

We've got intelligence all wrong – and that's endangering our future

A narrow focus on IQ to determine success is depriving us of key decision-making smarts, as our faltering response to problems such as covid-19 and climate change shows



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IMAGINE a world in which admission to the top universities – to Oxford or Cambridge, or to Harvard or Yale – were limited to people who were very tall. Very soon, tall people would conclude that it is the natural order of things for the taller to succeed and the shorter to fail.

This is the world we live in. Not with taller and smaller people ([although taller people often are at an advantage](#)). But there is one measure by which, in many places, we tend to decide who has access to the best opportunities and a seat at the top decision-making tables: what we call [intelligence](#). After all, someone blessed with intelligence has, by definition, what it takes – don't they?

We have things exactly the wrong way round. The lesson of research by myself and many others over decades is that, through historical accident, we have developed a conception of intelligence that is narrow, questionably scientific, self-serving and ultimately self-defeating. We see the consequences in the faltering response of many nations to the [covid-19 pandemic](#), and a host of other problems such as [climate change](#),

increasing [income disparities](#) and [air](#) and water pollution. In many spheres, our ways of thinking about and nurturing intelligence haven't brokered intelligent solutions to real-world problems.

We need a better way. Fortunately, at least the starting point for this is clear. By returning to a more scientifically grounded idea of intelligence, who can have it and how we set about cultivating it in ourselves and others, we can begin to reboot our decision-making smarts and reshape our world for the better.

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Our conception of intelligence has come both a long way and not very far in the past century or so. Historically, intelligence has been defined simply as an ability to adapt to the environment. People who are intelligent can learn, reason, solve problems and make decisions that fit their real-life circumstances.

"Intelligence is something you can learn, and that can change through life"

This "adaptive" intelligence consists of different things in different environments. According to where you are in the world or your mode of life, it might be shown in negotiating city life or the environment of a rural farm, or in approaches to ice-fishing or using natural herbal medicines. Adaptive intelligence – rather than intelligence as something you either have or don't have, that is hardwired in your genes – is something you can learn, and that can change through life. It is constantly updated by your interactions with your environment.

This notion is quite alien to the modern, Western way of thinking about intelligence, but it was clearly understood by Alfred Binet, the [co-creator of the first modern intelligence test](#). This test was published in France in 1905 and [translated into English](#) a few years later. Binet believed that intelligence is modifiable, and he wanted to serve children and schools by identifying those children who didn't respond well to regular schooling, but instead needed special instruction. He intended to introduce mental "orthopaedics" to help children become smarter and open up opportunities for them, regardless of social class. Binet died in 1911 and didn't live to develop his idea fully. Soon enough, the law of unintended consequences kicked in.



Standard examinations and assessments don't capture the full picture of intelligence

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The kinds of tests pioneered in those early days measured memory skills and a narrow range of analytical skills: things such as vocabulary recall, information-processing speed, the ability to perform numerical operations and complete number series, spatial visualisation and the like.

Things started to go off the rails when intelligence researchers adopted a technique pioneered by a distinguished English psychologist, Charles Spearman. He had discovered in 1904 that the results of various tests he was using to measure mental abilities tended to correlate with one another – if you scored highly in one, you tended to do well in them all. He interpreted that as suggesting that the tests all measured largely the same thing: a number he called “**general intelligence**”, or **g**. Differences in **g**, he believed, resulted from different levels of “mental energy”, whatever that was, or is.

Thus was born the idea of intelligence as one largely unmovable number, the guiding principle of IQ tests to the present day. The correlations many researchers found between Binet-style tests and academic performance weren't terribly surprising: after all, Binet created his tests using academic types of problems to predict academic performance under regular schooling. But those correlations meant that many testers never made a fully serious effort to independently measure other, broader ability constructs: the ability to think creatively, for example, or to solve practical problems. New tests were simply validated against old tests, with a new test labelled “good” if it correlated with old ones. Instead of scientific theories about intelligence generating hypotheses, which in turn generated empirical tests to revise the theories, the science

got stuck. Data from tests drove the development of theories about intelligence, which drove more tests that measured the same things.

At the same time, in many parts of the world, access to education expanded rapidly during the 20th century. IQ tests and their proxies – for instance school assessments and examinations measuring that same narrow range of recall and analytical skills – became ever more important in determining the opportunities and career paths open to people. Rather than being primarily tools to help individuals realise their full potential, as Binet had envisaged, their function was to restrict people's opportunities in the service of employers, colleges, universities and other institutions.

“Intelligence tests work perversely to increase social and economic barriers”

Narrow and biased

Rather than intelligence tests helping to break down social and economic barriers, they perversely helped to increase them. Parents who were able to give their children the schooling, socialisation and other experiences that allowed them to do well on narrowly focused tests and examinations gained a huge advantage – a self-perpetuating one, as those children then gained the opportunities that allowed them to pass on the same advantages to their own kids. Meanwhile, the tests themselves were shot through with the narrow views about what constituted intelligence held by the largely white, well-to-do individuals with a certain academic background who created the tests.

This narrow focus has been a recurring theme in my own research. Nearly three decades ago, my colleague Lynn Okagaki and I [showed that different socially defined racial, ethnic and socio-economic groups](#) in the US tend to emphasise different skills in socialising young people to be intelligent. For example, European-American and Asian-American parents typically focused on cognitive skills, whereas Latino-American parents emphasised social skills. Because teachers were predominantly European-American and Asian-American, they estimated the abilities of the children of similar-thinking parents to be higher.

Different groups show not only different views of intelligence, but also different patterns of skills as they grow up. The tests that determine success don't reflect that. My research has shown, for example, that the particular skills measured by traditional university admissions tests in the US [tend to favour the skill patterns of white and Asian students](#) and disfavour those of black and Hispanic students. These differences reflect many things, including conceptions of intelligence slanting towards or away from what the tests measure, and also the socialisation opportunities parents want to, or are able to, provide. When members of diverse groups are measured for what matters to them, they show strengths that are hidden by the conventional tests.

Perhaps surprisingly, the dominant intelligence tests and their proxies don't even necessarily measure particularly well those aspects of analytical reasoning [relevant to broader kinds of success](#), such as research in science, technology, engineering and mathematics. When we assessed students for their abilities at generating alternative scientific hypotheses, designing experiments, drawing scientific conclusions and related skills, the students' scores on different tests of scientific reasoning correlated with each

other, but didn't consistently correlate with scores on US university admissions and abstract-reasoning tests.



Tackling climate change requires problem solving for the common good

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More generally, the characteristics of real-world problems are very different from the characteristics of problems on standardised tests (see "[Real-world problems...](#)"). IQ works best for solving problems that follow familiar or easily learned patterns. It doesn't work so well for the complex, highly novel, high-stakes, often emotionally charged problems we frequently face – how to balance the demands of individual liberty and public health in the covid-19 pandemic, for example, or how best to motivate action on global climate change and the other environmental challenges we face. As UN secretary-general António Guterres said last month, humanity is waging a suicidal war on the natural world. That is hardly the product of intelligent thinking.

So how do we fix things? Put simply, by embracing the idea that intelligence is about adaptation. Sometimes we change ourselves to suit the environment, sometimes we shape our environment to suit ourselves, and sometimes we find a new environment when our current environment isn't working out. We need to nurture the adaptive intelligence that is best suited to identifying the need for such changes and developing the strategies for carrying them out.

In general, adaptive intelligence consists of four kinds of skills we use to adapt to, shape and select environments. There are creative skills, which we use to generate relatively novel and somehow useful or meaningful ideas: you can't change a situation you find yourself in if you can't creatively imagine what you want it to become. There are broad-

based analytical skills, which we use to ascertain whether our ideas, and those of others, are any good: what is and isn't working in the situation we find ourselves in. Then there are practical skills we use to implement our ideas and persuade others of their value, to achieve change in our situation. Finally, there are wisdom-based skills that help to ensure that our ideas contribute towards achieving a common good, both in the short term and the long term, by balancing our own, others' and higher-level interests.

Collective wisdom

The drive to develop and deliver a covid-19 [vaccine](#) gives an example of where all these skills come into play. Creative thinking was needed to come up with the new mRNA-based vaccines that have proved successful. Analytical skills are needed to ensure that the vaccine trials are scientifically rigorous and the data from them properly interpreted. Practical abilities are needed to upscale the work of the research scientists and produce billions of doses of vaccine.

And then comes the wisdom part. Decision-makers need to have the wisdom to recognise that there will be many people with other interests – people [who are afraid of the vaccine](#), people who are [generally anti-vaccine](#), people who object for political, religious or ideological reasons – and to develop strategies to convince them of the need to get themselves vaccinated for the common good. We all need to have the wisdom skills to recognise the benefits, to ourselves and others, if we all vaccinate ourselves, as vaccines become available.

All this can be taught and learned. If we broaden our conception of intelligence and pay more attention to nurturing the elements of adaptive intelligence in all of us, we will stop needlessly wasting talent and also broaden the pool of skills available to us to find constructive solutions to such problems. My research shows that students taught in ways that help them to capitalise on their creative and practical strengths, and also to compensate for or correct weaknesses, often perform better than do students who are taught in a way that favours only those with good memory and analytical skills.

Instead of teaching and testing students on arcane problems, the emphasis needs to be on realistic problems. So, rather than an appropriate test question in mathematics being to recall the formula for an exponential curve and calculate quantities from a given exponential curve, it might be to describe what an exponential curve looks like, and sketch out the problems that can arise from an exponential growth curve in a given context. Or in the social sciences, instead of asking a student to recall the essential points of such-and-such a theory, problems need to test the full range of creative, analytical and practical skills (see "[Measuring adaptive intelligence](#)").

This isn't airy-fairy, touchy-feely stuff. Tests of creative, practical and wisdom-based skills are just as good, if not better, at measuring things relevant for success in the real world as conventional IQ-based tests. Tests of practical intelligence, for example, predict various kinds of job success as well as conventional intelligence tests, even though success on one type of test correlates only minimally with success on the other type.

Meanwhile, adding creative, practical and wisdom-based skills to university admissions tests increases the accuracy of predictions of both academic and extracurricular success

over those provided by conventional tests. In one study my colleagues and I conducted in US universities with widely differing levels of selectivity and kinds of students, such tests [predicted first-year grades almost twice as well](#) as standard admissions tests. They also [decreased differences between socially defined racial and ethnic groups](#).

“An obsession with individual success has blinded us to the damage we are causing to our collective well-being”

It is way past time to let go of a narrow, antiquated and self-serving notion of what it means to be intelligent. The stakes couldn't be higher. Our current ideas have created a “tragedy of the commons”, whereby privileged people's obsession with their own individual success and that of their children has blinded many people to the damage we are causing to our collective well-being. We need to think of intelligence as having positive collective goals, not just individual ones. The dinosaurs lasted on Earth for 165 million years. If we don't change our notions about what it means to be adaptively intelligent, we may not come anywhere close to that. We will have runaway global climate change, pandemics, pollution and the confrontations among people these problems will cause. We won't need a heavenly body to do us in. We will have done it to ourselves.