounds her main thesis in Carol Dweck's highly popular “mindset” theory, which holds that many children and adults have fixed mindsets: they believe they have limited competencies and will hit a distinct ceiling in what they can learn and do. Individuals with a “growth” mindset, by contrast, believe that if they apply themselves and work hard, they can overcome challenges and continue to acquire new knowledge and skills. There is, of course, much to like about the notion that students can change their mindsets, alter the way they view their own learning, come to realize that with work and practice they can build their skills, and ultimately understand that learning involves struggle.



Unfortunately, Boaler's review of the empirical literature on efforts to change mindsets uses outdated studies and overstates the effects of the interventions. Some of the early studies on this subject did indeed suggest that mindset interventions among students had large transfer effects on their academic learning, but subsequent work with larger, more representative samples of students has shown that these effects are, at best, modest—and possibly, nonexistent. A recent study with more than 12,000 U.S. 9th graders showed that, following less than an hour of computerized mindset intervention, lower-achieving students raised their grade

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point averages by 0.1 points in subjects such as math, science, and English—representing a small but significant transfer effect. In contrast, a randomized controlled trial conducted by the United Kingdom's Education Endowment Foundation found almost no evidence for a positive effect of a mindset intervention targeted at both students and their teachers. In sum, the evidence from these large-scale trials is mixed, and the positive effects reported are smaller than those conveyed in some of the earlier work on mindset intervention that Boaler cites in her book. The newest

research does not support the book's strong claims about mindset.

Ironically, despite reviews and blog posts pointing out Boaler's clear errors of interpretation and inference in her previous writings, she adopts a fixed mindset when it comes to scientific evidence, continuing her past tendency to play fast and loose with these findings and to ignore those that run counter to her narrative.

In Chapter 2, for example, the author discusses research on neuronal plasticity—the ability of the brain to change in its structure and activity as a function of learning and skills acquisition. She uses evidence that the brain changes when we learn and that it can recover (at least partially) from injury as support for her assertion that all humans can do anything they put their minds to and that there are no differences between them in terms of their learning potential. In so doing, Boaler paints brain plasticity as invariably positive. However, brain plasticity is a biological mechanism by which organisms adapt to their environments. It is neither positive nor negative, and it offers no direct implications for the way scientists think about learning and education. Certainly, if brains were not capable of changing there would be no point in having schools and other places of learning, but beyond this basic fact, the tangible implications of brain plasticity are limited. Our brains are changing all the time, but it does not follow that our learning capabilities are limitless.

Similarly, Boaler takes evidence that brain regions are connected to one another to suggest that people benefit from a “multidimensional approach” to teaching and learning. In teaching math, for instance, such an approach would focus not just on solving problems and applying formulas but also on building such skills as asking good questions, interpreting a problem in various ways, using logic and reasoning, and explaining concepts to others. The author states that “anyone can learn the content of any subject

with a multidimensional approach.” Not only is this a very strong claim about the equipotentiality of learners, but its link to research on brain connectivity is nothing but tenuous.

Boaler also presents a ringing endorsement of the educational approaches of Barbara Arrowsmith, who has developed a commercial program to help students with learning disabilities. The program is based on an idiosyncratic interpretation of brain plasticity inspired by Arrowsmith’s own experience with brain injury. In her enthusiastic discussion of Arrowsmith’s approach, Boaler does not mention that the program has not been supported by rigorous empirical evidence, such as a randomized controlled trial, and has been widely criticized by leading developmental psychologists.

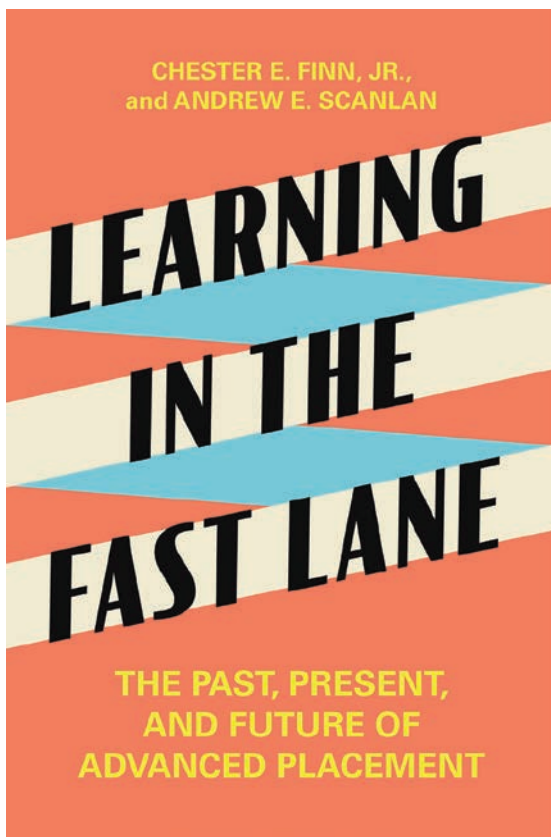
Throughout the book, Boaler adopts such an extreme “nurture” bias that I almost expected her to endorse the “tabula rasa” view of child development: that children are born as blank slates

without biological constraints on how they learn and develop. In overemphasizing nurture, Boaler ignores mountains of research showing that nature does influence differences between people: our genetic makeups *do* make us different from each other. Boaler briefly acknowledges that “at birth everyone is born with their own unique brain, and there are differences between people’s brains,” but she undercuts that by going on to say, “but the differences people are born with are eclipsed by the many ways people can change their brains.” This argument, and the even more startling assertion that “less than 0.001 percent” of individuals are influenced by the capabilities they were born with, are offered without any substantiating evidence.

The messages of *Limitless Mind* might leave some readers feeling positive and uplifted—but ignoring the truth that people vary in their abilities and learning potential could leave others frustrated that, even after adopting a growth mindset and

a “multidimensional approach,” they still don’t succeed in their learning as fully as others. It is unscientific to ignore the well-established fact that both nature and nurture have complex effects on learning and development and indeed are related to one another. Claims to the contrary set up dangerous and unrealistic expectations. Instead of buying in to the irresponsible message that we all have exactly the same potential, educators might do well to embrace the diversity of human skills and ability and seek to design educational environments that allow individuals to express who they are. Rather than proclaiming the limitlessness of all minds, teachers and parents might choose to place no limits on their appreciation of, and compassion for, the numerous, fascinating differences among people.

Daniel Ansari is a professor in the Department of Psychology and the Faculty of Education at Western University, Canada.



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