

INTELLIGENCE

Can We Keep Getting Smarter?

Ever rising IQ scores suggest that future generations will make us seem like dimwits in comparison

By Tim Folger

TWENTY-EIGHT YEARS AGO JAMES R. FLYNN, A researcher at the University of Otago in New Zealand, discovered a phenomenon that social scientists still struggle to explain: IQ scores have been increasing steadily since the beginning of the 20th century. Flynn went on to examine intelligence-test data from more than two dozen countries and found that scores were rising by 0.3 point a year—three full points per decade. Nearly 30 years of follow-up studies have confirmed the statistical reality of the global uptick, now known as the Flynn effect. And scores are still climbing.

“To my amazement, in the 21st century the increases are continuing,” says Flynn, whose most recent book on the subject—*Are We Getting Smarter?*—is being published this month. “The latest data show the gains in America humming right along at the old rate of three tenths of a point a year.”

One of the strangest aspects of the Flynn effect is its relentless monotony—it

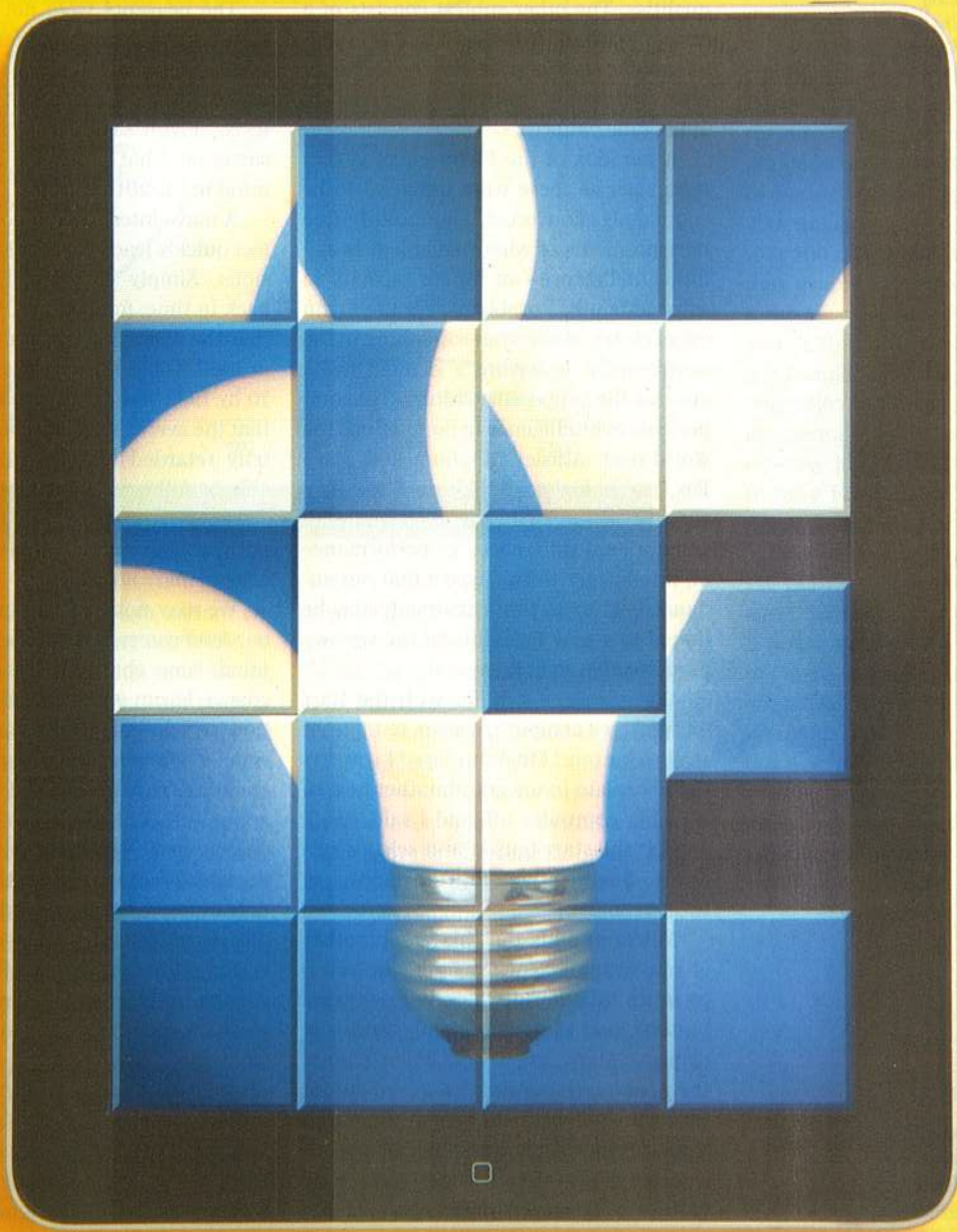
does not slow or stop and restart. It just moves steadily upward, “as if guided by an invisible hand,” Flynn says. Joseph Rodgers, a psychologist at the University of Oklahoma, examined the test results of nearly 13,000 American students to see if he could detect the Flynn effect on more granular timescales. “We wondered if the students’ scores would get better over a five- or 10-year period. Well, they get better over a one-year period,” Rodgers says. “The increase is there, systematically, year by year by year. Kids born in 1989 do a little better than kids born in 1988.”

The Flynn effect means that children will, on average, score about 10 points higher on IQ tests than their parents did. By the end of this century our descendants will have nearly a 30-point advantage over us—the difference between average intelligence and the top 2 percent of the population—if the Flynn effect continues. But can it continue? Will the trend go on indefinitely, leading to a future filled with people who would be considered geniuses by today’s standards? Or is there some natural limit to the Flynn effect and to human intelligence?

THE MODERN MIND

ALMOST AS SOON AS researchers recognized the Flynn effect, they saw that the ascending IQ scores were the result almost entirely of improved performances on specific parts of the most widely used intelligence tests. One such test, the Wechsler Intelligence Scale for Children, or WISC, has multiple sections, each of which assesses different skills. It would seem more natural to expect improvements in crystallized intelligence—the kind of knowledge picked up in school. That is not happening, however. The scores in the sections that measure skills in arithmetic and vocabulary levels have remained largely constant over time.

Most of the IQ gains come from just



Photograph by Kevin Van Aelst



Tim Folger is an award-winning science writer and editor of *The Best American Science and Nature Writing* series of books.

two subtests devoted to abstract reasoning [see box on opposite page]. One deals with “similarities” and poses questions such as “How are an apple and an orange alike?” A low-scoring answer would be “They’re both edible.” A higher-scoring response would be “They’re both fruit,” an answer that transcends simple physical qualities. The other subtest consists of a series of geometric patterns that are related in some abstract way, and the test taker must correctly identify the relation among the patterns.

A paradox of the Flynn effect is that tests such as these were designed to be completely nonverbal and culture-free measurements of what psychologists call fluid intelligence—an innate capacity to solve unfamiliar problems. Yet the Flynn effect clearly shows that something in the environment is having a marked influence on the supposedly culture-free components of intelligence in populations the world over. Ainsley Mitchum and Mark Fox, psychologists at Florida State University who have made detailed studies of generational differences in performance on intelligence tests, suspect that our enhanced ability to think abstractly may be linked to a new flexibility in the way we perceive objects in the world.

“Everybody is familiar with the start ‘button’ on a computer screen, but it’s not really a button,” Mitchum says. “I was trying to explain to my grandmother how to turn her computer off, and I said, ‘Well, you hit the start button and select shut-down.’ She was banging the mouse on the screen.”

Mitchum adds that his grandmother is not unintelligent. She did, however, grow up in a world where buttons were buttons, and phones certainly were not cameras. Many researchers, Flynn among them, argue that rising IQ scores do not reflect an increase in our raw brainpower. Rather the Flynn effect shows how *modern* our minds have become. Such tests require a facility with recognizing abstract categories and making connections among them. And that facility, Flynn says, has become more useful over the past century than at any previous time in human history.

“If you don’t classify abstractions, if you’re not used to using logic, you can’t really master the modern world,” Flynn says. “Alexander Luria, a Soviet psychologist, did some wonderful interviews with

peasants in rural Russia in the 1920s. He would say to them, ‘Where there is always snow, bears are always white. There is always snow at the North Pole. What color are the bears there?’ They would say they had never seen anything but brown bears. They didn’t think of a hypothetical question as meaningful.”

The peasants were not stupid. Their world just required different skills. “I think the most fascinating aspect of this isn’t that we do so much better on IQ tests,” Flynn says. “It’s the new light it sheds on what I call the history of the mind in the 20th century.”

A naive interpretation of the Flynn effect quickly leads to some strange conclusions. Simply extrapolating the effect back in time, for example, would suggest that the average person in Great Britain in 1900 would have had an IQ of around 70 by 1990 standards. “That would mean that the average Brit was borderline mentally retarded and wouldn’t have been able to follow the rules of cricket,” says David Hambrick, a cognitive psychologist at Michigan State University. “And of course, that’s absurd.”

We may not be more intelligent than our forebearers, but there is no doubt our minds have changed. Flynn believes the change began with the industrial revolution, which engendered mass education, smaller families, and a society in which technical and managerial jobs replaced agricultural ones. New professional classes emerged—engineers, electricians, industrial architects—and their positions demanded a mastery of abstract principles. Education, in turn, became the driver for still more innovation and social change, setting up an ongoing positive feedback loop between our minds and a technology-based culture that does not seem likely to end any time soon.

Most researchers agree with Flynn’s broad assessment that the industrial revolution and technological advances are responsible for his eponymous effect. Yet pinning down precise causes—which might allow for the design of educational or social policies to augment the effect—has been difficult. Improvements in education certainly account for part of the advances. As recently as the beginning of the 20th century, most Americans spent no more than seven years in school. Today about half of all adults have had at least some tertiary education.

IN BRIEF

IQ scores have been steadily rising for a century, a phenomenon now known as the Flynn effect.

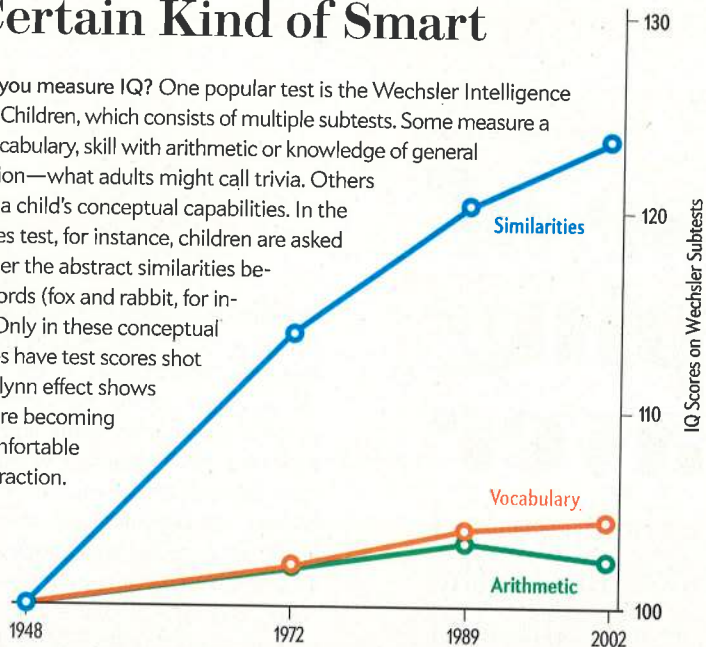
The surge in scores comes from supposedly “culture-free” tests of intelligence such as pattern matching.

Researchers believe the effect has its root in the increasingly abstracted nature of modern life.

More advanced minds create technologies that, in turn, enhance intelligence still further, forging a feedback loop that shows no signs of abating.

A Certain Kind of Smart

How do you measure IQ? One popular test is the Wechsler Intelligence Scale for Children, which consists of multiple subtests. Some measure a child's vocabulary, skill with arithmetic or knowledge of general information—what adults might call trivia. Others examine a child's conceptual capabilities. In the similarities test, for instance, children are asked to consider the abstract similarities between words (fox and rabbit, for instance). Only in these conceptual categories have test scores shot up. The Flynn effect shows that we are becoming more comfortable with abstraction.



Formal education, though, cannot entirely explain what is going on. Some researchers had assumed that most of the IQ increases seen over the 20th century might have been driven by gains at the left end of the intelligence bell curve among those with the lowest scores, an outcome that would likely be a consequence of better educational opportunities. A recent study by Jonathan Wai and Martha Putallaz of Duke University, however, looked at 20 years of data that comprise 1.7 million test results of fifth, sixth and seventh graders and found that the scores of the top 5 percent of the students were going up in perfect lockstep with the Flynn effect. "For the first time we have evidence that the whole intelligence curve is rising," Wai says. Wai and Putallaz's results suggest that because the whole curve is shifting, the cultural forces behind the increase must be influencing everyone equally. In a paper now in press, the researchers speculate that the ubiquity of sophisticated video games—and even some television shows—may provide a training ground that enhances the problem-solving skills needed for IQ tests.

For Rodgers, the universality of the Flynn effect confirms the pointlessness of seeking a single cause: "There must be

four or five dominant causes, any one of which can stand against fluxes or wanes in the other." Improved childhood nutrition, universal education, smaller families and the influence of educated mothers on their children are some of the most likely causes. "As long as two causes were in existence, even when something like the Second World War came along and caused the other two to disappear, the Flynn effect kept cranking along," he says.

MENTAL EVOLUTION

WHAT WILL the future bring? Will IQ scores keep going up? One thing we can be sure of is that the world around us will continue to change, largely because of our own actions.

Flynn likes to use a technological analogy to describe the long-term interaction between mind and culture. "The speeds of automobiles in 1900 were absurdly slow because the roads were so lousy," he says. "You would have shaken yourself to pieces." But roads and cars co-evolved. When roads improved, cars did, too, and improved roads prompted engineers to design even faster cars.

Our minds and culture are locked in a similar feedback loop. We are creating a world where information takes forms and

moves with speeds unimaginable just a few decades ago. Every gain in technology demands minds capable of accommodating the change, and the changed mind reshapes the world even more. The Flynn effect is unlikely to end during this century, presaging a future world where you and I would be considered woefully premodern and literal.

Of course, our minds are not only changing in ways that can be captured by IQ tests. "People are getting faster—I'm certain of this," Hambrick says. "A common practice in reaction-time research is to discard responses that are below about 200 milliseconds. It had been thought that 200 milliseconds is about the fastest that people can respond. But if you ask someone who has done this sort of research, they're having to discard more trials; people are getting faster. We text, we play video games, we do a lot more things that require really fast responses. I think once we have enough data, we'll be able to see a Flynn-like effect on measures of perceptual speed."

Maybe we should not be so surprised by the existence of something like the Flynn effect. Its absence would be more startling; it would mean we were no longer responding to the world we are creating. The Flynn effect itself is neither good nor bad—it is a symptom of our adaptability, and the abilities it reflects allow us to destroy as well as to create. If we are lucky, perhaps we will keep building a world that will make us smarter and smarter—one where our descendants will marvel at our simplicity. ■

MORE TO EXPLORE

Flynn's Effect. Marguerite Holloway in *Scientific American*, Vol. 280, No. 1, pages 37-38; January 1999.

Solving the IQ Puzzle. James R. Flynn in *Scientific American Mind*, Vol. 18, No. 5, pages 24-31; October 2007.

Are We Getting Smarter? Rising IQ in the Twenty-First Century. James R. Flynn. Cambridge University Press, 2012.

SCIENTIFIC AMERICAN ONLINE

Listen to an interview with James R. Flynn at ScientificAmerican.com/sep2012/flynn