

MicroRNA Expression Plasmids
\$295 Each

ORIGENE
Your Gene Company

[AAAS.ORG](#) | [FEEDBACK](#) | [HELP](#) | [LIBRARIANS](#)

Daily News

Enter Search Term

ADVANCED

[ALERTS](#) | [ACCESS RIGHTS](#) | [MY ACCOUNT](#) | [SIGN IN](#)

[News Home](#) | [ScienceNOW](#) | [ScienceInsider](#) | [Premium Content from Science](#) | [About Science News](#)

[Home](#) > [News](#) > [ScienceNOW](#) > [April 2011](#) > [What Does IQ Really Measure?](#)

Science **NOW** UP TO THE MINUTE NEWS FROM SCIENCE

What Does IQ Really Measure?

by Michael Balter on 25 April 2011, 3:02 PM | [Permanent Link](#) | [24 Comments](#)

[Email](#) | [Print](#) |

[More](#)

[PREVIOUS ARTICLE](#)

[NEXT ARTICLE](#)

Kids who score higher on IQ tests will, on average, go on to do better in conventional measures of success in life: academic achievement, economic success, even greater health, and longevity. Is that because they are more intelligent? Not necessarily. New research concludes that IQ scores are partly a measure of how motivated a child is to do well on the test. And harnessing that motivation might be as important to later success as so-called native intelligence.

Researchers have long debated what IQ tests actually measure, and whether average differences in IQ scores—such as those between different ethnic groups—reflect differences in intelligence, social and economic factors, or both. The debate moved heavily into the public arena with the 1994 publication of *The Bell Curve* by Richard Herrnstein and Charles Murray, which suggested that the lower average IQ scores of some ethnic groups, such as African-Americans and Hispanics, were due in large part to genetic differences between them and Caucasian groups. That view has been challenged by many scientists. For example, in his 2009 book "Intelligence and How to Get It," Richard Nisbett, a psychologist at the University of Michigan, Ann Arbor, argued that differences in IQ scores largely disappear when researchers control for social and economic factors.

New work, led by Angela Lee Duckworth, a psychologist at the University of Pennsylvania, and reported online today in the *Proceedings of the National Academy of Sciences* explores the effect of motivation on how well people perform on IQ tests. While subjects taking such tests are usually instructed to try as hard as they can, previous research has shown that not everyone makes the maximum effort. A number of studies have found that subjects who are promised monetary rewards for doing well on IQ and other cognitive tests score significantly higher.

To further examine the role of motivation on both IQ test scores and the ability of IQ tests to predict life success, Duckworth and her team carried out two studies, both reported in today's paper. First, they conducted a "meta-analysis" that combined the results of 46 previous studies of the effect of monetary incentives on IQ scores, representing a total of more than 2000 test-taking subjects. The financial rewards ranged from less than \$1 to \$10 or more. The team calculated a statistical parameter called Hedge's *g* to indicate how big an effect the incentives had on IQ scores; *g* values of less than 0.2 are considered small, 0.5 are moderate, and 0.7 or higher are large.

Duckworth's team found that the average effect was 0.64 (which is equivalent to nearly 10 points on the IQ scale of 100), and remained higher than 0.5 even when three studies with unusually high *g* values were thrown out. Moreover, the effect of financial rewards on IQ scores increased dramatically the higher the reward: Thus rewards higher than \$10 produced *g* values of more than 1.6 (roughly equivalent to more than 20 IQ points), whereas rewards of less than \$1 were only one-tenth as effective.

In the second study, Duckworth and her colleagues analyzed data from an earlier study of more than 500 boys from Pittsburgh, Pennsylvania, whose IQs were tested in the late 1980s by a team from the University of Wisconsin, Madison. During the IQ test, the boys, whose average age was 12.5 years, were videotaped; then observers trained

[ENLARGE IMAGE](#)



Effort helps makes you smart? Kids who are more highly motivated on IQ tests achieve higher scores.

Credit: iStockphoto

ADVERTISEMENT



[Click Here for More Information](#)

ADVERTISEMENT

SAVE 20%
on BD extracellular matrices

Poly-D-Lysine
BD™ PuraMatrix™
Collagen
Fibronectin
Vitronectin
Osteopontin

Collagen
Poly-D-
Matrix™
Fibronectin
BD

ScienceNOW. ISSN 1947-8062

to detect signs of boredom and lack of motivation (such as yawning, laying their heads on the table, or looking often around the room) viewed the videos and assigned motivation scores.

Researchers followed the boys over time, and when the boys reached early adulthood (average age 24), 251 of them agreed to a series of interviews about their educational and job achievements (there were no differences in IQ or other key factors between those boys who participated and those who didn't.)

Duckworth's team analyzed the results of these earlier studies to see what they said about the relationship between motivation, IQ scores, and life success. By constructing a series of computer models of the data, the team found that higher motivation accounted for a significant amount of the differences in IQ scores and also in how well IQ predicted later success in life. For example, differences in motivation levels accounted for up to 84% of the differences between the boys in how many years of school they had completed or whether they had been able to find a job. On the other hand, motivation differences accounted for about only 25% of the differences in how well they had done in school as teenagers. According to the researchers, that suggests that native intelligence does still play an important role in both IQ scores and academic achievement.

Nevertheless, the Duckworth team concludes that IQ tests are measuring much more than just raw intelligence--they also measure how badly subjects want to succeed both on the test and later in life. Yet Duckworth and her colleagues caution that motivation isn't everything: The lower role for motivation in academic achievement, they write, suggests that "earning a high IQ score requires high intelligence in addition to high motivation."

The study has important social policy implications, Duckworth says. "I hope that social scientists, educators, and policy makers turn a more critical eye to any kind of measure, intelligence or otherwise," she says, adding that how hard people try "could be as important to success in life as intellectual ability itself." Duckworth suggests that admissions to programs for "gifted and talented" children should not be based on IQ scores alone, but also on "who wants to do the work."

Nisbett agrees that the study is "tremendously important in its implications." Motivation, along with self-discipline, "are crucial," Nisbett says. "A high IQ and a subway token will only get you into town."

Lex Borghans, an economist at the Maastricht University in the Netherlands, who has also studied the relationship between intelligence tests and economic success, says the new report shows that "both intelligence and personality matter." Even if native intelligence cannot be increased, Borghans says, "there might be other routes to success."

Follow **ScienceNOW** on [Facebook](#) and [Twitter](#)

Posted in [Neuroscience](#)

[Email](#) | [Print](#) | [Share](#) **1256** **47** retweet **11** [More](#)

Related Articles



APRIL 26, 2011
Female Dogs Aren't Easily Fooled



APRIL 26, 2011
ScienceShot: Smart Birds Live in the City



APRIL 15, 2011
Podcast: Senior Moments, Mass Extinctions, and Facebooking Ants

What's on your mind...

[Follow](#)
Cancel Post

Echo 24 Items

[Admin](#)

[Dr. Colossus](#)



but all ANY test does is determine how good you are at that specific task. This does not necessarily imply some underlying intelligence. How do you know that you are hiring someone good for the job and not someone who can sound good for the job in an interview?

Tuesday, May 03, 2011, 20:54:44 – Flag – Like – Reply



W.F. Gayton

I agree that a high IQ and a subway token only get you into town. I would suggest however, that all the motivation in the world will not get you into town without the intelligence necessary to figure out how to get there.

Saturday, April 30, 2011, 22:55:13 – Flag – Like – Reply

Liked by Dr. Colossus



William Braden

The meta-analysis is convincing, as motivation was varied by the experimenters. The second study, not so much. Students who find the material difficult are likely to experience boredom and lack of motivation, so motivation depends on "intelligence" as well as the other way around. (I suspect their conclusions are correct anyway!)

Saturday, April 30, 2011, 17:20:20 – Flag – Like – Reply



Dr. S.R. Keister

I am now aged 89 and a retired rheumatologist and my recollection is that in 1938, while in high school, a friend and I were called to the principles office to take a test as a favor to a lady doing a PhD dissertation. It was called The Stanford Binet Test. My friend and I looked at it as a lark, no examination apprehension, and lightheartedly flew through it. Later on my cohort was notified that his IQ was 134---he went on to study for a PhD and ended up as his career in a very important U.S. government position. I scored 130 and afterwards spent 40 years as a physician. We both wonder now how we would have scored if we had taken the test seriously..

Wednesday, April 27, 2011, 15:03:35 – Flag – Like – Reply

Liked by Guest



YZ

"For example, differences in motivation levels accounted for up to 84% of the differences between the boys in how many years of school they had completed or whether they had been able to find a job. On the other hand, motivation differences accounted for about only 25% of the differences in how well they had done in school as teenagers. According to the researchers, that suggests that native intelligence does still play an important role in both IQ scores and academic achievement. "

Doesn't this mean motivation is much more important than IQ in terms of long term success (e.g. finding a job)? It also suggests that our current school system fails to pick out these students. Of course everyone knows it already.

Wednesday, April 27, 2011, 10:31:45 – Flag – Like – Reply



Damian

I stopped reading when you mentioned "The bell curve" and what it suggested, as if this is an accepted view of intelligence today, sure you clarified the part about adjusting for social and environmental factors, but that is precisely the reason why it's not necessary to drag it into the spotlight again.

Tuesday, April 26, 2011, 11:35:39 – Flag – Like – Reply



Phaltran

I think IQ tests are one measure that needs to be considered with several other factors mentioned: motivation, attitude, surroundings, emotional state. I also feel that putting too much importance on IQ can have a detrimental effect. I provide myself as an example.

I tested extremely high in grade school, went through the GT programs and if my little backwoods school could have supported it would have entered college at age 13. Test taking was a breeze. Eidetic memory and quick recall aside, I just learned for the sake of learning. However, I had no discipline. Homework and projects were boring, so I didn't do them and had 0s in my grades bringing my GPA down. College was pure work not mental ability, something foreign to me, and I nearly flunked out. Because I was told I could do whatever I wanted, I had no idea where to go or what I wanted to do. I ended up floundering around until I landed in Computer Science. Computers are simple and I'm very skilled at using them which has led me to a decent career.

Am I satisfied with my career? No. Did I reach my full potential? No. Am I happy in my life. Not at all.

Am I still smart? Yes. Could I apply my intelligence elsewhere and "help the world?" Yes. Am I motivated to do so? Not in the least.

A common definition of a genius is the ability to go from point A to point E without taking all the steps in between. We all have the potential to be a genius when we have the motivation to do so. Instead of measuring ourselves with differing standards of success, I think it is much more important that we as individuals find out what we love to do and are allowed to reach our potential.

Tuesday, April 26, 2011, 09:55:04 – Flag – Like – Reply

Liked by 6 Guests



CZ Yutzman

"Genius is 1% inspiration, 99% perspiration." That would imply actually having to do a great many steps between point A and point E rather than simply teleporting, which leads us back to the concept of "motivation". Look at the output of the average research scientist. If they spend their whole careers and accomplish one significant thing, that is a major achievement, even for the geniuses. If they accomplish THREE things in a lifetime, that makes them a polymath. You need to reach down deep and pull out a lot of motivation to reach such a destination.

Wednesday, April 27, 2011, 11:22:14 – Flag – Like – Reply



Arkane

That is so my story :/

Except that I am getting more satisfied with my life since I realized that I don't have to feel obliged to reach my "full potential". Even though people keep telling me otherwise ("you are so gifted...", "you really

should... ", "...if you only wanted...").

Not having motivation is the same fault as not being intelligent - none.

Wednesday, April 27, 2011, 13:44:38 – Flag – Like – Reply



Maya

Interesting, but it fails to account for all the women I know who had extremely high IQ's as girls but now work as office support staff. Also, other studies have shown that when immigrants are given the test in their own language, their scores look very much like the white middle-class standard. There's clearly more to this story. I hope they won't stop here. More than anything I think that if the score is that manipulable, then the test isn't actually a very good measure of anything.

Tuesday, April 26, 2011, 09:29:25 – Flag – Like – Reply

Liked by 3 Guests



B.B.

"For example, in his 2009 book "Intelligence and How to Get It," Richard Nisbett, a psychologist at the University of Michigan, Ann Arbor, argued that differences in IQ scores largely disappear when researchers control for social and economic factors. "

That book was absolutely torn to shreds by Rushton and Jensen in their review of the book titled "Race and IQ: A Theory-Based Review of the Research in Richard Nisbett's Intelligence and How to Get It", which was published in the peer-reviewed Open Psychology Journal. Their review article can be downloaded from here:

www.charlesdarwinresearch.org/2010%20Review%20of%20Nisbett.pdf

Tuesday, April 26, 2011, 08:52:28 – Flag – Like – Reply

Liked by B.B. Guest



SC

And they published this in the "Open Psychology Journal"?

Wednesday, April 27, 2011, 22:36:57 – Flag – Like – Reply



B.B.

Yes, that is what I said.

Saturday, April 30, 2011, 14:50:30 – Flag – Like – Reply



Nutrient

I think it might be most accurate to say that people are more intelligent than IQ tests have shown in the past, it's just that many test-takers didn't feel a need to put forth a lot of effort for no reward.

This could be vital in explaining the rather large difference in IQs between blacks and all the other races (which persists even when completely controlled for socio-economic factors). Maybe they're just more likely to be bored by paper tests. Some classroom studies have shown that blacks learn much better in active environments including song, dance, and hands-on learning, but do less well than other groups in sit-down rote learning with paper and pencil.

The difference may be more one of temperament and cognitive styles than actual inherent intelligence.

Monday, April 25, 2011, 22:26:40 – Flag – Like – Reply



King Runite1

Wow, people who are paid do stuff do it better... Shock horror.

Monday, April 25, 2011, 21:19:51 – Flag – Like – Reply

Liked by 2 Guests



JEMc

Exactly. How much time did they spend figuring this out? Motivation is always important. Offer a person with an IQ of 80 \$million to do well, and they still won't score a 130 IQ.

Yesterday, 20:28:03 – Flag – Like – Reply



asq

I think its true, i got 134.. and i was sick they day i took the test.. i dint even want to take it.

Monday, April 25, 2011, 19:29:56 – Flag – Like – Reply



Tom Erez

I don't get the last bit - if IQ tests actually measure a mixed score of "intelligence" and "motivation", why would the conclusion be that admissions to programs for "gifted and talented" children should not be based on IQ scores alone, but also on "who wants to do the work."? Didn't you just say that the IQ score measure exactly that?!

Monday, April 25, 2011, 19:17:53 – Flag – Like – Reply

Liked by 7 Guests



Mimble


I had exactly the same thought. And surely a child who is actually gifted is going to become more motivated if they are given interesting and challenging work rather than languishing in the back of a classroom bored to tears. Lack of challenge is a known cause of underachievement in gifted kids. It concerns me that this research could be interpreted that the class high achiever should be bumped to the GT class and the GT kid just left to go quietly mad because of their lack of 'motivation'.

Tuesday, April 26, 2011, 23:19:35 – Flag – Like – Reply



Guest

Nope, nope, nope. I did well on IQ when I was young. It has not led to a productive life, neither does it seem to have been a predictor. Pure unabashed will and ambition is what succeeds in our society. It does not require that one can perform at anything else.

Monday, April 25, 2011, 16:00:09 – Flag – Like – Reply
Liked by  6 Guests



Angela

Your link appears to be broken.

Monday, April 25, 2011, 15:33:17 – Flag – Like – Reply



Grannie

Actually, ALL school tests measure is the students ability to answer test questions well. I was always a good test-taker, and have a high IQ. As a teacher, I taught students 10 key points to look for in ANY multiple choice question that would let them answer them correctly even if they weren't sure. It works. You don't have to be 'smart' to pass or excel, you just have to know how to take tests !

Monday, April 25, 2011, 15:28:38 – Flag – Like – Reply

Liked by  9 Guests



Bill

Your observation appears to be correct because many tests are flawed. I'm pretty sure I could create plenty of multiple choice tests in the hard sciences where "intelligent" guessing wouldn't score significantly above random guessing.

Tuesday, April 26, 2011, 12:29:19 – Flag – Like – Reply



Grannie

Actually, ALL school tests measure is the students ability to answer test questions well. I was always a good test-taker, and have a high IQ. As a teacher, I taught students 10 key points to look for in ANY multiple choice question that would let them answer them correctly even if they weren't sure. It works. You don't have to be 'smart' to pass or excel, you just have to know how to take tests !

Monday, April 25, 2011, 15:28:18 – Flag – Like – Reply

Liked by  1 Guest