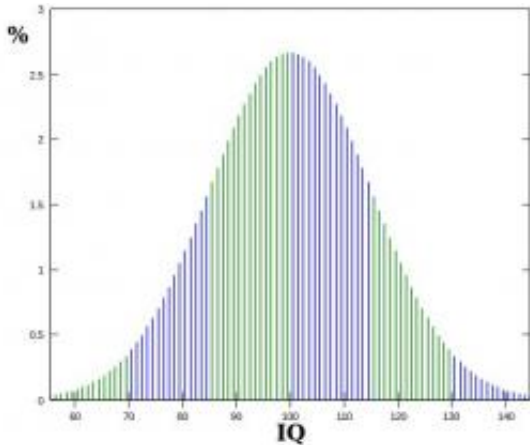


More schools, more challenging assignments add up to higher IQ scores

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The IQs of a large enough population are calculated so that they conform to a normal distribution with a mean of 100 and a standard deviation of 15. Image: Wikipedia.

More schooling—and the more mentally challenging problems tackled in those schools—may be the best explanation for the dramatic rise in IQ scores during the past century, often referred to as the Flynn Effect, according to a team of researchers. These findings also suggest that environment may have a stronger influence on intelligence than many genetic determinists once thought.

Researchers have struggled to explain why IQ scores for developed nations—and, now, developing nations—have increased so rapidly during the 20th century, said David Baker, professor of sociology and education, Penn State. Mean IQ test scores of American adults, for instance, have increased by about 25 points over the last 90 years.

"There've been a lot of hypotheses put forward for the cause of the Flynn Effect, such as genetics and nutrition, but they generally fall flat," said Baker. "It really begged the question of whether an environmental factor, or factors, could cause these gains in IQ scores."

School enrollment in the United States reached almost 90 percent by 1960. However, the researchers, who report their findings in the current issue of *Intelligence*, suggest that it is not just increasing attendance, but also the more challenging learning environment that are reasons behind the IQ score rise.

"If you look at a chart of the Flynn Effect over the 20th century in the United States, for example, you notice that the proportion of children and youth attending school and how long they attend lines up nicely with the gains in IQ scores," said Baker. "As people went to school, what they did there likely had a profound influence on brain development and thinking skills, beyond just learning the three R's. This is what our neurological and cognitive research shows."

He added that over the century, as a higher percentage of children from each new generation went to school and attended for more years, this produced rising IQ scores.

"Even after full enrollments were achieved in the U.S. by about the 1960s, school continued to intensify its influence on thinking," said Baker.

While even basic schooling activities can shape [brain development](#), over the past century, schools have moved from learning focused on memorization to lessons that require problem solving and abstract [thinking skills](#), which are often considered functions of fluid intelligence, Baker said.

"Many like to think that schooling has become 'dumbed down,' but this is not true," said Baker. "This misperception has tended to lead cognitive scientists away from considering the impact of schooling and its spread over time as a main social environment in neurological development."

Just as more physical exercise can improve sports

performance for athletes, these more challenging mental workouts in schools may be building up students' mental muscles, he added, allowing them to perform better on certain types of problems that require flexible thinking and abstract problem solving, such as IQ tests.

"Certain kinds of activities—like solving problems, reading—stimulate the parts of the brain that we know are responsible for fluid intelligence," said Baker. "And these types of activities are done over and over in today's schools, so that you would expect these students to have higher development than populations of people who had no access to schooling."

Students must not only solve more challenging problems, they must use multiple strategies to find solutions, which adds to the mental workout in today's schools, according to Baker.

The researchers conducted three studies, from neurological, cognitive and demographic perspectives, according to Baker.

He said that genetics alone could not explain the Flynn Effect. Natural selection happens too slowly to be the sole reason for rising IQ scores. This suggests that intelligence is a combination of both genetics and environment.

"The best neuroscience is now arguing that brains of mammals, including, of course, humans, develop in this heavy genetic-environmental dependent way, so it's not an either-or situation," said Baker. "There's a high genetic component, just like there is for athletic ability, but the environment can enhance people's abilities up to unknown genetic limits."

In the first study, the researchers used functional Magnetic Resonance Imaging to measure brain activity in children solving certain math problems. They found that problems typical of today's schooling activated areas of the brain known as centers of fluid intelligence, for instance, mathematical problem solving.

A field study was also conducted in farming communities in Peru where education has only recently become fully accessible. The survey

showed that schooling was a significant influence on improved cognitive functioning.

To measure the challenge level of lessons, the researchers analyzed more than 28,000 pages of content in textbooks published from 1930 to 2000. They measured, for example, whether students were required to learn multiple strategies to find solutions or needed other mental skills to solve problems.

Provided by Pennsylvania State University

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