Twitter Thread by Steve Stewart-Williams



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THREAD: 12 Things Everyone Should Know About IQ

1. IQ is one of the most heritable psychological traits – that is, individual differences in IQ are strongly associated with individual differences in genes (at least in fairly typical modern environments). https://t.co/3XxzW9bxLE

TABLE 1

Estimates of Broad Heritability and Shared Environmental Influence and Indications of Nonadditive Genetic Effects and Sex Differences in Heritability for Representative Psychological Traits

Trait	Heritability	Nonadditive genetic effect	Shared environmental effect	Sex differences in heritability
Personality (adult samples)				
Big Five				
Extraversion	.54	Yes	No	Perhaps
Agreeableness (aggression)	.42	Yes	No	Probably not
Conscientiousness	.49	Yes	No	Probably not
Neuroticism	.48	Yes	No	No
Openness	.57	Yes	No	Probably not
Big Three				
Positive emotionality	.50	Yes	No	No
Negative emotionality	.44	Yes	No	No
Constraint	.52	Yes	No	No
Intelligence				
By age in Dutch cross-sectional twin data				
Age 5	.22	No	.54	No
Age 7	.40	No	.29	No
Age 10	.54	No	.26	No
Age 12	.85	No	No	No
Age 16	.62	No	No	No
Age 18	.82	No	No	No
Age 26	.88	No	No	No
Age 50	.85	No	No	No
In old age (> 75 years old)	.54–.62	Not tested	No	No
Psychological interests				
Realistic	.36	Yes	.12	NA
Investigative	.36	Yes	.10	NA
Artistic	.39	Yes	.12	NA
Social	.37	Yes	.08	NA
Enterprising	.31	Yes	.11	NA
Conventional	.38	Yes	.11	NA
Psychiatric illnesses (liability estimates)				
Schizophrenia	.80	No	No	No
Major depression	.37	No	No	Mixed findings
Panic disorder	.30–.40	No	No	No
Generalized anxiety disorder	.30	No	Small female only	No
Phobias	.20–.40	No	No	No
Alcoholism	.50–.60	No	Yes	Mixed findings
Antisocial behavior				
Children	.46	No	.20	No
Adolescents	.43	No	.16	No
Adults	.41	No	.09	No
Social attitudes				
Conservatism				
Under age 20 years	.00	NR	Yes	NR
Over age 20 years	.45–.65	Yes	Yes in females	Yes
Right-wing authoritarianism (adults)	.50–.64	No	.00–.16	NA
Religiousness				
16-year-olds	.11–.22	No	.45–.60	Yes
Adults	.30–.45	No	.20–.40	Not clear
Specific religion	Near zero	NR	NA	NR

Note. NA = not available; NR = not relevant.

2. The heritability of IQ *increases* from childhood to adulthood. Meanwhile, the effect of the shared environment largely fades away. In other words, when it comes to IQ, nature becomes more important as we get older, nurture less. https://t.co/UqtS1lpw3n

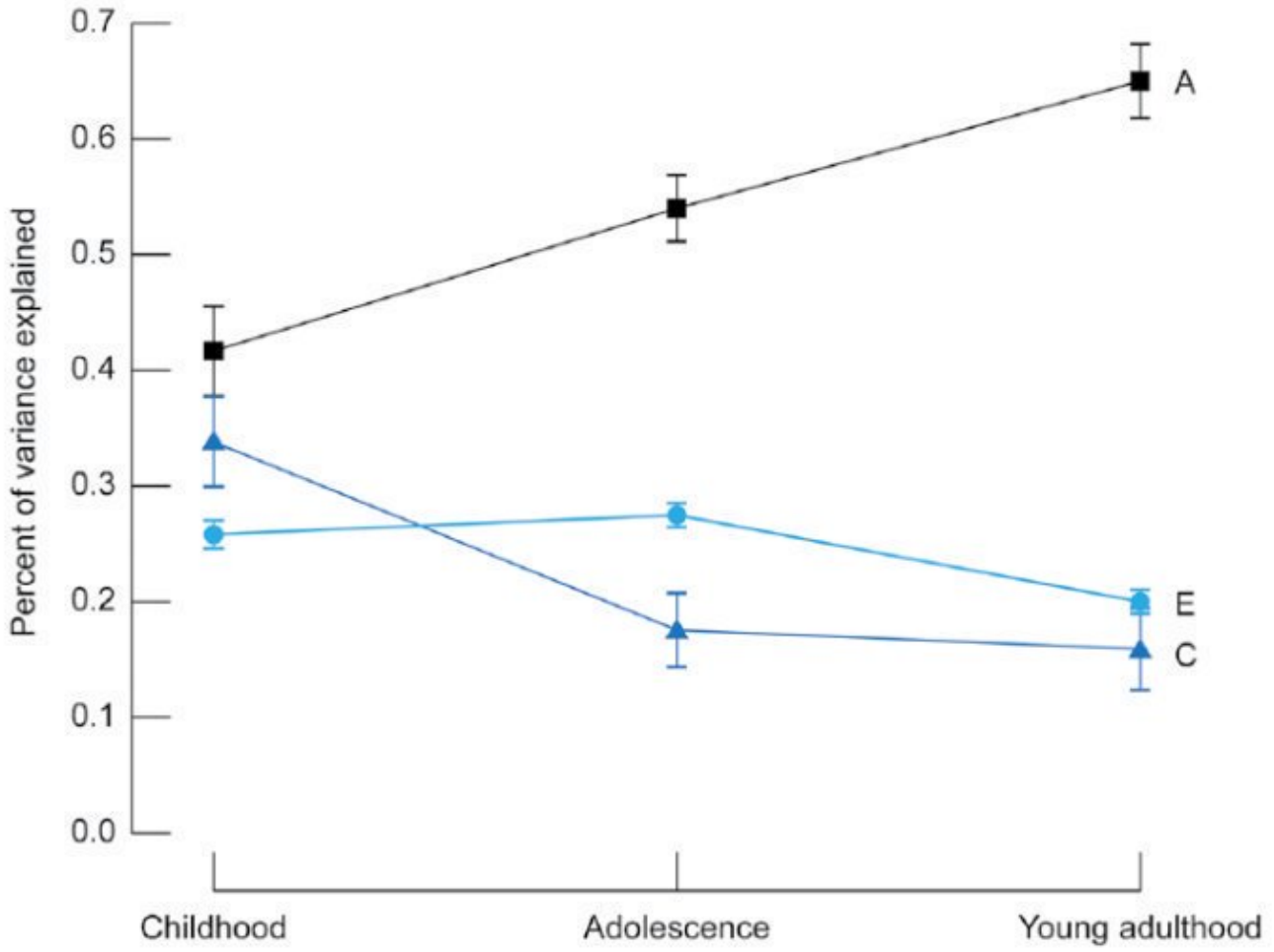


Fig. 3. A meta-analysis of 11,000 pairs of twins showing that heritability (A) of intelligence increases significantly from childhood (age 9) to adolescence (age 12) and to young adulthood (age 17). Estimates of shared environmental influence (C) decreased significantly from childhood to adolescence. Nonshared environment (E) showed no change. (From Haworth et al., 2010.)

3. IQ scores have been increasing for the last century or so, a phenomenon known as the Flynn effect. https://t.co/sCZvCst3hw (N ≈ 4 million)

(Note that the Flynn effect shows that IQ isn't 100% genetic; it doesn't show that it's 100% environmental.)

One Century of Global IQ Gains: A Formal Meta-Analysis of the Flynn Effect (1909–2013)

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Abstract

The Flynn effect (rising intelligence test performance in the general population over time and generations) varies enigmatically across countries and intelligence domains; its substantive meaning and causes remain elusive. This first formal meta-analysis on the topic revealed worldwide IQ gains across more than one century (1909–2013), based on 271 independent samples, totaling almost 4 million participants, from 31 countries. Key findings include that IQ gains vary according to domain (estimated 0.41, 0.30, 0.28, and 0.21 IQ points annually for fluid, spatial, full-scale, and crystallized IQ test performance, respectively), are stronger for adults than children, and have decreased in more recent decades. Altogether, these findings narrow down proposed theories and candidate factors presumably accounting for the Flynn effect. Factors associated with life history speed seem mainly responsible for the Flynn effect's general trajectory, whereas favorable social multiplier effects and effects related to economic prosperity appear to be responsible for observed differences of the Flynn effect across intelligence domains.

4. IQ predicts many important real world outcomes.

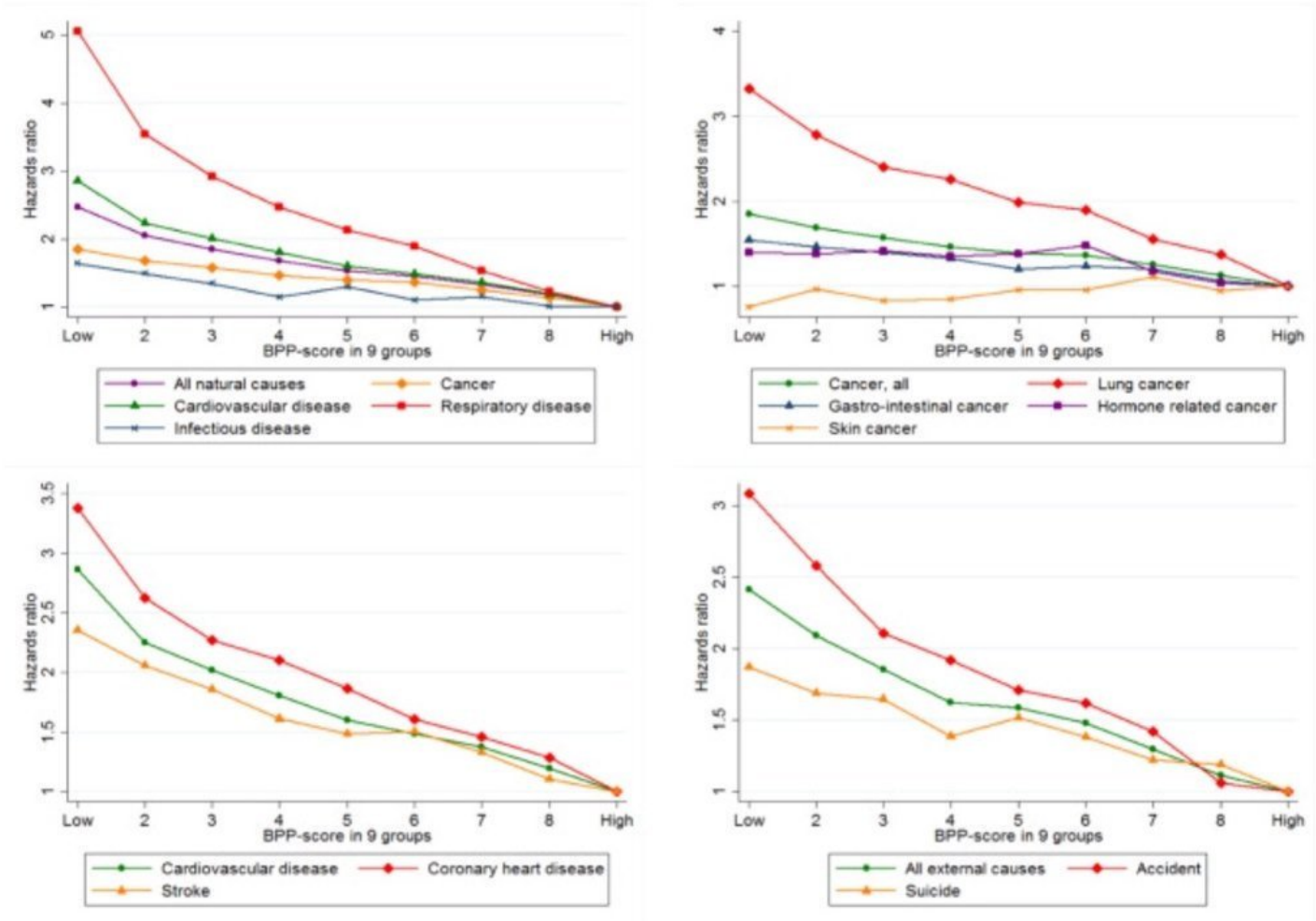
For example, though far from perfect, IQ is the single-best predictor of job performance we have – much better than Emotional Intelligence, the Big Five, Grit, etc. https://t.co/rKUgKDAAVx https://t.co/DWbVI8QSU3



▲ Figure 3.1 Correlation of IQ with different aspects of job performance. (Figure adapted from Kuncel and Hezlett, 2010, with permission from Sage.)

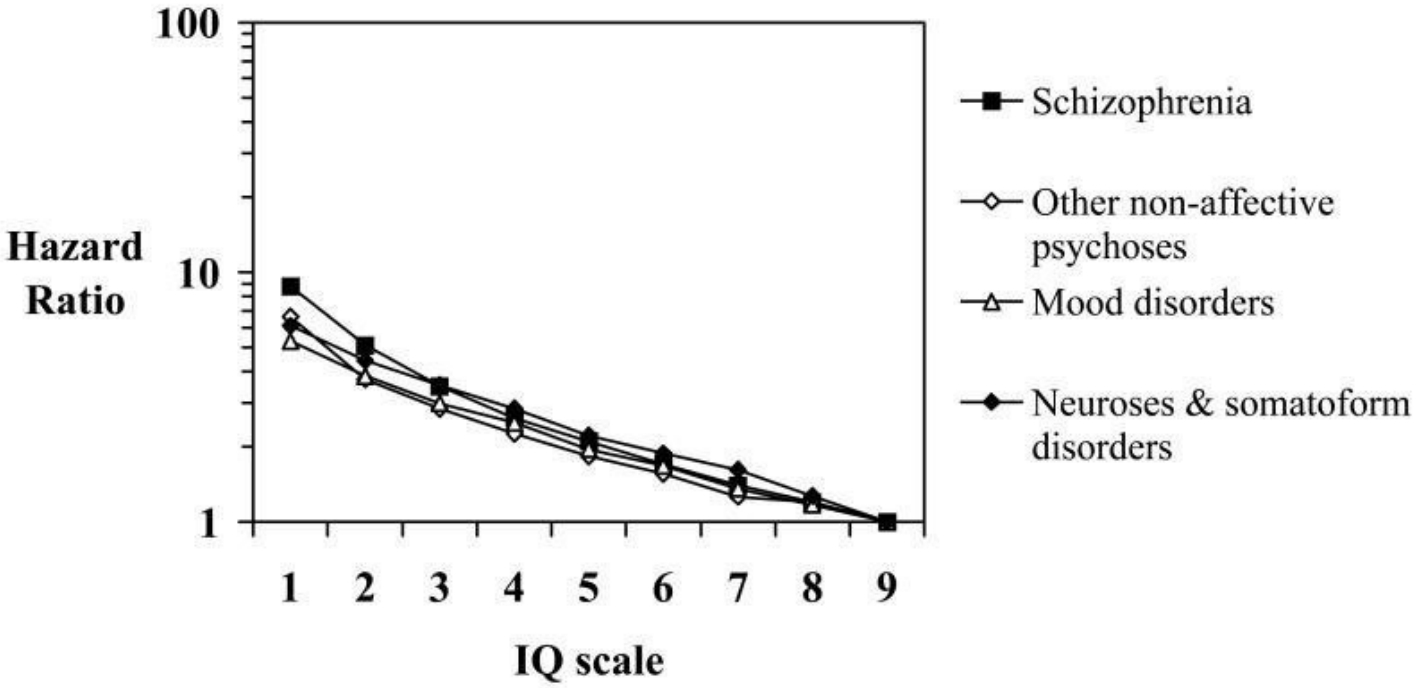
5. Higher IQ is associated with a lower risk of death from most causes, including cardiovascular disease, respiratory disease, most forms of cancer, homicide, suicide, and accident. https://t.co/PJjGNyeQRA (N = 728,160)

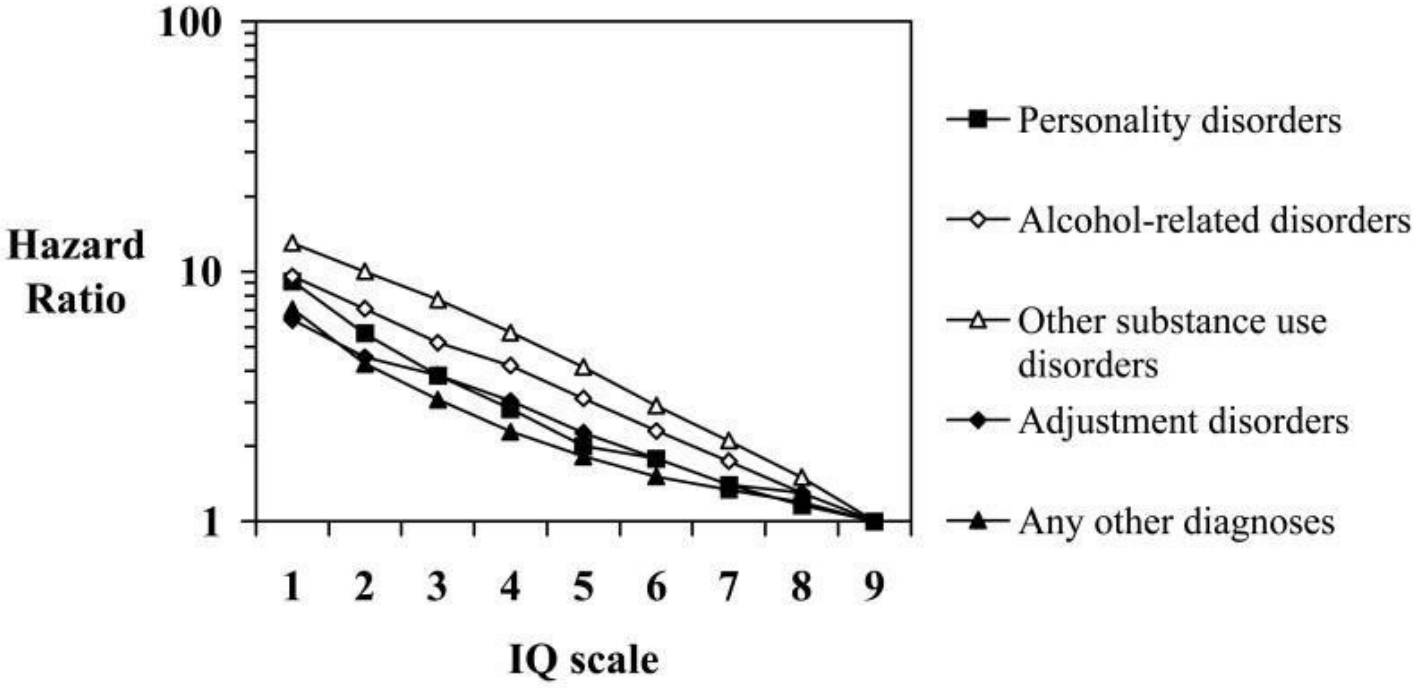
Fig. 2 presents the association between young adult intelligence, expressed as the BPP-score in nine groups of equal size, and cause-specific mortality in the period from conscription until late mid-life. We found a significant linear trend with decreasing risk of mortality the higher the intelligence test-score for all causes of death except for hormone-related cancer and skin cancer.



6. Higher IQ is associated with lower rates of most forms of mental illness. https://t.co/0jX1og7xHV (N = 1,049,663)

a and b





7. More generally, IQ tests are among the most reliable, predictive measures in psychology – one of the field's crowning achievements. https://t.co/a9z9GPQYuD

If IQ isn't a valid concept, no concept in psychology is valid.

'IQ tests just measure how good you are at doing IQ tests.' This is the argument that is almost always made when intelligence-testing is mentioned. It's often promoted by people who are, otherwise, highly scientifically literate. You wouldn't catch them arguing that climate change is a myth or that vaccines might cause autism. But saying that IQ tests are useless is just as wrong as these notions: in fact, decades of well-replicated research point to IQ tests as some of the most reliable and valid instruments in all of psychological science.

So what does an IQ test – which might consist of, for example, shape-based puzzles, timings of how quickly you can check through lists of meaningless symbols, memory tests, and vocabulary measures – actually tell you? The strongest correlation is perhaps unsurprising: an IQ score is highly predictive of how people will do in school. One large study found that IQ scores at age 11 correlated 0.8 (on a scale of -1 to 1) with school grades at age 16. Surely this gives us some basis for calling these measures 'intelligence tests'. But that's just the beginning: higher IQ scores are predictive of more occupational success, higher income, and better physical and mental health. Perhaps the most arresting finding is that IQ scores taken in childhood are predictive of mortality. Smarter people live longer, and this association is still there after controlling for social class.

Neuroscientists and geneticists have also made good progress in understanding human intelligence. Meta-analyses of hundreds of studies confirm that people with larger brains tend to get higher scores on IQ tests, and research on more specific brain regions and features continues apace. We know from studies of twins, and from studies done directly on DNA, that intelligence test scores are heritable: a substantial portion of the intelligence differences between people are due to genetics. We've already begun to find some of the specific genes that might be responsible for these differences, and further findings are on the way.

8. Despite this, many people are allergic to the concept of IQ. Ironically, this includes many intellectuals. https://t.co/ThPkVT8apc

I find it truly surreal to read academics denying the existence of intelligence. Academics are *obsessed* with intelligence. They discuss it endlessly in considering student admissions, in hiring faculty and staff, and especially in their gossip about one another. Nor can citizens or policymakers ignore the concept, regardless of their politics. People who say that IQ is meaningless will quickly invoke it when the discussion turns to executing a murderer with an IQ of 64, removing lead paint that lowers a child's IQ by five points, or the presidential qualifications of George W. Bush. In any case, there is now ample evidence that intelligence is a stable property of an individual, that it can be linked to features of the brain (including overall size, amount of gray matter in the frontal lobes, speed of neural conduction, and metabolism of cerebral glucose), that it is partly heritable among individuals, and that it predicts some of the variation in life outcomes such as income and social status. [20]

9. Perhaps as a result, there's some evidence that researchers are less likely to publish studies showing a link between IQ and grades – the reverse of the usual publication bias for positive findings. https://t.co/gTiKmmarTB; although see https://t.co/sYEgBnaJkO

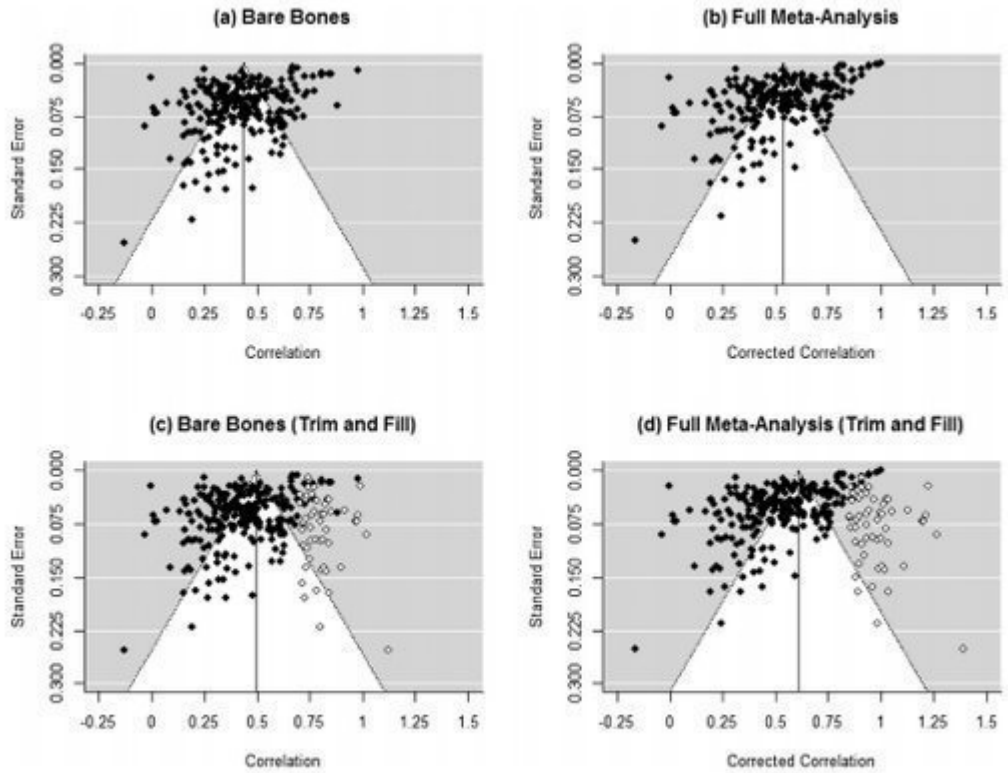


Fig. 1. Funnel-plots for the main meta-analysis. Dotted lines represent the 95%-standard error of the mean correlation. Black circles represent correlations employed in the analysis. White circles represent correlations complemented by the trim and fill method.

10. The antipathy to IQ is unfortunate. IQ predicts all things good. Interventions to boost IQ (such as salt iodization) could greatly enhance human well-being. https://t.co/LHVqClN2kE

Conversely, IQ-denial could cause real harm by stalling the development of such interventions.

The US Military is not constrained by political correctness or fine sounding ideological redescriptions of reality. One representative from DARPA wrote:

> The world contains approximately 4.2 billion people over the age of twenty. Even a small enhancement of cognitive capacity in these individuals would probably have an impact on the world economy rivaling that of the internet.

Cognitive enhancement is one way of overcoming one of the biological barriers to a good life and a life of opportunity. And it can be cheap. 1 in 3 people in the world don't get enough iodine. This causes mental slowness. Deficiency of iodine in pregnancy results in the loss of 10 to 15 points IQ points in the fetus. Around the world, this results in the more than 1 billion IQ points of mental capital being lost each year. Iodizing salt costs only 2 cents to 3 cents per person per year.

There may be other cheap methods of cognitive enhancement. For example, choline may increase fetal IQ if given in pregnancy. It occurs naturally in eggs.

11. IQ testing has other potential benefits as well. One of my favourite studies of the last few years found that universal IQ screening boosts the number of poor, female, and minority students in gifted education. https://t.co/5at8wNjKe8

Figure: https://t.co/fogF8GyO8Z

Low-income and minority students are substantially underrepresented in gifted education programs. The disparities persist despite efforts by many states and school districts to broaden participation through changes in their eligibility criteria. One explanation for the persistent gap is that standard processes for identifying gifted students, which are based largely on the referrals of parents and teachers, tend to miss qualified students from underrepresented groups. We study this hypothesis using the experiences of a large urban school district following the introduction of a universal screening program for second graders. Without any changes in the standards for gifted eligibility, the screening program led to large increases in the fractions of economically disadvantaged and minority students placed in gifted programs. Comparisons of the newly identified gifted students with those who would have been placed in the absence of screening show that Blacks and Hispanics, free/reduced price lunch participants, English language learners, and girls were all systematically "underreferred" in the traditional parent/teacher referral system. Our findings suggest that parents and teachers often fail to recognize the potential of poor and minority students and those with limited English proficiency.

12. Last but not least, here's a list of ten common myths about IQ. https://t.co/DOTDWhMoyS HT @StuartJRitchie

Ten common myths (debunked in this book)

71 ‘You can’t sum up a person/measure a person’s worth in a single number.’ (Nobody said you could – see Chapter 3.)

72 ‘Intelligence tests only tell you how good you are at doing intelligence tests.’ (They tell you much more than that – see Chapter 3.)

73 ‘Your IQ is just a reflection of your social background.’ (IQ only correlates modestly with social background – see Chapter 3.)

74 ‘There are multiple separate intelligences.’ (All mental abilities are correlated – see Chapter 2.)

75 ‘Brain size isn’t related to intelligence.’ (Larger brains are linked to higher IQ – see Chapter 4.)

76 ‘Intelligence is immutable.’ (There’s plenty of evidence for IQ change – see Chapter 5.)

77 ‘Intelligence research is elitist/sexist/racist.’ (Facts don’t have moral values attached – see Chapter 6.)

78 ‘Intelligence tests just measure culturally valued information.’ (They include much more basic tests, like speed – see Chapter 2.)

79 ‘Twin studies have been discredited.’ (They haven’t, and even if they had, other methods tell us that IQ is heritable – see Chapter 4.)

80 ‘IQ tests were originally invented for eugenic purposes.’ (The story is complex, but the first test was invented by Binet to help children with learning disabilities – see Chapter 1.)