

AT OUR WITS' END

WHY WE'RE BECOMING LESS INTELLIGENT
AND WHAT IT MEANS FOR THE FUTURE



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'They reel to and fro, and stagger like a drunken man, and are at their wits' end.'

—Psalm 107: 27

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One

Can You Believe We Put a Man on the Moon?

It's incredible to think that in the year 2000 you could get from London to New York in just 3-and-a-half hours. These days, it takes longer than that to fly from London to Athens.

With the advent of Concorde in 1969, we had dealt with an extremely difficult problem—how to get from A to B much faster. We had been trying to solve this problem since 1954. That was when Arnold Hall, director of the Royal Aircraft Establishment, set up a committee to look into supersonic flight. The USA was an important country. Western Europe was almost as vital. There were crucial business connections between the two regions. These were massively complicated by the 8 hours it took to fly between America and Western Europe. It wasted time. It wasted money. How could we solve this problem?

The solution was Concorde. Concorde wasn't a minor update to existing technology which made things slightly easier, like the introduction of active power-steering in BMW cars in 2003. This was a major breakthrough, comparable to the invention of aeroplanes themselves ('How can we fly?') or the Spinning Jenny ('How can we massively speed up production?'). In the 1950s, some of the world's most intelligent and creative people were put to work to find a solution to this enormous problem and, on 2nd March 1969, Concorde was in the sky.

It fell from the sky on 25th July 2000. Air France flight 4590 took off from Paris's Charles de Gaulle Airport and promptly smashed into a hotel, killing all 100 passengers and 9 crew, as well as 4 people on the ground. The crash was essentially due to incompetence. A titanium 'wear strip' had been attached to the back of the thrust reverser of a Continental Airlines DC 10 Airliner as part of an operation to repair it. Not only was the wear strip badly produced, but it had not been made by the Airliner's original equipment manufacturer. Accordingly, when the plane took off—just minutes before Concorde did on the same runway—the wear strip fell off.

As Concorde accelerated over this sharp bit of metal at high speed, it punctured Concorde's tyre, causing rubber to spin off the wheel and break open the fuel tank. This led to a fuel leak, which in turn led to a fire, resulting in one of Concorde's engines being shut down. At the speed it was going, it was committed to take off, but Concorde couldn't gain enough velocity or altitude to remain in the air. So Concorde crashed; all because an earlier aeroplane hadn't been maintained properly. There had been problems with Concorde before—such as part of the rudder breaking off on a 1989 flight—but never a crash. The system had always worked. The pilots, in the heat of the moment, had always realised how to save the plane; the ground crew never made any major mistakes. Public confidence was shaken and, by 2003, Concorde was permanently grounded.^[1] We were back to how it used to be. Flights between the UK and the USA were once again interminable.

1969 was also the year that we put a man on the Moon. In many ways, this may be the greatest achievement in the history of humanity to date. This was not something that developed organically and unplanned. Things naturally develop in this way if people of reasonable intelligence and conscientiousness work on them for long enough. Science fiction writers had long dreamed of going to the Moon.^[2] The American government decided they wanted a manned flight to the Moon in around 1958, as they competed with the Soviets to win the Space Race. The Soviets had already beaten them in getting a satellite into space and would soon beat the USA in landing machinery on the Moon and getting a man into space. Thousands of America's best minds were put to work to achieve this quite fantastic goal. It was accomplished on 20th July 1969, with every step in the voyage having to be 'checked' by eight NASA experts. With each new twist, they had to think on their feet, calculate all the possible risk scenarios, and reach the correct decision to avoid a tragedy. There were 5 further manned flights to the Moon until December 1972.^[3] But we carried on dreaming of exploring the stars until the Space Shuttle *Challenger* Disaster in 1986. The shuttle exploded just after launch because one of the rocket's o-rings had malfunctioned due to recent cold weather. A potential problem with o-rings had been identified in 1971 but had never been addressed and it was only the severe cold combined with this failure that led to the crash. Caution would have dictated abandoning the launch due to the freezing conditions; financial considerations dictated otherwise.

Confidence in manned space travel had been damaged. The space programme—in terms of serious leaps, like getting people to Mars—began to stagnate.^[4]

Why? Why is it that we used to be able to fly from the USA to London in less than 4 hours but now we can't? Why is it that we used to be able to put people on the Moon but now, it seems, we can't? The answer is surprisingly simple. We are no longer intelligent enough to be able to do these things. We have become too stupid to keep Concorde in flight; let alone go back to the Moon.

Don't be Stupid!

'Don't be stupid!' you might be thinking. 'There are so many complex reasons why we haven't been back to the Moon! The economic collapse in the 1970s, the end of the Cold War meaning there was no longer as strong an incentive to compete with the former Soviet Union, and attention turning to making life fairer for people on Earth. It's the same with Concorde. There's been another economic collapse since then. We just haven't got round to doing these things, but we could..!'

Science looks for the theory that explains the most with the fewest assumptions. Named Occam's Razor, after the English friar William of Occam (c.1287–1347), the axiom that the simplest theory is the best is accepted by all scientists. If we can plausibly explain two separate events with one theory, then that is superior to having a different theory for each event. We will show in this book that the simplest explanation, with the fewest assumptions, for our failure to get back to the Moon or to get Concorde back in the sky is that we are becoming less intelligent. Other explanations might account for one of the two events, or aspects of these, but they will not explain everything without leaving questions unanswered or assumptions hanging in the air. Our explanation does not suffer from these problems.

The Decline of Intelligence

Our argument is based on a number of foundations, each of which are ‘controversial’—at least among those who are sure they know best—but each of which we will demonstrate in the course of this book.

To understand what’s going on, we have to understand what ‘intelligence’ is and why it’s so important. ‘Intelligence’ is, basically, the ability to solve complex problems and do so quickly. The quicker you can solve a problem, the cleverer you are. The cleverer you are, the more complicated the problem has to be before you’re stumped. On adult samples intelligence is 0.8 heritable meaning that 80% of the variation among individuals is due to genetic factors (a heritability of one would indicate that 100% of the variation was genetic).^[5] Socioeconomic status is strongly connected with intelligence. It ‘correlates’ strongly with it. A correlation is a measure of the degree to which the change in one variable predicts the change, either positively or negatively, in a second variable. The key measure captured by correlations is the percentage of variance which is simply the value of the correlation squared. Correlations are scaled from -1 to 1 —these being perfect correlations (i.e. where 100% of the change in the second variable is predicted by the first). A correlation of 0 indicates no association between the variables. So, 0.7 is a very strong positive correlation indicating that the variables share almost 50% of the variance in common. Salary correlates with intelligence at 0.3, while intelligence correlates with education level at 0.5. And intelligence correlates with how well you do at school at 0.7.^[6] We all know of people who aren’t that bright but work very hard and get top marks in their school leaving exams, but they are the minority. It’s intelligence that really counts.

We will see in this book that the process of Darwinian selection acting on intelligence did not end on the African Savannah 100,000 years ago. Rather, Darwinian selection, and social selection in particular—where Darwinian fitness stems from cooperation among or competition against other members of society—continues into the present day, with more general evolution among humans still on-going. This process led to what the British economist Gregory Clark, who we will meet later, has termed ‘The Survival of the Richest’.

Between the 1400s and the mid-19th century, in every generation, the richer 50% of the population had more surviving children than the poorer 50%.^[7] As economic status and intelligence are positively correlated this led to us becoming more and more intelligent every generation. This carried on until the most intelligent people—the outlier, super-clever geniuses—were so numerous and so capable that their innovations actually allowed us to take control of our environment to an unprecedented extent. Here we had the Industrial Revolution. This led to more and more inventions, such that our standard of living—our ability to feed the population—outpaced population growth, meaning that our living standards now are higher than those of medieval kings.

However, this process led to a reversal of selection for intelligence. With huge leaps in medical technology, we went from around a third of children failing to reach adulthood to almost none failing to do so. In pre-Modern times, the children who died young were disproportionately the children of those with lower social status, and therefore by proxy, lower intelligence and, as we've seen, intelligence is strongly heritable. The main reason for this was that the less intelligent were poorer, lived in worse conditions, and had worse nutrition. This pattern of selection favouring higher intelligence ceased with the Industrial Revolution's innovations in medicine and hygiene, such as widespread use of inoculations against formerly killer childhood diseases such as measles, in addition to social initiatives aimed at alleviating the effects of poverty. In fact, it didn't just cease. It went into reverse.

The resultant low death rate of children also meant that people no longer had to have large numbers of kids in order to guarantee that some survived. Accordingly, they could have smaller families and use the left over money to fund an even higher standard of living. By the late 19th century, this meant that having a large family tended to be an accident. It would happen because people were less able to think of the future here in the now, meaning they would impulsively have sex and not worry about the consequences. As we will see, such impulsive behaviour is a function of low intelligence,^[8] as is the inability to successfully use contraception. This meant that the less intelligent soon started having more children than the more intelligent.

With the rise of women in the workplace, we will show that the most intelligent women dedicate themselves to their careers in their twenties and

even the first half of their thirties. If they have children at all (they often don't want to or find they've left it too late) they will only have a small number of them. By contrast, less intelligent women, less career-focused and more impulsive, will have larger numbers of children, starting as teenagers and sometimes becoming grandparents by the time their more intelligent contemporaries begin thinking about motherhood. For these reasons, we will show that it has long been predicted that we would have become less intelligent.

However, in this book we will go further. We will prove that although we are becoming better at certain very narrow abilities, due to improvements in the environment we have managed to create for ourselves, we are, in fact becoming less intelligent with respect to the core cognitive ability—general intelligence.^[9] We are becoming less intelligent at a quite staggering rate as well. In the last one hundred years, we may have lost as many as 10 IQ points: the difference between the average policeman and the average school-teacher today.^[10] This research is cutting edge; many scientists consider it 'controversial' even. But, as we will see, the fact that we are getting less intelligent cannot be ignored any longer. Only if we understand what is happening to us can we act in such a way so as to minimise the problems that this is generating and perhaps even overcome some of them.

The Grand Plan

We know what we're up against. If we were trying to persuade people of something that they wanted to hear or something that sounded nice, we'd have no problems. A book which suggested that everything was a matter of environment and if we just did the right things we could create a utopia would be much more crowd pleasing. But it would also be nonsense. We are interested in what's really happening and in persuading the intelligent reader that it really is happening. As such, we will assume no detailed knowledge of science or statistics. We will simply assume an open and inquiring mind.

We will begin, in Chapter Two, by looking at the concept of intelligence. We will show that it is a scientifically valid concept, as are the IQ tests that are used to measure it. We will respond to many criticisms of the concept and demonstrate that it can be robustly defended against them. Proxies for intelligence—other measures that correlate with it; are partial measures of it—will also be examined.

In Chapter Three, we will discuss the history of Darwinian selection for intelligence, from the world of dogs and chimpanzees up until pre-industrial England. We will then see, in Chapter Four, that average intelligence was increasing in Europe up until the dawn of the Industrial Revolution because wealth—and thus by proxy intelligence—strongly predicted how many surviving children you had.

In Chapter Five, we will explore the concept of personality, as it is so vitally relevant to understanding genius, which will be explored in Chapter Six. In Chapter Six, we will show that between 1450 and 1850 there was a rise in per capita levels of genius; in super-intelligent people with a very specific kind of personality who innovated hugely important ideas.

We will see in Chapter Seven that a number of 19th- and early 20th-century scientists were convinced that the cleverest people had the fewest children by that time. We will show that they were correct and, in modern Western countries, the cleverer you are the fewer children, on average, you have. We will look at the reasons for this ranging from contraception to career women.

In Chapter Eight, we will explain how something called the Flynn Effect has masked the intelligence decline on IQ tests in the 20th century, as the

scores have increased year on year. However, we will see that the Flynn Effect doesn't actually reflect a rise in 'core' or 'general' intelligence—just the imperfect nature of the IQ test for measuring intelligence changes over time. And we will show that, anyway, now even the Flynn Effect has gone into reverse in some places. In Chapter Nine, we will present evidence that on measures of general intelligence that more reliably measure this, over time, than the IQ test, intelligence has indeed been declining.

In Chapter Ten, we will demonstrate how our findings fit with the idea that civilisations don't last forever. They rise and fall and we will see that changes in average intelligence are the simplest explanation for this process. In Chapter Eleven, we will show that Rome—like us—likely reached a peak of intelligence due to selection, then fertility became negatively associated with intelligence, causing Rome to subsequently decline and collapse. The same thing happened to civilisations in the Middle East and China.

In Chapter Twelve, we will see how Western civilisation has followed the different stages which all civilisations do and we will see that we are now in the winter of civilisation. Finally, in Chapter Thirteen, we will look—in practical terms—at what we can do about this. Can we break out of the winter of civilisation before there is further collapse?

Back to the Concorde and the Moon

So, why can we not re-launch Concorde—or make a superior version? We have a hypothesis, for which we will present more evidence as the book progresses.

We should conceive of a pyramid of technology, an idea presented by the British psychiatrist Bruce Charlton.^[1] At the top are the inventors—the geniuses. Beneath these are those who develop and refine the invention. Below them, are those who can fix the invention. Then there are those who can operate it and finally those who cannot even use it, but might be employed to maintain it. When Concorde was launched, every level of this pyramid was slightly more intelligent than it is now. Between 1969 and the year 2000, those at the very top of the intelligence pyramid simply didn't produce many descendants, while those at the very bottom in 1969 were a significantly larger percentage by the year 2000. This meant that in the year 2000, by the standards of 1969, everybody in the aviation industry was slightly upwardly socially mobile relative to their level of intelligence. A better term for this might be 'over-promoted'. The average pilot was less intelligent—and so less able to solve a sudden, difficult problem—and, more importantly, so was the average engineer on the ground and the average worker in an aircraft hangar.

This decline in IQ meant that more and more people were making more and more short-term, bad decisions. And this culminated in the piece of defective, sharp, poorly-made metal strip falling off the DC 10 and being left on the runway, causing Concorde to crash.

But what is this thing intelligence? We all know people who are convinced that intelligence is really meaningless and it's hard work and social skills that count. Is intelligence really so important?

¹ For a detailed history of Concorde, see: Orlebar, C. (2011) *The Concorde Story*, New York: Bloomsbury USA.

² See: Alkon, P. (2013) *Science Fiction Before 1900: Imagination Discovers Technology*, London: Routledge.

³ See: Compton, W. (2012) *Where No Man Has Gone Before: A History of NASA's Apollo Lunar Expeditions*, Chelmsford, MA: Courier Corporation.

⁴ MacDonald, A. (2009) *Truth, Lies, and O-rings: Inside the Space Shuttle Challenger Disaster*, Gainesville, FL: University of Florida Press. See also: Walsh, P. (2015) *Echoes Among the Stars: A Short History of the U.S. Space Program*, London: Routledge. This argument was first presented in

Charlton, B. (2012) *Not Even Trying: The Corruption of Real Science*, Buckingham: University of Buckingham Press.

[5](#) See Bouchard Jr., T. (2004) Genetic influence on human psychological traits, *Current Directions in Psychological Science*, 13, pp. 148–151.

[6](#) Jensen, A. R. (1981) *Straight Talk About Mental Tests*, New York: Free Press.

[7](#) Clark, G. (2007) *A Farewell to Alms: A Brief Economic History of the World*, Princeton, NJ: Princeton University Press. Clark does not consider ‘intelligence’ as one of the traits that increased as a consequence of the ‘survival of the richest’, however this is what is entailed by the mass of evidence he cites.

[8](#) Shamosh, N.A. & Gray, J.R. (2008) Delay discounting and intelligence: A meta-analysis, *Intelligence*, 36, pp. 289–305.

[9](#) Woodley of Menie, M.A., te Nijenhuis, J. & Murphy, R. (2015) The Victorians were still faster than us. Commentary: Factors influencing the latency of simple reaction time, *Frontiers in Human Neuroscience*, 9, art. 452.

[10](#) Woodley of Menie, M.A., Figueredo, A.J., Sarraf, M.A., Hertler, S.C., Fernandes, H.B.F. & Peñaherrera-Aguirre, M. (2017) The rhythm of the West: A biohistory of the modern era AD 1600 to the present, *Journal of Social Political and Economic Studies, Monograph Series, No. 37*, Washington, DC: Scott Townsend Press.

[11](#) See: Charlton, B. (26 November 2012) The pyramid of technology and of intellectual functions, *Bruce Charlton's Notions*, [Online], <http://charlton-teaching.blogspot.fi/2012/11/the-pyramid-of-technology-and-of.html>.

Two

What is Intelligence?

‘Intelligence’ is one of those concepts that a lot of people don’t like. Currently, the ‘politically correct’ way to think—the way of thinking that means you’re a good person who won’t make people feel uncomfortable or make them think about the possibility they might not be right—involves the belief that everyone is equal in terms of their innate capacities.^[1] Everyone must be equal because they have equal value. But the problem with this idea is that some people are much better at some tasks than others. If your computer breaks down you might ask Lee, who knows a lot about computers and designs computer games for a living, to help you out. Lee is clearly not equal—in terms of that ability—to Mike, who is a doctor but knows nothing about computers. You’d be better off going to Mike if you found a lump on your neck. He would be better than Lee and of more value to you in those circumstances.

Intelligence—like computer-mending ability or diagnostic skill—is something that some people have more of than others. Intelligence, as we have already discussed, is the ability to solve complex problems and to solve them quickly. Some people are clearly better able to solve complex problems and solve them more quickly than others and those people are more intelligent than those who are slower or who simply have to give up because the problem is beyond them. We might compare intelligence to how a computer works.^[2] Intelligence is like the processing speed of a computer and how much complexity it can deal with before it simply freezes and shuts down.

So, intelligence can be seen as the ability to think abstractly and to learn quickly—this leads to the ability to solve problems quickly, especially if they are similar to problems that have previously been experienced. Intelligence is measured by IQ tests. Some people argue that IQ tests don’t really measure intelligence and are essentially only a measure of how well people do on IQ tests. This is simply wrong. Child and adulthood IQ correlate at between 0.7 and 0.85.^[3] IQ test scores in childhood will predict many important things in adulthood—higher intelligence predicts higher

education level, higher socio-economic status, higher salary, better health, greater civic participation,^[4] lower impulsivity, and longer lifespan.^[5] Lower intelligence predicts higher criminality, and shorter-term future-orientation.^[6] In other words, people who are more intelligent tend to live for the future whereas people who are less intelligent tend to live for the now. A test of future-orientation might involve placing a chocolate bar in front of a young child and telling him or her that he or she can have that chocolate bar now or two chocolate bars in an hour's time if the child doesn't take the chocolate bar now. The more intelligent the child is, the more likely s/he is to wait an hour. Higher IQ people are also more trusting. The relationship between intelligence and trust may result from the way in which less intelligent people will be less able to discern whether someone is trustworthy, meaning it would make more sense for them to trust nobody.^[7] In general, therefore, high intelligence—as measured by IQ tests—predicts socially desirable outcomes. A full list of the qualities that are associated with intelligence based on IQ tests—specifically ‘general intelligence’, which we will define below—can be seen in Table 1.

Table 1. Variables correlated with general intelligence^[8]

Positive Correlation	Negative Correlation
Achievement motivation	Accident proneness
Altruism	Acquiescence
Analytic style	Aging quickly
Abstract thinking	Alcoholism
Artistic preference and ability	Authoritarianism
Atheism	Conservatism (of social views)
Craftwork	Crime
Creativity	Delinquency

Positive Correlation	Negative Correlation
Diet (healthy)	Dogmatism
Democratic participation (voting, petitions)	Falsification ('Lie' scores)
Educational attainment	Hysteria (versus other neuroses)
Eminence and genius	Illegitimacy
Emotional sensitivity	Impulsivity
Extra-curricular attainments	Infant mortality
Field-independence	Obesity
Height	Racial prejudice
Health, fitness, longevity	Reaction times
Humour, sense of	Religiousness
Income	Self-Esteem
Interests, depth and breadth of	Smoking
Involvement in school activities	Single/young motherhood
Leadership	Truancy
Linguistic abilities (including spelling) Logical abilities	Trust (lack of)
Marital partner, choice of	Weight/height ratio (BMI)
Media preferences	
Memory	

Positive Correlation	Negative Correlation
Migration (voluntary)	
Military rank	
Moral reasoning and development	
Motor skills	
Musical preferences and abilities	
Myopia	
Occupational status	
Occupational success	
Perceptual abilities	
Piaget-type abilities	
Practical knowledge	
Psychotherapy, response to	
Reading ability	
Social skills	
Socioeconomic status of origin Socioeconomic status achieved	
Sports participation at university Supermarket shopping ability	
Talking speed	
Trusting nature	

Some people argue for a broader definition of intelligence, which encompasses ‘multiple intelligences’.^[9] For example, researchers talk of ‘emotional intelligence’ as the ability to get on with people, to empathise with them, to know what the right thing is to say and when to say it. This ability is sometimes described as being distinct from intelligence as measured by IQ tests. There is no question that what gets called ‘emotional intelligence’ is important and people who are high in it will have more friends than those who are socially awkward and who constantly offend people. However, the ability to solve social problems has been shown to be weakly predicted by intelligence and all cognitive aptitudes inter-correlate in rigorous studies.^[10] It may be comforting to believe, if you’re not that smart, that reality is like the US sitcom *The Big Bang Theory*. Penny is not as bright as her scientist friends but she has much greater ‘emotional intelligence’ and you’re like her. But the reality is that, on average, somebody like Leonard would not only be more intelligent than Penny but more socially skilled than her as well. This would not necessarily be true of Sheldon, but we will look at outliers like him in Chapter Six.

Different Kinds of Intelligence

And this leads us onto the real ‘different kinds of intelligence’. In general, we can understand that some people are more intelligent than others. After talking to somebody, and often after talking to them for not very long, we get an intuitive sense of how ‘bright’ or ‘smart’ they are. But this can be deceptive in a minority of cases.

For example, somebody might be very verbally skilled and use lots of big words—meaning they will superficially appear to be highly intelligent—while, overall, this is not the case. You certainly wouldn’t want them trying to fix your computer or diagnosing some potential illness. This is seemingly true of many people who study humanities subjects at university. In general, the student reading a subject like cultural anthropology will have high verbal intelligence, but they will be much less intelligent, overall, than the stereotypical tongue-tied, shy physics student.^[1] That is not to say that there are not highly intelligent and inquisitive students who study cultural anthropology, but it is simply a fact that their average IQ is lower than that of those who study physics.¹¹ IQ tests typically measure three main forms of intelligence: verbal, numerical (mathematical), and spatial (geometric). On the WAIS IV test, a typical test of verbal comprehension (known as ‘similarities’), for example, might be: ‘What is the connection between an apple and an orange?’ The correct answer is that they are both kinds of fruit. This would receive 2 points whereas the less nuanced ‘They’re both food’ would receive 1 point.^[2] Some people are higher in one manifestation of intelligence than another, and, rarely, they may have above average scores in one measure of intelligence and below average in another. Einstein, for example, had such fantastic mathematical skills that he worked out an original proof of Pythagoras’s theorem at the age of 12. However, his linguistic skills were so poor that he failed the entrance examination for the Federal Institute of Technology in Zurich.^[3] But, Einstein is an extreme case; an outlier. Overall, in group studies, the many different measures of cognitive ability always positively correlate with one another. It is consistently found that, within-groups, high ability in one task goes with high ability in other tasks.

This is why the computer comparison works so well. A faster processing computer will be better at pretty much any task you set it. It will always run

more efficiently and will be able to easily cope with tasks which would overwhelm slower computers, causing them to simply crash. The positive correlations that exist between many different cognitive ability measures mean that we can talk about a ‘general factor’ that underpins performance in all of them. This was first described statistically by Charles Spearman (1863–1945). Spearman was a pioneering English psychologist and a very unusual man. He joined the army, became an officer, and then suddenly left, in 1897, intent on pursuing an academic career. While studying for his degree at University College London, he published a seminal paper, in 1904, in which he showed that the ability of school children in tests on different subjects inter-correlated.^[14] This can be seen in Table 2.^[15]

Table 2. Spearman’s (1904) matrix of correlations showing that all of the scholastic aptitudes correlate positively with one another—so high-level performance in maths goes hand-in-hand with high-level performance in classics, French, English, etc.

	Classics	French	English	Maths	Pitch	Music
Classics	1					
French	0.83	1				
English	0.78	0.67	1			
Maths	0.7	0.67	0.64	1		
Pitch	0.66	0.65	0.54	0.45	1	
Music	0.63	0.57	0.51	0.51	0.4	1

With this, Spearman argued that there was a *g*-factor—a general factor — which underpinned the relationship between how well people did in all these diverse subjects. But let’s pause to examine Spearman’s ‘correlation matrix’ in more detail. It can be seen that ability in French —remember this is with a British sample—very strongly correlates with ability in classics, which is no surprise because they both involve the learning of foreign

languages, and French, Latin and, to a lesser extent, Ancient Greek are closely related. The correlation between classics and English is a bit weaker but even with maths the relationship is strong, at 0.7. We can see that the ability to learn a foreign language is more strongly related to maths than it is to English. And pitch discrimination also correlates with these academic subjects. This is consistent with an idea first postulated by Sir Francis Galton (1822–1911)^[16]—who we will also meet later. Galton proposed that intelligence is driven in part by the ability to notice subtle differences among sensory inputs (pitch, colour, etc.)—so intelligent brains have more ‘bandwidth’ as they can take in more information, which can in turn be used for solving problems more effectively. For example, if the problem was building a waterproof roof, an intelligent individual might notice that a particular material behaved very slightly differently from another and so choose the superior material. This ability to deal with subtlety would mean that they had solved the problem better.

IQ is a statistical construct which measures Spearman’s g factor. So, the IQ test is measuring g . However, the IQ test is not a perfect measurer of g , just as many a school maths test will also, to some extent, measure vocabulary ability along with mathematical ability, meaning it is not a perfect measurer of mathematical ability. The IQ test—in testing, let’s say, the ability to place an animal in the correct category—is measuring g , because g predicts the ability to do this. But there are other mental abilities that also predict the ability to do this. So, the test also tests these measures, measures which influence performance in very specific cognitive domains. Spearman termed these s for *specialised* abilities—there being many different s ’s that are unique and that only influence maths ability or language-learning ability and so forth. So, the IQ test measures a series of cognitive abilities. These abilities are predicted by g but also by specialised abilities which are independent of g .

Things have moved on from Spearman’s somewhat crude *two-factor* or g and s model of intelligence. Today, researchers typically conceive of intelligence as a pyramid. At the pinnacle is Spearman’s g factor. Beneath this are what are called *group factors* or sometimes *primary mental abilities*. These would include determinants of performance that may be shared among groupings of cognitive abilities, but which are nonetheless independent of the g factor. Examples of these ‘mini- g ’s’ would include the *Verbal*, *Perceptual*, and *Rotational* primary ability groupings.^[17] These

ability groupings strongly correlate with each other, but performance in these domains is also in part a reflection of other things; specific narrow abilities. Beneath these are even more specific narrow skills—i.e. *s*'s that predict performance *within* the sub-domains of the primary ability clusters. These, likewise, correlate with *g* but are also substantially measuring other highly specialised cognitive processes. This is why somebody might not have a particularly high score in any of three main ability clusters but, nevertheless, be brilliant at darts or realistic drawing. They have a very specific cognitive skill. Finally, at the bottom of the pyramid are the numerous test-specificities —extremely narrow skills that influence performance on specific ability tests, but do not help in others—being really proficient at pattern recognition may help on tests that rely on this for problem solving, but won't help much on tests that don't (like a vocabulary test).

It is important to note that not all indicators of intelligence are equally *g*-loaded—that is, the degree to which they measure the *g* factor varies.^[18] To give an example, how well you do at school in English or in maths are both strongly predicted by how intelligent you are because they both measure the *g* factor. However, maths is more closely related to *g* than English. It is a better proxy for *g*. English, in turn, is likely to be a better proxy for general intelligence than art. But if you were a university lecturer faced with a huge pile of university applications and you wanted the most intelligent students you could save a lot of time by simply turning to how well the applicant scored in GCSE maths,^[19] even if they were applying to read modern history. This would, of course, be extreme and simplistic. But it seems fairly likely that most admissions tutors will take GCSE maths into account even if their subject is modern history, as the essence of it is the ability to think logically.

Intelligence and IQ Tests

IQ compares your intelligence with those of your own age. Intelligence increases throughout childhood. Problems which an average adult could solve would be beyond even the brightest three-year-old. But we would not say that the three-year-old who was already beginning to learn to read was not very intelligent. In comparison to adults, all three-year-olds are not especially intelligent. But their IQ is a different matter. Intelligence increases up to middle age and then decreases from middle age onwards.^[20] As such, IQ is a comparative measure—comparing the individual with a group sample of the same age.

The IQ number is a way of expressing the individual's position in a rank ordering of IQ test scores for their age group; hence the term 'intelligence quotient' (IQ). The average IQ is set at 100. Larger numbers represent above average IQ and lower numbers represent below average. IQ is 'normally distributed' in a so-called bell curve and, in that respect, it is rather like height. IQ distribution, on the bell curve, is conventionally divided into 'standard deviations' of 15 IQ points. Most people have an IQ of somewhere around the average of 100, just as most people's height is clustered around the average with smaller and smaller percentages of people being either very short or very tall. Indeed, 68% of the population have an IQ that is between 85 and 115. Only 14% of the population have an IQ that is either between 115 and 130 or between 70 and 85. And—you can see where we're going with this!—as a consequence 95% of the population have an IQ that is between 70 and 130. This can be considered the 'normal' IQ range because those who are below 70 would be classified as having learning difficulties and those above 130 would be exceptionally bright. So, 2% of the population have an IQ either between 55 and 70 or between 130 and 145. These are the people of either very low or very high intelligence respectively. Just 0.1% of the population, at either end of the bell curve, are higher or lower still. This can be seen in Figure 1.

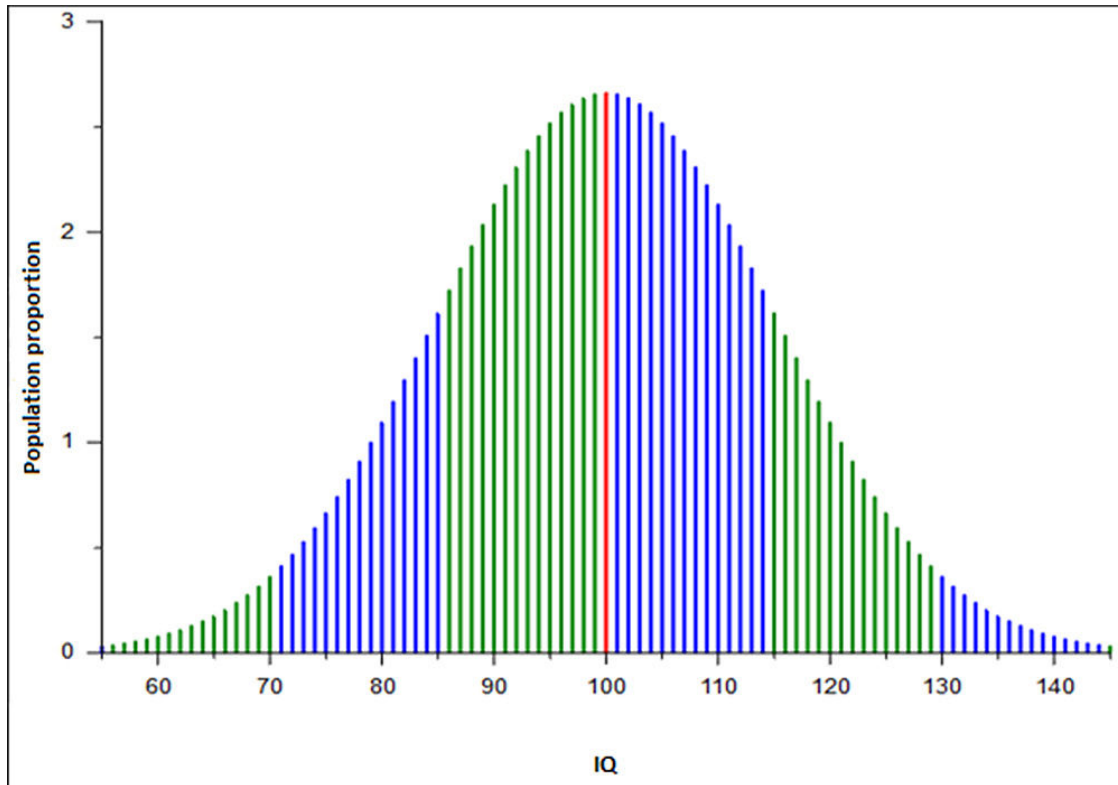


Figure 1. The IQ bell curve.^[21]

We measure weight with a weighing-scale and height with a tape measure. The IQ test is simply the instrument through which we measure IQ. No instrument is perfect. Some weighing-scales will give a much more accurate and subtle reading than others and it's the same with IQ tests.^[22] The test of the accuracy of an instrument is if its results strongly correlate with other instruments that are measuring the same thing or measuring something very similar. So, one measure of weight might involve getting people to physically lift different people and estimate which was the heaviest. If this correlated with what the weighing-scale indicated, we could have faith in the scales. The results of IQ tests strongly correlate with intuitive measures of thinking ability (such as school exams) and they are not merely culturally influenced. We know that IQ testing is valid and robust, because culture-fair IQ tests have similar predictive power across cultures.^[23] This is exactly the opposite of what we would predict if the tests were poor-quality instruments that were highly subject to cultural bias.

Also, IQ test results correlate positively with something objective—that is, with differences in reaction times.^[24] It is widely accepted among leading psychometricians such as Arthur Jensen,^[25] Hans Eysenck,^[26] and Ian

Deary^[27] that IQ tests correlate with this objective neurological measure. There are many different tests of reaction times. An American psychologist called Arthur Jensen (1923–2012) developed one of the most commonly used. Jensen, who was Professor of Psychology at the University of California at Berkeley, spent his entire academic career studying intelligence, though he was a social worker before that. Jensen pioneered the ‘odd man out test’, in which people were seated in front of a bank of lights. They observed which light went on, lifted their finger from a ‘home’ button and pressed the button closest to the illuminated light. Studies have found correlations of between 0.3 and 0.4 between IQ and how quickly they did this. On average, the quicker your reaction times are, the cleverer you are. In other words, IQ is, in part, a measure of *processing speed*—once again, the computer analogy shows its relevance. This correlation with reaction times means that a significant part of being intelligent is simply having a high functioning nervous system. So, there is every reason to be confident in the validity of IQ tests.

A number of other criticisms have been levelled against the objectivity of IQ tests. The most fashionable is so-called ‘stereotype threat’. This is the idea that certain groups are stereotyped to do badly on IQ tests. As such, when they take the test they become worried about doing badly and therefore they do badly—thus conforming to the stereotype, presumably because they’re stressed. However, studies using large samples have shown no evidence for this effect whatsoever. In some cases, the opposite effect has been observed—those who are told they will do badly in something become more motivated to do well and so they do better than they otherwise would. In addition, there is clear evidence of publication bias around stereotype threat. When a study proves it, then it’s published. If it disproves it, it gathers dust as an unpublished dissertation or sitting in some academic’s file drawer.^[28]

Another criticism of IQ tests is that motivation plays a part in test scores. This is obviously true. If we give you some complex sum and tell you to solve it, most of you aren’t going to bother unless we can persuade you that doing so is vitally important to understanding the rest of the book (don’t worry—we’re not that cruel!). Motivation plays a role in IQ tests and so do a host of other things, like suffering from flu on the day of the test. But if nobody gets a prize for doing well in the test then people will only be equally unmotivated to try their hardest. The solution to ensuring that these

factors don't skew the results is drawing upon lots of samples and drawing upon large samples and we have these. For example, the US National Longitudinal Study of Youth is a sample of over 12,000 individuals—a sample that is in fact fairly representative of the population of the USA. A 'longitudinal' study involves repeated observations of the same set of individuals over time. So, the lives of the participants are tracked over time to see how they unfold.

As already noted, intelligence is a vital predictor of life outcomes, correlating with school results at 0.7, university performance at 0.5, and postgraduate performance at 0.4. It correlates with salary at 0.3 and is an important predictor of occupational status.^[29] It has been found that those in less-selective professions, such as nurses, have an IQ of about 110, while the average is 120 for doctors and lawyers, and higher still for those who rise to the top of these kinds of profession.^[30] The average PhD student in an education department has an IQ of around 117, while the average PhD student in a physics department has an IQ of 130.^[31] The more intelligent are more likely to engage in civic activities such as voting, and are less likely to endorse extreme political parties or opinions. They are, presumably, less extreme because they are better able to foresee the negative consequences of extreme action and are better at perceiving nuance. They are more likely to engage in civic activity because they are more cooperative and trusting. They can also better understand the positive outcomes of doing so, such as living in a nice environment or being politically free.^[32]

The Causes of Intelligence Differences

Why are there differences in intelligence? We know from studies of identical twins—who share roughly 100% of their genes in common—that intelligence is strongly heritable. Heritability is in essence a measure of how closely parents resemble their children in a group study. The number refers to how closely the parents' IQ predicts the child's. A heritability of 1 would mean that children's IQs were wholly a product of their parents' IQs; zero would mean the statistical relationship between parent and offspring's IQ was random. In these twin studies, researchers test identical twins, meaning that the only variable causing them to diverge is the environment. Intelligence is seemingly 80% heritable—meaning that 80% of the variation among individuals is due to genetic factors and overwhelmingly, therefore, people resemble their parents in terms of intelligence.^[33]

Environmental factors that are relevant include access to good nutrition and a sufficiently cognitively stimulating environment during childhood. But an intellectually stimulating childhood is not enough. Your adult environment also impacts your intelligence. Those with higher intelligence will tend to create a more intellectually stimulating environment for themselves when they grow up, surrounding themselves with other highly intelligent people, for example. For this reason, among others, the heritability of IQ during childhood is not very high, as the child's environment will be a reflection of factors that are beyond its control. Only as the child becomes an adult will its environment start to reflect its own intelligence. This ultimately leads to a heritability of about 80%.^[34] Think of the super-intelligent character Matilda in Roald Dahl's children's book of the same name. Her parents have no interest in intellectual matters and there are hardly any books in their house. This kind of environment will reduce Matilda's IQ because it reflects her parents' intelligence rather than hers. As she moves in with Miss Honey, and eventually becomes independent of her, she will start to create an environment which reflects her own innate intelligence. This will lead to a substantial increase in her knowledge (but not necessarily her abstract reasoning ability), which will be reflected in an increase in her measured IQ.^[35]

1. Additivity

The bulk of the heritability of intelligence is due to the action of what is known as *additivity*. Genes with additive effects typically have individually very small effects on the phenotype; on how the gene is expressed in a particular environment. Thus complex traits like intelligence are *massively polygenic*, meaning that there are thousands of genes (maybe as many as 10,000) with small additive effects co-contributing to the trait.^[36] In other words, intelligence is primarily a product of lots of different genes, each with a tiny effect, rather like a society where the actions of each individual member all contribute, only slightly, to the overall character of the society. Additivity is the reason why offspring are typically intermediary of their parents for traits like IQ. Your IQ is generally the average of that of your parents—whose genes have ‘blended together’ to make you.

People furthermore tend to be sexually attracted to those who are moderately genetically similar to themselves.^[37] This is known as ‘assortitive mating’. Couples are typically more genetically similar than two random members of the same population, and especially on more heritable physical measures, such as wrist circumference. This mating for genetic similarity enhances the degree to which offspring resemble their parents, as the parents are more similar to one another, hence they will more strongly resemble their offspring. People engage in the practice of assortitive mating because it is a way of indirectly passing on more of their genes. If they mate with somebody too genetically close, then they risk genetic defects due to the children inheriting two copies of a harmful gene (inbreeding depression). If they mate with someone too distant, then they will be passing on fewer of their genes than they could. Also more distantly related genes could combine in ways that may be harmful to the offspring (outbreeding depression). According to research from Iceland, the ‘sweet spot’ in terms of fertility, or producing the highest numbers of children, is your third cousin!^[38] It would follow that this would extend to non-relatives who share the same percentage of genes with you as do third cousins, just by genetic chance. We will discuss other ways of indirectly passing on your genes in Chapter Six.

2. Dominance

As many traits are predominantly influenced by the action of genes with additive effects, children are fairly similar to their parents, both mentally

and physically. But there are exceptions to this. Traits like eye colour are not caused by many genes with small effects, but rather by small numbers of genes with big effects (this is termed *dominance*). Hence, offspring will resemble one or the other parent in terms of eye colour, based on which parent is transmitting the dominant eye colour gene. So, with dominance traits a small number of genes have a big effect.

3. *Epistasis*

The third form of genetic action is ‘epistasis’. Interactions can occur between genes with both additive and dominant effects, whereby the effect of one gene will only be triggered if the other is also present. This process is called *epistasis*. It’s as if the genes in this case were like Jack Sprat and his wife. Alone, they don’t do anything, but when they’re both present they interact with each other and ‘lick the platter clean’. The contribution made to intelligence by genes with dominant effects and interactions is smaller than the contribution made by pure additivity.^[39] However, because dominant and epistatic effects nonetheless play a role, children can occasionally be significantly different from their parents and their siblings.

4. *Genetic Action and Epistasis*

The same thing can happen with intelligence more broadly. Two average people might have a highly intelligent child due to a rare combination of genes interacting with one another. In this case the IQ of that child might be held back by the environment that their (far less intelligent) parents had created for them. It would start to rise when they reached early adulthood, moved away from the parental influence, and began to create an environment reflecting their own genetic IQ.

Rare gene interactions and single genes with big effects may play a role in the genetics of genius—which may account for why geniuses seem to ‘pop up’ out of nowhere.^[40] This also seems to be the case for certain forms of giftedness, such as in mathematics, where instead of the offspring simply having the average of the parents’ mathematical ability, the ability seems to concentrate in one child, and is not shared by the other offspring—suggesting the action of rare genes with dominant effects which are not inherited equally.^[41] Einstein, for example, was clearly super-intelligent, however his father, an engineer, was presumably bright but nowhere near Einstein’s level.

And, of course, the opposite can happen. Two highly intelligent parents may produce a rather average child—genes with big effects do not ‘breed true’, meaning that the gene may go to one but not all offspring (as in the case of eye colour and mathematical giftedness). Rare IQ-boosting gene interactions present on one of the parents are, furthermore, likely to be broken up in the offspring, which will reduce their IQ substantially relative to the high-IQ parent. The intellectually stimulating environment which the high-IQ parent (or parents) creates for the child may artificially boost the child’s IQ while it is still a child. But as it leaves the influence of the parental environment, it will start to create an environment for itself based on its own genetic intelligence and so its IQ will begin to fall. It needs to be repeated, however, that *most* of the genetic variance in IQ is additive in nature. Unusual cases aside, such as genius (which are nonetheless important as we will see in Chapter Six), in general, the majority of people resemble their parents in terms of ability, with the action of additive or nearly-additive genes being responsible for up to 80% of the variation in IQ among adults.

‘But What Do You Mean By Intelligence?’

Earlier, we met the ‘right-thinking’ people or, as they are commonly known, the ‘politically correct’. So far, we have responded to their more logical criticisms, because we have shown that intelligence can be measured by IQ tests, it predicts real-world outcomes (such as educational attainment and job performance), the tests are broadly culturally fair, they correlate with other measures of cognitive ability, and they correlate with objective biological measures that relate to the efficiency of the central nervous system, such as reaction times. In addition, the idea of ‘different kinds of intelligence’ is pointless because these ‘kinds of intelligence’—emotional, musical, and so on—are correlated through the *g* factor. Intelligence predicts things which are important across cultures, and intelligence is relevant to all cultures. It is negatively associated with criminality, for example, and, surely, no culture would want people to actively break its rules.

As such, we are left—or the detractors are left—with the more emotionally-based criticisms. The first is to say something like, ‘But what do you mean by intelligence?’ You then insist that it’s difficult to define. Where do you draw the border between ‘highly intelligent’ and ‘very intelligent’? Where do you draw the border between ‘intelligent’ and ‘stupid’? The response is quite simple. You could level this criticism against any category and so insist it shouldn’t be used. But we can’t live like this. Reality is a mass of information and we make sense of it by breaking it up into manageable chunks. We call these ‘categories’. The test of a useful category is that it allows successful predictions to be made and, therefore, allows us to better negotiate the obstacles in our lives and survive. If we cannot use categories, we cannot distinguish between ‘dangerous’ and ‘safe’ and, therefore, we will get killed. If somebody genuinely thinks that we shouldn’t use categories, they should in no way be frightened of hurling themselves from a tall building because it would be a sign of a lack of intellectual depth to distinguish between ‘short’ and ‘tall’. We must, of course, define our terms but this must be balanced with practicality or we’ll never get anywhere. If we say, ‘Lee is more intelligent than Mike’, it’s obvious what we mean. See how many people would waste time asking what we mean by ‘intelligent’ if we were on a crashing Boeing

747 with two dead pilots and we needed to work out who would be best able to figure out how to take control of the plane.

‘Intelligence Means Different Things in Different Cultures’

No, it doesn't. The capacity to reason abstractly—to solve complex and novel social and environmental problems—is universal across cultures. For example, as in Western cultures, intelligence—albeit intuitively assessed—predicts success in attaining social status and leadership in tribal societies.^[42] Furthermore, intelligence is valued to a high degree as a trait in prospective partners across many cultures—indicating that intelligence is considered desirable across cultures.^[43] This is consistent with the concept of ‘intelligence’ as we have defined it. If the detractors are defining it differently then we're simply not talking about the same thing.

‘We Don’t Know the Genes Behind Intelligence, so We’re Just Speculating’

There are many things that we know exist, but we don’t fully understand their architecture. We could talk about measles before we understood its architecture. ‘Measles’ used to be defined in terms of what it meant to us. It was a series of symptoms that seemed to happen to children. Likewise, we can define intelligence as summarising its manifestations without fully understanding the genetics behind it. If we cannot do this, then it can be countered that, as science by its nature is always progressing, we do not fully understand anything and, therefore, we cannot discuss anything at all.

At any rate, this objection holds considerably less water now that advances in genomics have in fact substantially increased our understanding of the genetics of intelligence, with recent studies having even managed to track down a number of specific alleles (these are simply alternate forms of the same gene) which predict individual differences in intelligence.^[44] We have now reached the point where we can actually predict (albeit with low accuracy) a person’s intelligence based on their genome alone.

‘There Are Different Kinds of Intelligence’

As discussed, the most well-known example of an ‘alternate’ intelligence is ‘emotional intelligence’. The idea that there are multiple ways in which individuals can be intelligent is emotionally reassuring to some, because ‘intelligence’ is a highly socially valued quality and it means that everybody can be ‘intelligent’ in some way. But the emotional reasoning behind the desire for multiple intelligences is akin to the precocious child who sees his little playground gang arguing over who should be ‘leader’ and chips in, ‘Why can’t we all be leaders?’ ‘If everybody’s somebody then no-one’s anybody.’^[45] If everyone’s ‘intelligent’ then it’s akin to everyone being ‘tall’—the concept simply becomes meaningless. And more importantly, as we have already discussed, these different kinds of ‘intelligence’ actually positively correlate with general intelligence. The exceptions, like ‘bodily kinaesthetic intelligence’ (essentially a measure of multi-limb coordination), are examples of low-level psychomotor skills and not intelligence defined in terms of the capacity to solve abstract problems.

‘Intelligence is a Very Western Concept’

That doesn't mean it's not relevant to understanding what's happening elsewhere. We only really developed the modern definition of 'intelligence' around 1912, but that doesn't mean it's not relevant to understanding people who lived before then. This would be like saying that relativistic and Newtonian physics are irrelevant to understanding cosmological events that happened in deep time, before the discovery of these physical laws. The anthropological concept of the shaman—the priest-figure and healer in certain tribes—is from Siberia,^[46] but that doesn't mean the concept can't be applied in other cultures. Ultimately, all words come from a culture. Should we not be able to talk about the French in any language other than French? As was mentioned previously, intelligence is also highly relevant in non-Western cultures because it will predict everything from law-abidingness and cooperativeness to being able to make better arrows and shelters, and to manage others via leadership.

‘Intelligence and Ranking People by Their IQ Makes Me Feel Morally Uncomfortable. It’s Very Dangerous’

This is a fallacy—an illogical argument—known as ‘appeal to morality’. Science is amoral. The possible fact that using IQ tests, and measuring intelligence, may have negative consequences—let alone that it makes some people feel bad—is completely irrelevant to whether ‘intelligence’ is a meaningful concept and whether IQ tests fairly measure it. If scientific data indicate that humans have evolved from a common ancestor with chimpanzees, and you believe this knowledge is ‘dangerous’ or ‘uncomfortable’, this has no bearing at all on whether it’s true. Anyway, the argument can also be easily turned on its head. If we don’t know how intelligent people are then we will appoint them to professions at random. Accordingly, people who are intellectually incapable of—let’s say—designing aeroplanes, will be put to work doing so. And the aeroplanes will crash and people will be killed. *We* feel rather uncomfortable about *that* and would suggest it is rather dangerous.

So, we can conclude that intelligence is extremely important. People who are more intelligent can do more complex things and can do them more quickly. Different measures of intelligence correlate with one another—giving rise to a ‘core’ intellectual ability, or *g* factor, which is what actually predicts the degree to which people solve problems more efficiently. It furthermore predicts all kinds of important life outcomes, from education level to long-term health, and it can be accurately and fairly measured by IQ tests. But now, armed with a sound understanding of the concept of ‘intelligence’, let us turn to how human intelligence has evolved.

¹ For a detailed discussion of political correctness, see: Ellis, F. (2004) *Political Correctness and the Theoretical Struggle: From Lenin and Mao to Marcuse and Foucault*, Auckland: Maxim Institute.

² We are grateful to Bruce Charlton for this metaphor. It is explored in more detail in Dutton, E. & Charlton, B. (2015) *The Genius Famine: Why We Need Geniuses, Why They’re Dying Out and Why We Must Rescue Them*, Buckingham: University of Buckingham Press, Ch. 2.

³ Winner, E. & Von Karolyi, C. (1998) Artistry and aphasia, in Sarno, M. (ed.) *Acquired Aphasia*, San Diego, CA: Academic Press.

⁴ Deary, I., Batty, G.D. & Gales, C. (2008) Childhood intelligence predicts voter turnout, voter preferences and political involvement in adulthood; the 1970 cohort, *Intelligence*, 36, pp. 548–555.

[5](#) For a more detailed discussion of these associations, see: Lynn, R. & Vanhanen, T. (2012) *Intelligence: A Unifying Construct for the Social Sciences*, London: Ulster Institute for Social Research.

[6](#) Shamosh, N.A. & Gray, J.R. (2008) Delay discounting and intelligence: A meta-analysis, *Intelligence*, 36, pp. 289–305.

[7](#) Carl, N. & Billari, F. (2014) Generalized trust and intelligence in the United States, *PLOS ONE*, 9, e91786.

[8](#) These are sourced mainly from Jensen, A.R. (1998) *The g Factor: The Science of Mental Ability*, Westport, CT: Praeger, p. 75.

[9](#) For more information on multiple intelligence theory, see: Gardner, H. (1983) *Frames of Mind: The Theory of Multiple Intelligences*, New York: Basic Books.

[10](#) Kaufman, S., DeYoung, C., Reiss, D. & Gray, J. (2011) General intelligence predicts reasoning ability for evolutionarily familiar content, *Intelligence*, 39, pp. 311–322.

[11](#) See, Dutton, E. & Lynn, R. (2014) Intelligence and religious and political differences among members of the U.S. academic elite, *Interdisciplinary Journal of Research on Religion*, 10, pp. 1–29.

[12](#) Wechsler Test (2017) [Online], <https://wechsler-test.com/test-preparations/sample-wechsler-test-questions>.

[13](#) Miller, A. (1999) Albert Einstein, in Runco, M. & Pritzker, S. (eds.) *Encyclopedia of Creativity*, New York: Academic Press.

[14](#) See: Thomson, G. (1947) Charles Spearman, 1863–1945, *Obituary Notices of Fellows of the Royal Society*, 5, p. 15.

[15](#) Spearman, C. (1904) General intelligence: Objectively determined and measured, *American Journal of Psychology*, 15, pp. 201–293.

[16](#) Galton, F. (1883) *Inquiries into human faculty and its development*, London: Macmillan.

[17](#) Johnson, W. & Bouchard Jr., T. (2005) The structure of human intelligence: It is verbal, perceptual, and image rotation (VPR), not fluid and crystallized, *Intelligence*, 33, pp. 393–416.

[18](#) For a more detailed introduction see: Jensen, A.R. (1998) *The g Factor: The Science of Mental Ability*, Westport, CT: Praeger.

[19](#) GCSEs are the school leaving exams in England and Wales. They are taken at the age of 16. A large number of subjects are taken—typically around ten. English, maths, and science are compulsory.

[20](#) Kirasic, K. (1989) Acquisition and utilization of spatial information by elderly adults: Implications for day to day situations, in Poon, L., Rubin, D. and Wilson, B. (eds.) *Everyday Cognition in Adulthood and Later Life*, Cambridge: Cambridge University Press.

[21](#) Source: https://commons.wikimedia.org/wiki/File:IQ_curve.svg.

[22](#) We are grateful to Satoshi Kanazawa for this metaphor, which he presented in Kanazawa, S. (2012) *The Intelligence Paradox: Why the Intelligent Choice Isn't Always the Smart One*, Hoboken, NJ: John Wiley & Sons, p. 39.

[23](#) See: Jensen, A.R. (2013) Rushton's contributions to the study of mental ability, *Personality & Individual Differences*, 55, pp. 212–217.

[24](#) See: Jensen, A.R. (1998) *The g Factor: The Science of Mental Ability*, Westport, CT: Praeger. For 'reaction times' and intelligence, see: Jensen, A.R. (2006) *Clocking the Mind: Mental Chronometry*

and *Individual Differences*, New York: Elsevier.

[25](#) Jensen, A.R. (2006) *Clocking the Mind: Mental Chronometry and Individual Differences*, New York: Elsevier.

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Three

How and Why Has Intelligence Been Selected For?

Why are some animals more intelligent than others? Where does intelligence come from? In order to understand this we have to understand the general principles of Darwinian selection as set out by Charles Darwin.

There are two processes by which a population of animals are kept healthy, and adapted to their environment. Those that have genetic traits, which help them to survive in the face of particular environmental challenges, or are simply healthier, will live longer and have more children. This will happen every generation and it is known as *natural selection*. As part of this, those who have genetic disorders, or poor immunity, will be—along with their genes—constantly eliminated from the population. This is because they won't survive childhood and, if they do, they won't have many children or indeed any at all. Furthermore, there is a tendency for mothers to refuse to feed, and even to simply kill, obviously unhealthy offspring; the so-called runts of the litter. In this way, it is ensured that only the 'fittest'—i.e. those with the greatest potential for reproduction—survive, because resources are not given to those with little chance of survival.

Fitness is reflected in the degree to which an organism is healthy and adapted to the environment. Genes are copied during the process of procreation, but these will sometimes be copied incorrectly and you end up with a mutant gene. If this mutant gene confers some benefit—such as greater strength (where this is needed) or a better immune system—it will spread throughout the population. But, in general, animals are relatively 'fine-tuned' with respect to the survival requirements imposed upon them by their environment, so a mutant gene will more often than not be bad. The organism will work less well. So, the healthy organism has a low percentage of mutant genes: a low 'mutational load'.

Sexual Selection

There are a number of forms of selection. Darwin's first book, *On the Origin of Species*, in 1858, popularised the idea of evolution and gave us the concept of 'natural selection'. His second book, in 1871, was entitled, *The Descent of Man and Selection in Relation to Sex*. This gave us the equally important concept of 'sexual selection'.

In most animal species, males will compete—fight—to mate with as many females as possible. In winning these fights, they establish who among them is strongest, healthiest, and who likely has very few mutant genes. Females will prefer the males who are successful in these fights because they will provide them with healthier offspring who are more likely to survive. The population will remain healthy and strong, because those who lack these qualities will be unsuccessful in their attempts to persuade females to mate with them. The females will actively fight off any attempt by an unhealthy male to breed with them. In much the same way, the human female will fight off attempts by unattractive (in whatever sense) males to breed with her. And, when they do so anyway, she has been raped—this being considered an appalling violation in most human societies.^[1]

Darwin himself observed that, 'It is certain that among all animals there is a struggle between the males for possession of the female.'^[2] Throughout animal species, males compete for territory or, in the case of more social animals, the group competes for territory but each male competes for status within the male hierarchy of the group. Only those who are successful in gaining territory, where there is a limited amount of territory, or status within the hierarchy will be attractive to the females. In addition, the females will be specifically attracted to the qualities which lead to the males obtaining status. These will be markers of physical strength—in a society where status is obtained by fighting—and good genetic health. Males can showcase these qualities through fighting in front of the females but also by strutting; by advertising their genetic quality. This issue has long fascinated evolutionary psychologists (psychologists who attempt to explain the evolution of widespread, and thus likely evolved, psychological traits).^[3]

A good example of males showcasing attractive physical qualities—examined by the American evolutionary psychologist Geoffrey Miller—is the peacock’s tail. This may have some use in terms of natural selection, in that the peacock can make himself look frightening to predators by displaying a particularly large tail with eye-shapes on it. However, it is also a ‘fitness indicator’. A peacock with poor genetic fitness—and thus a high number of mutant genes—would have to invest proportionately more of its resources into simply staying alive than a peacock with fewer mutant genes, because the body and mind of the mutant peacock would function less efficiently. As such, it would not be able to grow or maintain as impressive a tail. The tail of a less fit peacock would be smaller, less bright, less ornate, and less symmetrical. This is because we are evolved to be symmetrical; so symmetry is correlated with a lack of mutant genes (which interfere with the normal course of development) and it shows that the organism is fit enough to have acquired a healthy (symmetrical) phenotype in the face of disease or food shortage. With these considerations in mind, the tail would tell the peahen a great deal about the fitness of the peacock and we would expect the peahen to (1) select for peacocks that had such an ornament and (2) select for peacocks with the biggest and brightest tails.^[4] A peacock’s tail is also a ‘costly signal’ of the peacock’s fitness. It is a way of saying, ‘My genes are of such good quality that I have resources left over to grow this fantastic tail *and* deal with the potential problems that it may cause, such as weighing me down while I am trying to escape from a predator!’

Social Selection

Another type of Darwinian selection that was clearly described (but not named) by Darwin in his 1871 book is *social selection*. This type of selection occurs when individuals enter into social alliances, compete for social resources, compete for status, and go to war.^[5] It involves competing against other members of your own, or another, society. Most obviously, if people who are able to become richer than other people are, therefore, more likely to end up with more surviving children, then this is a matter of social selection.

The ways in which social selection can impact human populations are many—humans being an intensely social species. Traits like altruism and virtue were likely to have been very strongly shaped by social selection—the ways in which your fellow man acts on your behalf are going to have a big effect on your chances of leaving descendants, especially when such actions entail the sharing of scarce resources, protection from violence, or the formation of cooperative alliances.

It is important to keep in mind that natural, social, and sexual selection are not mutually exclusive to one another—in fact they are always related to one another via a *sequalae*—or causal chain. For example, let's imagine that a population of social organisms is all of a sudden afflicted with a new disease. This source of natural selection will immediately kill all those who lack any kind of intrinsic resistance to it. However, because the population is highly social, individuals who are more altruistically inclined may aid those who are ill, putting themselves at risk in the process. The aid may increase the proportion of surviving organisms and hence social selection will work to increase the fitness of the recipients of the aid. The altruists are also producing costly social signals of their altruism (by allocating effort to the sick and putting themselves at risk in the process), which increases their odds of being sexually selected for on the basis that the altruistic traits are proxies for having good quality genes conferring a strong immune system. Therefore natural selection entails social selection, which in turn entails sexual selection. The disease weeds out those with weak immune systems, creating opportunities for the less vulnerable to benefit from the protective actions of the altruists, who in turn reap an extra

fitness boost on the basis of having had the opportunity to display their fitness to prospective mates.

Group Selection

‘Group selection’ is an important manifestation of social selection. People who lay down their lives for their group are operating a ‘group selection’ strategy. By ‘group selection’ we mean selection for groups composed of individuals with certain traits. These are called ‘trait-groups’. There will be inter-group differences in the group averages of these traits, leading to some groups being more successful at passing on their genes than others. Unlike the classical group selection model, trait groups are comprised of variable numbers of individuals and their compositions can change over time. The fitness of the group can increase or decrease based on the change of its composition. This is because the composition of the group alters the relative strength of individual versus group selection, because an increase in individuals with certain traits may reduce or increase the group’s average level of, for example, altruism.

Broadly, this is part of multi-level selection. This refers to the way in which selection can occur at many levels such as the individual, the kinship group, the ethnic group, and the species.^[6] They are making sure that their group survives and in doing so, as we will see later, they are indirectly passing on their genes. In much the same way, people who come up with a brilliant invention which allows their group to prosper and expand are following, whether consciously or not, a group selection strategy: they are aiding the survival of their group. Group selection happens when two groups come into conflict and must compete for scarce resources. Certain qualities, such as the desire to engage in self-sacrifice for the group, superior organisation, or abilities that lead to the production of better weapons, will allow one group to triumph over the other. There is evidence, as we will see later, that people differentially select in favour of their kin. Group selection extends this to the ethnic group, which is generally an extended kinship group.^[7]

Selection for Intelligence in Animals

With these principles in mind, we can also understand how a certain optimum level of intelligence will be selected for among different species. There will be differences in general intelligence within the species and the less intelligent are likely to be weeded out in cases where there are clear benefits to being able to tackle and solve complex problems. This is not just speculation. We know there are individual differences in general intelligence within particular animal species and sub-species. This has been demonstrated in mice, racoons, pigeons, ravens, and chimpanzees and most recently it has been comprehensively demonstrated in the breed of dog known as border collies.^[8]

British psychologist Rosalind Arden, of King's College London's Institute for Psychiatry, and her team procured 68 border collies in Wales aged between 1 and 12 years. This is a relatively large number for animal studies of this kind. Testing them in a purpose-built barn, each of the border collies was given a series of problems to solve, all of which were rewarded with a food treat. One test measured spatial intelligence (the dogs had to get a treat from behind a screen), a second measured behavioural inference (going to a beaker pointed to by a human), and the third measured quantity discrimination (how often the dog would go to the larger of two piles of food). Arden's team found a clear *g*-factor among dogs. In general, those dogs which performed one of the tasks more quickly or accurately also did so in the other two tasks. This has clear implications for border collies because the more intelligent ones are kept as sheep dogs while the less intelligent ones end up being pets. But this clearly shows that there are real intelligence differences between individual animals of the same breed. This would have obvious effects in terms of survival in the wild because the more intelligent dogs would be more likely to survive and accrue territory. Related to this is research which has re-examined a study of general intelligence among 99 chimpanzees. The team found that the tasks administered to the chimpanzees which were the best measures of *g* among chimpanzees—that is, those which were more *g*-loaded—were also more heritable, based on estimates derived from the same chimpanzees.^[9] So, there is not only variability in non-human general intelligence, but it is partly heritable, meaning it can be selected for.

Based on these studies, it is quite reasonable to argue that in every generation, the animals that are extremely impulsive or generally have very low intelligence are much more likely to take silly risks and get themselves killed, meaning that they don't pass on their genes. Intelligence will also become important in terms of moving up the status hierarchy, although intelligence will be more important the more developed the animal is. In a troupe of chimpanzees, typically numbering 20 to 50, there will emerge a dominant male who will stay in place until he is successfully defeated by a middle ranking male. The successful 'Young Turk' must carefully judge when it is optimum to present his challenge to the alpha male. If he makes it when he is too young, or hasn't developed enough support among subordinate males, then he may be killed or seriously injured in the resulting fight. If he leaves it too late, he may be too physically weak due to age and will also lose the fight. To strike at precisely the right time requires forethought, impulse control, and social skill—such that alliances with other chimps can be developed—and the careful calculation of possible consequences.^[10] These are all signs of intelligence and so we would expect a certain level of average intelligence to be maintained among chimpanzees, with the less intelligent almost always failing to breed, or failing to breed to any significant extent. The alpha male will be the most attractive to females and will fight subordinate males who attempt to have sex with the females, though some will still manage to do so behind his back or may even be permitted to do so to maintain an alliance.

Of course, this doesn't mean that we would expect chimpanzees to eventually become as clever as us and then enslave us, like in *Planet of the Apes*. Growing a large brain, which is associated with intelligence, would involve directing energy away from growing big muscles, for example. In the unstable, dangerous, but relatively intellectually undemanding environment of chimpanzees—where basic needs like warmth or food are met—this would be damaging. So, there would be no selection for super-intelligent chimps—instead an optimum level of intelligence would be maintained.

Hunter-Gatherers

Moving on from chimpanzees, this combination of social, sexual, and natural selection for intelligence and health is very obvious in the least developed human social organisations: hunter-gatherers. These peoples mainly live off foraging from the local environment and, occasionally, meat brought into the community by male hunters. In some cases, they have developed very primitive forms of agriculture, tending a small garden in territory they regard as their own. But, in general, territory is held collectively by the band.^[11]

These groups are unstable, often splitting into separate groups over minor arguments, and they have very high levels of child mortality. Around 50% of children die from accidents or poor resistance to disease. In addition, in many of these tribes, such as the Yanomamö of Venezuela, unhealthy or simply unwanted infants will be killed by their mothers or allowed to starve. There is also a tendency for stepfathers, who may even have killed the father in a fight and taken his wife, to kill young stepchildren.^[12] For all of these reasons, in the groups from which modern humans evolved there is selection in favour of the appropriate level of strength, aggression, and good genetic health.

But we can also see how there would be selection for intelligence. Partner intelligence does not seem to be considered significant for short-term relationships. In the latter case, physical qualities which betoken good genetic health are what is most important. However, when looking for somebody with whom to have a long-term relationship—where children might result, for example—females are more interested in males' social status (and by extension his intelligence) than vice versa. This is likely because a male of high status will, in general, be more able, and more willing, to invest resources in the female and her offspring.^[13] And she will benefit from this investment when she is pregnant and has young children, meaning that she and the children will be more likely to survive. Accordingly, the female (and her offspring) will be more likely to pass on their genes. For this reason, there are sex differences in the qualities that we find attractive in partners. Although there are all kinds of shades of grey in between, overall it really is true that men go for looks and women go for money and status or the potential to achieve these.^[14] Men go for looks

because they have less to lose from the sexual encounter. Thus, unless they intend to invest in the family, their best strategy is to have sex with as many healthy and fertile—and thus good-looking and young—women as possible.¹⁴

In order to understand this selection for intelligence more, let's focus on the Yanomamö or, as other tribes term them, 'the fierce people'. They are a group of about 35,000 people living in up to 250 separate villages on the Brazil–Venezuela border. They are extremely violent, with men settling disputes by smashing each other on top of the head with logs until one of them loses consciousness or dies. This leaves the heads of the males as a mass of scars which they show off as evidence of their fortitude. The hierarchy is clearly based around access to females. The 'headman' will have about three wives and roughly eight children, while lower ranking men will have one or even no wives and a smaller number of children.^[15] This means that only the strongest, healthiest, and most intelligent men will make a significant impact on the gene pool. As Darwin put it, in describing these kinds of tribes:

'The strongest and most vigorous men, those who could best defend and hunt for their families, and, in later times, the chiefs or headmen, would have succeeded in leaving a greater number of offspring than would the weaker, poorer and lower members of the same tribes. The chiefs of nearly every tribe throughout the world succeed in obtaining more than one wife.'^[16]

This can also be seen among the Bushmen of the Kalahari Desert, who live in small bands and migrate from one watering hole to another. One study of this group found that infant mortality was 45%, and that 62% of adult males produced no children at all. There is an excess of females, due to male deaths on hunting trips, and, as such, the headman will have an excess of wives.^[17] Reviews of hunter-gatherers all agree that most of these peoples follow status-based polygamous mating systems.^[18]

We are not aware of any intelligence test which proves that the headman would be cleverer than his subordinates, but there's certainly good circumstantial evidence that this is the case. One of the means by which men in these tribes attract women is by being good at hunting. They can use the (rare) meat they obtain on hunting trips as presents for those they like, or as food for their children. The anthropologist Janet Siskind explains in her ethnography of the Sharanahua of Peru that: 'Prestige accrues to the

generous hunter. Prestige is not a vague goal at Marcos, it brings a definite reward, the possibility of gaining women as lovers and/or wives. The successful hunter is usually the winner in the competition for women.^{'[19]} Such abilities would also impress the males whom they would hope to lead. But, clearly, skill at hunting would involve not just good physical health but also intelligence. The ability to hit the target or make the best weapons would be predicted by spatial intelligence and lightning reaction times. Building and maintaining the weapons would require high impulse control and planning for the future. Reaching the top of the hierarchy would require the social skill involved in making alliances and understanding the best time to pose a challenge, while good verbal intelligence would be necessary to persuade rival males or outdo them in tests of wit. So, we would expect the headmen to have relatively high intelligence by the standards of the tribe, and it would be these very people who would be disproportionately passing on their genes.

This view is backed up by qualitative evidence from anthropologists, who have lived with these hunter-gatherers. Napoleon Chagnon is an American anthropologist who did long-term ethnographic fieldwork with the Yanomamö in the 1960s. In his ethnography, he writes: 'Kaobawa, on the other hand, has the special status of being the group's headman ... Kaobawa thinks for the others in the village, many of whom are not able to perceive some of the less obvious implications of situations. In political matters, he is the most astute man in the group, but he so diplomatically exercises his influence that others are not offended.'^[20] Kaobawa is strongly implied to be the most intelligent man in the village. American evolutionary psychologist David Buss has summarized that, 'In tribal societies, the headman or leaders are inevitably among the most intelligent in the group.'^[21]

We must also think in terms of group selection—i.e. where selection operates on groups of individuals. Chagnon found that the Yanomamö and similar hunter-gatherer groups are in a constant state of war against rival villages. This being the case, if the level of aggression were roughly similar then we would expect the healthier and more intelligent of the two villages to triumph and slaughter the males from the other village. This would be an obvious example of 'group selection'. This is because the more intelligent village would develop superior war strategies, produce better weapons, and engage in better planning.

Pastoralists

Pastoralists are nomadic peoples who keep a variety of domesticated animals such as goats and chickens. They frequently migrate from place to place in order to find fresh pastures for their herds. They are a more complex form of society than that of hunter-gatherers; they reflect a greater degree of specialisation, and there are clearer differences in social status within these groups. These differences strongly impact whether or not people have children and we have already noted that social status is partly predicted by intelligence.

The first pastoralists appeared in Neolithic times, around 10,000 years ago, in the so-called 'Fertile Crescent' on the shores of the Mediterranean. Pastoralists can sustain larger populations than hunter-gatherers because they can produce a surplus of food in order to feed these larger populations. A modern example of such a people is the Rendille camel herders of Northern Kenya. In this society, there is very strong selection both for physical prowess and intelligence. At the age of around 11, a boy undergoes a bloody rite of passage, in public, in order to transition from being a boy to being a warrior. He must sit perfectly still as he is circumcised. If he betrays the slightest emotion then he will shame his family and himself. At best he will be an outcast, who cannot marry, and, at worst, he will be killed by his furious and humiliated relatives. Clearly, this would select for physical prowess and thus good health. Once the male graduates to warrior status, he can get married, but only once he can pay the 'bride price', which is paid in camels. Only about 50% of Rendille males ever accrue enough camels to be able to pay the bride price, and so, in general, only the more socioeconomically successful males will father children at all.^[22] We have already seen that socioeconomic status is predicted by intelligence, so this system would have the indirect effect of preventing those of both low intelligence and poor health from having children.

A number of these pastoralist peoples have become agriculturalists. This means that there is even greater surplus and so an even larger population, though there will tend to be a greater concentration on one particular kind of crop. There are hundreds of studies of these kinds of people and almost all concur that there are polygamous mating systems through which the

wealthier males achieve the highest fertility. In addition, there are arduous rites of passage which weed out the males who are low in physical health. Accordingly, there is selection for intelligence and physical vigour. We would, in fact, expect selection for intelligence to be stronger among agriculturalists than among hunter-gatherers. To pursue agriculture successfully, you require far higher impulse control and a much stronger degree of orientation towards the future, such that you can achieve a surplus, ready for times of famine. As you are settled, and cannot move with the seasons, you have to keep warm and thus manufacture appropriate clothes and more complex and versatile dwelling structures. In order to marry, you must be highly successful in agriculture, being able to pay the bride price, and this would require far higher intelligence—as reflected by the heightened ability to plan and practise self-discipline—than would hunting ability.^[23]

Early Nation States

As agriculture improved further, such a large food surplus could be achieved that there was no need for everybody to even work in agriculture. Increasing numbers of people were able to pursue specialisms that had nothing to do with agriculture directly or simply employ others to work on their land while they lived a life of ease. As such, around 5,000 years ago we begin to see the development of city states, especially around the Fertile Crescent. A clear social class system develops. At the top, there are the kings, the nobility, and the leading religious and military figures, then there are the wealthy farmers, merchants, and craftsmen, then there are labourers and poorer farmers, and at the very bottom are slaves who are literally owned by members of the higher classes. These societies were generally polygamous and there is sound evidence that members of the higher social classes enjoyed many wives and extremely high fertility.^[24]

We need look no further than the Old Testament in search of evidence for this. King Solomon (c.990–931 BC) ran a harem of around a thousand sexual partners:

‘King Solomon, however, loved many foreign women besides Pharaoh’s daughter—Moabites, Ammonites, Edomites, Sidonians and Hittites. They were from nations about which the Lord had told the Israelites, “You must not intermarry with them, because they will surely turn your hearts after their gods.” Nevertheless, Solomon held fast to them in love. He had seven hundred wives of royal birth and three hundred concubines, and his wives led him astray.’ (I Kings, 11)

Other Old Testament kings also had very high numbers of wives, though nothing to match Solomon. King Rehoboam of Judah, for example, had 18 wives and 60 concubines. Among the Incas of Peru there were legal regulations on the extent of polygamy. Emperors could have as many wives and concubines as they desired while military officers were permitted between 30 and 15, depending on their rank.^[25] In China, emperors maintained harems of hundreds of women who would be rotated according to their time in the menstrual cycle. As such, they would have hundreds of

children.^[26] It is recorded that the Moroccan emperor Moulay Ishmael the Bloodthirsty (1634–1727) fathered 888 children. These were produced by hundreds of concubines and 9 wives, including ‘Mrs Shaw, an Irish woman’ who was taken as a slave by Barbary pirates during a raid on her native land.^[27]

As the societies become more complex, the social differences become greater, which leads to another form of selection both for intelligence and health. The upper classes simply had considerably better access to nutritious food than the lower classes, who would eat a poor diet, be close to starvation, and live in very unhealthy conditions. Many studies have compared skeletons from higher and lower class graves and demonstrated that the upper class skeletons displayed evidence of better nutrition and were also taller, because they had been able to reach their maximum genotypic height due to good nutrition. Among the Maya in Central America, upper class skeletons were, on average, 7cm taller than lower class skeletons.^[28] This association between social class and height can also be seen in Early Modern England. The average sailor on the English ship *The Mary Rose*, which sank in 1545, was 5ft 7 inches tall.^[29] However, Henry VIII was 6ft 3 inches,^[30] Edward IV, Henry’s grandfather, was 6ft 3-and-a-half inches,^[31] and Mary, Queen of Scots was almost 6ft.^[32] These significant differences in nutrition would have had a direct effect on the ability to conceive, on the likelihood that a child would survive into adulthood, and on life expectancy. They would have meant that there was a form of social selection in favour of the wealthy and, therefore, in favour of the more intelligent. And this would have been in addition to the impact of sexual selection, with upper class men having greater access to females. Thus, it can be argued that intelligence would be more strongly selected for in these early states than was the case among agriculturalists or pastoralists, as a consequence of the development of a social class system with significant differences in living standards.

The Christian World

In some respects, the adoption of Christianity by the Roman Empire may be regarded as damaging to selection for intelligence, and we will explore possible reasons for the fall of the Roman Empire in Chapter Eleven. Christianity began as a religion of the poor and dispossessed and, thus, it made sense to espouse monogamy, as this was in the interests of the poor. Under a system of polygamy, as we have seen, the wealthier men will monopolise the females, leaving low status men unable to pass on their genes. As such, the adoption of monogamy by the Roman Catholic Church would have decreased the intensity of selection for intelligence.

Secondly, clerical celibacy was imposed by the Council of Carthage around the year 400, though it had been strongly encouraged as early as 306. Those who were already priests were banned from getting married, or having sex with their wives if they were already married.^[33] Priests would have been among the most educated, and thus the most intelligent, people in the society at the time and so imposing celibacy upon them would have weakened selection for intelligence. Some priests did sire illegitimate children anyway, as we will explore shortly.

Thirdly, the Church prohibited abortion, which would have led to the births of many—often illegitimate—children from unwanted pregnancies.^[34] These would be more likely to be the children of those of relatively low intelligence who had acted in the moment and not considered the future consequences. However, this may be balanced by the fact that the Church also banned contraception, to the extent that Europe simply lost the knowledge of it. The more intelligent would have been more efficient in using this than the less intelligent. It is widely accepted in the medical literature that those of low intelligence are at most inefficient users of contraception.^[35] The more intelligent may even have been more inclined to use it because, due to being wealthier, it is probable that they would have experienced lower levels of infant mortality.^[36]

However, in spite of this, there is evidence that the selection for wealth continued in the form of *de facto* polygamy. Despite the official monogamy, the nobility would generally have mistresses in addition to their wives; often servant girls working in their households. William the Conqueror, who invaded England in 1066, was the illegitimate son of

Robert, Duke of Normandy, and succeeded his father to the Dukedom. Until the Reformation, it was so socially acceptable for the upper class to have illegitimate children by mistresses that these ‘noble bastards’ or ‘royal bastards’ would be acknowledged by their father, take their father’s surname, be raised in his household, and be provided for by him, often lavishly. Historians Katharine Carlton and Tim Thornton examined 876 wills from northern England made over the period 1450 to 1640. Of these, 11% had specifically marked illegitimate beneficiaries. Of these 96 wills, 8 belonged to nobles, 27 to knights, 23 to esquires, and 38 to gentlemen—the latter three being the ranks of the gentry, the English ‘lower nobility’, in descending order.^[37] The historian Stephen Staves has noted that upper class men in Early Modern England would generally have ‘roughly as many illegitimate children as legitimate ones’.^[38]

Even among the supposedly celibate clergy, who were generally of relatively high social status, there were many cases of priests fathering children. In 1535, it was reported that the Abbot of Norton, in Cheshire, was not resident at Norton Abbey. He lived with his mistress and had fathered children by her. Bishop Edmund Bonner (c.1500–1569), notorious for persecuting Protestants in England during the bloody reign of Queen Mary I (1553–1558), was the bastard son of the Rector of Davenham, in Cheshire, and this rector was himself the illegitimate son of a knight.^[39] Bonner himself fathered two illegitimate sons.^[40] Cardinal Wolsey, who was Henry VIII’s chief minister in the first half of his reign, had an illegitimate son.^[41] Pope Alexander VI (1431–1503) had four of them, and the infamous Lucrezia Borgia (1480–1519) was his illegitimate daughter.^[42] Thus, there is evidence that even in the pre-Modern, Christian world a form of *de facto* polygamy continued such that the upper class could have pronounced fertility compared to the lower classes. However, it is as we move into the Early Modern Era—with increased record keeping—that we can find direct evidence that the richer half of the population had much higher fertility than the poorer half.

Fertility in the Early Modern Era

From around the beginning of the 17th century, most English parishes began to keep systematic parish records of baptisms, marriages, and burials. Some parishes, right from the beginning, kept very detailed records, including the names of the child's parents on the baptism record and the name of the father in the case of an infant burial. The survival of wills, proved by parish courts, is sketchy in the 16th century, but is relatively comprehensive by the 17th. As such, we now have a series of fascinating studies that give us real proof that the richer had higher fertility than the poorer in Early Modern England and elsewhere in Europe too.

The most detailed of these studies was produced by the British economist Gregory Clark, of the University of California at Davis. It was reported in his book *A Farewell to Alms*. Clark shows, drawing upon 1,978 wills from Suffolk and Essex, in the east of England, made between the years 1585 and 1638, that the richer 50% of English testators had almost twice as many surviving children as the poorer 50%.^[43] The completed fertility of the richer half was 40% higher than that of the poorer half. Wills extended well down the social hierarchy. In Suffolk, in the 1620s, 39% of males who died aged over 16 left wills and many belonged to what was then known as the 'lower sort': labourers, small scale farmers, junior craftsmen, and servants. Analysing the wills and comparing them to the parish records, Clark found that, if we divide the testators into the 'richer half' (those leaving the average estate of £100 or more) and the 'poorer half', then: 'A richer man married for twenty or more years fathered 9.2 children while a poorer man would have only 6.4, an advantage to the rich of over 40%.'^[44]

Those bequeathing less than £9 had fewer than two children whereas those leaving £1,000 or more had at least four. Around 14% of the poorest left all their wealth to those not genetically related to them. This is compared to only 2% of those with over £1,000 who left all their money to non-relatives. This negative relationship between wealth and bequeathing to friends implies, argues Clark, that the poorer testators were, the more likely they were to have no children and even no surviving relatives at all. Though the relationship is not so clearly linear, wealth also predicts the number of grandchildren bequeathed to in wills. And these poorer testators

are themselves 50% more fertile than the 60% of adults who didn't leave wills. By 1650, testators had 1.5 children compared to 1 for non-testators. So the very poor, who didn't leave wills, had fewer children even than the poorest testators.

Clark is not the only person to have unearthed this pattern, though his research is the most extensive. In 1978, historian Victor Skipp (1925–2010) found, from a sample of Warwickshire parish records between 1560 and 1670, that the 'middle class' (the richer half) had, on average, four children while the 'working class' (the poorer half) had three.^[45] This was 'children baptised' rather than 'completed fertility', meaning that, as 45% of children tended to die in infancy, some of the poorest may have ended up with no surviving children at all. In fact, in 1972, historian John Pound found, drawing upon Norfolk records, that between 1500 and 1630 completed fertility was four for the middle class and two for the working class, giving the middle class a fertility advantage of 100%.^[46] A similar pattern has been unearthed in many other pre-industrial European societies. For example, according to research by German historian and psychologist Volkmar Weiss, in Saxony between 1547 and 1671, the middle class, on average, had 3.4 children who got married while the working class had 1.6 who did so.^[47] See Table 3.

Table 3. Socio-economic differences in fertility in Europe 1560–1674 (Lynn, 2011, p. 45).

Dates	Location	Middle Class	Working Class	Criterion	Reference
1560-1599	England	4.1	3.0	Children born	Skipp, 1978
1620-1624	England	4.4	2.1	Children born	Skipp, 1978
1625-1649	England	4.0	3.4	Children born	Skipp, 1978
1650-1674	England	3.8	3.4	Children born	Skipp, 1978

1547-1671	Saxony	3.4	1.6	Children married	Weiss, 1990
1500-1630	England	4.2	2.2	Children married	Pound, 1972

Clark has examined mortality rates in his sample, comparing christening records with whether the child was mentioned in the will. 63% of the children of poorer testators survived to be mentioned in their father’s will, but it was 69% of the children of richer testators. This would seem to imply that the poor were purposefully having fewer children, or that more of their children didn’t survive long enough to be christened.

So, the 17th century continued to see the pattern, which we see even in pastoralist tribes. Clark has termed it the ‘Survival of the Richest’. The wealthier half of the population were simply more fertile—they left more surviving children—than the poorer half of society, and there were further gradations in favour of the richer even within the ‘rich’ category. In addition, the rich had a far longer life expectancy than the poor. For example, data from 17th-century Geneva shows that the upper class lived, on average, until the age of 35.9, the middle class until 24.7, and the working class until 18.3. This is illustrated in Table 4.

Table 4. Age of death and social class (Lynn, 2011, p. 46).

City	Period	Upper	Middle	Lower
Berlin	1710–1799	29.8	24.3	20.3
Geneva	17 th c	35.9	24.7	18.3
Rouen	18 th c	32.5	33.0	24.5
Neuruppin	1732–1830	33.2	28.6	28.9

This would mean that the poor simply had less time to have children and this would be compounded by the fact that, by the Early Modern Era, the

average age of marriage in Western Europe was relatively late; around 27 for men and around 26 for women.^[48] This meant around 25% of people never married and, among men, these were likely to have been the less socioeconomically successful.^[49]

The high child mortality rate, of around 45%, meant that the population grew only very slowly. Indeed, when it grew too high—higher than the capacity of the land to be able to sustain it—then there would be widespread famine and the population would dramatically decline. The consequence of this was that England and other European societies were characterised by a system of constant social descent. Every generation, those at the bottom of the hierarchy would die off, without children, and those one step up the ladder would, by necessity, move downwards in order to take their place. In general, the younger sons of the gentry would fall into the ‘middling sort’. They would become yeoman farmers, who, on average, weren’t as wealthy as the gentry and would do some farm labour themselves.^[50] Or these younger gentry might become merchants, but, either way, they would work for a living. The younger sons of merchants would become craftsmen and the younger sons of yeomen would be husbandmen, meaning they would take to the plough themselves. The younger sons of craftsmen and husbandmen would be cottagers, who would supplement a smallholding with day labour on the farms of others; and the younger sons of smallholders would simply be labourers. And below these were the destitute and the starving.

As such, we would expect that the qualities that made people socioeconomically successful—including highly genetic qualities such as intelligence—would be growing in the population every generation. The genes for being rich—which is significantly predicted by intelligence, and which is strongly heritable, as we have seen—were being selected for under the harshness of pre-industrial conditions. We would predict that people would have been becoming more intelligent; the average IQ of pre-industrial society would have increased every generation.

With the rise of the internet, researching your family history has become extremely popular. Before the internet, it was a time consuming and costly hobby involving lots of trips to London or the relevant local archive. Now, many records can be searched online and they are combed through by enthusiastic amateur historians, often in the search for ‘interesting’ ancestors, inspired by the BBC television programme *Who Do You Think*

You Are? In this programme, celebrities have their family trees traced and they always uncover some fascinating story or other. However, this illusion of everyone having an intriguing family past is achieved by broadcasting only the more dramatic cases^[5] and by tracing every possible line until something that might make good television reveals itself. In reality, most people trace their paternal line and the results are depressingly predictable. If you are English, you probably won't be able to get beyond the mid-16th century, because that's when the English parish records begin. And you will very likely find that you are descended from 16th-century 'yeomen' or possibly 'gentlemen'; very wealthy farmers. The reason is simple. It was these people whose offspring survived.

Executing the Less Intelligent

Clearly, ‘Survival of the more Intelligent’ characterised pre-industrial societies. Those who were less intelligent lived in poorer conditions and fewer of their children survived. But there was also a more direct selection pressure against those of low intelligence, which began to manifest itself in the Medieval Era: execution. In an article, which by its very nature aroused controversy, Canadian anthropologist Peter Frost and American anthropologist Henry Harpending (1944–2016) examined the way in which judicial violence acted as a selection pressure in pre-industrial Europe.^[52] Up until the 11th century, they note, execution was not widely employed, because the Church was opposed to it, law enforcement was rudimentary, and it was believed that people should have the right to settle their own disputes. But as the Medieval Era progressed, the Church accepted that the ‘wicked’ should be executed so that the ‘good’ could live in peace. By the Early Modern Era, all felonies carried the death penalty and this meant that up to 1% of the male population of Europe was executed each generation, with roughly another 1% dying at the scene of the crime or in prison while awaiting trial. Most of these felons were young men.

Frost and Harpending argue that this process would have altered the nature of Western personality, by preventing those with high psychopathic personality (the criminally-inclined) from passing on their genes. This is likely the case, and they argue that it is evidenced in the way that the murder rate falls. But, as Edward Dutton and Swedish psychologist Guy Madison have noted, it also has implications for intelligence.^[53] Those who were executed or died in prison were overwhelmingly poor and uneducated. In England, those who were of high social status could fund relatively luxurious conditions in prison and, unless their crime was treason or heresy, they could avoid execution by pleading ‘Benefit of the Clergy’. In essence, this meant that if they could read then they would avoid execution. It also meant that it was disproportionately those of low intelligence who went to the gallows. In addition, we have already seen that, in general, intelligence is negatively associated with criminality and we might expect this association to be particularly strong when the punishment for felony is death. This would mean that judicial execution

was very likely playing a role in boosting European intelligence by removing some of the least intelligent young men every generation.

Upward Social Mobility in the Early Modern Era

We know that, in pre-industrial England, the rich half of the population had higher fertility than the poorer half and there is evidence that intelligence was a major reason for this, even then. This can be better understood if we look at the nature of social mobility in Medieval and Early Modern England. Many people believe that social mobility is a modern phenomenon and that your childhood social status pretty much dictated your life further back in history. But this is simply untrue. Gregory Clark has charted the rise and fall of particular families over time, by focusing on those with unusual surnames. In his book *The Son Also Rises* (Clark likes Hemingway puns) Clark presents data for assorted countries including England, Japan, the US, China, Sweden, and India. Clark notes that social mobility, in modern times, is often assumed to be high because there is a weak correlation, of around 0.3, between the income of parent and child. But this is problematic because there are different measures of status: wealth, education, and occupational status, for example. People can make trade-offs between these measures. A teacher would have higher occupational status than a plumber but may well earn less. In addition, argues Clark, because the factors which affect social status are likely to be strongly genetic, there will be random fluctuation when comparing father and son. As such, it is better to compare surnames—and thus families—across time.^[54]

In England, for example, Clark argues that you can tell the historical social status of a family by the kind of surname they have. High status surnames are those which are Norman (such as those that end in ‘ville’) or those which are ‘locative’—the names of places. People with these surnames are descended from Normans who took the name of their feudal manor. Surnames which refer to a profession—Bailey, Cooper, Thatcher—are middle ranking, while low ranking surnames tend to end in ‘son’, be the name of the father, refer to physical appearance (e.g. ‘Brown’), or relate to the part of the village a person lived in, such as ‘Hill’. Assessing the data between the medieval period and 2012, Clark finds that across the period, and even now, those with Norman or locative names are over-represented among proxies for high social status. These include Oxbridge graduates, barristers, and physicians. Those with low status surnames are under-

represented. Over this period, Clark emphasises, there has been a gradual 'regression to the mean'. This means that those at the representation extremes have moved closer to the average over time, so that Normans are less over-represented than they used to be and Saxons are less under-represented than they used to be.

Clark provides a number of explanations for this. Something akin to regression to the mean happens in genetics. Owing to the large number of genes involved, it sometimes (though rarely) happens that children are significantly more (or less) 'socially competent' (Clark's term for the ability to achieve high socioeconomic status) than their parents. They then marry a person with comparable abilities and move up (or down) the social hierarchy. Alternatively, a person with high genotypic 'ability' marries a person with high phenotypic 'ability'. Finally, as pre-modern fertility was predicted by high social status, Norman surnames would have to spread downwards through the population.

Overall, Clark finds that social status across history is around 0.75 heritable, its heritability is the same now as it was in Medieval England, and sudden shocks that might raise social status very quickly—such as winning the Lottery—wear off within a few generations. This implies that ability is required to maintain wealth and a person of low ability who is born into a wealthy family will likely squander his or her inheritance. This movement towards the mean, in terms of surnames and status, implies that something is being selected for in all classes, and this is likely intelligence, though Clark doesn't look directly at this trait. Interestingly, Clark finds the same results in countries that are far more egalitarian than Britain, such as Sweden. Dividing between the surnames of the higher nobility, the surnames of the untitled nobility, Latin surnames (historically adopted by the highly educated non-noble), geographical surnames (e.g. Berg), and the lowest status surnames (those ending in 'son'), Clark finds a similar pattern to England. Those with noble and Latin surnames are still over-represented at the top universities, amongst the richest, and in the top professions, and the heritability of social status is about 0.75.

So, even in Medieval England, social status was 0.75 heritable, roughly the same extent to which intelligence is heritable. Something allowed the children of the poor, who by the randomness of genetics were much more intelligent than their parents, to move up the hierarchy, become rich, and have lots of surviving children. Clearly, the best candidate for this would be

high intelligence as this is a highly significant predictor of socioeconomic success. It is also strongly heritable. Another candidate would be high ‘Conscientiousness’, a personality trait which is also heritable, as we will see in Chapter Five. The Medieval world created conditions whereby those who did not become rich would not pass on their genes and you became rich if you had the necessary intelligence and personality-type, which a minority of people born outside the elite always did, just by genetic chance.

All societies had social mobility, even India with its formerly rigid caste system.^[55] The highly intelligent, born to poor families, would gradually rise to the top, even if it took a few generations. The rise would often be slow, due to nepotism, but where there was a crisis—such as many noble families being killed off in the Black Death or the Wars of the Roses or a power vacuum created, such as by the Dissolution of the Monasteries—then social ascent could be dramatic. Indeed, precisely because medieval society was less meritocratic, intelligence and diligence were likely more equally distributed across social classes, meaning there were always people from modest backgrounds who could socially ascend. In an extreme meritocracy, intelligence will be concentrated in the higher classes and because it is highly heritable there will be very little social mobility.^[56] Poor boys could also move swiftly up the hierarchy by being so obviously able, at school for example, that it would be impossible to hold them back.

British psychologist Richard Lynn has explored the various ways they could rise further.^[57] These ways included becoming successful merchants; lawyers, clergymen (many of whom had illegitimate children), administrators (such as the stewards of feudal estates), and soldiers, and this was the case throughout Medieval Europe.^[58] These paths to riches would all require high intelligence. Likewise, notes Lynn, highly able females could socially ascend via advantageous marriages, with the wooing of a high status male being likely to involve a high degree of intelligence (even if this was not what attracted the high status male to the much lower status female). A minority of women, however, if they became widows, could start to become wealthy in their own right. In addition, females could rise in status by becoming the mistresses of high status males. As we have discussed, the resultant children would generally be raised in the father’s household and be relatively well provided for. In the 17th century, about 11% of males reached a higher ‘rank’—English society was composed of a

series of ranks that were based around a combination of wealth and lifestyle—than their fathers.^[59]

Social mobility was plainly significant and it is clear from looking at the routes via which it occurred—the law, administration—that intelligence would have been the guiding factor. The history of Early Modern England is littered with men from ‘modest’ backgrounds who reached great heights, especially (as already mentioned) in the wake of social crises, such as the War of the Roses.^[60] Henry VIII’s chief minister in the first part of his reign was Cardinal Thomas Wolsey (1473–1530). He was the son of an Ipswich butcher. Wolsey excelled at school and went to Oxford to train as a priest. He eventually became chaplain to the Archbishop of Canterbury and, in this position, he came to the attention of Henry VII, to whom he also became chaplain. His rise continued under Henry VIII and by 1515 Wolsey was Lord Chancellor.^[61] Wolsey’s own protégé, who effectively succeeded him, was Thomas Cromwell (c.1485–1540), the son of a blacksmith and brewer, from Putney Heath, a place now on the outskirts of London, then notorious for highwaymen. He ran away to the Continent and became a mercenary soldier and administrator, fluent in many languages. By 1512, he was a London attorney and by 1516 he was working for Wolsey. By 1534, Cromwell was the king’s chief minister.^[62]

Social mobility from relative poverty to wealth happened in all societies, and intelligence is a significant factor behind this mobility. In 1825, in England, 20% of men with working class fathers entered middle class professions.^[63] It has been found that 31% of Chinese mandarins—civil servants, selected for their intelligence and diligence through competitive examination—between 1371 and 1904, came from ordinary backgrounds.^[64]

Illegitimates

So, in pre-industrial England, wealth predicted fertility and the way you obtained or maintained wealth was partly through high intelligence. At the other end of the social scale Lynn observes that there is evidence that those who had particularly low intelligence would be especially likely to *not* pass on their genes. In general, illegitimacy—especially in the form of single motherhood—is associated with low status and, so, low intelligence. It has been calculated that in the US white American single mothers have an average IQ of 92, whereas it is 105 for women who are childless or married with children. We have seen that education level is a proxy for intelligence. Research from the USA has found that women with no high school education are 20 times more likely to end up as single mothers than are women with a high school education.^[65]

In pre-industrial Europe there was no welfare state. Indeed, this generally didn't develop until the second half of the 20th century. As such, single mothers would tend to abandon unwanted babies. In Ancient Rome they were placed in sewers, in the hope, perhaps, that a passing Samaritan might take pity.^[66] In the early 19th century, in London, it was not uncommon to see dead babies in the streets or in rubbish dumps. By the 18th century, the number of abandoned babies was so great in many European cities that orphanages were established to house them. In 1741, the Thomas Coram hospital for foundlings was opened in London. However, due to the lack of wet nurses, 71% of these foundlings were dead by the age of 15, whereas it was roughly 40% in the general population. Due to insufficient wet nurses, foundlings were malnourished and acutely vulnerable to infectious disease.^[67] Thus, in pre-modern societies, notes Lynn, illegitimate children of single mothers, who would have been of low intelligence, suffered very high mortality. Each generation, this would have acted to stop genes for low intelligence spreading through the population.

¹ For more discussion on the evolutionary origins of rape, see: Thornhill, R. & Palmer, C.T. (2000) *A Natural History of Rape: Biological Bases of Sexual Coercion*, Cambridge, MA: MIT Press.

² Darwin, C. (1981) *The Descent of Man*, Princeton, NJ: Princeton University Press, p. 259.

³ For an introduction to evolutionary psychology, see: Workman, L. & Reader, W. (2014) *Evolutionary Psychology: An Introduction*, Cambridge: Cambridge University Press.

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- [5](#) Nesse, R.M. (2007) Runaway social selection for displays of partner virtue and altruism, *Biological Theory*, 2, pp. 143–155.
- [6](#) See Wilson, D.S. (2002) *Darwin's Cathedral*, Chicago, IL: University of Chicago Press.
- [7](#) See Salter, F. (2007) *On Genetic Interests: Family, Ethnicity and Humanity in an Age of Mass Migration*, New Brunswick, NJ: Transaction Publishers.
- [8](#) Arden, R. & Adams, M. (2016) A general intelligence factor in dogs, *Intelligence*, 55, pp. 79–85.
- [9](#) Woodley of Menie, M.A., Fernandes, H. & Hopkins, W. (2015) The more g-loaded, the more heritable, evolvable, and phenotypically variable: Homology with humans in chimpanzee cognitive abilities, *Intelligence*, 50, pp. 159–163.
- [10](#) See Waal, F. de. (2007) *Chimpanzee Politics: Power and Sex Among Apes*, Baltimore, MD: Johns Hopkins University Press.
- [11](#) The following was originally discussed by Lynn in his book *Dysgenics*. Here we summarise his arguments and expand upon them. See: Lynn, R. (2011) *Dysgenics: Genetic Deterioration in Modern Populations*, 2nd ed., London: Ulster Institute for Social Research.
- [12](#) See: Chagnon, N. (1968) *Yanomamö: The Fierce People*, New York: Holt, Rinehart & Winston.
- [13](#) Of course, it should be stressed that a high status male is not necessarily the same thing as a caring male. Females, indeed, may actually trade ‘provision’ for ‘status’ in a potential partner. But, overall, the qualities which lead to males having high status, such as intelligence, will also render them more caring in the sense of being more cooperative and socially skilled, as we have already discussed.
- [14](#) Buss, D. (1989) *The Evolution of Desire: Strategies of Human Mating*, New York: Basic Books.
- [15](#) See Chagnon, N. (1968) *Yanomamö: The Fierce People*, New York: Holt, Rinehart & Winston.
- [16](#) Darwin, C. (1871) *The Descent of Man*, p. 368.
- [17](#) Howell, N. (1979) *Demography of the Dobe !Kung*, New York: Academic Press.
- [18](#) See Murdock, G.P. (1967) *Ethnographic Atlas*, Pittsburgh, PA: University of Pittsburgh Press.
- [19](#) Siskind, J. (1973) *To Hunt in the Morning*, Oxford University Press, pp. 95–6, quoted in: Kuznar, L. (1997) *Reclaiming a Scientific Anthropology*, Walnut Creek, CA: Sage Publications, p. 77.
- [20](#) Chagnon, N. (1968) *Yanomamö: The Fierce People*, New York: Holt, Rinehart & Winston, p. 93.
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- [29](#) Stirland, A.J. (2005) *The Men of the Mary Rose: Raising the Dead*, Stroud: The History Press.
- [30](#) Wooding, L. (2015) *Henry VIII*, London: Routledge, p. 263.
- [31](#) Ross, C. (1974) *Edward IV*, Los Angeles, CA: University of California Press, p. 10.
- [32](#) Mayhew, M. (2015) *The Little Book of Mary, Queen of Scots*, Stroud: The History Press.
- [33](#) See: Selin, G. (2016) *Priestly Celibacy: Theological Foundations*, Washington, DC: Catholic University of America Press.
- [34](#) Gorman, M. (1998) *Abortion and the Early Church: Jewish, Christian and Pagan Attitudes in the Greco-Roman World*, Eugene, OR: Wipf and Stock Publishers.
- [35](#) E.g. Senanayake, P. (2012) Selection of contraception: What guides a woman, in Snow, R. & Hall, P. (eds.) *Steroid Contraceptives and Women's Response*, New York: Springer.
- [36](#) For a more detailed discussion of this process, see: Meisenberg, G. (2007) *In God's Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing.
- [37](#) Carlton, K. & Thornton, T. (2011) Illegitimacy and authority in the north of England, 1450–1640, *Northern History*, XLVIII, I.
- [38](#) Staves, S. (2014) Daughters and younger sons, in Brewer, J. & Staves, S. (eds.) *Early Modern Conceptions of Property*, London: Routledge, p. 210.
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- [40](#) Strype, J. (1721) *Ecclesiastical Memorials, Volume III*, London: S. Richardson, Ch. 12.
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- [42](#) Bradford, S. (2005) *Lucrezia Borgia: Life, Love and Death in Renaissance Italy*, London: Penguin.
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- [45](#) Skipp, V. (1978) *Crisis and Development: An Ecological Case Study of the Forest of Arden 1570–1674*, Cambridge: Cambridge University Press.
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- [48](#) Grassby, R. (2002) *The Business Community in Seventeenth Century England*, Cambridge: Cambridge University Press, p. 309.
- [49](#) Wrigley, E. & Schofield, R. (1989) *The Population History of England, 1541–1871*, Cambridge: Cambridge University Press, p. 264.

[50](#) For further discussion of the nature of these social ranks, see: Dutton, E. (2015) *The Ruler of Cheshire: Sir Piers Dutton, Tudor Gangland and the Violent Politics of the Palatine*, Northwich: Leonie Press, Ch. 2. As we have already mentioned, the ranks were a combination of wealth and lifestyle, rather like modern day social class. So, usually a ‘yeoman’ was not as wealthy as a ‘gentleman’, but this wasn’t necessarily the case. Someone who lived in genteel poverty was more likely to be regarded as a gentleman than a very wealthy farmer who was frugal and did some labour himself. According to the social historian Mary Abbott, ‘In 1613, the church wardens of Great Burstead, Essex, rejected Edmund Blagge’s claim to be a gentleman because “the gates of his house were not greasy with giving alms to the poor”!’ Abbott, M. (1993) *Family Ties: English Families, 1540–1920*, London: Routledge, p. 72.

[51](#) For example, the British broadcaster Michael Parkinson, British politician Ann Widdecombe, and Tony Blair’s wife Cherie Blair have all reported having been approached to be in the programme. However, the programmes about their ancestors were never produced because their ancestors were simply too uninteresting. See: Holmwood, L. (21 July 2009) Michael Parkinson: My family was too dull for *Who Do You Think You Are?* *Guardian*, [Online], <https://www.theguardian.com/media/2009/jul/21/michael-parkinson-who-do-you-think-you-are>; Alexander, E. (3 July 2014) Cherie Blair’s family too boring for *Who Do You Think You Are* show: ‘My ancestors weren’t very interesting’, *Independent*, [Online], <http://www.independent.co.uk/news/people/cherie-blair-s-family-too-boring-for-who-do-you-think-you-are-show-my-ancestors-weren-t-very-9581451.html>; Widdecombe, A. (2012) *Strictly Ann: The Autobiography*, London: Weidenfeld & Nicolson.

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[60](#) Stone, L. & Stone, J.C.F. (1986) *An Open Elite?* Oxford: Oxford University Press.

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Four

Is there Evidence that Intelligence was Increasing Up to the Industrial Revolution?

Clearly, there were no IQ tests in pre-industrial England allowing us to track the rise of IQ and even had there been, as we will see in Chapter Eight, they might not have been that helpful. Gregory Clark, though he does not explicitly talk about intelligence, has amassed very good evidence that intelligence was nonetheless continuously increasing in the pre-industrial era in *A Farwell to Alms*.^[1] He has done this by gathering proxies for intelligence and showing that, across history, they seem to change in precisely the direction that would be predicted if intelligence was indeed going up. These proxies are interest rates, literacy, numeracy, and judicial violence.

Interest Rates

Interest rates can be regarded as a marker of intelligence because they measure time preference. We have already seen that ‘time preference’ is associated with intelligence. More intelligent people are more focused on the future than are less intelligent people. As such, a smaller reward, given relatively further into the future, is sufficient to persuade a more intelligent person to postpone immediate gratification. It follows from this that if you asked a less intelligent person to lend you some money, they would be profoundly concerned about the immediate consequence of this, which would be them having slightly less money here and now. In order to persuade them to lend you the money, you would have to offset this by allowing them to charge you a very high level of interest. If they could only charge you a low level of interest then, from their perspective, the reward of the low level of interest would be too small, relative to the length of time they would have to wait for it and so be ungratified, to matter. It would be outweighed by the fact that they would be postponing gratification here and now. In essence, the more intelligent a person is, the less of a return they require on their investment to bother making the investment.

This can also be seen with something as simple as how you spend your money. Viv Nicholson (1936–2015) was moderately famous in the UK and was immortalised in the musical *Spend, Spend, Spend!* Though seemingly good at art, there is every indication that she was not especially bright. She was raised in extreme poverty in Yorkshire, as the daughter of an unemployed miner. She became pregnant at 16 and had five children, four of whom died as children. However, in 1961, she won £152,319—about £3 million in today’s money—on the football pools. Asked by a tabloid journalist what she would do with the money she replied, ‘Spend! Spend! Spend!’^[2] By 1965, she was bankrupt. She simply had no ability to postpone gratification for the sake of the future.

Interest rates, then, are a marker of intelligence. Clark’s research has shown that between 1200 and 1800 in England interest rates significantly fell. Based on land return and rent return, interest rates in the year 1200 were over 10% and, in fact, in 1150 they were around 15%. By 1800, they had fallen to just 5%. Of course, there are all kinds of localised reasons why interest rates might have fallen—and fallen so much—over this

period. Our point is simply that it fits with the hypothesis that people were becoming more intelligent—and thus better able to defer gratification. The decline in interest rates can be seen in Figure 2.

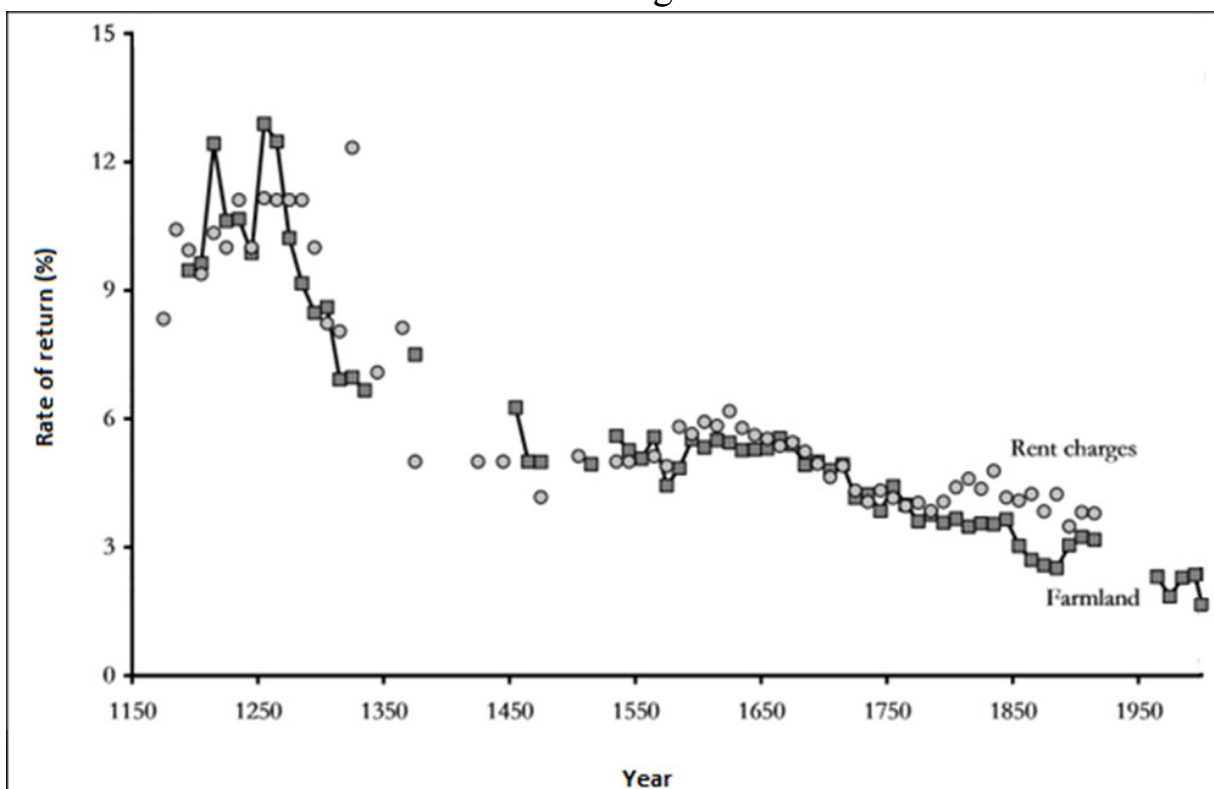


Figure 2. Return on land and on rent charges by decade in England, 1170–2003.^[3]

Literacy and Numeracy

Clearly, literacy and numeracy are significant components to intelligence. ‘Linguistic aptitude’ is an important component of intelligence and, so, the more intelligent you are the easier you will find it to learn to read. Intelligence correlates with ‘Intellect’ (see Chapter Five)—being interested in ideas. The more intelligent you are, the higher your intellect will be and thus the more of an incentive you will have to learn to read. As for learning to write, there will be clear benefits to learning to do this in terms of keeping records and accounts and these will become more necessary as society becomes more complex and specialised, which would potentially be a sign of its increasing intelligence. In addition, writing—especially with a quill—is a complex skill involving fine motor skills and patience, both qualities associated with more intelligent people. Furthermore, the wealthy would be more likely to be able to educate their children and those children would be more able to accrue wealth by being educated. It is, therefore, no surprise that Clark found a relationship between literacy and social status in his sample of wills. 94% of the gentry could sign their wills, 88% of merchants, 53% of yeomen, 26% of husbandmen, but only 17% of labourers. So, we would expect literacy to be a proxy for intelligence.

The same would be true of numeracy. More intelligent people would be better at maths and the kind of work they engaged in, such as business, would also necessitate the greater use of mathematics. Undeveloped societies have little use for mathematics. Clark notes that a good marker of numeracy is age awareness. By 1800, most people in Western Europe had a fairly accurate understanding of how old they were. However, this is not the case in illiterate and innumerate societies. In the 4th century AD, a survey indicated that 80% of Roman office holders—highly important people—knew their age. In 18th-century Paris, only 15% of people were of unknown age. In 15th-century Florence, a wealthy city, 32% of people did not know how old they were. In the small town of Corfe Castle in England, most of whose inhabitants were labourers, only 8% did not know their age in 1790. This implies that English labourers around 1800 were as numerate as late Roman office holders.

For literacy, Clark turns to a combination of the percentage of grooms who signed the marriage register when they married or the percentage of

witnesses in court cases who could sign depositions. These were traced between 1580 and 1920, in England, and showed a clear upward trend. For example, in 1740 about 60% of English men could sign their names but by 1920 it was close to 100%, gradually increasing, without a blip, from 1780. A similar process can be seen with female literacy and literacy from specific bishoprics in narrower periods. Again, disruptive factors such as the English Civil War, for example, would interfere with the trend—because they would interfere with the education of children—but there is a clear upward trend. Going back to Medieval England, it is clear that literacy was very low, to the extent that being able to read a passage from the Bible in court, which meant you could avoid execution for felony, was known, as mentioned previously, as ‘Benefit of the Clergy’, as it was mainly only the clergy who could read. There is no sign that there were greater rewards for literacy and numeracy in 1800 than in 1500; we simply became more educated. This would reflect us becoming more intelligent. The rise in literacy can be seen in Figure 3.

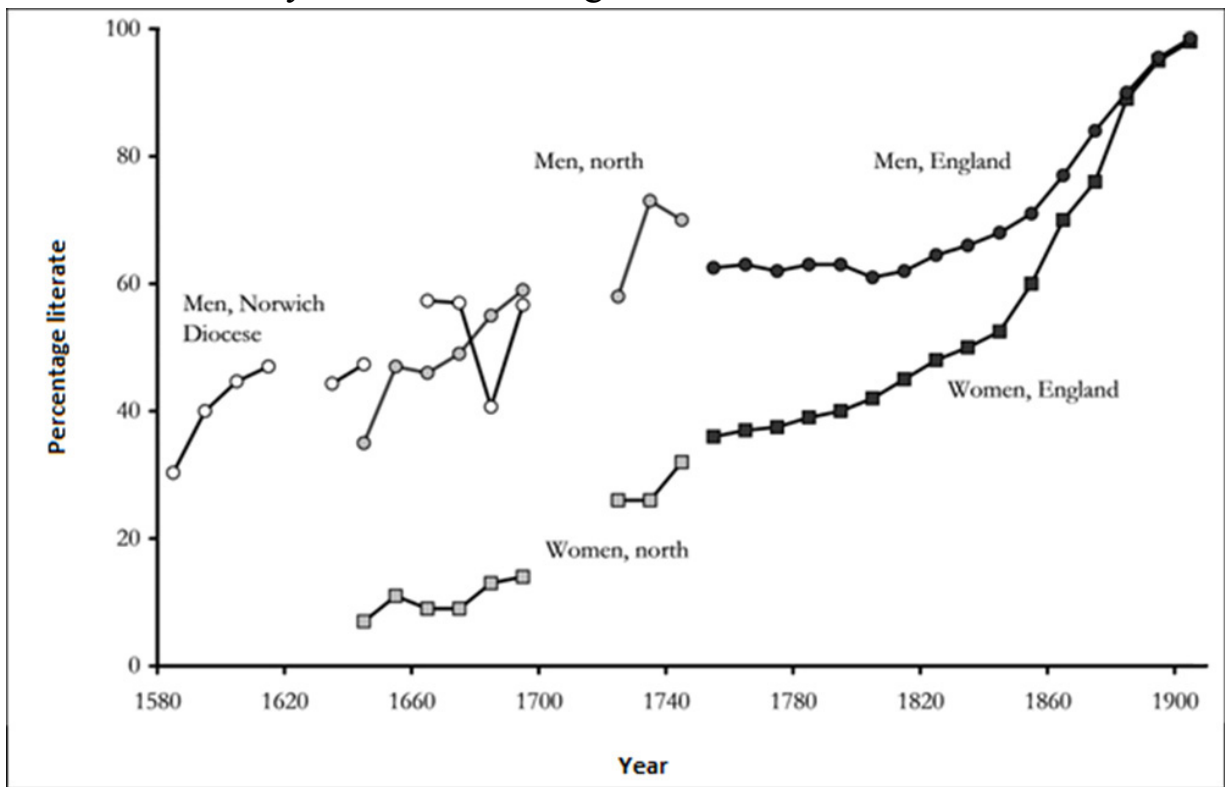


Figure 3. Literacy in England, 1580–1920.^[4]

Judicial Violence and Blood Sports

An appetite for violence and cruelty is often a reflection of low intelligence. As we have discussed, the less intelligent are less able to empathise with the feelings of others. Accordingly, we would expect to see a rise in intelligence parallel a decline in barbarity. Although this is difficult to measure, a case can be made that this is precisely what we see. A good example can be seen in the cruelty inflicted on criminals. In Tudor England, the punishment for any felony was death by hanging. In London, in the 17th century these hangings—which were by slow strangulation rather than breaking the neck via a long drop—took place at Tyburn. There would be a party atmosphere along the route via which the condemned were taken to the gallows. Effectively, the event was a kind of fair; a day out for the family.

In the Early Modern Era in England, the punishment for heresy or treason, if you were a woman, was to be burned alive. The punishment for high treason, if you were a man, was to be hanged, drawn, and quartered. You would be dragged through the street on a hurdle, hanged, cut down while still alive (though, in practice, you'd usually be allowed to hang until you died), castrated, disembowelled, beheaded, and quartered. The head and quarters would then be displayed in public until they rotted away. Of course, all the executions took place in public. In 1536, the rebel leader Robert Aske, leader of the Pilgrimage of Grace (a huge and very nearly successful uprising against Henry VIII), begged not to be executed in this way so, instead, he was hanged in chains until he died; his body left to decay.^[5] And even these kinds of punishments might seem benign compared to some of those enacted around 500 years earlier when the punishment for poaching in the king's forest was to be blinded and castrated.^[6] The same society that deployed these gruesome punishments enjoyed all forms of blood sports, including cock fighting and bear baiting.^[7]

Through the course of the 18th and the early 19th century, these kinds of sadistic punishments were abolished in England. The last hanging, drawing, and quartering occurred in 1782. The punishment of being burnt at the stake was abolished in 1789. The gibbeting of executed criminals stopped in 1832. Cock fighting and bear baiting were banned in 1835. Public executions were stopped altogether in 1869. In essence, we became

less cruel; less inclined to inflict vengeful and agonising punishment. This can be interpreted in many ways, but one interpretation is increasing intelligence. In addition to the measures discussed by Gregory Clark, there are a number of others which fit with the pattern he observed.

The Size of the Head

Higher intelligence requires a bigger brain. Indeed, brain size tends to weakly correlate, at about 0.2 to 0.3, with IQ score; a relationship that is further evidence of the objectivity of IQ tests.^[8] On average, the larger your brain is, the more intelligent you are. Large brains require large skulls and this being so we would expect that the average size of people's heads would have increased since, for example, the medieval period. A study, by W.P. Rock and his colleagues, has found that this is indeed the case. Comparing a sample of 31 skulls from 13th-century London and 30 skulls that are representative of modern English people, his group found that the dimensions of the cranial vault, which houses the brain, had increased by 10mm.^[9]

Democracy and Political Stability

We have already seen that democracy is associated with relatively high intelligence at the level of individuals. Those of low IQ are less likely to vote for democratic parties or sustain democracy at all. This is because democracy involves cooperation, low corruption, trust, and future orientation, all of which are associated to some extent with high intelligence. This being the case, we would expect to observe a process of greater democratisation and political stability as we move towards the 18th century.

Again, there is considerable evidence for this. Medieval England can hardly even be regarded as a functioning state in the modern sense. The king was an absolute monarch, but he had little control outside of London. The provinces were ruled by local warlords—the feudal nobility—whose support for the king was required in order to stay in power. When he lost this support, he would be toppled and even if he wasn't toppled he would frequently have to put down rebellions led by disloyal warlords. Edward II was murdered in 1327, Richard II was murdered in 1400, Henry VI was removed in 1461 and then again in 1471 after he retook power. He was murdered that time. Edward V was removed by his uncle Richard III and was likely killed in 1483. Richard III died at the Battle of Bosworth Field in 1485 and was replaced by Henry VII, a usurper with a tenuous claim to the throne who had to deal with various rebellions. Henry VIII was almost toppled in 1536. His successor was the nine-year-old Edward VI, and his Lord Protector, Edward Seymour, was executed in 1552. Edward VI's successor, Lady Jane Grey, was removed after nine days and beheaded by her successor, Mary I. Her successor, Elizabeth I, was nearly overthrown in 1588 by Philip II of Spain and also narrowly survived an assassination attempt. The attempt to kill her successor, James I, in the Gunpowder Plot of 1605 is well known.^[10]

However, the country does not start to become more stable after this. Charles I was executed in 1649, after the Civil War. The Interregnum was violently overthrown in 1660 and the ringleaders hanged, drawn, and quartered. James II was removed in 1688, by parliament, and died in exile. But then things begin to change. Although the last serious rebellion was in 1745, throughout the 18th century England develops into a country in

which power is held by parliament, not the crown. And the House of Commons is elected by an elite who qualify to vote by virtue of property ownership. The size of the electorate expanded from 1832 onwards and, by 1917, all males of 21 or over could vote. In 1928, the franchise was expanded to include all females aged 21 or over. The country had become more democratic and more politically stable.^[1]

Corruption

Again, changes in this marker are difficult to precisely measure, but it is widely accepted by historians that England became much less corrupt, especially from the end of the 18th century. Indeed, the preceding system is generally referred to as the ‘Old Corruption’.^[12] Under this system, England was only a meritocracy to a very limited degree. Appointments to lucrative positions were almost entirely a matter of nepotism or people paying to purchase a position from which they hoped to make money. Commissions in the army were purchased, as were church appointments and secular administrative posts. Many of these were sinecures: positions requiring little or no work but which gave the holder financial benefits. Electors voted publicly and were openly bribed and, sometimes, blackmailed. In other words, by modern standards England was extremely corrupt.

This began to change from around the late 18th century onwards, although some historians put the beginning of the change at around 1730. In terms of politics, the 1832 Reform Act abolished ‘rotten boroughs’—constituencies with tiny electorates, which nevertheless had as much influence as big cities in terms of voting in parliament. Pocket boroughs were those controlled by a wealthy noble who would have one of his retainers stand as an MP. He could also control how the electors would vote, because he was their landlord. This could be done through bribery, because voting was by public ballot. The MP would then vote, in parliament, as his patron demanded. The abolition of many rotten boroughs, accordingly, removed many pocket boroughs. Secret ballots were introduced in 1867.^[13] Local government was also highly corrupt, with the right to vote restricted to those whom the city government felt they could trust. This was ensured by the fact that you had to be a ‘freeman of the city’ in order to vote and this status would be conferred by the city authorities, often in return for money.^[14] This was changed in 1835, so that all rate-payers could vote. The ability to purchase a commission in the army was finally abolished in 1871 and by this time much of the general corruption had ceased.

Murder

Criminality is notoriously difficult to compare across time because there are so many variables involved. The definition of particular crimes changes as does the extent to which they are likely to be reported. Social factors which may increase crime levels—those that cause poverty—will also fluctuate. As such, caution is required when engaging in such comparisons. Nevertheless, quantitatively-minded historians have done this. They found that, in London, the per capita homicide rate in the year 1278 was roughly 13 murders per 100,000 people.^[15] Despite the fact that the penalty in England for homicide was hanging all the way up until the 1960s, and despite the fact that there was little significant change in living standards between the 1200s and the 18th century,^[16] historians found something which is in line with the theory that we were becoming more intelligent. Based on court records from various cities, we were becoming much less inclined to commit murder. In 1300, there were 23 murders per 100,000 people in England, similar to Brazil in 2012. By 1500, it was 15 murders, placing England on a par with Mexico in the year 2014. By 1600, it was 7 murders, and by 1700 just 5 murders. By 1800, we were down to 3 murders and by 1900 we were down to less than 2. By around 1950, we were down to less than 1 murder. In the UK, the rate is 1 murder per 100,000 as of 2014.^[17] The decline in the European murder rate can be seen in Figure 4.

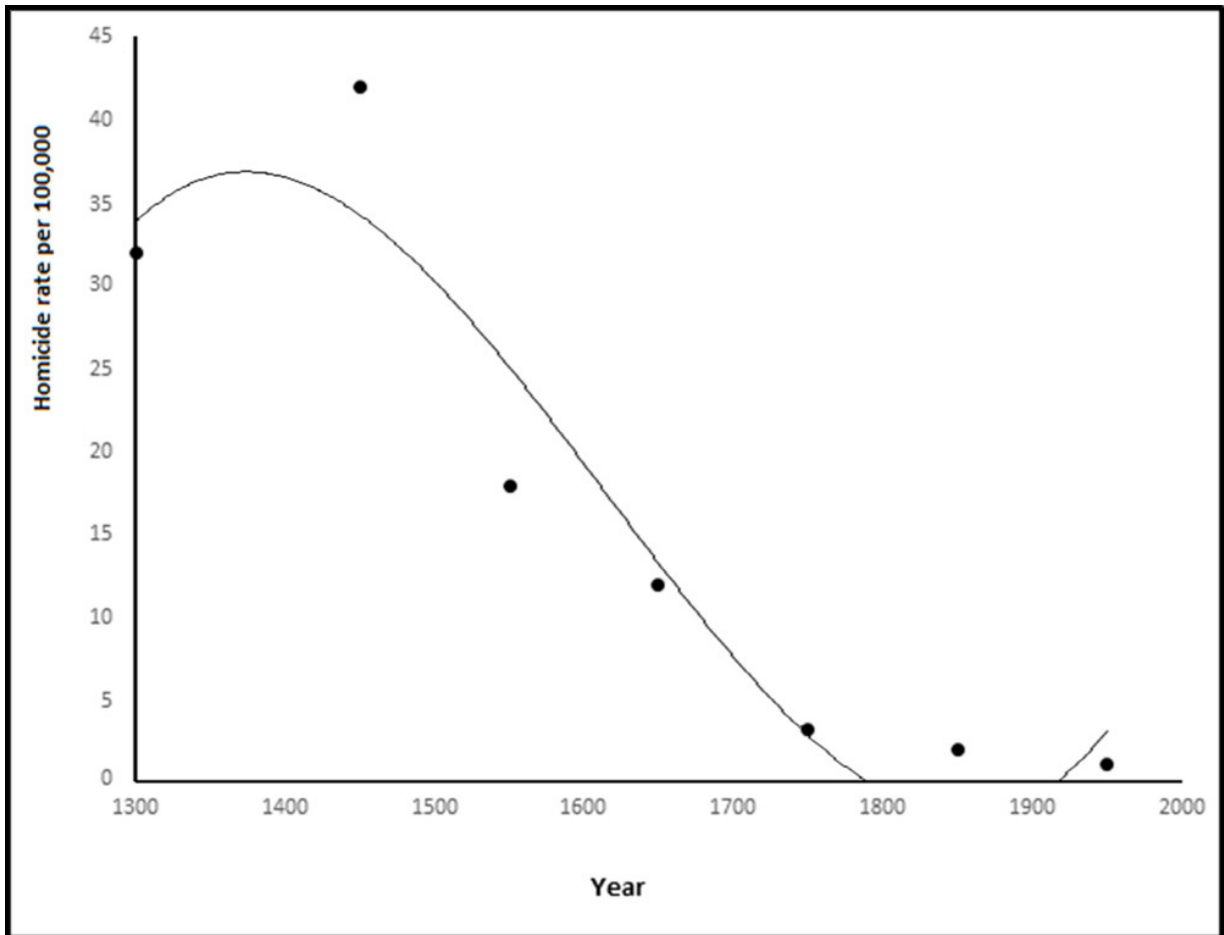


Figure 4. Indicators of homicides per 100,000 of the population in European countries, 14th to 20th centuries, fitted to a third-order polynomial curve. ^[18]

Many historians have been critical of attempting to trace the homicide rate over time. They question, for example, how likely the crime was to be reported, musing on issues of cultural difference. But, if anything, cultural differences would simply downplay the Medieval and Early Modern murder rate because the definition of murder was narrower—killing somebody in a duel, for example, was not ‘murder’ in Medieval England^[19]—and, as the society was more corrupt and the state’s power more limited, we can easily see how this would lead to under-reporting. Also, many other studies have shown the same phenomenon. In Kent, indictment for murder fell ten-fold between 1560 and 1985. Studies in Scandinavia, the Netherlands, Germany, Switzerland, and Italy reveal the same ‘civilising’ process.^[20] The simplest explanation for this civilising process—especially when there was very little change in living standards—is that the average

intelligence of European society was increasing every generation. The decline in homicides aggregated from data from England, the Netherlands, Belgium, the Scandinavian countries, Germany, Switzerland, and Italy can be seen in Figure 4.

It would seem that the simplest interpretation of these data, taken together, is that society was becoming gradually more intelligent. This is exactly what would be predicted by the reproductive patterns highlighted in the last chapter whereby those who are likely to have been more intelligent on average—the wealthier half of the population—are enjoying significantly higher fertility than the poorer half.

Genetic Changes: Comparing the Bronze Age to the Present

Ultimately, the frequencies of genetic variants that predict educational attainment and g should have increased throughout historical time, if g really did increase. This is precisely what was found in a 2017 paper in which the frequencies of three different polygenic scores (which the researchers termed POLYCOG)—these being composites of several different genetic variants which collectively predict a portion of the variance in the phenotype of interest—were estimated using a sample of (mostly) Bronze Age Eurasian genomes (from 4.56 to 1.21 thousand years before present). These were then compared with an ancestrally matched European sample of genomes from the 1000 Genomes dataset. It was found that the contemporary sample had significantly higher levels of POLYCOG (using all three polygenic scores). Furthermore, by simply correlating the POLYCOG levels with sample age for a subset of the ancient genomes, a statistically significant positive correlation was found, indicating an increase in these genetic variants over 3.35 thousand years. This can be seen in Figure 5. When we talk about a correlation being ‘statistically significant’ this means that, based on the sample size and strength of the correlation, there is at least a 95% probability that the correlation is not down to chance and it is, therefore, a genuine relationship. In science, 95% certainty is set as the line that must be crossed for something to be accepted as having a high probability of being valid.

Genetic data are not the only ‘solid’ data indicating that g was rising (up until the 19th century). There are also indications that scientific and mathematical geniuses—individuals of great eminence—were increasing in frequency in Western societies until the 19th century. However, to properly understand the factors that go into making genius, it is necessary to get a handle on the nature of personality.

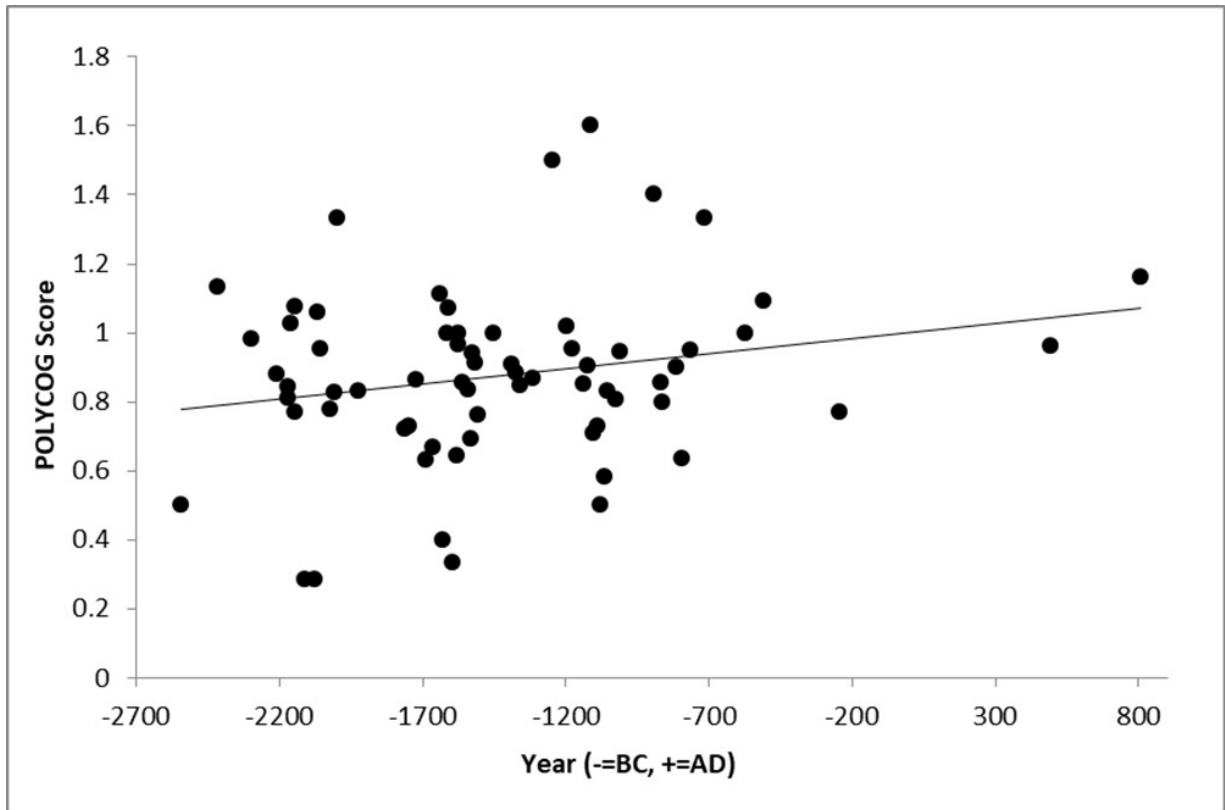


Figure 5. Plot showing the increase in POLYCOG over 3.35 thousand years, fitted to a linear trend.^[2]

¹ Clark, G. (2007) *A Farwell to Alms: A Brief Economic History of the World*, Princeton, NJ: Princeton University Press.

² Viv Nicholson, pools winner—obituary, *Daily Telegraph*, (12 April 2015), [Online] <http://www.telegraph.co.uk/news/obituaries/celebrity-obituaries/11531195/Viv-Nicholson-pools-winner-obituary.html>.

³ Clark, G. (2007) *A Farwell to Alms: A Brief Economic History of the World*, Princeton, NJ: Princeton University Press, p. 169.

⁴ Clark, G. (2007) *A Farwell to Alms: A Brief Economic History of the World*, Princeton, NJ: Princeton University Press, p. 179.

⁵ Dutton, E. (2015) *The Ruler of Cheshire: Sir Piers Dutton, Tudor Gangland and the Violent Politics of the Palatine*, Northwich: Leonie Press, Ch. 1.

⁶ Moffatt, A. (2011) *The Borders: A History of the Borders from Earliest Times*, Edinburgh: Birlinn.

⁷ See: Mortimer, I. (2013) *The Time Traveller's Guide to Elizabethan England*, London: Vintage Books, Ch. 12.

⁸ Pietschnig, J., Penke, L., Wicherts, J.M., Zeller, M. & Voracek, M. (2015) Meta-analysis of associations between human brain volume and intelligence differences: How strong are they and what do they mean? *Neuroscience & Biobehavioral Reviews*, 57, pp. 411–432.

⁹ Rock, W.P., Sabieha, A.M. & Evans., R.I.W. (2006) A cephalometric comparison of skulls from the fourteenth, sixteenth and twentieth centuries, *British Dental Journal*, 200, pp. 33–37. It should be noted that the research team had originally thought that the skeletons were from the mid-14th

century. It was later realised that they were from the 13th century. See: Steen, R.G. (2009) *Human Intelligence and Medical Illness: Assessing the Flynn Effect*, New York: Springer.

[10](#) For an examination of the murders of, and attempts on the lives of, British monarchs, see: Lewis, B. (2011) *Dark History of the Kings and Queens of England*, London: Amber Books.

[11](#) On the growth of democracy in Britain see: Machin, G.I.T. (2001) *The Rise of Democracy in Britain, 1830–1918*, London: Palgrave Macmillan.

[12](#) See: Harling, P. (1996) *The Waning of the ‘Old Corruption’: The Politics of Economical Reform in Britain, 1779–1846*, Oxford: Clarendon Press; or Rubenstein, W.D. (1983) The end of the ‘Old Corruption’ in Britain, 1780–1860, *Past & Present*, 101, pp. 55–86.

[13](#) See: Owen Lloyd, T. (1973) *The Growth of Parliamentary Democracy in Britain*, London: Rigby.

[14](#) Hasluck, E.L. (2010) *Local Government in England*, Cambridge: Cambridge University Press, p. 175.

[15](#) See: Eisner, M. (2003) Long term historical trends in violent crime, *Crime & Justice*, 1, pp. 83–142.

[16](#) See: Clark, G. (2007) *A Farewell to Alms*, Princeton, NJ: Princeton University Press.

[17](#) The World Bank (2016) *Intentional Homicides per 100,000 People*, [Online], <http://data.worldbank.org/indicator/VC.IHR.PSRC.P5>.

[18](#) Adapted from Eisner, M. (2003) Long-term historical trends in violent crime, *Crime and Justice*, 30, pp. 83–142.

[19](#) For a history of duelling in England, see: Peltonen, M. (2003) *The Duel in Early Modern England: Civility, Politeness and Honour*, Cambridge: Cambridge University Press.

[20](#) See: Eisner, M. (2003) Long term historical trends in violent crime, *Crime & Justice*, 1, pp. 83–142.

[21](#) Adapted from Woodley of Menie, M.A., Yonuskunju, S., Balan, B. & Piffer, D. (2017) Holocene selection for variants associated with general cognitive ability: Comparing ancient and modern genomes, *Twins Research and Human Genetics*, 20, pp. 271–280.

Five

What is Personality?

As we will see in Chapter Six, a genius seems to combine extremely high IQ with a certain kind of personality. So, to really understand the nature of genius, we need to take a short detour in order to understand what personality is, what different kinds of personality there are, and the huge influence your personality has on everything from your health to what subjects you're good at in school.

If we return to the computer analogy, intelligence loosely corresponds to the processing efficiency of the computer, while personality reflects the types of software installed on it.^[1] A further difference is that, as we have seen, intelligence is measured by IQ tests. Personality is more subjectively evaluated. It is either self-rated using scales upon which you position yourself, or rated by other people (peer-rated). A person high in intelligence, or high on a personality trait such as Conscientiousness, is 'high' in relation to other people and, as with intelligence, personality changes with age.^[2]

The Big Five

Differences in personality predict differences in how people will respond in different situations. How near to you does a car moving at high speed have to be before you decide that it is too risky to cross the road in front of it? How many irritating things have to happen to you in a day before you lose it and start yelling? How strongly does how others feel influence how you feel?

Different people will answer these questions differently and they'll do so because they have different kinds of personalities. On a personality test, people are asked whether a certain behaviour, or like or dislike, is present or absent in them; or else asked to rate its strength on a scale. For example, the Newcastle Personality Assessor includes the following statements about yourself: 'Starting a conversation with a stranger', 'Insulting people', and 'Feeling stressed or worried'. With each statement you have to rate the extent to which they apply to you on a scale ranging between 'Very unlike me' and 'Very like me'.^[3] These kinds of questions can be analysed and averaged to yield a few personality 'traits' which cluster together.

While many models of the structure of personality have been proposed over the decades, the model with the greatest currency in modern personality psychology holds that personality can best be understood in terms of five essential personality characteristics: these are the 'Big Five',^[4] with each corresponding to a dimension between positive and negative extremes separated by a dash:

(1) **Extraversion–Introversion.** Extraversion is feeling positive feelings strongly. It is associated with being outgoing and gregarious (i.e. enjoying the company of others). Introversion is experiencing these feelings weakly, and is associated with being self-reliant.

(2) **Emotional Stability–Neuroticism.** Neuroticism is feeling negative emotions strongly. A person high in Neuroticism is emotionally unstable and prone to mood-swings, anxiety, and depression.

(3) **Conscientiousness–Impulsiveness.** Conscientiousness refers to impulse control. People who are high in this are self-disciplined,

hard-working, and rule abiding.

(4) **Agreeableness–Disagreeableness.** Agreeableness refers to those who are high in empathy and who are pro-social. They deeply care about, and empathise with, how others feel.

(5) **Openness-Intellect–Closedness-Instrumentalism.** Openness-Intellect is a broad domain of personality, which references intellectual curiosity and a preference for novelty, progressive politics, creativity, aesthetics, and unusual psychological experiences. The opposite pole of this domain is characterised by lack of interest in novelty, a preference for conservative politics, and pragmatism. Openness-Intellect weakly, but significantly, correlates with intelligence, at 0.3. This is because it—or the ‘Intellect’ domain anyway—is measuring some of the same things.

These five personality traits are (except for Openness-Intellect) regarded as independent of IQ scores and our placing on them predicts how we behave. For example, high Conscientiousness as a child predicts greater success in the education system and in the world of work. High Neuroticism is associated with mood swings, anxiety, and depression. Indeed, it is correlated with suffering from depression at 0.8.^[5] High Extraversion predicts early death because extraverts are more likely to take risks, because they will enjoy the resulting pay-off so much more. One study found that high Extraversion leads to a three-fold increase in the risk of early death.^[6] Extraversion also predicts poor health, because of the extra enjoyment that will be found in food or smoking. Unsurprisingly, high Agreeableness predicts having lots of friends while low Agreeableness is associated with marital breakdown and criminality.^[7]

The General Factor of Personality

The Big Five were developed from the Big Three traits defined by psychologist Hans Eysenck (1916–1997). Eysenck arrived in England from Germany in the 1930s and made his temporary visit permanent after the Nazis, whom he loathed, came to power. Eysenck became the dominant personality in British academic psychology.^[8] The Big Three are Extraversion, Neuroticism, and Psychoticism. In effect, the Big Five dimensions of Conscientiousness and Agreeableness are the opposites of various aspects of Eysenck's Psychoticism; and Openness-Intellect takes some aspects of Psychoticism and blends them with behaviours characteristic of modern intellectuals or artistic types.

Like Eysenck, British-born Canadian psychologist J. Philippe Rushton (1943–2012) was a highly original thinker; to the extent that he was prepared to tackle controversial ideas. When he was a PhD student in London, Rushton attempted to protect Eysenck from a student mob protesting what they perceived to be 'controversial' aspects of his work, and got punched for his troubles. Rushton showed that the Big Five (and Big Three) are all co-correlated, and could all therefore be reduced to a single personality variable, which he called the General Factor of Personality (GFP). The GFP can be understood as the single foundational dimension of personality, corresponding broadly to *social effectiveness*—or the ability to effectively read people and social situations and to behaviourally regulate oneself. This underlies the more specific personality traits—akin to how general intelligence or *g* underlies all the specific cognitive abilities, as we have already explored. With personality, you have the 'aspects' or 'facets'—lots of very specific traits such as 'courage' or 'jealousy'. These can be reduced down to the Big Five and these, in turn, yield a Big Two comprised of a broad *Stability* factor (encompassing Conscientiousness, Agreeableness, and Emotional Stability) and a *Plasticity* factor (comprising Extraversion and Openness-Intellect). The Big Two always correlate. This gives rise to the *g* factor of personality; the 'General Factor of Personality'.^[9]

So the General Factor of Personality (GFP) can be conceptualised as the degree to which a personality is socially desirable and socially effective. GFP describes a basic personality dimension, high levels of which (it is

suggested) evolved as an adaptation in complex and stable societies so that people would ‘get along together’. So a person with high GFP would be socially extraverted, be empathic and concerned with the feelings of others, conscientious and self-disciplined in pursuit of socially-approved goals, have stable emotions, and be open to new ideas. The existence of the GFP is also why people say things like ‘She has a nice personality’, or ‘He’s shallow!’: the idea being that people intuitively understand that there is one ‘core’ personality trait with socially desirable and undesirable poles—and that paying attention to this in choosing mates and allies likely would have had significant evolutionary pay-offs. Unsurprisingly, the GFP predicts likeability and employability, and is substantially correlated with (and is essentially the same thing as) Emotional Intelligence.^[10] This is the ability to ‘know’ yourself and take command over your emotions, which, as was discussed earlier, is sometimes touted as a sort of ‘second’ intelligence, but is really a mixture of general intelligence and the GFP, with such traits properly belonging in the ‘personality realm’.

How Personality Develops and Why there are Differences

Personality develops throughout the lifespan.^[11] Anyone who has ever had a four-year-old child will notice that, in comparison to a child of ten, the four-year-old will have lower impulse control and is more likely to have a tantrum, is less considerate to his or her friends, and is far more likely to become scared of something or inconsolably upset. We equally see that the elderly tend towards being non-aggressive and highly resistant to change; ‘set in their ways’. In the 18th-century satire *Gulliver’s Travels*, Gulliver travels to the land of Luggnagg where he meets a people called the Struldbruggs. They are immortal but lack the gift of eternal youth. In consequence, the very elderly do not even speak the same language as the young. The language has been evolving, but they are too set in their ways to keep up with this. This fits with what we know about the development of personality over the lifespan.

We don’t know much about how the GFP changes, so let’s stick to the well-studied Big Five for the time being. Conscientiousness increases with age up until puberty, where people regress a bit, and then from early adulthood it continues increasing. Exactly the same is true of Agreeableness. In males, Neuroticism simply decreases with age, while in females it decreases with age until adolescence, when it increases, before beginning to decline in early adulthood. For this reason, though there is much variation within the sexes, women score higher in Neuroticism than men and are more prone to anxiety.

It is interesting that the move towards higher Conscientiousness as one gets older experiences a blip during adolescence. It may be that there is some evolutionary benefit to this, such as young people being less inhibited and therefore potentially more creative, and so being more likely to attract the attention of a mate or produce some useful innovation for society at large. Such behaviour patterns might also make them more likely to break or loosen the bond with their parents, incentivising them to make their own mark on the world—the famed psychoanalyst Carl Gustav Jung (1875–1961) called this process *Individuation*.^[12] Once people reach adulthood their personalities, compared to others of their own age, are fairly stable. For example, one study found that the correlation between personality scores over six years on the same adult sample was 0.85.^[13]

There are clear personality differences between males and females. These fit with stereotypes about women entering caring professions and men being more aggressive and inclined to fight and compete. By the time they reach adulthood, women are higher in Agreeableness and Conscientiousness than men: they have higher impulse control and they are kinder. This would make women better carers for children and men higher in competitive drive and aggression. This should be borne in mind when people bemoan the fact that high-stakes, money-oriented professions like finance or even politics are male-dominated, but nursing and school teaching are female-dominated, as these differences are precisely what male–female differences in personality would predict. Women are also higher in Neuroticism than men, as already noted, which would mean a greater proneness to suffering from stress. They are higher in some Extraversion facets than men, more likely to be outgoing, for example. The differences on Openness-Intellect are at the facet level. Women are higher in ‘Aestheticism’; men are higher in ‘Intellect’.^[14] So, you would predict that women would be more interested in the arts and men more interested in the sciences.^[15]

Personality traits, including the GFP, have been shown to be in the region of 50% heritable, based mainly on twin studies. As with intelligence, much of the genetic underpinnings of personality traits relate to genes with individually small, additive effects, however some of the heritability—perhaps even a larger portion than is the case for intelligence—is due to the action of rare genes with big effects and epistatic gene–gene interactions (i.e. non-additive genetic effects).^[16] Since the heritability of personality is less than one, some combination of chance and the environment does affect the kind of personality which you develop, but only within certain genetic limits. An unstable, dangerous childhood will tend to increase mental instability, and those who experience it will learn to see the world as a perilous place—and this may have a lasting effect on their behaviour. For instance, when childhood is unpredictable and dangerous, children will tend to ‘live for the now’, so displaying lower Conscientiousness, and they may be suspicious of other people, leading to lower Agreeableness.^[17]

Another example is that girls who have grown up in sexually-unstable situations seem to adopt a short-term sexual strategy. They have children with a large variety of men and these men are chosen because they are

macho, not for their ability to remain committed to the relationship and/or provide resources over the long term. To put it in slang terms, girls from unstable homes seem to exhibit a preference for ‘cads’ rather than ‘dads’.^[18]

So, we have now looked at personality and the important dimensions of life that its various manifestations predict. This is vital to understanding genius, because of the unusual personality–intelligence profile involved. So, with this in mind, let us now turn to the crucial issue of the rise in levels of genius as evidence of rising intelligence up until the Industrial Revolution.

[1](#) Dutton, E. & Charlton, B. (2015) *The Genius Famine*, Buckingham: University of Buckingham Press, p. 7.

[2](#) See: Soto, C., John, O., Gosling, S. & Potter, J. (2011) Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample, *Journal of Personality & Social Psychology*, 100, pp. 330–348.

[3](#) See Nettle, D. (2007) *Personality: What Makes You Who You Are*, Oxford: Oxford University Press.

[4](#) See: Costa, P.T., Jr. & McCrae, R.R. (1992) *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) Manual*, Odessa, FL: Psychological Assessment Resources.

[5](#) For a good introduction to personality, see: Nettle, D. (2007) *Personality: What Makes You Who You Are*, Oxford: Oxford University Press.

[6](#) Friedman, H.S., Tucker, J., Tomlinson-Keasey, C., *et al.* (1993) Does childhood personality predict longevity? *Journal of Personality and Social Psychology*, 65, pp. 176–185.

[7](#) See: Nettle, D. (2007) *Personality: What Makes You Who You Are*, Oxford: Oxford University Press.

[8](#) Eysenck, H. (1997) *Rebel With a Cause: The Autobiography of Hans Eysenck*, New Brunswick, NJ: Transaction Publishers.

[9](#) Rushton, J.P. & Irwing, P. (2008) A General Factor of Personality from two meta-analyses of the Big Five, *Personality & Individual Differences*, 45, pp. 679–683.

[10](#) Just, C. (2011) A review of literature on the general factor of personality, *Personality & Individual Differences*, 50, pp. 765–771.

[11](#) See: Soto, C., John, O., Gosling, S. & Potter, J. (2011) Age differences in personality traits from 10 to 65: Big Five domains and facets in a large cross-sectional sample, *Journal of Personality and Social Psychology*, 100, pp. 330–348.

[12](#) See: McNeely, D. (2010) *Becoming: An Introduction to Jung's Concept of Individuation*, Carmel, CA: Fisher King Press.

[13](#) Costa, P. & Arenberg, D. (1980) Enduring dispositions in adult males, *Journal of Personality and Social Psychology*, 38, pp. 793–800.

[14](#) Weisberg, Y., DeYoung, C. & Hirsch, J. (2011) Gender differences in personality across the ten aspects of the Big Five, *Frontiers in Psychology*, 2, art. 178.

[15](#) Indeed, this is precisely what Baron-Cohen's model of the extreme 'male brain' predicts. See: Baron-Cohen, S. (2002) The extreme male brain theory of autism, *Trends in Cognitive Sciences*, 6, pp. 248–254.

[16](#) Bouchard Jr., T. (2004) Genetic influence on human psychological traits, *Current Directions in Psychological Science*, 13, pp. 148–151.

[17](#) Simonton, D. (2009) Varieties of (scientific) creativity: A hierarchical model of domain-specific disposition, development, and achievement, *Perspectives on Psychological Science*, 4, pp. 441–452.

[18](#) Bugental, D., Corpuz, R. & Beaulieu, D. (2014) An evolutionary approach to socialization, in Grusec, J. & Hastings, P. (eds.) *Handbook of Socialization: Theory and Research*, New York: Guildford Publications.

Was Genius Becoming More Prevalent Historically?

We have already mentioned the character Sheldon Cooper from the sitcom *The Big Bang Theory*. This character appears to be based, to some extent, on the archetypal genius. His friends, though sometimes slightly socially awkward, are the typical ‘normal’ scientists. They are highly intelligent, high in Conscientiousness, and high in Agreeableness, these traits characterising the typical scientist.^[1] For these reasons, they have active social lives—based around ‘nerdy’ interests such as *Star Trek*—and their lives are highly routinised. Sheldon Cooper deviates from this, though perhaps not quite enough to make him the archetype of a genius. He is super-intelligent, with outlier high IQ; far more intelligent than his friends. He is relatively low in aspects of Agreeableness. He is cold, blunt, unreasonable, socially blind, and cares little for the feelings of others even when he can identify them. His intelligence is also very narrow. Simple tasks, such as driving a car, are beyond him, such that his friend Leonard has to drive him to and from work. He is also extremely unworldly. In earlier ‘seasons’—before the series turned into a replacement for *Friends*—he had no interest in women, sex, or even money, allowing his pay cheques to pile up in a drawer because, ‘Most of the things I’m planning to buy haven’t been invented yet.’

Sheldon is, in certain respects, similar to the genius. How do we define a genius? Normally, a ‘genius’—at least in the world of science—is somebody who makes an enormous breakthrough, which has huge ramifications, such as the insight of ‘natural selection’ by Darwin or the identification of the laws of optics and of gravity by Newton. In much the same way, a hugely important invention, such as the Spinning Jenny, can be considered the product of genius. This being the case, we can start to identify geniuses—people who are commonly recognised, by other scientists for example, as being geniuses. One method of discerning this is *convergent bibliography*, which features heavily in the research of the American psychologist Dean K. Simonton. Using this method, an

individual's eminence is really a function of how they are regarded by their peers, which can be modelled by simply measuring the prominence and prevalence of famous names across historical works—thus establishing the degree to which different authorities agree with one another (or converge) with respect to who is extremely eminent. Simonton terms this field Historiometrics.^[2]

Some people argue that this method is subjective because it is based on the ratings of mere people and may be coloured by prejudice, meaning that certain potential geniuses are ignored. It can be countered that genius is a form of behaviour, just as tool use among chimpanzees is a form of behaviour. We know that tool use among chimpanzees is real only because multiple raters have observed this. Similarly, we know that a person behaves as a genius (by having a huge impact on everything around them) because multiple raters have observed this. In addition to convergent bibliography, we can assess the biographical information we have about them and draw reasonable inferences about the kind of people they were. A number of important researchers, such as Dean K. Simonton and also Hans Eysenck, have done precisely this, although (as with many important ideas) this approach had its origins in the mind of Sir Francis Galton.^[3] The generally accepted conclusion is that if you met a genius you may well superficially dismiss them as 'mad'. They probably wouldn't be particularly likeable or friendly, they would have unusual habits and perhaps dress or speak in an unusual way; they would be obsessive. They may have many of the signs of what is termed Asperger's syndrome; a mild form of autism which is associated with difficulty in understanding the feelings of other people.

The Nature of Genius: Meeting Sir Isaac Newton

Returning to our discussion of personality, Edward Dutton and Dutch psychologist Dimitri Van der Linden have explored the way that, whereas the average scientist—who might build on the insight made by the genius—would combine high intelligence with high Agreeableness and high Conscientiousness,^[4] the genius would have a much more complicated psychological profile. Experts on genius such as Simonton and Eysenck concur that high-intelligence is a necessary component for geniuses, but nowhere near a sufficient one; genius being an emergent property of rare combinations of environment, personality, and ability. The genius is extremely high in intelligence, but is moderately low in Conscientiousness and Agreeableness, which, when coupled with high creativity, is associated with the personality trait Psychoticism. This is crucial to genius because genius involves coming up with and presenting a ground-breaking and highly original idea. Frequently, it involves solving a very difficult problem and working to solve this—to the exclusion of most other things—for years on end. True originality will always offend vested interests. It will, at first at least, at best be met with ridicule and at worst with open hostility. True originality will also involve breaking the rules; thinking the unthinkable, contemplating something that is so ‘out there’ that it would seem ludicrous to ordinary people.

This is why geniuses require the personality profile that they have. As they are relatively low in Conscientiousness, they are happy to disregard the rules and they have the ability to think outside of them. Combined with extremely high intelligence, this means that they have the ability to think in a highly original way and, so, to solve incredibly difficult problems. Their moderately low Agreeableness will have two consequences. Firstly, it will help them to dedicate themselves to their work, as they find dealing with other people extremely difficult and tiresome. Low Agreeableness is associated with high self-esteem, so they are likely to bounce back quite well from any discouragements which they experience while trying to solve their chosen problem. Once they’ve solved it, they will have no difficulty in telling the wider world about it. This is because, moderately low in Agreeableness, they won’t care about the offence they may cause and

would have trouble anticipating that their work would cause offence even if they did care.

A final dimension to the genius personality, which may seem quite surprising, is at least elements of Extraversion.^[5] Geniuses are risk-takers and they are highly competitive. Often, when a problem has needed a solution, many people have been working to solve it. The recognised genius is the one who wins the race to solve the problem, so there is a degree to which he must have a strong competitive drive. The best example of this can be seen in the way that Darwin went to print with his theory of evolution (or as he termed it *modification by descent*) in 1859 because he was under the erroneous belief that Alfred Russell Wallace had, independently, come up with precisely the same theory. Darwin, however, had developed his own theory around 20 years earlier. Indeed, it should be remembered that though the archetypal genius combines super-high intelligence with moderately high psychoticism, there will be all kinds of variations on this theme. For example, a given genius—Darwin may be an example—might be quite high in Agreeableness, but extremely low in Conscientiousness (according to his son Francis, Charles Darwin's working habits were extraordinarily unsystematic and his study was always in a state of chaos).^[6] As long as the overall balance between the psychological factors is optimum, a genius can still be produced.

To understand what the genius is really like, we should perhaps meet just one of them. Sir Isaac Newton's intelligence was undoubtedly enormous, so what would he have been like to know? In their book, *The Genius Famine: Why We Need Geniuses, Why They're Dying Out and Why We Must Rescue Them*, Edward Dutton and Bruce Charlton discuss precisely this issue. They note that as a child and young man Newton would spend nearly all of his time alone and when in company he would be silent. He had essentially no friends, formed no relationships with women, and made very little effort to conform at all. As a boy, his relationships with other boys tended to be antagonistic. He really wasn't a very nice person. Newton was taught Latin at school and not much else. In terms of mathematics and science, he simply taught himself. Whatever he did, he did because he wanted to do it, he became engrossed in it and he did it brilliantly. In a year or so, he went from knowing almost no mathematics to mastering the subject and being among the best in the world; and then he immediately went on to make some of the greatest ever mathematical

discoveries. Newton's own explanation for his achievement was that he solved problems 'By thinking on it continually'. He also remarked, 'I keep the subject constantly before me.' Then he all-but dropped mathematics, and instead worked on one area of physics after another—making major discoveries, then moving on. Newton would think solidly for hour upon hour—sometimes standing lost in his own world half way down the stairs. For many years he hardly ever left his college. He almost never left Cambridge.^[7]

But there is another aspect of Newton that was particularly interesting; something he has in common with Einstein and many other geniuses. While Newton's academic performance was good, it was not amazing. Indeed, it was rather erratic. He excelled at some things and was mediocre at others. For example, he performed badly in his BA examination, which was a *viva voce* disputation; needing to go on to a second round of questions (rather than passing straight away).^[8] This is true of many other geniuses, observe Dutton and Charlton. Francis Crick, who co-discovered DNA, was rejected from Cambridge and went to university in London, where he failed to get a top degree.^[9] He then proceeded to drop out of a variety of PhD courses.^[10]

Newton's methods were highly intuitive. This can be contrasted with the method typical of highly intelligent and conscientious un-creative people—who read widely, learn many facts, and then try to apply other people's solutions to problems. And this leads us to a further point. It has been shown that as people become more intelligent—as IQ goes up—the relationship between the different cognitive abilities becomes weaker. This is termed *Spearman's Law of Diminishing Returns*, after Charles Spearman (whom we encountered previously), who first described this effect in 1927.^[11] In other words, as people become more intelligent, they become more specialised in the nature of their intelligence. So, a person who is of roughly average intelligence will be 'okay' in terms of their linguistic, spatial, and mathematical scores but they will be relatively equally okay in each one. By contrast, somebody who has much higher intelligence may be better on all of these measures, but they won't be equally better. They are likely, for example, to have much higher mathematical scores, with their linguistic scores being only moderately higher. But the mathematical scores are so much higher that, overall, the physics student, or whatever he may be, will have a much higher average IQ.^[12] Spearman's Law of Diminishing

Returns does not refute the concept of *g*—this being present in the ability scores of even those with the highest levels of intelligence. The *g* factor is, however, somewhat *weaker* among such individuals—as specialised abilities become more autonomous, playing a bigger role in influencing cognitive performance.

Geniuses, who have extraordinarily high IQs, will therefore tend to have an even weaker relationship between their different cognitive abilities. What this means, in practice, is that though they are super-intelligent overall, they may actually be below average when it comes to certain tasks that are towards the base of the ‘intelligence pyramid’ and, so, only weakly correlate with *g*. This, along with their moderately high psychoticism, would help to explain their often less than outstanding academic performance at university and, indeed, their ‘nutty professor’ behaviour patterns. Einstein once got lost close to his home in Princeton, New Jersey. He walked into a shop and said, ‘Hi, I’m Einstein, can you take me home please?’ He couldn’t drive a car, and many other tasks that most people take for granted were simply too difficult for him.^[13] This is, probably, the best example of somebody of extraordinary intelligence being, really, quite stupid, albeit in a specialised sort of way. Sheldon Cooper, of course, relies on Leonard to chauffeur him to and from work.

The Evolution of Genius

So, how has ‘genius’ been selected for? There is no evidence that geniuses have lots of children. Indeed, quite the opposite seems to be true. They are frequently asexual and often don’t reproduce at all.^[14] Why, then, do they exist? Shouldn’t they be shunned by the prehistoric tribe—as dangerously uncooperative—and removed from the gene pool?

This brings us back to the issue of group selection, which you will recall from earlier. There are different means by which you can pass on your genes. Firstly, there is doing so directly. If you have a child it will carry 50% of your genes and so it makes sense, genetically, for you to look after this child and help it to pass on its own genes. However, there are indirect ways of passing on your genes as well. This ‘indirect breeding’ model was pioneered by the English biologist William Hamilton (1936–2000).^[15] Hamilton was born in Egypt to New Zealander parents, his father being an engineer and his mother a doctor. When evacuated to Edinburgh during World War II, he became fascinated by natural history and at university, at Cambridge, became so obsessed with reading about natural selection that he neglected his degree studies. His ideas had a huge influence on evolutionary psychology. Always a pioneer, he travelled to the Congo in an attempt to understand the origins of HIV and died soon after his return, possibly because of an ulcer caused by the anti-Malaria medicine taken on his expedition.^[16]

Hamilton articulated the idea of ‘inclusive fitness’—that you can pass on your genes through means other than having direct descendants. You can follow a process of ‘kin selection’ where you invest in nephews and nieces (25% of your genes), cousins (12.5% of your genes), and so on. This is why many a spinster auntie will be inclined to spoil rotten her sibling’s children. She is aiding her kin and so indirectly perpetuating her own genes. For this reason, in some circumstances, it would make sense, in terms of inclusive fitness, to lay down your life if a large number of your cousins were under mortal threat, especially if you had already had children yourself. According to Hamilton, people will act altruistically if the benefit to their inclusive fitness is greater than the fitness cost of the act. Thus, it would make sense for a menopausal mother to lay down her life to save her only child. This would not make so much sense if the mother, aged 21, was

told to make a choice between her child's life and her own, because she could go on to have many more children.

The idea of kin selection can be logically extended to group selection. It has been established that ethnic groups are genetic clusters. The average Englishman is highly genetically similar to the next average Englishman *relative* to the average Dane, based on genetic assay data. The Australian political psychologist Frank Salter has calculated that if the world were divided between only English and Danes, then two average English people would have a kinship coefficient of 0.0021, whereas it would be zero for an Englishman and a Dane. This coefficient would be the equivalent of sharing a set of 6 x great grandparents; that is being 7th cousins. So, from a genetic perspective, it would be adaptive for an Englishman to fight to protect his ethnic group from Danes, even if it risked him having no children at all. If his actions saved enough of his people, this would more than compensate for the lack of direct breeding.^[17] The soldier, who laid down his life in this way, would be operating at the level of group selection. Indeed, computer models have shown that the more ethnocentric group—the group whose members are more inclined to repel outsiders and make sacrifices for the good of the group—always eventually dominates in between-group competition, all else being equal.^[18] Thus, the successful group will produce more people—though not too many—who are prepared to shun individual and even kin selection in favour of a group selection strategy.

Building on an idea first proposed by William Hamilton,^[19] it has been proposed that geniuses can be understood to operate precisely this kind of strategy.^[20] Their inventions do not benefit themselves or even their families (Gregory Clark has documented many cases of geniuses being cheated out of the credit for their inventions—which nevertheless went on to change the world) but they benefit the group to which the genius belongs. The inventions which kicked off the Industrial Revolution, for example, allowed the British population to soar in size and wealth and to expand around much of the globe. Clearly, then, a successful society needs to maintain an optimum but relatively low number of geniuses. The number cannot be too many, because a society full of uncooperative, impractical dreamers will be dominated by a more internally cooperative and practical one. And it cannot be too few, or the society will be dominated by one

which has the appropriate number of geniuses to allow the necessary level of innovation.

Geniuses will be formed—to the extent that genius is genetic—by chance but possible combinations of genes, which will stay in the population (and are often concentrated in certain family lines) precisely because they occasionally produce genius and this is outweighed by the negative which those genes in slightly different combinations can produce. This negative is people of low intelligence and high psychoticism—in other words, those who may be criminally prone. Recall that although the bulk of the genetics of intelligence involve genes with additive, or small and incremental, effects, there is also a role played by rarer genes with large effects and also epistasis, or gene–gene interactions, not just among genes responsible for intelligence, but involving personality and other traits as well. It is these rare genetic factors that play the biggest role in the genetics of extreme talent and genius.^[21] It has been noted that both geniuses and criminals are antisocial risk-takers, though geniuses are more intelligent.^[22]

For geniuses to happen, the available gene pool cannot be too small — otherwise geniuses will be too unlikely to be produced (the odds of getting precisely the right interactions among genes are very small). Thus, the genius is likely to be born to parents who are within the normal range of intelligence and have normal personalities and this genius is likely to have siblings who are much more like his or her parents. However, the genius will be very different. As discussed, the genius will be an outlier not just in terms of intelligence, but also in terms of creativity and personality.

The Growth of Genius

The genius, then, is one of the most significant people society has to offer at any given time, as they combine super-high intelligence with the optimum level of moderately high psychoticism which, within the context of a particular society, allows scientific and technological breakthroughs to be made. We can imagine that the inventor of the wheel, or the boat—people whose names are lost to history—would have been this kind of person, in comparison to the rest of their society. As the intelligence of the society increases, so the scarcity of genius would decrease, and as the society becomes more complex—coming into conflict with other groups—so the need for genius would increase. We have already traced the rise—via a series of proxies—of the intelligence of European societies up until the 18th century. This rise should be paralleled by an on-going increase in more and more significant technological breakthroughs as society's geniuses become more and more prevalent. As we have already seen, scientific and technological achievement is associated with intelligence at the individual level.

A number of researchers have shown that rates of innovation do indeed climb as we reach the 18th century. Jonathan Huebner, an American physicist, published a paper in 2005 in the journal *Technological Forecasting and Social Change* in which he showed precisely this.^[23] He drew upon a list of 8,583 important events in the history of science and technology, agreed to be highly significant by scientists, from the Stone Age up until 2004. Huebner limited this to the most recent 7,198 events, those since 1450. He noted down the year in which each event happened. Huebner then worked out what the world population was in each year, meaning he could track the per capita level of innovation. He found that scientific innovation rates per capita increased four-fold between 1450 and 1870. This can be seen in Figure 6 below.

The American political scientist Charles Murray, in his 2003 book *Human Accomplishment*, showed that it was not only significant innovations that were increasing between the Middle Ages and the mid-19th century, but (unsurprisingly) the eminent individuals responsible for them (i.e. geniuses) were increasing too.^[24] There were humps and bumps, of course. Innovation was reduced during periods of war and famine for

example. But we can see there is a dramatic rise and then, as of about 1873, a fall.

Michael A. Woodley of Menie developed Huebner's model.^[25] Huebner drew upon a particular inventory compiled by two scientists so, to avoid subjective bias, Woodley of Menie tested to see how well it correlated with other, similar, inventories. For example, he compared it to an index of significant scientific breakthroughs between 1400 and 1950 compiled by Murray.^[26] In each case, the correlation was over 0.8, showing that the inventory was not merely subjective. Woodley of Menie used a number of sources to calculate the average intelligence of the population in each year charted by Huebner. He showed that the simplest explanation for Huebner's findings was that intelligence was increasing between 1455 and about 1850 and then decreasing after that. This is what best fitted all these data.

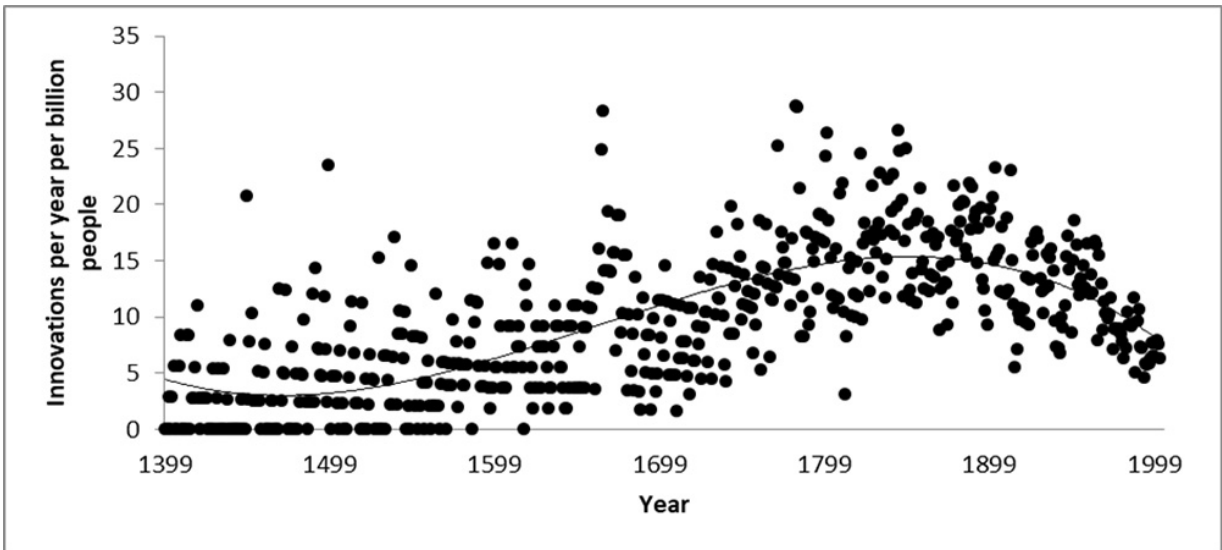


Figure 6. Per capita rates of significant innovation from 1450 to 2004, fitted to a third-order polynomial curve.^[27]

¹ Studies have shown that science students, when compared to humanities and social science students, are, on average, more intelligent and higher in Agreeableness and Conscientiousness. See: De Fruyt, F. & Mervielde, I. (1996) Personality and interests as predictors of educational streaming and achievement, *European Journal of Personality*, 10, pp. 405–425; Lievens, F., Coetsier, P., de Fruyt, F. & de Maesneer, J. (2002) Medical students' personality characteristics and academic performance: A five factor perspective, *Medical Education*, 36, pp. 1050–1105; and Dutton, E. & Lynn, R. (2014) Intelligence and religious and political differences among members of the U.S. academic elite, *Interdisciplinary Journal of Research on Religion*, 10, pp. 1–29.

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Seven

How Did Selection for Intelligence Go Into Reverse?

So, intelligence was increasing up until the dawn of the Industrial Revolution due to selection. This meant there was a process of ‘Survival of the Richest’ and, by extension, selection, each generation, for the most intelligent. This process was coupled with group selection and colonial expansion, fuelled by the fruits of genius, which culminated in the Industrial Revolution; an explosion of technological innovation the like of which the world had never seen before and has never seen since.

It is, perhaps, difficult for us to get our heads around the pace of the change during the Industrial Revolution because it would have been so dramatic. Someone born in 1770 would have grown up in a world little different from 1470. Transport would be via horse and almost everything had to be done by hand. Production was already beginning to mechanise, because James Hargreaves had invented the Spinning Jenny in 1764.^[1] An early steam engine had already been forged, but it hadn’t yet caught on. However, if that person had lived until just 1804, they would have seen the invention of the electric telegraph, the steam ship, the submarine, the circular saw, the steam roller, a reliable clock, the bicycle, the battery, and the steam-powered locomotive. The world of 1804 would have been dramatically different from that of 1770 or 1470.

If this person had lived until 1870, until the age of 100, they would have seen the electric light (1809), the steam train and the first photograph (1827), the electro-magnet, the typewriter (1829), the sewing machine, the electric dynamo, the calculator, the propeller, the revolver, the telegraph, rubber tyres, the washing machine, and, in 1858, the internal combustion engine. Then there was plastic and dynamite and we reach the year 1870. The extent and speed of change over a lifetime like that, compared to those for hundreds of years before, would have been astonishing.

And this new technology assisted numerous scientific breakthroughs, especially in the realm of public health and medicine. In the pre-industrial

world, there was a very limited understanding of the causes of illness and, therefore, illness selected against the least healthy. But this began to change. In 1796, Edward Jenner developed the smallpox vaccine, for example.^[2] There were also many other improvements in public health, such as better sanitation. And the simplest explanation for why all this was able to happen was that, for so long, we had been selected for intelligence by the rigours of natural, sexual, and social selection.

Scientists Who Predicted Intelligence Would Decline

However, by the 1860s, some people were beginning to notice something alarming, alarming for them anyway, and it had happened, in part, as a direct consequence of these breakthroughs in public health.^[3] The first person to write about it was a French physician, and early psychiatrist, called Benedict Morel (1809–1863). In 1857, Morel published a book in which he pointed out that the infant and child mortality rates in France were clearly in decline.^[4] They were in decline, he argued, because various improvements in public health in the preceding 50 years meant that many infants who would have died were now surviving into adulthood. It may sound callous, but there was a clear logic to the argument which followed. This increased survival rate, and consequent reproduction, would necessarily mean that the population would have a higher percentage of members who lacked whatever partly hereditary qualities were necessary for survival before these improvements in public health took place. Morel regarded the most important qualities as ‘health’, ‘moral character’ (by which he meant, essentially, high Conscientiousness and high Agreeableness), and ‘intelligence’. He was of the view that these qualities were transmitted within families, from parents to children, through a combination of (what would later be called) genetic and environmental processes. He argued that there was what he called a ‘degenerate class’, an ‘underclass’ of prostitutes, criminals, and the desperately poor, and that these people—albeit in his subjective experience as a physician and psychiatrist—seemed to have particularly high fertility. So, Morel predicted that these two processes—the reduction in child mortality as a check on the fertility of the ‘underclass’ and the, apparent, greater fertility of the underclass—would necessarily lead to the population of France gradually becoming less intelligent. In addition, they would also become—he predicted—more genetically sick.

Very similar conclusions were reached, around a decade later, by an English gentleman scientist. Sir Francis Galton (1822–1911), whom we encountered previously, was very much the Renaissance man. Statistician, polymath, social scientist, proto-geneticist, inventor, meteorologist, geographer, and even tropical explorer, the diversity and extent of his

achievements were truly extraordinary for the time. Galton read Darwin's *Origin of the Species* in 1859. He noted in 1865 that:

‘One of the effects of civilization is to diminish the rigour of the application of the law of Natural Selection. It preserves weakly lives that would have perished in barbarous lands. The sickly children of a wealthy family have a better chance of living and rearing offspring than the stalwart children of a poor one.’^[5]

Galton's language is brutal, but, in light of the strongly heritable character of intelligence, it is difficult to fault his reasoning: ‘the weak members of civilized societies propagate their kind’, he argued, leading, inevitably, to ‘degeneration’. It is noticeable, of course, that Galton doesn't necessarily see the problem as a matter of ‘the lower orders breeding too much’. The weakening of selection is particularly problematic precisely because wealthy people with access to modern medicine will be able to save a sickly child whereas poor people will see their healthier children die due to their terrible living conditions. This problem would have been less pronounced before the rise of scientific medicine. In general, only the strong would have survived. Galton summarised that: ‘there is a steady check in an old civilisation upon the fertility of the abler classes: the improvident and unambitious are those who chiefly keep up the breed. So the race gradually deteriorates, becoming in each successive generation less fit for a high civilisation.’^[6]

Charles Darwin (1809–1882) discussed the reversal of selection with respect to ‘socially valued’ traits in his second major book, *The Descent of Man*. In essence, Darwin argued that as societies become more advanced they become more compassionate towards their weaker members. This makes sense because, as we have already seen, the ability to solve social problems is modestly correlated with intelligence. Furthermore intelligence makes you more able to put yourself in the position of others. In other words, it increases your ability to empathise; it makes you nicer. Darwin, of course, is so highly respected that some people will try to bolster their arguments by appealing to him, while their critics will accuse them of misinterpreting him or quoting him out of context. So, let us simply quote what Darwin wrote, in 1871, verbatim:

‘With savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health. We civilised men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick; we institute poor-laws; and our medical men exert their utmost skill to save the life of every one to the last moment. There is reason to believe that vaccination has preserved thousands, who from a weak constitution would formerly have succumbed to small-pox. Thus the weak members of civilised societies propagate their kind. No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man. It is surprising how soon a want of care, or care wrongly directed, leads to the degeneration of a domestic race; but excepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed.’^[7]

In conversation with Alfred Russell Wallace (1823–1913), shortly before Darwin’s death, Darwin expressed extreme pessimism about the future of humanity, telling Wallace, ‘It is notorious that our population is more largely renewed in each generation from the lower than from the middle and upper classes.’ Darwin also spoke of the large number of children of what he called ‘the scum’ and the inevitable deterioration, as a consequence, of the qualities that were needed to build up civilisation.^[8]

Karl Pearson (1857–1936) was a leading mathematician and the protégé and biographer of Sir Francis Galton. Pearson was among the first to demonstrate that intelligence was heritable. He also believed selection for higher intelligence had pretty much completely reversed in modern populations due to the increased survival and high fertility of those with low intelligence. In his 1901 book, *National Life*, he wrote that, ‘while modern social conditions are removing the crude physical checks which the unrestrained struggle for existence places on the over-fertility of the unfit, they may at the same time be leading to a lessened relative fertility in those physically and mentally fitter stocks, from which the bulk of our leaders in all fields of activity have hitherto been drawn.’^[9] He also wrote, in 1912, that ‘the less fit were the more fertile’ and consequently, ‘the process of deterioration is in progress.’^[10]

Sir Ronald Fisher (1890–1962) was a geneticist and a statistician. He was born in Finchley, now in outer London, the son of an auctioneer. Fisher looked at the issue of the reversal of selection on intelligence and other traits in his 1929 book, *The Genetical Theory of Natural Selection*.^[11] In this, he summarised a number of the early investigations showing a negative association between socioeconomic status and fertility. For instance, Heron, in 1906, had shown that among London boroughs the birth rate was inversely associated with an index of average socioeconomic status.^[12] Fisher believed that social mobility over many centuries had led to genes for high intelligence being concentrated in the ‘professional classes’. Accordingly, their relatively low fertility would surely lead to the decline of intelligence levels. Indeed, Fisher’s ‘law’ was that civilisations collapse due to a negative relationship between intelligence and fertility,^[13] something we will explore in later chapters.

Raymond B. Cattell (1905–1998) was born in West Bromwich, near Birmingham, where his father made car components. Cattell worked on the question of declining intelligence in the 1930s. He presented his results in 1937 in his book, *The Fight for Our National Intelligence*.^[14] Cattell collected data which showed that there were social class differences in average intelligence. There was a gradient, with higher professionals having the highest average IQs and unskilled workers having the lowest. Cattell made an estimate of the decline of intelligence, using a sample of 3,700 ten-year-old children and examining the number of siblings they had. Cattell found that, on average, the more intelligent children had fewer siblings. This meant that intelligence had to be decreasing. He calculated that IQ was likely to be decreasing, based on this, by about 3 points per generation. Cattell, accordingly, predicted a decline in educational attainment, in ‘moral standards’, in cultural, scientific, and economic life, and in law-abiding behaviour.^[15]

In 1951, Cattell carried out another study on a comparable sample of ten-year-olds to see whether their average intelligence had declined. The surprising result, which came to be known as *Cattell’s Paradox*, was that the average IQ had increased by 1.3 IQ points.^[16] Cattell argued that the explanation was that various environmental factors, especially improvements in education, had probably masked a real decline in IQ.^[17] Cattell’s finding in fact represents one of the first observations of what

came to be known as the Flynn Effect, which will be explored in more detail later.

What is the Association between Intelligence and Fertility Now?

These researchers either subjectively observed a negative association between fertility and intelligence or found it to be the case some time ago, based on correlation studies using proxies for intelligence. However, there is now a very large body of evidence indicating that fertility is negatively and directly associated with IQ in industrial societies. There are many documented examples of this and the process is, therefore, likely to be happening in all such societies. Put simply, the more intelligent people are, the fewer children—on average—they tend to have.

USA

This can be seen in the USA. The National Longitudinal Survey of Youth (NLSY) refers to a series of surveys carried out by the US Department of Labour. In 1979, a representative sample of 12,686 people aged between 14 and 22 were surveyed. The progress of their lives was followed every year until 1994 and every two years thereafter. This sample was also given an IQ test. Gerhard Meisenberg, a German biochemist working at Ross University School of Medicine on the Caribbean island of Dominica, looked at the correlations in this survey, between IQ and the number of children people had in 2004, when they were between the ages of 39 and 47, and so, in the case of women in particular, towards the end of their reproductive lives.^[18] The results can be seen in Table 5.

Table 5. IQ and fertility of the NLSY 1979 (Meisenberg, 2010).

Sample	Correlation between IQ and Number of Children (all correlations, except for the Black males, are significant)
White Males	-0.089
White Females	-0.162

Black Males	-0.049
Black Females	-0.271

It can be seen that there is a weak but statistically significant negative association between intelligence and IQ and it is much stronger among women than among men. Another research group, led by psychologist Charles Reeve in 2013, drew upon a sample of 325,252 people aged 29. They found a correlation of -0.18 between numbers of children and IQ and a correlation of -0.26 between numbers of children and education level. Based on this, they estimated that IQ in the USA is declining by 1 point per generation.^[19] These findings are consistent with the negative relationship between education level and fertility in the USA which was highlighted by Richard Herrnstein and Charles Murray in their 1994 book *The Bell Curve*. This can be seen in Table 6.

Table 6. Education, intelligence, and fertility in the USA in 1994 (from Lynn, 2011, p. 127).

Years of Education	IQ	Number Children
16+	111	1.6
13–15	103	1.9
12	95	2.0
0–11	81	2.6
Average	98	2.0

Drawing upon a number of American studies into this relationship, a fascinating insight can be gained into why it exists and this can be seen in Table 7.

Table 7. Correlations of intelligence with actual number and planned number of children with t values for statistical significance of differences between the two correlations (Lynn, 2011, pp. 121–122).

Date of Birth	Number of Children		Difference
	Actual	Planned	t (all differences significant at $p < 0.05$)
1945–49	–0.27	–0.23	9.40
1950–54	–0.24	–0.18	22.00
1955–59	–0.25	–0.14	25.59
1960–64	–0.23	–0.21	3.07

The implication of this table is very clear. The less intelligent want to have more children and actually have more children than they plan to have. We will look at the reasons why later.

Britain

This negative association between intelligence and fertility can be seen in many other countries. In Britain, a study examined the relation between the IQs of a sample of 9,614 eleven-year-olds in Scotland and their numbers of children at the age of 46–51. They reported that, among men, those with children had an average IQ of 105.82, while those without children had an average IQ of 107.59. Among women, those with children had an average IQ of 106.55, while those without children had an average IQ of 108.94.^[20] Japanese evolutionary psychologist Satoshi Kanazawa looked at 9,434 British 46-year-olds born in 1958 and found that childhood intelligence was significantly negatively associated with parenthood among women. Women who were childless had an IQ of 105.3 while those who had children had an IQ of 101.7. However, there was a negligible difference

among men where those who were childless had an IQ of 103.0 while those who had children had an IQ of 102.2.^[21]

In addition, a meta-analysis in 2015 examined the results of 12 studies of the relationship between intelligence and fertility in Britain and the USA between 1927 and 2010. It was concluded that the IQ loss in the UK and the USA due to this pattern had been 0.39 points per decade across the 20th century.^[22]

Russia

Russian psychologist Ekaterina Chmykhova and her team have found evidence of the same process in Russia. They obtained average scores on the Standard Progressive Matrices for representative samples in 29 Russian provinces and found a correlation of -0.57 between the birth rate in the province and its average score. In a representative Russian sample aged between 40 and 50, they found that number of offspring negatively predicted score on the Standard Progressive Matrices IQ test. Based on this, they calculated that the IQ of Russians is falling by 0.44 points per generation.^[23]

Taiwan and China

A study of the relationship between intelligence, education, and fertility in Taiwan has been reported by Chen, Chen, Liao & Chen.^[24] They assessed intelligence with the Wechsler test on a representative sample of adults aged 35 to 84, and found that, for women, the correlation between fertility and IQ was -0.35 and the correlation between fertility and education was -0.59 . For men, the correlation between fertility and IQ was -0.18 and the correlation between fertility and education was

-0.37 . This was replicated more recently, with Taiwanese data again showing a negative correlation between intelligence and fertility.^[25] Research on China by psychologist Mingrui Wang and his team has found evidence of the relationship there as well. Drawing upon the China Family Panel Studies dataset, they found that for the birth cohort born between 1951 and 1970 the correlation between fertility and fluid intelligence—the ability to solve novel problems without any previous knowledge, such as in the case of matrix reasoning tests of IQ—was

–0.10. Based on this, they estimated that Chinese IQ is likely to have fallen 0.75 points between 1986 and 2000. They also found a growing negative relationship between years in education and fertility in China. In 1945 it was –0.17 whereas by 1990 it was –0.42.^[26]

Kuwait

The same relationship has been reported in Kuwait. Psychologists examined a representative sample of 4,643 children in Kuwait aged between 8 and 15 years. They found a correlation of –0.05 between family size and average score on the Standard Progressive Matrices IQ test. This is essentially a negligible magnitude, albeit significant, effect size.^[27] Another study found that there is a significant negative correlation in Kuwait—based on a sample of 7,749—between fertility and a number of robust proxies for intelligence. These proxies were education level, occupational status, age at first marriage, and socioeconomic status.^[28]

Sudan and Libya

Omar Khaleefa, a Sudanese psychologist who has been missing since 2012,^[29] reported that in 2008 the Standard Progressive Matrices was administered to 5,215 students aged 9 to 20 from socially representative schools in Khartoum. The results showed a significant negative association between Standard Progressive Matrices score and the number of siblings a student had. Khaleefa calculated based on this that Sudanese IQ is declining at a rate of 0.8 points per generation.^[30] Similarly, in Libya an administration of the Standard Progressive Matrices to school children found a correlation of –0.14 between IQ and number of siblings.^[31]

Why Do Smarter People Have Fewer Children?

Here we reach the crucial question. Why is intelligence negatively associated with fertility in industrialised societies? In particular, why is this so when it wasn't the case in pre-industrial societies? And why is the negative association stronger when it comes to women?

This takes us to a further question: why would people have lots of children, which they certainly did until relatively recently? One reason is that people, for example in pre-industrial England, understood that a significant percentage of their children—on average about half—would die before they reached adulthood. So, to the extent that they followed an instinct of wanting to pass on their genes, they needed to have as many children as they could afford, in order to guarantee that some would survive to have children themselves. In addition, in a society with no welfare state, children would be an insurance policy in old age. They would take care of you once you were too elderly to work, assuming you lived long enough to become too elderly to work. Most people, therefore, had lots of children. But the children of the poor suffered massive infant mortality, and poverty forced the poor to try to control how many children they produced. If they had too many, then they could all starve, unless they abandoned unwanted infants. Infant mortality was much lower among the rich and they could afford to have more children anyway, so it was the genes of the rich that survived.

The Industrial Revolution changed the situation radically and heralded what is known as the 'demographic transition'. This is when a society moves from being one characterised by high fertility and high child mortality to being one characterised by low fertility and low child mortality. This transition, which was complete in Western countries by the beginning of the 20th century, comes in two stages. In the first stage there is a massive decline in child mortality and this is followed, some years later, by a steep drop in fertility. In the intervening period, the population will dramatically increase because there will be both high fertility and low child mortality, presumably because people have not yet quite grasped that it is safe to heavily limit their fertility and so allow their living standards to improve. By the middle of the 20th century, most families in Western

countries had only two children and, by the end of it, they were down to less than two, to below replacement fertility.

The reasons for this transition are fairly clear. The scientific breakthroughs of the Industrial Revolution led to inoculations against childhood diseases, better sanitation, cheaper food, better public health in general, and the country being far wealthier, leading to the beginnings of a welfare state for the very poor. By 1900, the infant mortality rate in England wasn't 45%, but a mere 10%.^[32] Almost every child survived into adulthood and the relationship between poverty and child mortality would have been very weak. Serbian cultural anthropologist Jelena Čvorović and her team found, among a sample of Serbian Roma, that the relationship between child mortality and IQ was -0.26 , when controlling for factors such as poverty and health.^[33] As such, the population grew dramatically.

Education Level

As we have discussed, years spent in education is a good proxy for intelligence—the two measures sharing about 60% of their genetic variance in common.^[34] Educational attainment is not a phenotype in the same way as IQ, however. Instead it can be thought of as an environment which sorts individuals based on their level of innate ability, and also personality related factors such as Conscientiousness and personal drive. The additional role played by personality in predicting educational outcomes is the principal reason why educational attainment and IQ are not 100% genetically correlated. A side effect of this sorting is that it may encourage individuals to trade fertility for the opportunity to acquire greater degrees of education—with the more intelligent being more likely to make this trade-off. Years spent in schooling have increased dramatically in the 20th century (on average people increase their exposure to education by 24 months every three or so decades^[35]), as have the pressures on individuals to delay or even abandon reproduction.

Studies from many countries have found that the more educated people are, the more likely they are to end up childless. Gerhard Meisenberg, whom we met earlier, examined the relationship between education level and fertility based on data from the World Values Survey cohorts from 1990, 1995, and the year 2000. This gave him a sample of 181,728 people from 78 different countries in different parts of the world.^[36] Meisenberg

found that in nearly all countries there was a significant negative correlation between education level and completed fertility; that is fertility in late middle age when you are most unlikely to have any more children. In Latin American and Middle Eastern countries the correlation was -0.31 for females and -0.24 for males, while in Protestant Europe it was much weaker, though still significant: -0.1 for females and -0.01 for males. The exceptions were old males, aged 45 to 75, in Belgium, Finland, Latvia, Sweden, Switzerland, and Uganda and young men in Estonia. Here there was a weak positive relationship between education level and fertility.

Interestingly, Meisenberg found that the negative relationship was stronger for 'education level' than for 'years spent in education', implying that the more educated do not just delay having children in order to become educated. Something which motivates becoming highly educated also motivates low fertility. Meisenberg also found that the relationship is not 'mediated' (caused) by personal wealth. So, a desire to be wealthy does not seem to motivate people to limit their fertility. Wealth, alone, does not make people less inclined to have children.

Another fascinating finding is that the strength of this clearly universal negative relationship varies in a very clear way. It is weak in very poorly developed countries, probably because they are still undergoing the demographic transition. It is strongest in the societies that are involved in making the transition, but it is weak, once again, in the most advanced societies, such as those in Protestant Europe. However, this relationship may be getting stronger among younger people in these societies.

Studies have also been conducted into the relationship between polygenic scores—collections of alleles that predict variation in a given measure, in this instance educational attainment—and completed fertility, revealing negative associations between the two. A study by economist Jean Beauchamp found that the negative association in the US Health and Retirement Study was strong enough to reduce educational attainment by 1.5 months per generation, which translates into an IQ loss of around 0.32 points per decade.^[37] A study in 2016 revealed, using genetic data from the US Add Health cohort, that IQ mediates (causes) the positive association between these polygenic scores and educational attainment, and that educational attainment in turn mediates the negative relationship between IQ and fertility.^[38]

In other words, simply having the genes that make you smart does not necessarily make you less fertile.^[39] Instead, the negative association is driven to a substantial degree by the fact that smart people choose to trade time spent in education against fertility. Education is therefore one key factor that creates selection against the genes responsible for cognitive ability, which indicates that intelligence will decline over time.

Contraception

Richard Lynn and others have presented the rise of contraception as a key reason for the change.^[40] The development of the condom meant you could enjoy as much sex as you wanted with a much reduced risk of pregnancy. Lynn notes that the condom was first taken up by the 19th-century elite. The main means by which information about contraception grew in the 19th century was through the publication of a number of books. This, of course, limited contraception to those who were educated and could read and afford books.

The development of reliable contraception had predictable results, notes Lynn. It meant that in the context of low child mortality (relative to the 18th century), the more intelligent had far fewer children than the less intelligent. The more intelligent, trusting that most of their children would survive, calculated that they could improve their children's chances by having fewer of them. They would have more money to invest in each child and their legacy to them would be less thinly spread. The more intelligent, who would have been more educated and members of the so-called 'reading classes', found out about contraception first and started using it first, near the beginning of the 19th century. Accordingly, by the end of the 19th century there was a huge difference in fertility between the more educated and the less educated, with the latter hardly using contraception at all. This difference narrowed by the beginning of the 20th century but was still clear and significant.

And this is very likely due to intelligence. Once contraceptives were widely available, the only reason you end up with a large family, unless you actively wanted one, would be if you were an inefficient user of contraception or you weren't forward thinking enough to use contraception at all. Both of these reasons would be underpinned by low intelligence. More intelligent people would be more efficient users of contraception. An

example of how this would work can be seen in the contraceptive pill. A more intelligent woman will thoroughly read the instructions, understand that the pill has to be taken at the same time every day, and carefully do so, comprehending that unwanted pregnancy may be the result if she doesn't precisely follow the instructions. A less intelligent woman might not read the instructions properly, will not really understand how the pill works, and will take it when she remembers to, perhaps knocking it back with a glass of wine in the evening. An even less intelligent woman, who is therefore highly impulsive, will simply have unprotected sex in the moment—because it's enjoyable, now—without thinking about the long-term consequences at all.

This interpretation is backed up by the fact that, as we have already seen, unwanted pregnancies are associated with low intelligence. There is a negative association between intelligence and the number of planned children you have. For the United States, researchers have analysed the National Survey of Family Growth sample of women having babies in 1988 and found that 36% of them were unplanned. The incidence of unplanned births is strongly related to educational level. Among women with less than twelve years of education, 58% of births were unplanned, falling to 46% among those with twelve years of education, 39% among those with some college education, and 27% among college graduates.^[41] In the United States, it has been reported in a 1988 study that 72% of 15- to 19-year-old women from middle class families used contraception on the occasion of their first sexual intercourse as compared with 58% of those from poor families.^[42]

In addition, intelligence is negatively associated with the age at which you first have a child, whether you are male or female. More intelligent people delay parenthood because they want to concentrate on their careers, giving them more resources to invest in their small family, and because they are less likely to become parents accidentally. Less intelligent people will begin their families younger. This compounds the consequent loss of intelligence because it means that the less intelligent not only have more children than the more intelligent but they have more generations. In extreme cases, they may be grandparents in their late-thirties, at the same age that more intelligent people become first-time parents.

Desire for Children

A third reason for the negative association between intelligence and fertility is that the less intelligent simply want to have more children. One theory is that intelligence correlates with the personality factor of *Intellect* and, therefore, the more intelligent will be less interested in having children and more interested in focusing on their work or generally leading an intellectually stimulating life—which may play a key role in encouraging those with higher intelligence to spend time in education. Large families will subtract from the ability to achieve this.

Intelligence certainly predicts a desire to ‘remain childless for life’. Among men the average IQ of 23-year-olds who want to have children is 100 while the IQ of those who don’t is 104. With women, the IQ of those who never want to have children is 105. The IQ of women who wanted children was 99.94.^[43] And this is borne out by looking at British people who are still childless at the age of 32, based on a sample of 13,687 infants born in 1946 and interviewed in 1979. The more intelligent they are, the more likely they are to not have any children. This can be seen in Table 8.

Table 8. Percentages of British males and females childless at age 32 by IQ groups (Lynn, 2011, p. 92).

	Low IQ	Average IQ	High IQ
Females	11	16	18
Males	24	24	28

The Welfare State

We have already seen that unplanned pregnancy—and, by extension, pregnancy by single mothers, which is generally unplanned—is associated with lower intelligence. Richard Lynn has argued that the welfare state itself also aids the process of reducing the average intelligence of the population. Until the second half of the 20th century there were very strong incentives for single women not to have illegitimate children. Unmarried mothers suffered loss of employment, loss of earnings, and severe social

stigma. They were not given welfare payments or housing for themselves and their babies. Indeed, the consequences of becoming pregnant, as a single woman, were so severe and the level of social stigma so strong that the resultant children were often put up for adoption.

This began to change in the second half of the 20th century as the governments of Western nations began to provide, or to increase substantially, welfare payments and housing for single women with children. This was possible, of course, because of the increased wealth, which can ultimately be traced back to the Industrial Revolution. The effect of the welfare state was to provide financial incentives for women with low intelligence to have babies, or at least to reduce the disincentives. Increasing numbers of them began to do so. The case that increasing welfare payments for single mothers had the effect of increasing the illegitimacy rate was first worked out for the United States by Charles Murray in his book *Losing Ground*. Murray showed that from the early 1960s the welfare benefits paid to poorly educated young women increased relative to the wages for unskilled work. There was also a reduction in the social stigma incurred by having babies out of wedlock. The combined impact of these factors was to increase the incentives and reduce the disincentives for single mothers to have illegitimate children. Among White American women, illegitimate births remained steady at 2% from 1920 to 1960, and then rose steadily to 22% in 1991. Half of welfare single mothers are in the bottom 20% of the population for educational attainment.^[44] Herrnstein and Murray in an analysis of another data set, in *The Bell Curve*, found that the average IQ of long-term welfare-dependent single women is 92.^[45]

The same thing has occurred in Britain. From the 1970s onward single mothers in Britain have received a basic income, free housing, remission of property tax, and a variety of other benefits. Illegitimacy in Britain, which had stood at around 5% of births over the 400 years from 1550 to 1950, began to increase steadily from the 1970s and reached 32% in 1991. It currently stands at around 50%.^[46] Murray's analysis of the 1991 British census shows a correlation of 0.85 between the male unemployment rate and the female illegitimacy rate across local authorities, and that illegitimacy increased most over the years 1974 to 1991 among the lowest social class.^[47] The welfare state means that people can afford to be more

relaxed in terms of their sexual activity, confident that, whatever happens, they will be okay.

Though we have focused on single mothers, the welfare state would also act as a disincentive for poor families to limit their fertility. Prior to the introduction of the welfare state, it was possible to fall into the most terrible poverty and end up in the dreaded 'workhouse'. This would have acted as an incentive for those who couldn't afford more children to do their best not to have any more and be extremely careful in terms of their sexual activity. With the introduction of a far more generous system of poor relief in the second half of the 20th century these same people could afford to be less mindful of the risks of unplanned pregnancy.

In 2016, Adam Perkins, a neurobiologist at Kings College, London, published a book entitled *The Welfare Trait: How State Benefits Affect Personality*.^[48] The results presented in the book led to a predictable furore. A senior editor at the leading science journal *Nature* refused to consider it for review because she regarded research into the personalities of the long-term unemployed as unethical.^[49] This may be because much of the research it presented directly challenged the view that long-term welfare claimants are simply victims of 'systemic' inequality. Focusing on long-term benefit claimants, Perkins cited research from the UK showing that every 3% rise in benefits leads to welfare claimants having approximately 1% more children.^[50] Indeed, Perkins notes that follow-up interviews found that benefits were a causal factor because claimants chose to discontinue contraception use in response to rises in benefits. This clearly implies that a generous welfare system encourages those of relatively low intelligence to increase their fertility. He notes large cohort studies, which demonstrate that increasing welfare generosity has resulted in increasing fertility among recipients in the UK. Perkins draws upon the National Childhood Development Study (NCDS) (sample 7,219) which began in 1958 when the participants were born and last interviewed them when they were 55. He also draws upon the British Cohort Study (BCS) (sample 7,046) which began when the participants were babies in 1970 and last interviewed them when they were 42.

The studies found that the association between low self-control in childhood and having large numbers of children had doubled over a period of 12 years. Perkins implies that this is due to greater welfare benefits. But, certainly, he cites evidence from the UK in 2013 which shows that

workless households have the highest number of children per household, mixed households are in the middle, and households where both parents are working have the lowest average number of children per household. So-called ‘troubled’ or ‘problem’ households have even more children than workless households.^[51] Only the problem, workless, or partly workless households are reproducing at above replacement level.^[52] So, by implication, intelligence will decline, in part, due to the welfare state.

Fascinatingly, Perkins draws upon information from the UK’s Office for National Statistics for 2015, which found a slight reduction in the number of live births the previous year. He suggests that this would likely reflect government benefit cuts, which were introduced in 2013. The statistics also showed that foreign women living in the UK—which has relatively generous levels of unemployment benefit—were 0.34% more fertile than their compatriots at home, when stratified by the prosperity of their country of origin. So, unemployed women from poor countries were, perhaps unconsciously, adjusting their fertility upwards to take advantage of the greater available resources. Perkins, in discussing the system in the UK, notes that the benefit cap of 2013 means that the limit is still double a full-time minimum wage job and this limit can be reached by having lots of children. He further notes qualitative evidence that welfare recipient families require far less money than they are given but, rather than putting money aside for their children, they seem to spend the money on unnecessary luxuries such as alcohol, cigarettes, and electronic equipment instead.^[53] Perkins also presents evidence showing that children raised on welfare are far more likely to be neglected than those who are not. They are even spoken to less by their parents.

Perkins concentrates on personality and argues that the welfare state is, in effect, causing those with an ‘employment resistant personality’—low in Agreeableness and low in Conscientiousness—to be more fertile than those with a work-oriented personality, and he notes the heritability of personality. However, much of the research he cites would seem to imply that it is also those with low intelligence whom the welfare state is effectively encouraging to have children. For example, an analysis of low income families in the northern English industrial town of Sheffield in the 1970s showed that the 33 families regarded as ‘problem families’—those requiring assistance from social services and other government agencies—were more impulsive, apathetic, paranoid, and aggressive.^[54] These

characteristics are associated with low Agreeableness and low Conscientiousness as Perkins rightly argues. However, they are also associated with low intelligence.^[55] Perkins emphasises that personality can be just as important as intelligence for succeeding in employment, but he does not show that it is more important. He provides discussions of highly intelligent people who only go so far in the world of work due to low Agreeableness and low Conscientiousness. But he might have equally provided examples of highly Conscientious and Agreeable people who are never going to be promoted beyond a certain level by virtue of simply not being clever enough.

Perkins also cites the so-called Dunedin Study, a New Zealand longitudinal study which began in 1972. It began by presenting children aged 4 and 5 with a marshmallow and telling them that they could get the marshmallow now or wait 15 minutes and receive a second marshmallow in addition. This is a standard ‘delay of gratification’ test and, as we have seen, it correlates with intelligence. The children who were able to delay gratification, unsurprisingly, were rated by their parents as ‘more academically and socially competent, verbally fluent, rational, attentive, planful, and able to deal well with frustration and stress’.^[56] Again, these traits are associated with intelligence. Those who were found to be lower in this ability to delay gratification were more likely to find themselves unemployed or have low socioeconomic status as adults. Clearly, Perkins’ research, or that which he cites, demonstrates that a personality comprised of low Agreeableness and low Conscientiousness is associated with elevated levels of unemployment and the welfare state may be assisting these kinds of people to have children. But much of it also implies that intelligence is highly relevant and this is congruous with the earlier research from the USA, which we have already discussed.

Indeed, there is evidence that would indicate that the impact of the welfare state on the fertility of those with low Agreeableness and low Conscientiousness may be more complicated than Perkins thinks. As Perkins argues, Conscientiousness and Agreeableness are part of a constellation of inter-correlating characteristics known as a ‘slow life history’—or *K*—strategy; in essence, living for the future rather than living ‘fast’ and for ‘the now’. It has been shown that in Sweden (a strong welfare state) and the USA (a weaker welfare state), slow life history strategy actually positively correlates with fertility.^[57] The researchers argue that the

reason for this is that living ‘for the now’ involves having as many kids as you can as quickly as you can because you perceive the environment to be unstable; so you could be killed without warning. However, you invest little in the children and are, in essence, simply predisposed to seek out lots of sex with lots of partners. Modern contraception means you can avoid the resultant large number of children.

In earlier times, you could be a ‘drive-by parent’—effectively having these children whilst investing very little energy or resources in them. The large numbers produced coupled with the higher genetic diversity among children resulting from larger numbers of partners hedges the offspring against environmental instability. In other words, they are genetically diverse, so it is more likely at least some will survive. But, now, you do not want these children because modern society will compel you to invest resources in them, on pain of punishment. It has developed agencies to track fathers down and extract money from them, for example.

By contrast, the ‘slow’ strategists want to invest their energy in raising children, even if they don’t want many of them. Accordingly, in this kind of environment, the only way that a faster strategist would end up with lots of children would be by accident; if he or she was so lacking in intelligence that he or she couldn’t work out how to use contraception, for example. Intelligence and life history (K) are only extremely weakly correlated with one another—being largely distinct domains of cognition and behaviour respectively.^[58] It is true, however, that for some traits, such as executive functioning and time preferences, in addition to certain personality traits, g and K make joint but distinct contributions to individual differences. Therefore, fertility patterns that apparently favour higher K yet also lower intelligence simultaneously, in the same populations, are not contradictory if they are acting on separate traits controlled by largely distinct sets of genes.

It could be argued that the welfare state discourages such a person from making the effort to use contraception, because it means that they don’t have to invest much of their limited resources in the resultant children. The welfare state will provide for them. Indeed, if we were rather cynically minded we could take this argument further, as Richard Lynn has. People of relatively low intelligence, such that they are unable to hold down all but low-paying jobs, are likely to be intelligent enough to rationally calculate that they are better off not working as long as they have lots of children.

They can then fritter away the ‘child support’, to which these children entitle them, on their own pleasures, investing as little of it in the children as they can.

So, they are intelligent enough to deliberately have a large number of (neglected) children, in order to play the system, meaning that the welfare state encourages their fertility and contributes to declining intelligence. However, they are not intelligent enough to realise—or have the foresight to care about the fact—that their behaviour may lead to the collapse of the very system they rely upon if too widely adopted, and means that the system is potentially unsustainable in the long term. This is because low intelligence predicts low levels of foresight, empathy, altruism, and civic-mindedness.

Feminism

Another important contributory factor to the negative association between intelligence and fertility in industrial societies has been the rise of feminism and, in particular, the opening up of the professions to women, a point also raised by Richard Lynn. In the first half of the 19th century, routine discrimination meant that very few jobs were open to women at all. Women might be maid-servants, cooks, laundresses, cleaners, seamstresses, or factory workers of certain kinds. However, jobs such as teaching or nursing, which were relatively skilled, had to be abandoned if the woman got married. Obviously, professions such as medicine and law weren’t open to women. This began to change in the second half of the 19th century and accelerated after World War I, during which many women did the assorted jobs that men couldn’t do because they were away fighting. The percentage of women who worked increased dramatically not just in terms of women working in factories and the like but also in terms of women in the professions, such as teaching, medicine, and law.

This has led to a situation where most women now work, even if many give up work for significant periods when they become mothers. The more intelligent women will go to university and then enter one of the professions. By doing so, they will delay motherhood, often into at least their late twenties and, sometimes, significantly beyond that. They spend most of their twenties and maybe even the first half of their thirties concentrating on their careers. The result is that for purely biological

reasons they can expect to have a relatively small number of children, as fertility declines with age and does so very rapidly from around 35 onwards.^[59] And, indeed, they may find that they have left it too late and they cannot have children at all.

By contrast, we can expect that less intelligent women will be less likely to delay their fertility. Herrnstein and Murray have shown that in the USA, on the NLSY, the percentage married before the age of 30 decreases as IQ increases. Among those with an IQ classed as ‘dull’, 81% who had got married had done so before the age of 30 and the average age at marriage was 21.3. Among those classed as ‘very bright’, only 67% had married before the age of 30 and the average age at marriage was 25.4.^[60] For these reasons, the entry of women into the professions can be seen as a contributory factor to the negative relationship between intelligence and fertility. More intelligent women will be more able to go to university, more willing to go to university, and more interested in their careers. So, when they have the options of becoming a professional—and so delaying or completely abandoning motherhood—they are more likely and more able to take it. Indeed, this may explain why, among younger cohorts, the negative relationship between intelligence and fertility is actually becoming stronger in some countries. It weakened as knowledge of contraception spread down the social hierarchy but has strengthened once more as meritocracy, which enforces equality of the sexes to a great extent, allows more intelligent women to become highly educated and enter the professions. In addition, with the rise of the pill and the coil, contraception has become extremely reliable, meaning that unwanted and excess pregnancies are likely to be associated, even more strongly than before, with low intelligence. And this has coincided with the same society providing very generous welfare payments to single mothers.

Immigration

The final factor that is reducing average intelligence in developed countries is by far the most controversial. That factor is immigration from less developed countries. It would usually be a factor that we wouldn’t mention or, at least, we would be extremely careful to whom we mentioned it for fear of people becoming ‘offended’ or even physically violent towards us.^[61] One problem with science, which many people find difficult to get their

heads around, is that the aim of science is to understand the nature of the world and to present the simplest explanation, based on the evidence, for what is going on. Science is not there to be reassuring, to make people feel good, or to help bond society together. There are some researchers who have argued that there should be a ‘moral’ dimension to science and that, therefore, some findings—that upset people or make their lives difficult—should be suppressed or such uniquely high levels of proof should be demanded before they can be disseminated that they should effectively be suppressed. This is a problematic argument because, until that stage is reached, we could be developing policy based on a false hypothesis and this may in turn lead to seriously damaging consequences for society. Those who call for suppression are, in effect, arguing that scientific pursuit is fine until it forces them to question the worldview that they hold to for emotional reasons. Once it does this it is ‘bad science’ or ‘a higher standard of proof should be demanded’ or ‘it is immoral’. Or it is ‘racist’ or ‘sexist’. Or it is one of numerous other vague, indefinite, emotive terms that are deployed to associate the research with deviance and thus intimidate researchers into ideological conformity.

But it would be unforgivably intellectually dishonest of us to censor this issue, particularly considering the substantial body of academic research on it. Moreover, we have detailed research into the kind of people who buy books like this. They are inquiring and highly intelligent and so we are confident that none of our readers will be intellectually unable to deal with scientific research, which might question how they have previously thought. So, let’s get down to it. We have seen that intelligence is distributed on a bell curve. The nature of that curve varies according to the group that we’re discussing. For example, you will find plenty of highly intelligent people who have never been to university and plenty of not especially intelligent people who have. However, if you were to plot the intelligence of these two groups on a bell curve you would find it was slightly different. The percentage of graduates with an IQ above 130 would be greater than the percentage of non-graduates with this IQ and above. The percentage of non-graduates with an IQ of below 100 would be greater than the percentage of graduates with this IQ and below. And the range of the graduate IQ would be narrower; less like a bell, in other words. This does not mean, we must stress, that non-graduates are stupid and graduates are clever. Anyone that has ever attended a British university will testify to

the presence of some extraordinarily silly people. It simply means that a random graduate will probably be more intelligent than a random non-graduate, at least when controlling for age. Any non-graduate reading this who is highly intelligent should in no way be offended by this. And nor should any intelligent graduate feel a sense of pride. Feelings are irrelevant to this. We're talking about facts.

In much the same way, there are average differences in intelligence between different ethnic groups in Western countries.^[62] Northeast Asian (what in the old days would have been called Oriental) immigrants are the most intelligent. They are more intelligent than Europeans and they have an average IQ of 105. Europeans have an average IQ of 100. Immigrants from South Asia and the Middle East have an average IQ of about 90. Immigrants from Africa and the Caribbean have an average IQ of about 85. It cannot realistically be argued that IQ tests are unfair towards immigrant children. Northeast Asians perform better on them than Europeans, immigrant children perform the best on the least *g*-loaded parts of the IQ test even when the tests are stripped of parts that could be considered to be culturally-biased (such as the vocabulary scale, which will unfairly penalise those for whom English is not their primary language).^[63] And these differences in IQ correlate in the right direction with group differences in reaction times, which are an entirely objective measure.^[64]

So, let us turn to what is happening, using the example of Denmark. Emil Kirkegaard is a Danish researcher who began his career by doing a degree in linguistics. Indeed, his bachelor's thesis looks at the exciting issue of Danish spelling reform. However, tiring of the academic quiet life, Kirkegaard has turned to the academic hot potato of group differences in IQ. Based on information from Statistics Denmark, he has shown two important things. Firstly, non-Western immigration in Denmark has risen substantially between 1980 and 2012, on an almost continuous upward trajectory. In 1980, 50,000 non-Western immigrants were living in Denmark. In 2012, 300,000 non-Western immigrants were living in Denmark. Secondly, drawing upon published Danish army conscript data he showed that if we set the average IQ of Danes at 100 then the average IQ of non-Western immigrants is roughly 86. He cites studies showing that in many different Western countries a comparable difference exists between the native population and immigrants, at least when putting aside immigrants from Northeast Asia. Kirkegaard argues that this difference is

substantially genetic in origin because, in England for example, it has been shown to develop by a very young age among second-generation non-Western immigrants and it also fits with studies that show average differences in IQ between countries.^[65] These, themselves, strongly correlate with national differences on the PISA scholastic test, which is administered every four years to representative samples of 15-year-olds from OECD countries.^[66]

However, one issue at which Kirkegaard does not look is differential fertility between Danes and non-Western immigrants in Denmark. As of 2012, non-Western immigrants in Denmark produce an average of 1.8 children per couple, whereas this is 1.69 for ethnic Danes. However, second generation immigrants are defined as ethnic Danes for statistical purposes, meaning that the Danish number is likely to be significantly lower and the non-Western immigrant number significantly higher.^[67] Clearly, therefore, immigration from non-Western countries into Western countries is a potential contributory factor to IQ decline in Western countries. This decline would have happened even if there were no immigration, however. Immigration is simply speeding the process up.

This fertility and intelligence differential is likely to be the same in all Western countries. Richard Lynn has presented evidence for this from the year 2000, which can be seen in Table 9 below.

Table 9. Fertility rate of Europeans and non-Europeans in 2000 (Lynn, 2011, p. 272).

Country	Europeans	Non-Europeans
France	1.9	2.8
Netherlands	1.7	2.5
Sweden	1.5	2.3

It can be seen that the fertility rate of non-European mothers is almost double that of European mothers. Though the Danish statistics indicate that, while this difference is decreasing, the difference nevertheless still

exists. Lynn presents data showing that this same process is occurring in Australia, New Zealand, Canada, the USA, and in other European countries; in other words, across the Western world. Based on these data, he calculates the European percentage of different Western countries by certain years. By 2050, the UK, which was about 86% European in 2006, will be 56% European. The USA, which was 71% European in the year 2000, will be 45% European.^[68]

So, all of these developments have led to a ‘perfect storm’ of factors which ensure that there is a negative relationship between intelligence and fertility and a negative relationship between education level and fertility. We would expect this negative relationship to have been present in England at least since around 1800. Based on these data, Lynn has calculated that by the year 2106 the average IQ in Britain should be about 87, 13 points lower than it is now. This will obviously have huge implications for living standards, democracy, political stability, civic society, crime rates, and all of the other issues that are connected to IQ. The only Western country where Lynn predicts no significant intelligence decline over the next 20 years is Canada, because its immigrant population is primarily Northeast Asian in origin. Similarly, Danish psychologist Helmuth Nyborg has calculated that by 2072 Denmark will be 60% Danish and IQ will have gone down by 5 points, partly due to immigration and partly due to less intelligent Danes having the highest fertility.^[69]

Indeed, research by Richard Lynn and the Finnish political scientist Tatu Vanhanen (1929–2015) has shown that there are average IQ differences between countries. These strongly correlate with other measures of cognitive differences between countries, such as differences on international scholastic tests like PISA, so they are likely to be broadly correct even if some samples are problematic. Lynn and Vanhanen have shown that the average IQ of a country strongly predicts how highly it will score on pretty much every measure of civilisation that you can think of: educational attainment, average earnings, democracy, lack of corruption, nutrition, life expectancy, low infant mortality rate, access to clean water and sanitary conditions, low levels of crime, liberal attitudes, rational attitudes, and even happiness.^[70]

However, if intelligence is declining, and if intelligence is strongly heritable, we would expect it to be clearly measurable. There should be clear evidence that intelligence has been decreasing for the last century or

so. We will see that there is indeed such evidence. However, the most obvious place to look for evidence is IQ tests and here things start to become complicated, at least at first...

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[57](#) Woodley of Menie, M.A., Cabeza de Baca, T., Fernandes, H., *et al.* (2016) Slow and steady wins the race: *K* positively predicts fertility in the USA and Sweden, *Evolutionary Psychological Science*, 3, pp. 109–117.

[58](#) Woodley of Menie, M.A. & Madison, G. (2015) The association between *g* and *K* in a sample of 4246 Swedish twins: A behavior genetic analysis, *Personality and Individual Differences*, 75, pp. 80–

[59](#) Glass, R., *et al.* (2006) *Glass' Office Gynecology*, Philadelphia, PA: Lipincott, Williams & Wilkins, p. 385.

[60](#) Herrnstein, R.J. & Murray, C. (1994) *The Bell Curve*, New York: Free Press.

[61](#) This is no exaggeration. For a history of the way in which researchers in this area have been treated up to 2012, see: Dutton, E. (2012) *Culture Shock and Multiculturalism*, Newcastle: Cambridge Scholars Publishing, pp. 135–137. Reactions to their research have included death threats, assault, disruption of lectures, police investigations, trumped up academic misconduct investigations, condemnation in the media, condemnation by politicians leading to threats to their safety, petitions to be fired from university posts, and actual firings from university posts. We hope readers will agree that it is shocking that researchers can be treated in this way simply for reporting what they genuinely regard as empirically accurate findings. Such critics also deploy less violent though equally illogical tactics, such as finding small errors in the works of such scholars and attempting to claim that the whole work is, therefore, suspect; or attacking the researcher personally rather than his or her arguments. For example, they might accuse the researcher of bias, which, of course, has no bearing at all on whether what they are saying is empirically accurate.

[62](#) We have already looked at the fallacious arguments levelled against the concept of 'intelligence'. Similar arguments are used against the concept of 'race'. A 'race' is a breeding population that differs, genetically, from other such breeding populations. It differs as a result of geographical isolation, cultural separation, and endogamy. A 'race' shows patterns of genotypic frequency for a number of inter-correlated characteristics compared with other breeding populations. The most obvious manifestations of these differences are differences in physical appearance and mental characteristics which correlate together, indicating that it is useful, following the scientific desire to be able to make correct predictions about the world, to divide humans into racial categories in much the same way that we might divide any other particular animal species into different sub-species. The differences between races may be smaller than the differences within races for certain traits, but if these small differences are all in a particular direction—due to adaptation to a particular environment—they will lead to significant overall differences. Genetic clustering data indicate that there are around five to seven distinct races. Anyone who wants to question the 'morality' of the 'race' category should note that there are significant race differences in the prevalence of genetic diseases, so there are potentially serious consequences to denying the significance of race. For a more detailed explanation of the 'race' concept, see: Sarich, V. & Miele, F. (2004) *Race: The Reality of Human Differences*, Boulder, CO: Westview Press.

[63](#) Te Nijenhuis, J. & van der Flier, H. (2003) Immigrant-majority group differences in cognitive performance: Jensen effects, cultural effects, or both? *Intelligence*, 31, pp. 443–459.

[64](#) See: Jensen, A.R. (1998) *The g Factor: The Science of Mental Ability*, Westport, CT: Praeger.

[65](#) Kirkegaard, E. (2013) Predicting immigrant IQ from their countries of origin, and Lynn's National IQs: A case study from Denmark, *Mankind Quarterly*, 54, pp. 151–167.

[66](#) Lynn, R. & Vanhanen, T. (2012) *Intelligence: A Unifying Construct for the Social Sciences*, London: Ulster Institute for Social Research.

[67](#) *The Local* (15th January 2015) A portrait of modern Denmark in ten stats, [Online], <http://www.thelocal.dk/20150115/a-portrait-of-modern-denmark-in-ten-stats>.

[68](#) Lynn, R. (2011) *Dysgenics*, London: Ulster Institute for Social Research.

[69](#) Nyborg, H. (2011) The decay of Western civilization: Double relaxed Darwinian selection, *Personality & Individual Differences*, 53, pp. 118–125.

[70](#) Lynn, R. & Vanhanen, T. (2012) *Intelligence: A Unifying Construct for the Social Sciences*, London: Ulster Institute for Social Research.

Eight

But Aren't We Getting Smarter?

Originally from Washington DC, James Flynn emigrated to New Zealand in 1963, when he was 29 years old. He began his academic career as a political scientist, his first major paper, in 1964, being on the peace movement in the USA. This was followed by such studies as *American Politics: A Radical View* in 1967, *Humanism and Ideology: An Aristotlean View* in 1973, and assorted highly philosophical works including the article 'Kant and the Price of Justification' in 1979.^[1]

In 1980, however, Flynn's research profile began to change. He became fascinated by intelligence and IQ. As far as he could see, comparing old IQ tests administered to representative cohorts to modern ones, IQ scores had actually been increasing over time. He wrote to as many psychologists as he could in an attempt to obtain as much data as he could and the result was a ground-breaking paper published in 1984 in the journal *Psychological Bulletin*: 'The Mean IQ of Americans: Massive Gains, 1932 to 1978.'^[2] This study, and subsequent studies confirming it, was so influential that Flynn's discovery became known as the 'Flynn Effect'. In fact, as early as 1937, psychologists were commenting on evidence of rising IQ scores in the USA^[3] and Richard Lynn had also rediscovered the effect in a 1982 paper in the journal *Nature*, which has led to some people terming it the 'Lynn-Flynn Effect'.^[4] But, irrespective of whoever really was the first to uncover it, the effect has now generally become known as the 'Flynn Effect'. The Flynn Effect is the phenomenon whereby average IQ scores have increased throughout the 20th century. Later cohorts have, on average, higher scores than earlier cohorts.

When IQ tests are taken by each new cohort the average score is set at 100. The Flynn Effect has meant that with each new cohort the new average score is significantly above 100, which was, by definition, the average score of the previous cohort. As such, it is clear that the average IQ score must have been increasing over time. Between the 1930s and the 1970s, at least, we appeared to have been getting *more* intelligent or, at the very least, better at IQ tests. The extent of these gains in IQ was really

quite staggering. IQ scores were found to be going up by between 3 and 5 IQ points per decade or about a third of an IQ point per year. If this was really a reflection of intelligence increasing then the average person today would have to be considered some kind of genius in the 1930s. Flynn Effects have been reported across Western Europe, as well as in other Western or highly developed countries such as the US, Canada, Australia, New Zealand, South Korea, and Japan.

More recently, Flynn Effects have been documented in developing countries as well. The Kenyan IQ—on the Coloured Progressive Matrices—increased by almost 14 points between 1984 and 1998. Between 1977 and 2010, the IQ of the Saudis went up by 11 points. The same phenomenon has been observed in Sudan, Turkey, Dominica, Brazil, India, Israel, Argentina, white South Africa, and China. It has also been observed in ex-Soviet countries, such as Estonia from 1935 to 1978. Over the course of the 20th century IQ scores increased in highly developed countries and the same process then occurred in less developed countries by the end of the 20th century.^[3]

What Is Going On?

Superficially, the Flynn Effect makes absolutely no sense. Surely, if intelligence is strongly heritable and intelligence has been negatively associated with fertility for a long time, then IQ scores should be decreasing. How on earth can they be increasing and increasing so dramatically?

A closer look at the process allows us to make sense of it. The most important point is that the Flynn Effect has *not* been found to be occurring equally on all of the different parts of the IQ test. So, a representative Dutch male sample made gains of 0.6 IQ points per decade between 1952 and 1982. They made these gains on the Raven's test. This test measures fluid intelligence; that is solving problems purely via abstract reasoning without any prior knowledge. The Wechsler test is far broader. It measures both fluid intelligence and crystallised intelligence, where you do have to draw upon prior knowledge. The only Wechsler sub-test which showed similar gains to Ravens was the 'similarities' test. This is the test where you have to classify things. For example, you might be given a list of animals and have to select the one that is not a mammal. So, in fact, IQ scores were not rising in general but only on very specific kinds of ability.^[6]

This was backed up by a number of studies which found that the Flynn Effect is not occurring on 'general intelligence'.^[7] We have already discussed the concept of general intelligence or *g*. As we have seen, people who perform well on one kind of IQ test—for example, one that measures mathematical intelligence—also do well on all the others. As such, we conclude that there is a general factor underpinning ability in all of these different intelligence tests and we call this 'general intelligence'. However, analyses of the Flynn Effect in many countries show that it is not occurring on the highly *g*-loaded sub-tests. In fact, the Flynn Effect is occurring most strongly on the least *g*-loaded parts of the test. In other words, the Flynn Effect is not a rise in general intelligence. This is a point which Jim Flynn has emphasised in his book on the Flynn Effect, *Are We Getting Smarter?* The Flynn Effect involves a rise in very specific abilities that are weakly associated with general intelligence. These seem to be specialised abstract reasoning skills that relate to the ability to use classification, in other words thinking in a scientific and analytical way.^[8]

But, if that is the case, how can this possibly lead to massive IQ gains? The answer is quite simple. If people became dramatically better at an ability that is only weakly associated with intelligence then this would be reflected in their overall IQ score, causing their IQ score to increase. Therefore, if they were sufficiently strong in this ability (or a small set of abilities) then it could be more than enough to lead to them achieving a very high IQ score despite the fact that there had been no increase in their general intelligence. Indeed, their general intelligence might have decreased, but the massive increase in specific abilities could be enough to not only hide this decrease but show, overall, a huge increase. This would be entirely in line with the fact that the increases are only on certain specific parts of the IQ test and that these are typically the least *g*-loaded parts of the test.^[9]

A comparable example can be seen in how well people do in their school leaving exams. In general, these exams—in various different school subjects—can be understood as a test of intelligence and, overall, the more intelligent children will do better in them than the less intelligent children. But they are very far from a perfect measure of general intelligence. They also measure other factors, including Conscientiousness and simply the degree to which people are prepared for the exams. If their parents are wealthy and have hired them a private tutor, for example, this is likely to have at least some positive impact on their result. They will have practised more, learnt more, thought about the subject matter more, been taught techniques and skills to better answer the questions, and so on. This being the case, it is quite possible—if the degree of Conscientiousness or the extent of social advantage is great enough—that a less intelligent child could do better in their school exams than a more intelligent child. In much the same way, the imperfect nature of the IQ test means that a less intelligent cohort could perform better on the test than a more intelligent cohort, as long as the test was in part measuring something which the less intelligent cohort scored so much higher in that it compensated for their lower intelligence.

In fact, we can highlight a very specific limit to the usefulness of both the IQ test and school exams. They are both excellent instruments for measuring general intelligence differences *within a cohort*. But they are not good instruments at measuring it *between cohorts*. This is because they do not control for the possibility that the infrastructure of the society is

changing in such a way as to ensure that people practise these tests more and more and think in a way that is relevant to these tests more and more. Tabloid newspapers often bemoan so-called 'grade inflation' in the UK. The percentage of students getting top grades in their school leaving exams seems to increase every year. But then every year students are getting more experienced in taking exams, more experienced in thinking in the ways that help them to do well in these *particular* exams, and have greater access to more and more information. Accordingly, it becomes very problematic to assert that a person that got an A in A-Level Maths in 2015 is better at Maths, let alone cleverer, than a person who got a C in it in 1960.^[10] So, to measure general intelligence changes over time it is a bad idea to use IQ tests. More objective proxies, that are less sensitive to these sorts of cultural changes, would be better and these are what we will use.

Scientific Spectacles

Even if general intelligence is decreasing, there are a variety of ways in which the modern world is going to cover this up. Most obviously, better nutrition and a more intellectually stimulating environment—such as in relation to compulsory education and widespread literacy—are likely to mean that pretty much everybody achieves their maximum genotypically allowable intelligence, in a way that would not have been as easily possible before the Industrial Revolution, when there was widespread malnutrition and illiteracy. Also, increased living standards are likely to mean that people are decreasingly stressed and decreasingly sick and this should also have some positive effect on IQ test scores, via the effect of these factors on boosting brain development and promoting specialised abilities.

In addition to these factors, Flynn himself has proposed that the modern world makes us think in a different way. It causes us to use what Flynn has called ‘scientific spectacles’.^[11] In other words, the Industrial Revolution has created an environment which encourages us to think in a scientific and analytical fashion. We do this from a very young age and, therefore, become increasingly more adept at it over time. Flynn gives the example of Russian peasants who were interviewed in the 1920s. With no education at all, they were simply unable to think in the kind of scientific, analytical way that we now take for granted.

‘Q: There are no camels in Germany. The city of B is in Germany. Are there camels there or not?’

A: I don’t know. I’ve never seen German villages. If B is a large city there should be camels there.

Q: But what if there aren’t any in Germany at all.

A: If B is a village there is probably no room for camels.’

The Russian peasant who was interviewed lived in concrete reality, not a world of symbols. He almost certainly couldn’t read and we probably learn more new information in the average day than he might have done in ten years. He simply found it impossible to think in an abstract way. He thought in a concrete way.^[12]

With the Industrial Revolution, we are forced to think in an abstract way. If we learn to do formal mathematics, we are entering a world of symbols, which compel us to think in an abstract way. The same is true if we learn to read and write or if we learn a foreign language. The Industrial Revolution increases levels of education. It leads to a more specialised society in which more people must be literate and numerate, compelling society to make ever more schooling mandatory. It leads to a wealthier and more stable society in which there is more money to educate people and more reason to invest in the future. And it leads to easy access to information through the cheaper production of books and newspapers and the development of television and computers. To keep up in the industrial world, with its ever-increasing mechanisation, we require some understanding of science, which also compels us to think in a more abstract way. We must understand how things work and why they work as they do. Accordingly, it can be argued that the more educated society becomes the more prone it will be to thinking in an abstract way. It will also become more literate, leading to a larger vocabulary. Words can be seen as 'thinking tools', meaning that a larger vocabulary will permit more technically subtle thinking. Western societies have become highly educated, with everybody in full-time education until around the age of eighteen. And the nature of this education has also become more 'scientific' over the years. History at school, for example, has moved away from the rote-learning of important facts to attempting to understand why a period of history unfolded as it did. This will be compounded by hobbies that reflect a greater ability to think abstractly and increase our ability to do so. This will be true even of reading low-brow novels or playing computer games. Access to the internet means that we are reading and stimulating our minds and doing so almost all of the time. One of the most popular internet hobbies, and one we mentioned earlier, is genealogy. Here you must play amateur sleuth: transcribe old hand-writing, learn Early Modern English, learn basic Latin, and weigh up the significance of different clues. Genealogy, as just one example of something popularised by the internet, clearly makes you think in a more abstract way. It is hard to get our heads around how different life would be for a farm labourer in Russia in 1920. We think in a more abstract way and abstract thinking is precisely what is tested by Raven's and by the 'Similarities' component of IQ tests.

So, a narrow intelligence sub-ability—the ability to think abstractly — has been increasing.^[13] Indeed, it has been increasing to such an extent that it shows up on the IQ tests as a year on year increase in IQ scores. Michael A. Woodley of Menie has argued not just that the Flynn Effect is occurring on the less *g*-loaded parts of IQ tests—on the less *g*-loaded abilities—but, also, that it is occurring on the less heritable abilities. Just as we have noted that general intelligence is significantly heritable, so are the different sub-abilities, but they are heritable to different degrees. The Flynn Effect is occurring mainly on the less heritable abilities, further demonstrating that it is mainly an environmental effect. Woodley of Menie argues that, at the same time—as we will see later—there is good evidence that general intelligence is actually declining. As such, he calls this the ‘Co-occurrence Model’—because an environmentally caused rise in specialised cognitive abilities and a genetically caused fall in general intelligence have ‘co-occurred’.^[14]

There is, in fact, nothing especially unusual about these sorts of co-occurrences in nature. We have already looked at the parallels between IQ and height. Both are normally distributed on a bell curve, with the largest percentage in the centre of the curve and smaller and smaller percentages of the population positioned further and further away from it. However, there are other parallels between IQ and height. Like IQ, height has been rising in Western countries throughout the 20th century. The average height of a British adult male in 1900 was about 5 foot 6. By 1971, this average height had risen to 5 foot 10.^[15] As with IQ, these height improvements have been concentrated on the more environmentally influenced components of height. Some body measurements, such as wrist circumference, are strongly genetic while others, such as neck circumference, are heavily environmentally influenced.^[16] Similarly, there are different measurements that can make you tall. You could be tall, for example, due to having a very long neck. You could be tall, even if you had short legs, by having a very long torso. But the driving force behind the growth in height across the 20th century has in fact been leg length.^[17] Our legs—but not a lot else—got longer suggesting that leg length may be highly environmentally influenced.

As with IQ, the secular improvements in height have also slowed down towards the end of the 20th century and in some places stopped, implying that we have reached our genotypic maximum height.^[18] Studies from the

US have shown that there are no genetic-selection effects on height, when genetic variants that predict height are used to predict fertility outcomes in lieu of phenotypic measures of height.^[19] Hence, we would expect the more heritable components of height (such as neck and torso length) to have remained unchanged over time. This lack of genetic change will have been swamped by the contribution made to the change in height over generations by the increasing length of our legs, however. Thus with height we see another example of the co-occurrence model. The 20th century has seen a Flynn Effect on height: an increase in height driven exclusively by changes occurring on the more environmentally sensitive components of height. We are all used to being told that numerous human traits—intelligence, height, physical build, and the development of certain illnesses—are a product of a combination of genes and environment; nature and nurture. But with the co-occurrence model we can be far more specific than this. We can identify which aspects of the trait are primarily caused by environment and which aspects of the trait are primarily caused by genetics. This is a far less question-begging model which allows us to explain a lot more. If we want to understand the rise in obesity, for example, we can look at the different dimensions of obesity and work out how heritable each is and therefore how sensitive each may be to environmental change. We can therefore move beyond the rather trite assertion that ‘it’s a combination of environment and genes.’

The Reversal of the Flynn Effect

If this model is accurate we would expect two further phenomena. Firstly, proxy measures for general intelligence should show evidence that this is in decline and we will see later that this is indeed what is happening. Secondly, there should be a limit to and then a reversal of the Flynn Effect. This is because the specialised abilities that are being stimulated by changes in the environment will have a phenotypic limit. We will eventually reach the absolute maximum level of this ability that the environment can produce within the bounds of our genetic limitations. Once this happens the Flynn Effect will cease and the underlying decline in general intelligence—which has been hidden by the Flynn Effect—will start to show up even on the IQ tests.

This is precisely what has happened from the mid-1990s onwards. A study by Austrian psychologists Jakob Pietschnig and Martin Voracek showed that, in the 1980s, the Flynn Effect began to slow down, year on year.^[20] This would imply that more and more people were reaching its limit and the underlying intelligence decline was revealing itself. This decline has been documented in the most detail with conscription data from the Scandinavian countries, from the mid-1990s onwards. Almost all young males in these countries undergo around six months of compulsory military service and in the early stages of this they are given an IQ test. This leads to extremely large and representative samples; almost the entire male population of any given cohort. It has been shown, now, in Norway, Denmark, and Finland that the IQ scores of conscripts between about 1950, when records began, and around 1997 increased but have decreased thereafter. In Norway, the decrease was 0.38 points per decade between 1996 and 2002 and in Denmark it was 2.70 points per decade between 1996 and 2004.^[21]

And there is another fascinating point about these reverse Flynn Effects. They have also been found in Britain, Estonia, France, and the Netherlands, based on either school pupils or population samples. In the case the Netherlands, the decline was found to have occurred mainly on general intelligence; on the most *g*-loaded parts of the IQ test.^[22] In France, the decline was found to have occurred on the most *g*-loaded and also most heritable intelligence sub-tests, on the parts of the test where differences

are the most biologically caused.^[23] This is important because it has also been shown that the IQ tests in which results are more heritable are also more *g*-loaded; they are measuring general intelligence to a greater extent. Indeed, the magnitude of the negative relationship between intelligence and fertility is stronger on the more *g*-loaded—and thus more biologically influenced—sub-tests within the broader IQ test.^[24] This fits, very neatly, with the hypothesis that general intelligence is decreasing due to biological fertility patterns, but this is covered up by a massive rise in more weakly *g*-loaded and specialised abilities. When these reach their genotypic maximum, the on-going fall in general intelligence becomes clear even on the IQ tests themselves.

More recently, a very large study of cohorts in which the Flynn Effect has reversed had added complexity to this picture.^[25] It found that *across* cultures, the decline is actually biggest when the measure is *less* strongly associated with *g*. Thus, on a larger scale (i.e. between countries), the reversal might stem from negative changes in the environment, which in turn may result from declining *g*, suppressing the development of specialised abilities. Consistent with this expectation, it was found that per capita immigration was an independent predictor of this anti-Flynn Effect, and predicted this best when the IQ measure was most strongly associated with *g*. Therefore immigration may (as one factor discussed previously) be directly reducing *g*, but it also has additional negative effects on IQ (specifically on specialised abilities) which are amplified via its influence on the quality of culture and the schooling environment.^[26]

In addition, the Flynn Effect is seemingly coming to an end or going into reverse in some developing countries, but only among elite samples. Thus, a cessation and also reversal of the Flynn Effect has been documented in a particularly wealthy province of Brazil between 1990 and 2000 among 10- to 12-year-olds.^[27] These findings are consistent with the environmental nature of the Flynn Effect. Elite samples would reach the genotypic limit of the Flynn Effect more quickly than the nation in general and thus be the first to show a cessation or reversal of IQ gains.

The Impact of the Flynn Effect

So, the Flynn Effect works in one direction and selection for lower g in another, hence the coining of the ‘co-occurrence model’ to describe how it operates. The Industrial Revolution has had two effects. On the one hand, it has weakened selection pressure for general intelligence which in turn has set off a process whereby selection for general intelligence has eventually gone into reverse, meaning that there is now a negative correlation between intelligence and fertility. However, the Industrial Revolution has set off a chain reaction of industrial development, which massively outpaces the consequences of the weakening and eventual reversal in selection for general intelligence. As such, even though people are getting less intelligent (as assessed with g), their standard of living is going up. This is, in part, because of the Flynn Effect.

This is the other dimension of the Industrial Revolution. It creates a new world in which people must use and think about machines, in which people need to be educated, and in which people are compelled to think in a more logical and scientific way. In other words, it forces them to don scientific spectacles, which compel them to focus on categorising and how things work. This would seem to make people more inventive. They would be less able to come up with big important ideas—because these would be a function of genius—but they would be able to gradually develop the big, important ideas in interesting and useful directions. Thus, although the rate of important inventions would slow down (as Charles Murray and others have documented), society would keep developing and keep moving forward industrially because of improvements in narrow cognitive abilities. A huge advantage of this cognitive specialisation is that it would have made people wealthier, as with more cognitive specialists in a population there is more opportunity for division of labour, which means that more people are occupying specific micro-niches. Consistent with this, the Flynn Effect has been found to predict both the growth in wealth over time^[28] and also across countries.^[29] This, of course, would also reveal itself on IQ tests as a rise in IQ scores. But, eventually, we would reach the limit of this process of ability specialisation and would, therefore, no longer be able to cloak the on-going decline in general intelligence with a rise in specialised abilities. When that happened—and it seems that it has happened in some

places—rates of even micro-innovation would start to decline and we would start to go backwards; we would find ourselves unable to do things that we could do in the past to an even greater extent than had been the case before.

As Dutton and Charlton have argued, the best way to think of it is in terms of living off capital.^[30] With the Industrial Revolution, we managed to make an enormous amount of money. We became quite spectacularly rich because of the brilliant inventions we came up with. This permitted us an extremely high standard of living: the stereotypical American Dream of the mansion, the country retreat, the jetsetter lifestyle, and so on. But, thereafter, our rate of inventiveness slowly decreased. At first this didn't matter because of the huge interest that our capital was generating; the capital was basically making more capital with very little input on our part. Our input was just minor tinkering, little inventions here and there. But, eventually, our rate of inventiveness completely dried up and once this happened we were no longer making any new money. So, we had to start living off the capital and, in order to sustain this, standards of living would necessarily decline. This is the point we are beginning to reach with the reversal of the Flynn Effect.

¹ Flynn, J. (1967) *American Politics: A Radical View*, B. & J. Paul; Flynn, J. (1973) *Humanism and Ideology: An Aristotlean View*, London: Routledge; Flynn, J. (1979) Kant and the price of justification, *Kant-student*, 70, pp. 279–311.

² Flynn, J.R. (1984) The mean IQ of Americans: Massive gains 1932 to 1978, *Psychological Bulletin*, 95, pp. 29–51.

³ Lynn, R. (2013) Who discovered the Flynn Effect? A review of early studies of the secular increase of intelligence, *Intelligence*, 41, pp. 765–769.

⁴ Lynn, R. (1982) IQ in Japan and the United States shows a growing disparity, *Nature*, 297, pp. 222–223.

⁵ Flynn, J.R. (2012) *Are We Getting Smarter? Rising IQ in the Twenty-First Century*, Cambridge: Cambridge University Press.

⁶ Flynn, J.R. (2012) *Are We Getting Smarter? Rising IQ in the Twenty-First Century*, Cambridge: Cambridge University Press.

⁷ te Nijenhuis, J. & van der Flier, H. (2013) Is the Flynn Effect on *g*? A meta-analysis, *Intelligence*, 41, pp. 802–807.

⁸ Armstrong, E.L., te Nijenhuis, J., Woodley of Menie, M.A., Fernandes, H.B.F., Must, O. & Must, A. (2016) A NIT-picking analysis: Abstractness dependence of subtests correlated to their Flynn Effect magnitudes, *Intelligence*, 57, pp. 1–6.

⁹ It might be asked why Raven's, which is sometimes touted as being among the best measures of *g*, showed greater test score increases if the Flynn Effect is not happening on *g*. The Raven's, however, is not a good measure when cohorts of different generations are compared. This is because the items

that comprise the Raven's test change their meaning in more recent cohorts. In earlier cohorts, subjects would have been unfamiliar with the items on these kinds of tests and would have needed to work out that rules were involved in solving them. More recent cohorts, however, are more familiar with the tests and, more broadly, understand that a rule needs to be applied. Indeed, they are taught this. As such, the score difference between cohorts does not measure a difference in *g*, but instead reflects the rise of a narrow abstract reasoning skill, in essence a 'simple trick' that can be picked up. For a detailed analysis of this issue, see: Fox, M.C. & Mitchum, A.L. (2013) A knowledge based theory of rising scores on 'culture-free' tests, *Journal of Experimental Psychology: General*, 142, pp. 979–1000. More prosaically, modern people are much more likely to simply guess the answer to a multiple-choice answer format test like the Raven's, which will further boost their scores simply by chance alone. British psychologist Chris Brand (1943–2017) estimated that each correctly guessed Raven's item would raise a testee's score by 3 whole IQ points, see: Brand, C.R. (1987) British IQ: Keeping up with the times, *Nature*, 328, 761. The very large gains on the Raven's test in particular could therefore be explained by both of these processes acting in concert.

[10](#) A-Levels are the school leaving exams in England and Wales. They are taken at the age of 18 after a series of two-year courses. Results significantly determine what kind of degree you can study, if any, and the standard of university at which you can study it.

[11](#) Flynn, J.R. (2012) *Are We Getting Smarter? Rising IQ in the Twenty-First Century*, Cambridge: Cambridge University Press.

[12](#) Flynn, J.R. (2012) *Are We Getting Smarter? Rising IQ in the Twenty-First Century*, Cambridge: Cambridge University Press, p. 14.

[13](#) Armstrong, E.L., te Nijenhuis, J., Woodley of Menie, M.A., Fernandes, H.B.F., Must, O. & Must, A. (2016) A NIT-picking analysis: Abstractness dependence of subtests correlated to their Flynn Effect magnitudes, *Intelligence*, 57, pp. 1–6.

[14](#) Woodley of Menie, M.A., Fernandes, H., Figueredo, A.J. & Meisenberg, G. (2015) By their words ye shall know them: Evidence of genetic selection against general intelligence and concurrent environmental enrichment in vocabulary usage since the mid-19th century, *Frontiers in Psychology*, 6, art. 361.

[15](#) Hatton, T. (2013) How have Europeans grown so tall? *Oxford Economic Papers*, 66, pp. 349–372.

[16](#) Susanne, C. (1979) Genetics of human morphological characteristics, in Stini, W. (ed.) *Physiological and Morphological Adaptation and Evolution*, The Hague: Walter de Gruyter.

[17](#) Cole, T.J. (2003) The secular trend in human physical growth: A biological view, *Economics and Human Biology*, 1, pp. 161–168.

[18](#) Cole, T.J. (2003) The secular trend in human physical growth: A biological view, *Economics and Human Biology*, 1, pp. 161–168.

[19](#) Beauchamp, J.P. (2016) Genetic evidence for natural selection in humans in the contemporary United States, *Proceedings of the National Academy of Sciences USA*, 113, pp. 7774–7779.

[20](#) Pietschnig, J. & Voracek, M. (2015) One century of global IQ gains: A formal meta-analysis of the Flynn Effect (1909–2013), *Perspective on Psychological Science*, 10, pp. 282–306.

[21](#) For a meta-analysis, see: Dutton, E., Van der Linden, D. & Lynn, R. (2016) The negative Flynn Effect: A systematic literature review, *Intelligence*, 59, pp. 163–169.

[22](#) Woodley, M.A. & Meisenberg, G. (2013) In the Netherlands the anti-Flynn Effect is a Jensen effect, *Personality & Individual Differences*, 54, pp. 871–876.

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Nine

Is there Really Hard Evidence that General Intelligence is Declining?

If our theory is correct, then there should be clear evidence that general intelligence is in decline. It is all very well arguing that *g* is strongly heritable—based on twin studies—and that the negative correlation between *g* and fertility means it should be declining. But this is merely a prediction, albeit one that is likely to be accurate. It's borne out, of course, by the evidence that the Flynn Effect is a function of specialised, highly environmentally influenced abilities, while overall, the anti-Flynn Effect relates to declines in less *g*-loaded abilities that may in turn ultimately be driven by the impact of factors that have caused declining *g* on the environments that have historically nourished these abilities. But, even accepting this, it does not necessarily prove that general intelligence has been decreasing because of the Industrial Revolution. We need hard evidence and in this chapter this is precisely what we will present. Much of the evidence for this has been unearthed by Woodley of Menie and his team, such that evidence for declining general intelligence for genetic reasons has become known as a 'Woodley Effect'.^[1]

Simple Reaction Times

IQ tests are an excellent measure when comparing people of the same generation but, clearly, the Flynn Effect means that they are a poor measure across time. An IQ questionnaire is a relative measure. It ranks people based on their test results. But it does not give an objective measure of intelligence levels. It merely means that they can be compared to other people who take the same test at around the same time. Edward Dutton and Bruce Charlton have noted that IQ testing is like running races and placing people into first, second, third positions and so on, but never using a stopwatch: ‘This makes it impossible to know, over the decades, whether people are running faster, slower or staying the same: What is needed is some kind of objective measure of intelligence: a stopwatch.’^[2]

Bruce Charlton, who we met earlier, came up with the idea of measuring long-term trends in general intelligence using a stopwatch measure: in other words studying the historical changes in the simple reaction time (sRT) measurement. Reaction times are such a reliable proxy for general intelligence that eminent intelligence researchers such as Arthur Jensen,^[3] Hans Eysenck,^[4] and Ian Deary^[5] have promoted them as alternatives to pencil-and-paper IQ tests. It is possible to use (simple) reaction time (in particular) to measure long-term trends in general intelligence because reaction times have been measured since the late 1800s, and, as we have discussed, they represent an objective correlate of general intelligence. Simple reaction times (sRT) typically involve something like pressing a button as quickly as possible in response to a light being switched on, and measuring the time taken. This procedure usually takes a fraction of a second. While the correlation with IQ is not large, sRTs have the huge advantage of being objective and quantifiable physiological measures. It is widely accepted, by prominent researchers in intelligence such as Arthur Jensen and others, that reaction times are a robust *ratio-scale* measures of cognitive ability. This means that, unlike pencil-and-paper IQ tests, they have a true zero, and everyone who ever has their reaction time speed measured can (in theory) be meaningfully compared with everyone else, irrespective of the year in which they were born. It might be asked how we can measure general intelligence in Victorian England. The answer is that Galton measured simple reaction time, which is a measure of factors such

as nerve conduction velocity that are considered by some prominent researchers (i.e. Arthur Jensen) to be fundamental determinants of *g*. A critical strength of these measures is that the *meaning* of the measures does not change over time. The low-*g* loading of measures like simple reaction time is therefore not relevant to their ability (as ratio-scale measures) to reliably track the change in the underlying *g* over time. The critical thing is that they exhibit the property of *measurement invariance*.

In 2012, Woodley of Menie discovered a published survey of historical reaction time data.^[6] This demonstrated something very striking. There had apparently been a big slowing of sRTs from the time of Sir Francis Galton in the late 19th century until the late 20th century. It should be stressed that the instruments used to measure reactions times in the 1880s are accepted as having been perfectly adequate for the job. They had adequate temporal resolution. These data carried the strong implication that there had been a rapid and substantial decline in *g* over the past hundred years. This initial finding was improved with the addition of extra data and a more sophisticated analysis, and was published in the leading journal *Intelligence*.^[7] It was then replicated and confirmed.^[8] This replication study furthermore found, using sRTs, that the decline in *g* had been around 1 IQ point per decade between 1885 and the year 2004. That is about 10 points, in a century—and probably more over the past two hundred years. Dutton and Charlton have explained that, to put this in perspective, 15 points would be approximately the difference in average IQ between a low level security guard (85) and a police constable (100), or between a high school science teacher (115) and a biology professor at an elite university (130).^[9] In other words, in terms of intelligence, the average Englishman from about 1850 would be in roughly the top 15% of the population in the year 2000—and the difference would be even larger if we extrapolated back further towards about 1800 when the Industrial Revolution began to initiate massive demographic changes in the British population.

Woodley of Menie's numbers, note Dutton and Charlton, are not intended to be precise but they are certainly a rough guide to what is happening. Dutton and Charlton put it very trenchantly in summarising what these numbers mean. They mean that in everyday terms:

‘the academics of the year 2000 were the school teachers of 1900, the school teachers of the year 2000 would have been the factory workers (the average people) of 1900, the office workers and policemen of the year 2000

were the farm labourers of 1900, those who were around 10 to 15 IQ points below average at that time. The low-level security guards and shop assistants of the year 2000 were probably in the workhouse, on the streets, or dead in 1900. The substantial long-term unemployed or unemployable, the dependent 'underclass' of the year 2000, simply didn't exist in 1900. And even this estimate is ignoring the expansion of education since 1900, which expanded the middle class occupations and would, in itself, reduce the average intelligence of academics and teachers and even shop assistants in 2000 compared to what they would have been in 1900.'^[10]

What this means, in terms of everyday life, should be quite clear by now from our table setting out the correlates of intelligence. And new studies are replicating the finding. A study in Sweden, for example, based on a sample of more than 7,000 people found that simple audio reaction times had slowed by between 3 and 16 milliseconds between 1959 and 1985.^[11]

Colour Discrimination

But reaction times are not the only objective measure that correlates with general intelligence which is showing a decline. Colour discrimination—the ability to distinguish between ever more subtle shades of colour—is declining as well. Now, we might think, ‘What on earth has colour discrimination got to do with *g*?’ But, in fact, it has a great deal to do with it. As we have seen, Spearman showed that pitch discrimination strongly correlated with other examples of academic performance and, by implication, with general intelligence. Spearman also found that teacher ratings of pupil ability correlated with the ability of these pupils to judge subtle differences in lightness and weight. As such, Spearman posited a ‘general factor of discriminative ability’,^[12] which he expected to correlate very strongly with general intelligence. Sensory discrimination correlates with *g* because the more acute your sensory discrimination is, the better able you are to notice subtle differences between physical quantities which can help you to more efficiently solve problems. This is why more recent studies have found the correlation between general intelligence and general discriminative ability to be as high as 0.92 in some cases.^[13] It follows that the more intelligent people are, the better they will be able to discriminate among increasingly subtle differences in colour.

A 2015 study found four standardisation studies conducted between the 1980s and 2000s employing the Farnsworth-Munsell 100-Hue Colour Perception Test, which was developed in 1943. This test was first found to correlate with IQ in the 1960s. The participants have to physically arrange a series of 85 caps, each of a very subtly different hue, along a spectrum defined by two clear end caps such as blue and green or pink and purple. Participants are awarded an error penalty for each cap that is in the wrong order on the spectrum, allowing a quantification of their colour discrimination abilities. It was found that, across the four studies, colour discrimination ability had significantly declined, at the equivalent rate of 3.15 IQ points per decade—even after controlling for the IQ of the countries from which the participants were drawn (Belgium, Finland, UK, and US) and also participant age. Clearly, this is what we would expect if our hypothesis is correct.^[14]

Use of High-Difficulty Words

The more intelligent people are, the larger are their vocabularies and the more likely they are to use difficult-to-learn words. Indeed, this seems to be fairly clear to people. We know, implicitly, that intelligent people are more prone to using ‘big words’ or at least unusual words. This fits in with the association between *g* and colour discrimination. The more intelligent people are, the more able they are to perceive subtle differences; differences which require slightly different words in order to accurately encapsulate them. This use of the technically correct word by the highly intelligent can be distinguished from intellectual poseurs who try to showcase their supposed intelligence by using high-order words quite unnecessarily in order to intellectually intimidate people and to attempt to appear cleverer than they are. But, that aside, part of the linguistic intelligence dimension of the IQ test is vocabulary and the ability to understand subtle differences in the meaning of words. Scores on vocabulary tests are *very* highly *g*-loaded and highly heritable.^[15]

To test what was happening with vocabulary, a study in 2015^[16] examined historical changes in the frequency with which words from the highly *g*-loaded WORDSUM test were employed across 5.9 million texts published between 1850 and 2005. They also examined the association between WORDSUM scores and completed fertility; how many children you have had by middle age when, typically, you don’t have any more. They found that words with higher difficulties (those that are harder to learn and use correctly) and also stronger negative correlations between pass rates and completed fertility declined in usage over time. By contrast, less difficult words and less strongly selected words increased in use over time—an effect that was predicted by rising literacy. This finding would be consistent with the Flynn Effect stemming, in part, from the vocabulary enriching effects of increases in education level, which would be part of Flynn’s ‘scientific spectacles’ model. These findings persisted when explicitly controlled for word age, and other confounding factors.

More recently, another study has taken this further in a way that clearly illustrates the accuracy of our model. Google’s Ngram Viewer (a truly massive text archive of scanned books, newspapers, scientific journals, and other printed materials) includes texts that go all the way back to the 16th

century. So, drawing upon this, Woodley of Menie and colleagues analysed changes in the use of the four very high difficulty WORDSUM words over time between the 16th century and the modern day. They found that the use of these words *increases* from the 16th century up until the early 19th century and then goes into decline, as can be observed in Figure 7. This is precisely what our model of the rise and fall of Western intelligence would predict, if indeed the usage patterns of these words among those who contribute to literature really does reflect their underlying level of *g*.^[17]

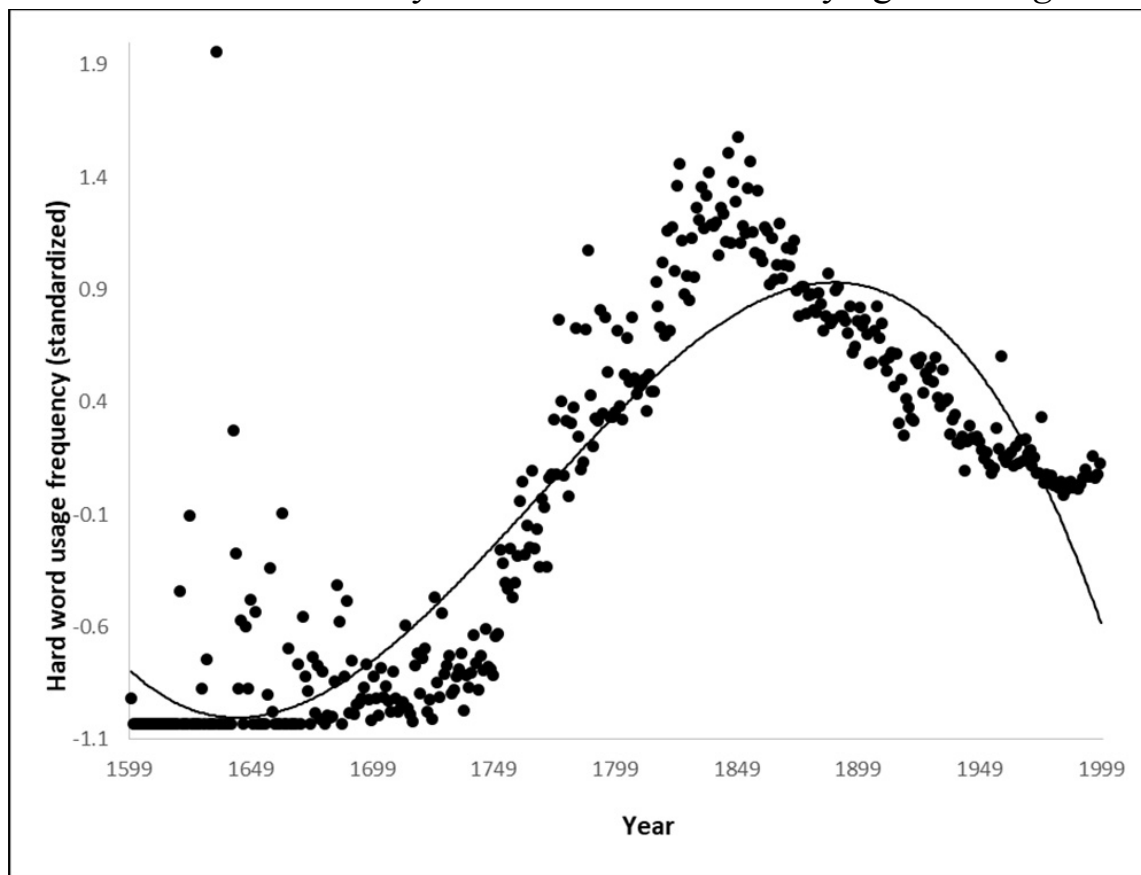


Figure 7. The usage frequency trend for a common factor of the four hardest WORDSUM words between 1600 and 2005, fitted to a third-order polynomial curve.^[18]

This system also allows us to estimate roughly how intelligent we are compared to people in the past. Based on the usage frequencies of these WORDSUM words, we currently have about the same level of *g* as people in the mid-18th century; a generation or two before the Industrial Revolution. It must be remembered that WORDSUM is likely to be subject to the Flynn Effect (recall that the usage of easy words is actually increasing), which may make our vocabulary level artificially high in relation to our underlying general intelligence. So, putting these influences

aside, it is likely that we have regressed considerably further, genetically, than the mid-18th century.

Backward Digit Span

Another good proxy for g is working memory, or the capacity to manipulate information committed to memory for the purposes of solving problems. More intelligent people tend to be better at this. This makes sense because if you have a good working memory the amount of information that you can handle will be greater, allowing for more complex problems to be solved. This ability is reflected in measures such as ‘digit span’, where the subject is presented with a list of digits (called bits) and must immediately repeat them back from memory. If they can do this successfully then they move onto a longer list. The number of bits that the subject can recall successfully is their ‘digit span’. They can be asked to recall the digits in the order in which they were given (‘forward’), which gives a measure of short-term memory, or they can be asked to recall them in the opposite order. The latter is known as their ‘backward digit span’ and is a measure of working memory. Clearly, remembering numbers in reverse order is likely to be more cognitively demanding and is therefore a much better measure of g .

In a re-analysis of previously published data, covering the period 1923 to 2008, it was found that forward digit span (short-term memory) had slightly improved over this period. However, backward digit span (working memory) had declined—equating to an IQ loss of 0.16 points per decade. In other words, we have gotten better at the less g -loaded memory task and worse at the more g -loaded task over a period of 85 years. This is clearly more evidence for the co-occurrence model.^[19]

Replication of this finding came from a very large meta-analysis of short-term and working memory performance from several countries across several decades, conducted by a team from King’s College London. In this study, it was found that two separate measures of working memory (backwards digits and Corsi Blocks) both showed evidence of having declined, even after controlling for the sample’s national origin, its age, and differences in the way in which the measurement had been obtained. The short-term memory tests (forwards digits and the short-term memory variants of the Corsi Blocks test) both showed the opposite trend—a Flynn Effect, exactly as predicted by the co-occurrence model.^[20]

Improvements in the environment are therefore raising certain weakly g-loaded abilities, such as short-term memory, but, at the same time, general intelligence (as reflected in working memory) has been decreasing throughout the 20th century.

Spatial Perception

Two Austrian psychologists—Jakob Pietschnig (who we met earlier) and Georg Gittler—have worked together to examine changes in scores on a test of spatial perception: the three-dimensional cube test (3DC).^[21] As we've seen, spatial intelligence is an excellent measure of general intelligence. The two Austrian researchers found 96 samples (amounting to 13,172 people) to whom the 3DC had been administered in German-speaking countries between 1977 and 2014. They 'meta-analysed' the results—this is a statistical procedure whereby you combine data from multiple studies—meaning that they could see what had happened to spatial perception ability in German-speaking countries over this period of almost 40 years.

Their results were entirely consistent with the other lines of evidence that we've examined and, in particular, with IQ scores. There was an initial increase in performance (a Flynn Effect) and a subsequent decrease in performance (a negative Flynn Effect) when controlling for age, sex, and sample type—whether examining general population, convenience samples (e.g. university students), or a mixture of the two. Thus, it would appear that spatial perception performance was pushed to its phenotypic limit by environmental factors after which the underlying decline in general intelligence began to reveal itself. Put simply, we are getting worse at understanding how three-dimensional objects work. This has obvious implications for road safety and, of course, safety in the skies.

Piagetian Developmental Staging

Jean Piaget (1886–1980) was a Swiss clinical psychologist who produced ground-breaking work on childhood development. He is best known for his theory of cognitive development, in which he charted the four stages of development that children go through up until around the age of 16. From birth to age 2 they are in the ‘sensorimotor stage’ in which they experience the world purely in terms of sensory stimuli. In stage two, from age 2 to 7, they are in the ‘pre-operational stage’. They have stable mental concepts, but difficulty with logic. In stage three (7–11), the ‘concrete operational stage’, they can think logically but are still limited in terms of what they can physically manipulate. Finally, in the ‘formal operational stage’ (11–16), they develop their abstract reasoning skills.

Piaget devised a series of methods for testing where children were developmentally, which, to a significant degree, can be regarded as measuring intelligence.^[22] One such measure is ‘volume and heaviness’, which looks at the ability of children to correctly estimate these quantities. British psychologist Michael Shayer and others compared English 11-year-old school children in terms of their scores on this, looking at samples from 1975 and then from 2003. They found that children had become considerably worse at it: girls by roughly half a standard deviation and boys by an entire standard deviation. Whilst this would be in line with average general intelligence decreasing over this period, these declines are simply too massive to have been caused by this process alone.^[23] A recent analysis noted that the collapse seems to have been concentrated specifically in the numbers of top scorers over this period.^[24]

Genius Levels and Macro-innovations

As has been discussed already, per capita rates of genius and the macro-innovations for which they are responsible have been declining since the early to middle of the 19th century. Charles Murray (whom we encountered earlier) has shown that these major scientific breakthroughs reached a peak around 1825.^[25] This, of course, is the height of the Industrial Revolution. Then they go into decline, as do the rates of macro-innovation. Based on Murray's published data, we have calculated per capita levels of genius across time restricted to just the English-speaking countries. The trend can be seen in Figure 8.

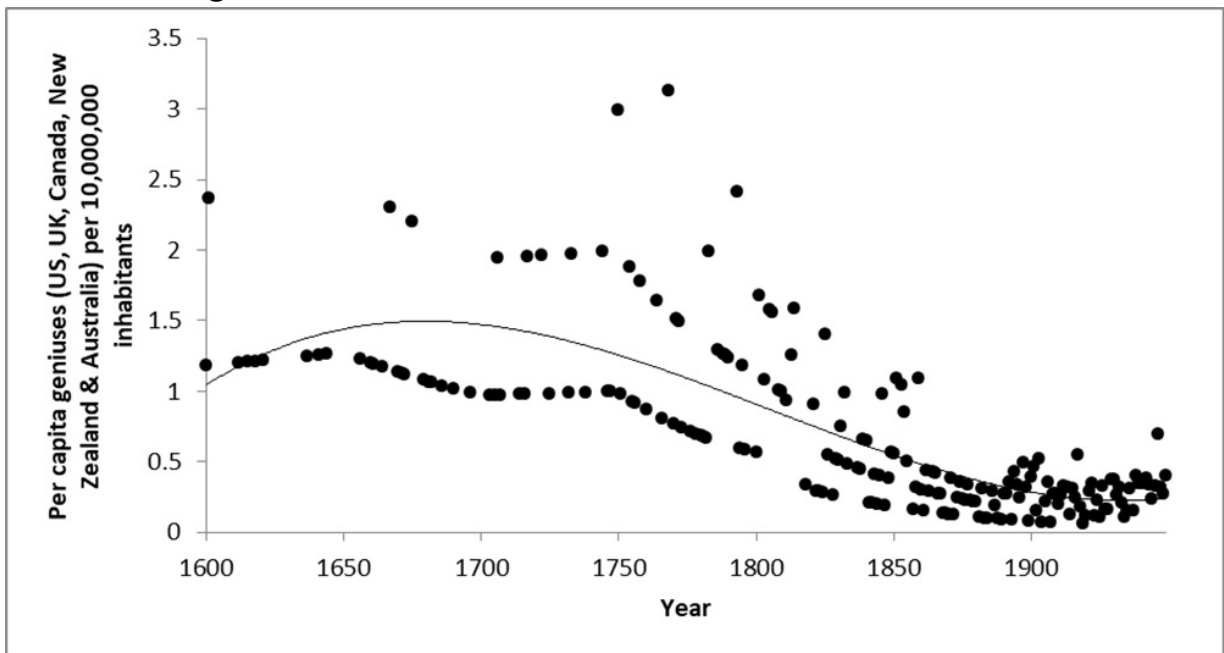


Figure 8. Per capita geniuses in USA, UK, Canada, New Zealand, and Australia, 1600–2000 (using publically released data from Charles Murray), fitted to a third-order polynomial curve.

It should be stressed that there are likely to be other factors behind the decline in genius and macro-innovation apart from simply falling g . As was discussed previously, genius may be dependent in part upon rare genes with large effects on the phenotype that do not ‘breed true’—meaning that they do not transmit faithfully across the generations. It may also be dependent on interaction between genes that have a low probability of combining in a single individual (giving rise to a very unusual kind of personality). This means that as populations shrink, due to the demographic transition (i.e. the general tendency for Western populations to have fewer children since the

Industrial Revolution), the size of the ‘pool’ of these rare gene combinations has decreased and so they are less likely to occur. Recall also that genius is likely a highly group-selected manifestation of intelligence—geniuses help their populations during times of war, and their innovations have furthermore fuelled the rise of empires. This means that populations that are in situations of war or which are building empires, also placing them in situations of conflict, will be under group selection pressure and the group with the optimum number of geniuses will be more likely to expand. This will increase the probability of rare genetic variants and combinations of variants emerging, leading to new geniuses.

Population shrinking in the West is in part, therefore, a manifestation of the collapse of group selection, and is characterised by decreasing inter-group conflict (i.e. reductions in the frequency, duration, and lethality of warfare). The environment is milder today climatologically (warmer temperature has historically promoted inter-group peace^[26]), furthermore ecological stress stemming from disease is largely absent from modern life, with the advent of modern medicine. The result is that the populations of contemporary Western countries are pacified and are no longer inclined towards battling for living space. So, selection pressure for genius has decreased and, accordingly, the relevant genetic combinations are not being selected for and they are less likely to combine anyway because the (native) population is shrinking. So, we have a perfect storm—selection for low IQ comes at the expense of group-level fitness, which via population shrinking massively reduces the frequency of the rare elements that must be present in order for genius to manifest.

It should be emphasised, however, that the declining numbers of geniuses may also have a partly environmental cause, though this is itself underpinned by our declining general intelligence. In their book *The Genius Famine*, Edward Dutton and Bruce Charlton have explored in depth why levels of genius are declining.^[27] They concur that a significant part of the decline is directly genetic: average intelligence is decreasing and, therefore, the average intelligence of the high-IQ outliers is also decreasing. But they suggest that certain social factors conspire to make this ‘famine’ even worse. Intelligence is correlated with a trait known as ‘Intellect’: being open to new ideas and being fascinated by intellectual pursuit. Until the 1950s, this kind of attitude underpinned the British university. Academics were under no pressure to regularly publish or

obtain grants. They were expected to teach and were given vast amounts of time to think and do research based on the hope that some would produce works of genius. Charles Murray has observed that, in the 19th century, religion was also part of the reason that universities were created along these lines. Their purpose was to reach a greater understanding of God's creation—a practice called *Neo-Thomism*, a reference to the medieval scholastic St. Thomas Aquinas who attempted to prove God's existence using logic. If this academic system involved frittering away money—with most academics not publishing anything—this didn't matter. Some things are more important than money, such as the glory of God.^[28]

Since the 1960s, universities have become bureaucratic businesses. This reflects the anti-intellectual, anti-religious attitude that their purpose is to make money. Academics contribute to this by getting funding, publishing frequently, and attending conferences. All of this is anathema to the genius, who wants to be left alone to solve their chosen problem.^[29] Remember that the genius, as well as being highly intelligent, is moderately low in Agreeableness and Conscientiousness, and moderately high in Psychoticism. They also won't tick the bureaucratic boxes that get you an academic position—Francis Crick, discoverer of DNA, was rejected from Cambridge, failed to get a top mark in his bachelor's degree, and dropped out of assorted PhDs. As such, universities are less likely to appoint genius types. They will appoint what Dutton and Charlton call the 'head girl' (at UK schools)—quite intelligent, socially skilled, conscientious, but absolutely not a genius. This person will be excellent at playing the academic game and will make a great colleague. But they won't innovate; won't rock the boat. Once upon a time, they note, a 'country vicar' had lots of free time to research, but with the shrinking of the Church, the days of the Victorian 'scholar-rector' are long gone as well. The genius has no institution to nurture him and his potential will not be fulfilled.^[30] So, an indirect consequence of the decline in intelligence is a decrease in the degree to which people in general venerate 'intellectual' pursuits and a rise in the degree to which they emphasise simply making money. For both genetic and environmental reasons, with an ultimately genetic cause, we see a decline in the levels of genius since the mid-19th century. This is consistent with the expectation that *g* is in decline.

Creativity

We have already met the innovative German psychologist Hans Eysenck. Eysenck wanted to understand the kind of qualities which led to genius and this meant that he was also fascinated by the idea of ‘creativity’. The genius, Eysenck argued, is characterised, as we have seen, by moderately high Psychoticism and extremely high *g*. It is this combination that allows geniuses to think in an extraordinarily intellectually creative way and so make fantastic breakthroughs. It follows that lower levels of creativity—wherein people have interesting and original ideas but do not come up with anything that fundamentally changes the world—would be characterised by a lower dose of the same kind of psychological make-up. In other words, people whom we would regard as ‘creative’—artists, poets, novelists, comedians, as well as the more original journalists and academics—would be likely to combine moderately high Psychoticism and high intelligence, but not in as pronounced a way as those whom we would accept were geniuses.

Eysenck produced sound evidence to support this contention. He developed a test of creative thinking and administered it, alongside an IQ test, to various large samples of students. He found that up to an IQ of 120, creativity was predicted by intelligence: the more intelligent you were, the more creative you were. However, beyond an IQ of 120, creativity ceased to be significantly predicted by intelligence and personality differences became the driving factor. So, to be significantly creative you need foundations of high IQ, but extreme creativity is built upon those foundations with moderately high Psychoticism.^[31] Accordingly, tests of creativity are useful for our purposes because they are partly tests of intelligence. If intelligence is declining then we would expect levels of creativity to be declining and there is evidence that is exactly what is happening.

Korean psychologist Kyung Hee Kim, of the College of William and Mary in Virginia, published an important paper in 2011 in the *Creativity Research Journal*,^[32] entitled ‘The Creativity Crisis’. Her findings made something of a stir at the time and were even reported on the front page of the American magazine *Newsweek*. Kim employed the Torrance Test of Creative Thinking, which was developed in 1966 and administered to large

samples of people—ranging from kindergarten pupils through to ‘12th grade (17–18-year-old) students and adults’—in 1974, 1984, 1990, 1998, and 2008. This meant that she could compare average levels of creativity across time with a very large sample of people, 272,599 of them to be exact. She found that since 1990 creativity scores had significantly decreased—in other words people are becoming less creative. This is what might be expected to happen if people were becoming less intelligent. Declining creativity should have real life implications, especially in terms of the quality of the arts and entertainment. It is certainly consistent with British comedy critics arguing that the high point of the UK sitcom was the 1970s and 1980s and that the genre’s originality and creativity has declined since that time.^[33] It is also consistent with the production of modern ‘remakes’ of assorted comedies from this period, including of *Dad’s Army* and *The Rise and Fall of Reginald Perrin*. The anecdotal evidence of the decline of the British sitcom is in line with Kim’s findings and, in turn, with the decline of intelligence.

Putting it All Together: The *g.h* Chronometric Factor

The best way to show that these ‘Woodley Effects’ are validly measuring some underlying change in *g* would be to demonstrate that they correlate with one another in time. In other words, does the decline in working memory correlate with the decline in simple reaction times? What about the decline in the utilisation frequencies of hard-to-learn vocabulary words?

This is precisely the approach used by Woodley of Menie and colleagues to *cross validate* these declines. The method employed was very similar to the idea of the *g* factor, which was discussed previously. You will recall that the *g* factor is a sort of ‘super-correlation’ among various measures of intelligence. It is the reason why people who do well on one type of ability measure typically do well across many such measures. This same approach was used in cross-validating these ‘Woodley Effects’. It was predicted that the trend in one indicator of declining *g* should predict the decline in the others as well, and that, furthermore, those putative Woodley Effects should tend to cluster together in time—forming a common *chronometric* (literally ‘measurement in time’) *heritable general intelligence (g.h)* factor. The *g.h* chronometric factor was made up of time trend data on five variables:

1. Slowing simple visual reaction times.
2. Declining working memory.
3. Declining utilisation frequencies of four hard-to-learn vocabulary words tracked using Google Ngram Viewer.
4. Declining per capita rates of US and UK macro-innovation (weighted based on the populations of these two countries), which capture the decline in complex problem solving ability.
5. The utilisation frequencies of ten altruism indicating words, also tracked via Google Ngram Viewer.

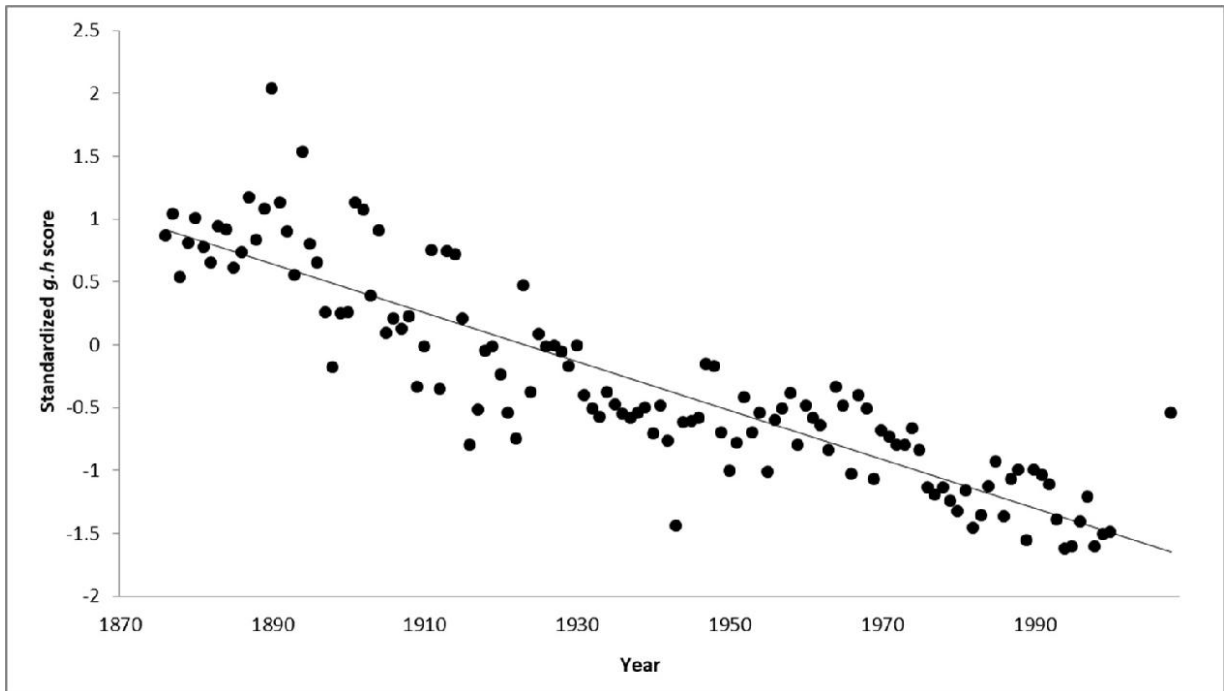


Figure 9. The decline in the chronometric $g.h$ factor between 1876 and 2008, fitted to a linear trend.^[34]

You will recall that group-selection likely played a major role in the evolution of higher levels of g in the Early Modern Era, especially in the case of genius, therefore it was predicted that altruism (or, more specifically, the more g -loaded components of ‘social intelligence’^[35]) should be declining in tandem with these Woodley Effects. This is indeed what was found. So, we are not only becoming less intelligent, we are becoming less kind and less cooperative. The decline in chronometric heritable general intelligence can be seen in Figure 9.

The Smoking Gun: A Decline in the Frequencies of Variants in the Genome Associated with Educational Attainment and g

So far then we have looked at phenotypic evidence, which indicates (quite strongly) that g is declining and doing so for largely genetic reasons. But now let's turn to the smoking gun. A hugely important study, led by a Chinese researcher called Augustine Kong, of the University of Iceland, was published in *Proceedings of the National Academy of Sciences* in 2017.^[36] In this study, his team identified a large number of genetic variants which collectively predicted both educational attainment and g . They called this set of variants POLYEDU (polygenic score for educational attainment). The team investigated the effect of this polygenic score on the reproductive history of 109,120 Icelanders and the impact of this history on the Icelandic gene pool over time. They demonstrated that those who had higher POLYEDU had delayed reproduction and had fewer children than did Icelanders carrying lower POLYEDU. So far this result is somewhat consistent with those of the previously discussed studies that used polygenic scores for educational attainment to predict fertility outcomes. However, Kong and his team went one step further. Based on a sample of 129,808 Icelanders born between 1910 and 1990, they found that the average POLYEDU—the average percentage of the population with genes that predict high educational attainment—had been declining at a rate of roughly 0.010 standard units per decade, which, they noted, 'is substantial on an evolutionary timescale'. They added that 'because POLYEDU only captures a fraction of the overall underlying genetic component the latter could be declining at a rate that is two to three times faster.' Their findings can be observed in Figure 10.

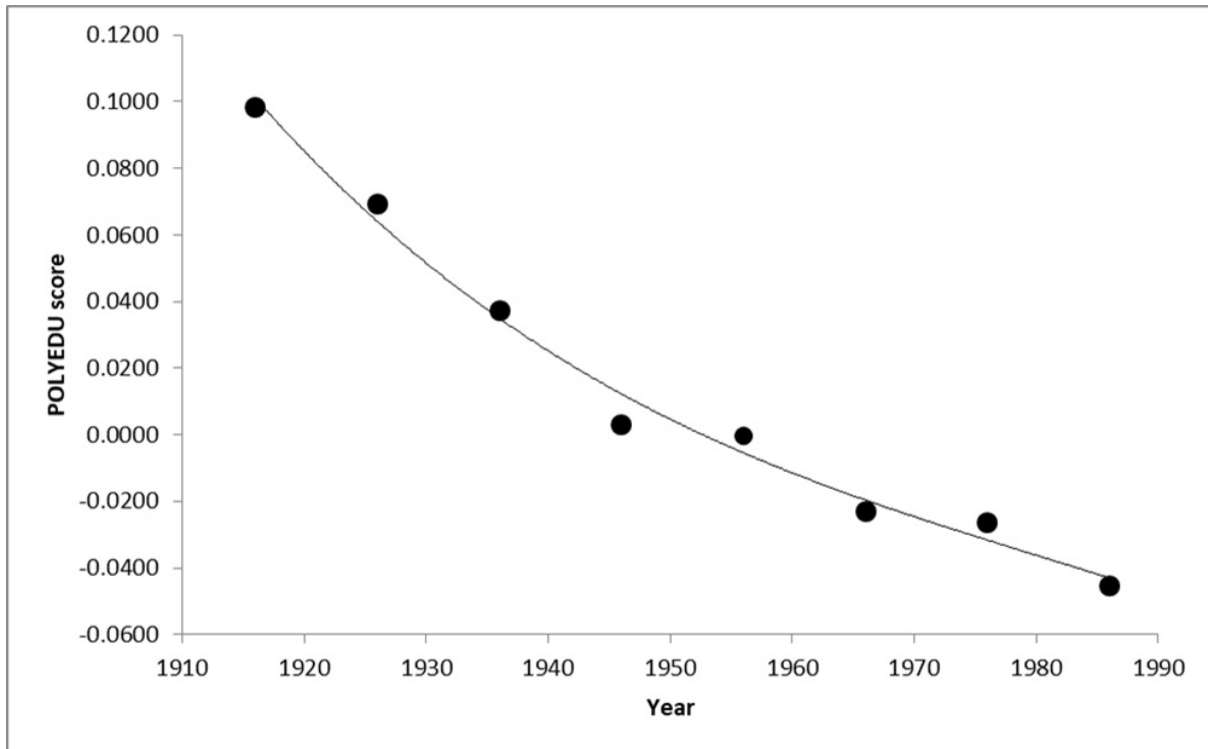


Figure 10. The decline in POLYEDU in Iceland, between the 1910–20 and 1980–90 birth cohort groupings, fitted to a third-order polynomial curve.^[37]

This observed decline over decades in the population’s levels of POLYEDU was found to be highly consistent with the decline predicted using the negative association between POLYEDU and fertility, and the positive association between POLYEDU and age at first birth (recall that those with high IQ don’t simply produce fewer children, they produce them later in life). Kong and his colleagues even went so far as to estimate the IQ loss that should result from this process—0.3 points per decade. It is important to note that in arriving at this estimate they employed a *very* low value of the heritability of IQ (0.3) in their formula. As was discussed earlier, the actual heritability of IQ (as determined using twin studies, which have the advantage of capturing *all* genetic variants that go into a given trait) is likely to be substantially higher (closer to 0.8). When Kong and his colleague’s numbers are adjusted to take this into account, the decline increases to around 0.8 points per decade—meaning that the population of Iceland may be losing IQ at a rate very close to a whole point per decade.^[38]

This research would seem to strongly vindicate our theory. We have already seen that education level is strongly genetically correlated with g . So, g should have declined between 1910 and 1990 among the people of Iceland. The average Icelander born in 1910 was cleverer than the average Icelander born in 1990 in terms of heritable general intelligence. This decline in Iceland has furthermore occurred exclusively for genetic reasons and the key reason is the low and postponed fertility of the highly intelligent in Iceland, especially the highly intelligent women.

What about Pollution?

Some researchers have argued that declining general intelligence is caused by environmental pollution. The claim to this effect has been presented by Barbara Demeneix. Demeneix (formerly Jenkins) is a British biologist who took her original degree at Swansea University in Wales. But since 1990 she has run a laboratory at the Natural History Museum in Paris. In her 2014 book *Losing Our Minds*,^[39] Demeneix argues that the rise in pollution from certain kinds of plastic and other modern pollutants, coupled with the effects of ‘ever present neurotoxins’ in the environment and in our diets (such as lead, mercury, and alcohol), significantly explains the evidence for IQ (specifically *g*) decline. In particular, these neurotoxins act as endocrine disruptors, leading to epigenetic changes—alteration of genetic expression—in the early stages foetal development that have resulted in reduced *g*.

A team of researchers have tested Demeneix’s neurotoxin theory. They created a model in which they predicted the decline in general intelligence (measured via the chronometric *g.h* factor presented in Figure 9), using a neurotoxin factor (comprised of environmental measures of lead, mercury, and persistent organic pollutants, along with per capita alcohol consumption for the US and UK) and a polygenic score factor. This was comprised of genetic variants which predict *g* sampled from individuals of different ages, binned based on birth year—sourced from the aforementioned Iceland study and also from a smaller study presenting similar findings for cohorts born between 1919 and 1955 in the USA. They found that changes in polygenic scores predicted around 25% of the variance in the change in *g.h* over time. Changes in neurotoxic exposure did not significantly predict any of the variance in *g.h*, however.^[40] The neurotoxin theory therefore simply does not seem to be supported by the data.

Why Did the Murder Rate Continue to Decline?

We have used the falling murder rate up until the Industrial Revolution as evidence of rising general intelligence. This being the case, it might be asked why the murder rate continued to fall from 1800 onwards, if g was in fact declining. Shouldn't the murder rate have risen? There are three reasons for this. Firstly, the British state continued executing murderers right up until the 1960s. Accordingly, there was a degree to which, in every generation, the genes which would incline people to commit murder were being removed from the population. Related to this is the finding (discussed previously) that slow life history orientation (K) is currently *favoured* by selection in Western populations. As high- K is associated with low criminality, parallel genetic changes in K could be compensating, or even overcoming, the expected effect of declining g on promoting criminality.

Secondly, we have to think about the circumstances that would push people into committing murder. Most murders in pre-modern England were not premeditated but were, rather, the result of fighting. They occurred 'in the heat of the moment'. People would be more likely to lose self-control—to the extent of committing murder—if they were subject to stress due to financial worries, constant fear of death, illness and want, and chronic pain. These would all have been relatively constant between the Middle Ages and 1800, because living standards changed very little. This, of course, means that the falling murder rate had little to do with environment and can be plausibly partly explained by rising g . However, with the Industrial Revolution, environmental factors that promoted murder were very substantially reduced to an extent that their effects outpaced the intelligence decline, as evidenced by the on-going construction of an increasingly comfortable society.

Since the abolition of hanging for murder in the 1960s, it can be argued that the suppression of environmental triggers is the main explanation behind the murder rate remaining relatively low by historical standards. This must be taken together with technological and social advances—themselves ultimately a product of the Industrial Revolution—which make it much more difficult to 'get away with murder', including DNA evidence, ubiquitous CCTV, and a large, trained, and equipped police force.

The third reason is simply the Flynn Effect. As we have discussed, the Flynn Effect—although it does not occur on general intelligence and is, in reality, cloaking a decline in this—is caused by industrial society making us think in a more analytic way. This is because it pushes various specialised abilities at the base of the intelligence pyramid to their genotypic limit. The result of this is that we become more educated and more specialised, resulting in the ability to generate more and more micro-innovations. These micro-innovations, as long as their effect outpaces the on-going decline in general intelligence, lead to economic growth and thus reduced environmental instability. This, in turn, makes us less stressed, less on edge, and less inclined to commit murder when the circumstances are controlled for. Thus the decline in criminality is likely driven by both environmental and genetic changes favouring slower life history orientation in Western populations.

Should We Be Telling You This?

So, general intelligence appears to be declining in just the way that we would predict. We have no desire to be doom-mongers or to unreasonably speculate. ‘Speculation’ is a word often thrown at researchers when other researchers dislike their findings. It is defined as ‘making conjecture without firm evidence’. But we have seen that g underpins civilisation and is the motor for the development of civilisation. Therefore, it is neither doom-mongering nor speculation to assert that the decline of g will lead to the reversal of civilisation. We have ‘firm evidence’ with which to make this assertion. And we have seen that g is indeed declining and there is a substantial amount of evidence for this, all of it pointing in the same direction. It logically follows, therefore, that civilisation will decline.

Now, some scientists would suggest that this raises a moral question. We already responded to these kinds of questions with regard to the concept of intelligence. They argue that, as researchers, we have a kind of moral responsibility to the broader society and if we persuade that society that civilisation is going to decline—even if it is true—then we are inciting fear and panic and potentially stirring up unrest and chaos. As such, we have a moral duty to suppress our findings or to only reveal them when there is ‘more evidence’. And, presumably, the time when the level of evidence is sufficient will never arrive, because you can always ask for more evidence when you are unhappy with what the available evidence demonstrates. You can always demand, of those whose findings you dislike, that they respond to an infinite regress of increasingly unlikely possibilities or that they prove a series of negatives (which are inherently impossible to prove) to your subjective satisfaction. But, of course, this is a highly inconsistent position, because if you demanded it of all scientists then nothing could ever be proved, no action could ever be taken, and civilisation would collapse. There could be no cars, and no aeroplanes, because there would always be insufficient proof of their safety.

Our response is that we have substantial evidence for our theory and, once more, the ‘moral argument’—which should, anyway, be irrelevant as science is amoral—can simply be turned around. By suppressing these findings, we are ensuring that we will do nothing to slow down, adapt to, or even prevent the decline of civilisation. It is the act of failing to publicise

the findings which will, thus, hasten unrest and chaos. It is that act which is truly ‘immoral’ and ‘irresponsible’. So, it is quite reasonable to assert that the decline in intelligence is happening and it will lead to the decline of civilisation.

Many of us, raised in a context of constant scientific progress in which it was assumed we’d one day colonise space, may find this idea astonishing. But we shouldn’t be astonished. It has happened before and it is very likely to happen again. It seems to be a law of human history.

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Ten

Does this Mean that Civilisations Always Rise and Fall?

There are three basic models of history: the Fall, the Linear, and the Cyclical. For those who believe in the Fall, there was a glorious time of perfection or near-perfection sometime in the distant past and we can only hope to try to somehow recreate that. We are most unlikely to ever be able to do so, so we must content ourselves with living fallen lives in a fallen world.

The Fall

In many ways, this is the Christian view of the world. Perfection existed in the Garden of Eden. Life may not have been technologically complicated, but who cares. We only need technology to overcome suffering and there was no real suffering. Or, at least, there was no suffering until we disobeyed God by eating the fruit from the Tree of Knowledge. We were punished for this by being cast out into an unkind world in which men had to toil the earth and women had to suffer the agonies of childbirth. This religious way of thinking may seem alien to us now, but it can be seen in many far more modern world-views. As far as medieval and even 16th-century Europeans were concerned, Ancient Rome was a glorious past just as entrancing and inspiring as the Garden of Eden. You could not possibly hope to recreate this fantastic ‘before-time’ of philosophical, mathematical, and literary genius. You just weren’t good enough to do that. You would never reach such stratospheric heights again. You must merely attempt, as far as possible, to return to it by imitating it. Accordingly, education was centred on Latin and Classical literature and any new literature had to ultimately be grounded in Classical tales and in Classical literary forms. The 17th-century playwright Ben Jonson (1572–1637) criticised his contemporary, William Shakespeare (1564–1616), for daring to deviate from these Classical guidelines. This view is so alien to people raised in a society based around ‘progress’ and novelty: our best days are long behind us and all we can hope to do is return to them. In many ways, this was the very essence of the Renaissance and even the Reformation, which conceived of a purer, superior Church, back at the time of Christ.^[1]

Many modern philosophies also hold to this view. For the 18th-century Swiss philosopher Jean-Jacques Rousseau (1712–1778), the glorious past of humanity—the Garden of Eden, if you like—can be found among tribes or, at least, among his Romanticised, de-fanged understanding of tribes.^[2] These, according to Rousseau, are social organisations in which there is no real hierarchy and everyone works together for the common good. As such, the ‘will of the people’ will predominate.^[3] This way of thinking was taken up by nationalists and communists alike. For nationalists, like the German Johann Gottfried Herder (1744–1803), there was a glorious past of a pure German nation held together by blood, soil, language, and religion and

without any ‘decadent’ foreign influences. The city was polluted by precisely these influences but this honest past had been kept alive in the German peasant farmer. As such, we need to imitate peasant culture, preserve peasant culture like onions in vinegar—rejuvenate peasant culture and so return to the glorious past.^[4] This way of thinking spread around Europe and can be seen in nationalistic movements in all European countries. In Finland, for example, the least Swedish-influenced area of the country was considered to be Karelia in the east, on the Russian border. As such, anthropologists were despatched there to interview the peasants and collect their folktales, which were ultimately published, in 1831, as the nascent nation’s national epic *Kalevala*. This unveiled a wonderful Finnish past in which the country had been an independent nation; something to strive towards, something to bring back to life by idolising Finnish peasant culture.^[5]

Progress

A rather different view also developed, perhaps indirectly from Rousseau but there are also Christian dimensions to it. This can be summarised as the belief that ‘things can only get better’. Our best days are not in the past. In fact, the past is a dreadful place and we should reject everything about it. Our best days lie in the future and, in fact, some kind of future state of perfection is not beyond our reach. This understanding of the world can be seen in the works of the 19th-century German philosopher Georg W.F. Hegel (1770–1831). For Hegel, all History was a process by which God, or the Absolute, attained self-knowledge. This process of God getting to know himself played itself out in this world with a series of dominant ways of thinking or ‘Spirits of the Age’. Each system of thought—‘thesis’—would lead to a reaction against it; an ‘antithesis’. This would lead to the production of a new thought; a ‘synthesis’. And so History progressed towards the Absolute fully understanding Himself; towards a future perfection.^[6]

Ideologies such as Marxism can be understood to be in line with this philosophy. For Karl Marx (1818–1883), History unfolds according to Hegel’s principles and the end of history is reached with the achievement of a communist utopia. As such, there is constant striving in Marxism, and related ideologies, towards the utopian future, which never seems to arrive because it is always in the future. There is a state of eternal Revolution, in which the symbols of the past, and in which anything seen as old-fashioned, must be shunned so we can hasten towards this future perfection and not slide back into the unfair, capitalist world of the past. Drawing on this ideology, various communist parties attempted to create this ‘Heaven on Earth’ in many countries. However, as the utopia is always in the future, they constantly had to fight against ‘enemies’ who might take them back into the past (reactionaries). One way they did this was through breaking connections to the past; driving out anything that was symbolic of the ‘past’ and of ‘outdated’ ways of thinking. This can be seen in the way that the Cultural Marxist movement influenced the English language. The cultural vanguard decides that a particular word is ‘offensive’ and replaces it with a different word which they eventually also decide is offensive—a process driven by continuous competition among themselves for the moral

high ground. In changing the language, we speak in an increasingly different way from people in the past, we are increasingly distanced from them. They and their ideas become increasingly alien to us.^[7]

However, the ideology of ‘Progress’ can also be seen in the world-view of many scientists. In the 19th century, their forebears developed so-called ‘stage theories’ as part of a broader thought system known as ‘social evolutionism’. Societies, they argued, all passed through roughly the same stages: first, they believed in magic and many gods, then, as they progressed, they moved on to believing in just one God, and, finally, they rejected belief in God and became scientific.^[8] This progress could potentially continue forever and ever, as we progress so far that ‘science fiction’ becomes reality. This is best encapsulated in the idea known as the ‘Singularity’, a term first coined by science fiction author Vernor Vinge in 1993 to describe the impact on society of exponential or ‘runaway’ evolution of computing power.^[9] In his 2006 book *The Singularity is Near*, the American inventor Ray Kurzweil argues that according to this ‘law of accelerating returns’ there will be an exponential increase in technological advancement in multiple fields such that by about 2045 we will reach the ‘Singularity’. This will be a turning point, when technological progress will be so rapid that it will outstrip the ability of humanity to comprehend it. Kurzweil predicts that these technological advances will irreversibly transform people. They will improve their minds and bodies with genetic alterations, nanotechnology, and artificial intelligence. Once the Singularity has been reached, Kurzweil claims that machine intelligence will be incomprehensibly more powerful than all human intelligence put together. Intelligence will then radiate outward from the planet until it saturates the entire universe.^[10]

In many ways, this world-view is quite similar to the philosophy of the French priest Pierre Teilhard de Chardin (1881–1955), who was a very popular thinker in his lifetime. He argued that evolution inevitably moved towards increasing complexity and therefore increasing consciousness and intelligence. Eventually, evolution would take us to an Omega Point of maximum complexity in which a kind of supreme consciousness and awareness would be reached.^[11] Elements of this world-view can also be seen in the Christian belief in the return of Christ who will usher in the Kingdom of God. For Church Father St. Augustine of Hippo (354–430), the world moves in a linear fashion from ‘creation’ to the return of Christ

and the End of Days. At that point, the elect will spend eternity in Heaven while everybody else will be damned to Hell.^[12] However, there is a slight difference here in that we will merely recreate a perfect past in Heaven. Either way, all these world-views seem to understand history as being linear. It has an end point, which we either move towards or try to return to.

Cycles

The third view is neither that our best days are necessarily behind us nor are they ahead of us. There is neither constant progression towards perfection, nor perfection in the past that we try to imitate as best we can. Civilisations follow cycles. They rise and fall. They reach a tipping point, they burn themselves out, they collapse, but new civilisations will eventually rise once more.

This world-view, of the cyclical nature of life, underpins many non-Judeo-Christian religions; religions, which we might call 'polytheist'. In Hinduism, there is no end time, nor even a beginning. There are three main gods who manifest themselves in different stages of the universe. Universes come into existence as Brahma, they follow the life cycle of Vishnu, and they are ultimately destroyed by Shiva, the goddess of destruction. Then Brahma breathes new life into the universe and the process begins afresh. Universes rise and fall, and so do people. If they live their life according to Hindu rituals they will be reincarnated as something higher; a member of a higher caste, perhaps. If they are a bad Hindu then they may be reincarnated as a dog. But they will always be reincarnated as something, because the cycle of life is eternal. We rise, we fall, and we rise again.^[13]

Europe's pre-Christian religions understood the world in very similar terms. For the Norse pagans, there was no real afterlife, in the sense of a state of eternal bliss. Depending on how you had lived your life, you would make your way to one of three worlds where you would simply carry on with your life much as you had lived it in 'Midgard', the world of humans. These worlds are Valhalla, for warriors, Niflheim, for honourable non-warriors, and Hel, for those who are not honourable. However, the world will culminate in Ragn rok, a huge flood and orgy of destruction in which many gods and most humans will be killed, effectively destroying the universe. But from these deadly waters, a new universe will arise and the cycle of life will start all over again.^[14]

Many Classical and Medieval writers observed that civilisations work in much the same way, as even in Classical times there were records of civilisations having already risen and fallen. These writers were the precursors of what is known in sociology as 'Social Cycle Theory'. Put simply, social cycle theorists argue that civilisations begin in a primitive

Dark Age. They grow until they reach a Golden Age of science and technology but they will eventually go into decline, fall into another Dark Age and ultimately rise once more. This was essentially grounded in a religious view of the world, rather like the Norse one. Plato, Hesiod, and Aristotle all conceived of cycles of existence, a Golden Age, the collapse of human order, and its subsequent revival, though this occurred, as in the Norse case, in the form of the rise of a new universe. The Roman philosopher Cicero (106–43 BC) understood the world to be influenced by the movements of the planets. These moved in cycles, he argued, and life on Earth reflected this with its different ages, including the different ages of civilisations. Eventually, we would reach the ‘Great Year’ in which the planets returned to their original positions and the cycle began anew.

However, it was the Greek philosopher Polybius (200–118 BC) who was the first to advocate, albeit implicitly, a cyclical philosophy of the rise and fall of civilisations wherein there was no metaphysical dimension. Polybius was from the city state of Megalopolis in Arcadia. The son of a senior politician, Polybius rose to be highly influential in politics himself. In analysing the rises and falls of dominant societies in the history of Rome and Greece, Polybius noticed that the same pattern could be observed again and again. Societies rise when they are religious, have a deep reverence for the past and for older generations, are prepared to engage in noble acts of self-sacrifice, and follow clear moral rules. These qualities ensure that they have a sense of superiority, a sense of their own destiny, that they are a cohesive community, and that they can be motivated to defend their society, even unto death. When they lose these qualities—which they inevitably do—then they fall. People become too rich and when this happens they lose their ‘fear of the gods’ and with it their selflessness and community spirit, their sense of eternal destiny, their reverence for older generations, and the strict moral rules which bind them together. By the time Polybius was writing, he was of the view that Roman society was itself in decline, as we will see in Chapter Eleven. Polybius also noticed that this process coincided with the same demographic decline that we have witnessed in the second half of the 20th century in the West: people, and especially the most intelligent people, simply stop having children.^[15]

Moving into the medieval period, we meet the Islamic scholar Ibn Khaldun (1332–1406). Ibn Khaldun was born into an aristocratic Andalusian family that had emigrated to Tunisia after the fall of Seville to

the Reconquista in 1248. He worked as an adviser or prime minister to various political leaders and established himself as a great philosopher. In 1400, he was caught up in the siege of Damascus. The leader of the siege, Timur, was so keen to meet the famous philosopher that Ibn Khaldun was lowered in a basket over the city wall and spent seven weeks in Timur's camp, lecturing him on the theory of history.^[16] Ibn Khaldun argued that central to civilisation was the concept of 'Asabiyyah', which translates as something like social cohesion or social solidarity. Asabiyyah will increase and reach a peak as civilisation advances but, ultimately, it will go into decline and, with it, the civilisation will go into decline and be displaced by another one in which Asabiyyah is stronger. It can be seen just how similar Ibn Khaldun's theory is to that of Polybius, though Ibn Khaldun directly spells it out.^[17] For Ibn Khaldun, conditions of something like group selection were strong among people who lived in the deserts. This meant they could only survive if they were high in Asabiyyah and manifestations of it such as religiousness and martial values. This high Asabiyyah allowed them to flourish and create cities. However, here the selection for Asabiyyah was lower because conditions were more luxurious. As such, after a number of generations Asabiyyah declined to an extent that they would be invaded by desert tribes that were higher in Asabiyyah and the cycle would begin all over again.^[18]

Modern Social Cycle Theories

The first prominent ‘modern’ advocate of this theory was the Italian historian Giambattista Vico (1668–1744). The son of a bookseller, he originally worked as a private tutor, but rose to become Professor of Rhetoric at the University of Naples and was the official historiographer to the king. Vico argued that states pass through three stages: the Age of Gods, the Age of Heroes, and the Age of Men. After the Age of Men, society collapses back into the Age of Gods and the cycle occurs all over again in the form of recurrence which is similar, though not identical to, the previous cycle. From his historical analysis, there appears to be some kind of upward spiral, with the successor cycle reaching a higher level of complexity than the previous one, but this is merely based on his observance of two cycles.

For Vico, the three ages of the cycle clearly took place in Ancient Greece and Rome. They began as simple, savage societies whose anxieties were allayed by the gods, whom they also feared. A simple aristocracy ruled over these societies and controlled them through religion or, as Vico terms it, ‘poetic wisdom’. However, this aristocracy was not highly distinct from those whom it ruled. From this, they developed into more complex societies where there was a much clearer divide between the ‘nobility’ (the heroes) and the ‘plebeians’, who fought to gain some of the privileges held by the nobility but were ruled by them. So, society has become less united. In the Age of Heroes, there is a conspicuous and highly distinct ruling class whose members battle with each other for control and to show their strength. In the Age of Men, the heroes cede some of their power to the plebeians. In the previous ages, humanity was ruled by religion and ritual and this upheld the power of the nobility. The plebeians advance their own interests, and undermine the power of the nobility, by advocating a rational way of thinking. This empowers the plebeians but also undermines religion and, in so doing, shatters cultural unity. Religiousness inspires people to work for the common good but now they focus only on the individual. Society splinters into ‘the barbarism of reflection’ in which civil wars are fought solely for personal gain. It duly collapses back to the Age of Gods. Vico argued that this can be seen in the Fall of Rome, as we will see in Chapter Eleven. In the Dark Ages, we then have a new ‘Age of Gods’.

Medieval Europe is the Age of Heroes and the Renaissance can be understood as the beginning of the Age of Men, in which society reaches an intellectual, cultural, and technological peak which is also its own undoing.^[19]

A number of scholars since Vico have explicitly analysed society in terms of cycles. Oswald Spengler (1880–1936), a German philosopher, produced the two-volume *The Decline of the West* in 1918.^[20] Spengler was a morose and depressive character. The son of a postal clerk, he attended several universities, and eventually focused on philosophy, but then failed his doctoral thesis—on the Greek philosopher Heraclitus—in 1903. This humiliation essentially ended his chances of an academic career. Spengler passed his PhD exam in 1904, wrote another thesis so he could qualify as a school-teacher, and then had a nervous breakdown in 1905. He worked as a school-teacher until 1911 when his mother died, leaving him independently wealthy. Avoiding military service due to a heart defect, he spent the rest of his life as a writer. He met Hitler and was so unimpressed that, in 1934, he published the best-selling book *The Hour of Decision*.^[21] Being critical of National Socialism, it was duly banned. Spengler died of a heart attack shortly before his 56th birthday.^[22]

Comparing societies to organisms, Spengler argued that all societies that have ever existed—though they may differ markedly in specifics—go through the same fairly clear stages that organisms do: birth, youth, maturity, decline, and death. In its spring, the society is characterised by a ‘culture’ which is based around a strong sense of religiousness. This bears fruit in its summer, in which we then see the height of its creative achievements: its epics, its poems, its plays; all of them religiously inspired to some extent. The culture is vital, optimistic, and does not question its own destiny. However, as it matures into the autumn of its years, it becomes urbanised and wealthy. There appears a Socrates or a Rousseau who questions everything and we enter an age of rationalism in which technological progress goes hand-in-hand with scepticism about religion, aristocratic rule, tradition, and everything that has held society together. At first this generates optimism about a better future, in which standards of living are much improved. Indeed, the society is so certain of the utility of its rational way of thinking that it motivates empire-building and the spread of its way of thinking, often via a political figure: Caesar, Napoleon, or

Cecil Rhodes. But, on the other hand, there is a decline in religious certainty, with everything focused around material wealth.

This process of rationalisation continues, and every idea is questioned, then everything is rationalised down to money (even having children), all of the old ways are despised, and there is no longer any optimism or soul holding society together. Society is strongly individualist and we enter the winter of civilisation. The constant critique, and artificial attempt to create meaning, leads to a nihilistic, pessimistic world and a gulf between the money-focused elite and the masses, because there is no longer any religious belief that the position of the elite is somehow deserved. Society becomes fragmented, democracy and order break down and demagogues take over, leading an increasingly alienated mass. This is the Age of Emperors. These Emperors are given extraordinary powers to sort out the mess of conflict that society has degenerated into, including problems of external invaders. The despair which people feel is lifted by vague religious yearnings. They engage in religious practices of various kinds but don't really believe them. But as society becomes yet more chaotic we see the development of a 'Second Religiousness', which is an anti-intellectual and rehashed version of the religion on which the society was founded. So, in Rome, argues Spengler, we see the rise of the Cult of the Emperor and, in particular, the Mystery Cults, where members were initiated into secret practices and worshipped specific gods. The Emperor Julian the Apostate (r.361–363), who attempted to re-convert Christian Rome back to paganism, was an initiate of the Cult of Mithras, for example.^[23] Spengler insists that, when he was writing, the West's Second Religiousness remained a number of generations into the future. During this period, society becomes so badly weakened that it is often taken over by societies which are more youthful, and descends back into a Dark Age, to be reborn anew.^[24]

Many other historical theorists have presented models to understand the rise and fall of civilisations. An entire volume could be written on this subject alone. For example, the British historian Arnold Toynbee (1889–1975) observes that civilisation is based around an increasing ability to solve problems and it is those who are most able to do this who become the society's 'elite' or, as he terms it, society's 'creative minority'. Eventually, their ability to solve new problems stagnates and they stay in power not because they deserve it, but by force, in a declining society. This leads to a

resentful internal proletariat and an equally resentful external one in less wealthy border societies, both of whom are poor and excluded. Eventually, they rise up and take over, and the society collapses.^[25]

A variation of these models can be seen in the work of the English vicar Thomas Malthus (1766–1834). In his book *An Essay on the Principle of Population*, Malthus proffered a beautifully simple cyclical theory of how the growth and contraction of a society operates.^[26] When there is an abundance of resources and a small population the standard of living is relatively high, because there is more than enough land and food to sustain the population. Precisely because conditions are auspicious, the population will grow and eventually it will reach the maximum possible population that the ecology can realistically sustain. However, this will also mean that living standards for most of the population will have declined and, in addition, the situation will be highly unstable. It will take little more than a few bad harvests or a period of pestilence to cause a population collapse. Once this happens the cycle simply begins all over again. This has obvious implications for the development of civilisation.

The application of Malthusian theory to more general social cycle theories is an important nuance. Just as a social cycle theory argues that history is not a simple progression towards perfection characterised by constant improvement, the same can be said of cycles of civilisation. Looking at the life cycle of any civilisation, though we may note a general progression towards the summer of civilisation followed by a decline, it will not be entirely smooth. There will be cycles even within this process; periods in which civilisation goes backwards within a broader progression or forwards within a wider decline. Following Spengler's seasonal metaphor, we might conceive of these as rainy days in summer or warm days in winter. The period surrounding the World Wars, for example, might be conceived of as some wintry days in autumn. They are entirely congruous with the innovation rate graph we have already examined whereby per capita eminent individuals increase between 1600 and 1825 and then go into decline. This is the overall pattern, but there are many 'humps and bumps' within this. In fact, these regressions are generally explicable in terms of wars and famines, which would be congruous with the Malthusian model.

The progress towards and regress away from the heights of civilisation is not linear but oscillates due to economic factors and religious factors,

among others. However, at some points, society falls so far from the heights of civilisation that we can talk about it having collapsed. It's also worth noting that the history of any cycle of civilisation seems to involve a number of intense periods of intellectual curiosity, and it could be plausibly argued that they are actually caused by the chaos that precedes them. Sergey Nefedov has identified eight Malthusian cycles in the history of Europe. (1) The Republic of Rome; (2) The Early Roman Empire; (3) The Christian Empire, ended by the Barbarian invasions; (4) The Dark Ages and the Middle Ages, ended by the Black Death; (5) The first cycle of the Modern Age, ended by the English Civil War; (6) The second cycle of the Modern Age, ended by the French Revolution and Napoleonic Wars; (7) The Industrial Age, which seems to have broken the Malthusian cycle.^[27]

An example of this can be seen in the Black Death in Europe. By the late 1340s, the European population had become unsustainably high, leading to famine and so it became a weakened population. When the plague hit, therefore, it was unleashed on people who already suffered from weakened immunity. This made it far more catastrophic than other outbreaks of plague and it killed around a third of the European population. However, it wouldn't have been a random third. It disproportionately impacted the poor. In some areas of England, up to 80% of the labouring class was killed.^[28] They were more likely to be killed because their poor living conditions and poor health made it much more likely that they would catch and die of plague. They would also, on average, have lower g than the higher classes, meaning they would be less forward-thinking and so less likely to follow strategies that would help them avoid catching the plague, such as avoiding people that seemed to have it. As such, we would expect that the Black Death would have increased the average IQ of Medieval Europe quite dramatically. The Black Death was followed by a period of depression and war, which would likewise have heavily affected the poor, which ended towards the end of the 15th century. It is likely no coincidence, therefore, that the Renaissance, a marked period of intellectual curiosity, began in earnest around one hundred years after the Black Death. Furthermore, with a much-reduced population, living standards significantly increased; further aiding intellectual development. The end of this period, around the middle to late 17th century, was also marked by plague and famine and it may be that this assisted the development of the

Enlightenment and the Industrial Revolution by, once more, boosting European g in a relatively sudden way.

Cutting Through it All with General Intelligence

These theories are all extremely thought-provoking and are the products of some of humanity's greatest and most pensive minds. But they raise a very simple question: what is underpinning the whole process? The essence of science is 'reductionism'—trying to get down to the simplest possible root cause of things; striving to achieve a theory of everything. What is it that is behind the way in which civilisations appear to rise and fall, flower and decay?

Whatever answer we suggest, there will be those who will accuse us of over-simplifying things, who will nit-pick the validity of the model by noting that it doesn't work precisely with some obscure civilisation or other; or demand that we respond to an infinite regress of very unlikely possible alternative explanations before we can possibly have any confidence in our case. Our response to those people is that this is real life and real life doesn't work like this. If someone told you not to get out of your car in the Woburn Abbey Safari Park lion enclosure in Bedfordshire because the lions will probably kill you, we would suggest that is a very good piece of advice based on empirical evidence regarding how lions behave. Of course, if you wanted, you could assert that it was simplistic to argue that all lions are dangerous. You could highlight some outlier example of a really friendly lion that licks children and befriends kittens. You could demand that we prove that all people who have previously been killed by lions didn't in fact coincidentally die of something else in the presence of the lion. Or you could ask, with great profundity, 'But, what do you mean by "lion"?' and refuse to accept the argument until 'lion' is perfectly defined, which, obviously, no category can be because they all involve drawing artificial borders; breaking up reality into manageable chunks that allow us to make successful predictions. If you followed these pseudo-intellectual strategies at the Safari Park in Bedfordshire, you would almost certainly be killed by a lion. As such, they fail the philosophical test of pragmatism, a test proposed by the American philosopher William James (1842–1910).^[29] Pragmatism argues that theories are tools to better understand, and find our way through, the world. Following the kind of arguments we have highlighted would simply lead to death, because no

decisions could ever be made. They are intellectual posing and should be dismissed out of hand.

So, having despatched such arguments, what is the fundamental factor behind the growth and shrinkage of great societies throughout history? We would argue that the fundamental issue, as Ronald Fisher earlier argued, is ‘intelligence’, or more specifically ‘*g*’. Put simply, in their early stages civilisations have relatively low *g* and are extremely unstable and dangerous places to live. People are under extreme conditions of group selection. For this reason, they are highly religious, as religiousness is associated with stress.^[30] Religiousness has been shown to be weakly negatively associated with *g* in many different societies among population samples.^[31] It is also positively associated with positive ethnocentrism (the belief that your society is superior and a desire to make sacrifices for your society) and negative ethnocentrism (the belief that other societies are inferior).^[32]

As already noted, research with computer models has shown that the more ethnocentric a society is, the more internally cooperative it will be. All things being equal, a more ethnocentric society will always predominate over a less ethnocentric one, according to computer models. In these models, you set up a grid with different coloured dots, which reproduce asexually at certain intervals. If you ‘cooperate’ when you are next to another dot, you damage yourself slightly but you aid the other dot. There are four kinds of dot or ‘agent’: humanitarians (they always cooperate), selfish (they never cooperate), ethnocentrics (they only cooperate with their own colour), and traitors (they only cooperate with other colours). Eventually, after a number of generations, the ethnocentrics dominate the grid.^[33] This means, and this is a point that will become very important later, religion can be understood as a matter of group selection. When two roughly similar groups are in conflict, because they are expanding, there will be group selection for religiousness. The more religious group under these conditions will triumph.

As such, in the early stages of civilisation there is individual level selection for *g* and a kind of selection—at the group level and even the individual level—for religiousness. Society has a sense of divine purpose, is strongly united, it is under intense selection pressure, and it is becoming ever more intelligent, as only the richest pass on their genes. Assuming the selection intensity for *g* is strong enough, the society will develop into a

civilisation—of great intellectual ability—and become highly urbanised. However, this will also be its undoing. In effect, it will become ‘too intelligent’ and this will lead to the civilisation’s collapse.

Religiousness has been shown to be associated with stress, as we have already noted. People become more religious at times of stress, religious experiences tend to occur at times of stress, and those who are high in Neuroticism—meaning they suffer strongly from stress—are prone to periods of religiousness.^[34] Religiousness is about 40% heritable, so it seems to be an evolved disposition, one of the purposes of which is to help us cope with stress.^[35] With a very high level of average *g*, society will create an environment that is so low in stress—at least for the better off—that they will become less religious, something which will also occur due to their very high level of *g*.

This will have further consequences. Stress is also likely to engender fertility, as producing lots of children hedges against the fact that relatively few may survive—thus with the relaxation of environmental and social stress, fewer children need to be produced. Simply put, knowing that they don’t need a large family to guarantee the survival of their children, intelligent people will only have a small family. Also, their high *g* and interest in intellectual pursuits may mean that they manage to rationalise having no children at all. By contrast, those with lower *g*, who are relatively more impulsive, will have high fertility, by accident. In previous times, these accidental offspring would have likely died young. But in a society with better living conditions and better medical knowledge, this will be less likely to happen. In addition, as the standard of living increases, stress levels will be reduced and people will become more altruistic and caring towards the less fortunate in society and will be wealthy enough to sustain them with a system of welfare. These processes will remove checks on the fertility of the poor and thus on those lower in *g*. It will reduce the strength of selection favouring higher *g*.

Virtue Signalling and Equality

At the same time, members of this comfortable elite will compete for intellectual or moral status with other members of the elite by critiquing the society's religious traditions and attempting to display their altruism, a point made by the German psychologist Volkmar Weiss.^[36] The rise of social media has brought the subject of competition for moral and intellectual status into stark relief. Whenever there is a tragedy, such as the terrorist attacks in Paris in 2015, Facebook will soon be awash with slogans such as 'Pray for Paris' or people altering their profile picture so that the background is the French flag. Such behaviour, of course, in no way helps to fight terrorism or assist those who are affected by it. It is simply a form of virtue signalling; a way of indicating to the community that you are a kind person, kindness being a socially and sexually valued quality. The effect of this, however, is to create an arms race of competitive altruism and this can be seen in the changes in focus of the political left in England since the 1940s.

In the 1940s, the focus of the left was the condition of the working class. This was at a point at which there were still influential people who were opposed to concepts such as the National Health Service, high levels of unemployment benefit, redistributive taxation, and similar ideas. Once everybody, in public at least, pretty much accepted these ideas then status could no longer be accrued by advocating them. So, a competition developed to continuously increase levels of unemployment benefit and also to move the focus onto the issues of racism and sexism. People began to signal their superior virtue by stressing how non-racist they were. This led to a new anti-racism arms race until almost nobody would openly admit to being racist by the 1990s. And so while this arms race continues, a new one began with regard to sexual orientation and signalling your virtue by stressing how much you want to help those of a non-traditional sexual orientation. This arms race has led to innovations that would have been unthinkable twenty years earlier, such as gay marriage and unisex public toilets.

But another arms race occurs at the same time. We might term this an 'intellectual' arms race. The elite compete with one another to signal their high *g* and originality. They do this by questioning and critiquing all

aspects of tradition. There is a strong focus on questioning religious tradition but this can extend to questioning all traditional norms, including the social hierarchy, sex roles, traditional models of sexuality, and so forth. Again, this creates an arms race of ever more extreme views which eventually become the norm.

This will have the effect of undermining the basis of the traditional hierarchy and permitting the rise of new forms of religion, which help to promote those who are not part of the elite. And they will then promote ideologies based around equality, as these will be in their interests. This will contribute to an atmosphere in which all people must be considered equal. This being the case, it will be difficult and even dangerous to attempt to advocate a policy which would reverse the process of g decline, a point also made by Volkmar Weiss.^[37] Policies of this kind simply could not be instituted in a democracy. Weiss also observes that democracy and socialism are obvious examples of these equality-based ideologies. They both treat all people as equal (either in absolute terms, or in terms of their capacity to jointly contribute to the commonweal via political participation) and, in the case of socialism, transfer resources from those with higher g to those with lower levels, aiding the genetic interests of those with lower g .

And this will be potentiated by the decline of religion. When you control for social class, religiousness is a significant predictor of fertility: the more religious you are, the bigger your family is likely to be. This may be because many religions teach that children are a blessing from God and you should have as many as possible. But, as the elite become more intelligent, less stressed, and less religious, their fertility is likely to be impacted for this reason. There's no God who demands they 'go forth and multiply', so why bother? Why not just 'drink, eat and be merry, for tomorrow we shall die'? By having a small number of—or even no—children, such people help to preserve a relatively high standard of living, but it is at the expense of their genetic interests. This compounds the g decline and also leads to a society—and particularly its elite—that is low in ethnocentrism and is nihilistic. These views will spread down the society as the elite tends to be imitated in a process known as 'trickle effect',^[38] highlighted by the German sociologist Georg Simmel (1858–1918). Also, people lower and lower down the society will be less and less stressed.

As g declines, society will stop working as well, levels of crime will increase, levels of trust will collapse, and democracy will be debased. We

have already observed the way in which, as societies develop, social differences become more pronounced. Indeed, the French economist Thomas Piketty has shown—using 250 years of French tax records—that wealth inequality increases as economic growth increases.^[39] So, because no religious certainty sanctifies the position of the (ever more elite) elite, they will find themselves challenged by organised members of the proletariat advocating ideologies of equality. As these grow in power, the decline in g will become even more pronounced as resources are transferred from the rich to the poor, encouraging the latter to be more fertile. As such, an internal proletariat or external proletariat will be able to take over, and we will now be in the winter of civilisation. As the society lacks the unifying force of religiousness, it will be easy for Ibn Khaldun's 'desert tribesmen' to invade the society. The society will stop innovating and will eventually start to go backwards, becoming less rational and more religious as levels of stress begin to increase. This is likely to continue until it returns to pre-modern levels of selection for g . From this it will—in some form—rise from the ashes. In other words, the society will continue to decay until conditions are so harsh that selection for g and religiousness are re-established and then, as Ibn Khaldun argues, the cycle will begin all over again.

Even the Malthusian model—which is in theory entirely environmental—would be less question-begging if g were a dimension of it. As Volkmar Weiss has noted, under Malthusian conditions, intelligence is positively associated with fertility and, thus, continuously selected for. However, this eventually leads to an Industrial Revolution in which the pace of development—and the rise in living standards—outpaces population growth. As such, the Malthusian cycle—of a period of wealth leading to an unsustainably high population and thus a population collapse—is broken. The population climbs and climbs and g is no longer being selected for. Indeed, with the rise of reliable contraception and very high living standards, selection for g goes into reverse. Eventually, due to the resultant decline, society will run out of ways to sustain its rising population. Indeed, this would be reflected in declining per capita major innovation rates, which we have already discussed. The population will lose its ability to master systems that were comprehensible when societal g was higher. This will lead to a population collapse, uprisings, and a decline of civilisation. In addition, we can add that the decline of religion—caused partly by the

society's high standard of living—would mean the elite were no longer united or motivated, making a revolution more likely to succeed. However, it is quite likely that the higher g members of the population—who would be wealthier and more far-sighted—would be more likely to survive this societal collapse. Thus, the collapse of civilisation would boost the g of the remnant population, such that the cycle of development could begin anew.

Climate Change

However, there is another model of the collapse of populations which may also contribute to understanding these cycles. It has been proposed that the key culprit may in fact be climate change.^[40] Cold temperatures are known to make populations more violent. This makes sense, as crops are more likely to fail when the weather is inclement, thus starving populations will seek to expand in order to secure resources. It has been noted that temperatures were considerably lower in Early Modern Era Europe than they are today. This was due to the *Little Ice Age*, which corresponded with a period of very low sunspot activity called the ‘Maunder Minimum’. Research has shown that cold correlates with warfare and inter-group violence—the Little Ice Age corresponding with a series of extremely violent conflicts in Europe called the *General Crisis of the 17th Century*.^[41] Recall that this was a period of extremely high mortality, especially among the poor, and also downward social mobility (as described by Gregory Clark, whom we met earlier). So, if the cold and hunger didn’t kill you, violence or disease would, hence the cold, both directly and indirectly, promoted the fitness of those with high *g*. Recall also that geniuses were increasing in prevalence during this time period. Again, this would be consistent with the presence of inter-group conflict and group selection—the geniuses being most numerous in the biggest, smartest, and most successful groups.

During this time period, the most successful populations (such as the British) were establishing empires. These caused massive additional population growth to occur. By the start of the Late Modern Era in the mid-18th century, global temperatures had started to increase, however. The ecological stress on the populations of Europe would have started to reduce. Fewer people died of exposure or hunger. Populations became more peaceful as well, with conflict dropping to very low levels after the Napoleonic Wars in a period called *Pax Britannica*—literally the ‘British Peace’.^[42] This was a time period in which the fruits of genius were making life more tolerable for everyone. There were innovations in hygiene, medicine, and labour saving technologies. These boosted economic efficiency and led to social innovations, such as the first serious welfare economy having first been introduced in Germany in the 1870s.^[43] Less

distressed and better looked-after but ultimately pacified populations fell into the regime of individual-level selection favouring those with low IQs, which became exacerbated as it became easier for high-IQ individuals to better control their fertility.

In a more recently published monograph, a team of psychologists tested this empirically using 400 years of temperature means, an index of group selection strength (which was comprised of converging measures of per capita war fatalities, the frequency of altruism words across texts, and the proportion of Anglo-derived people to the rest of the world's population), and the utilisation frequencies of the four high-difficulty WORDSUM words tracked using Google Ngram Viewer, graphed in Figure 7. It was found, consistent with predictions, that the increase in global temperature negatively predicted the intensity of group selection, which in turn positively predicted the level of g . So as the climate warmed, group selection declines, which in turn reduces the level of g .^[44]

Basically, we can understand the rise and fall of civilisation in terms of a number of interrelated models which are ultimately underpinned by g . In the next chapter we will look at how this social cycle model applies to what is surely the greatest civilisation before our own: Rome.

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⁵ Wilson, W. (1976) *Folklore and Nationalism in Modern Finland*, Bloomington, IN: Indiana University Press.

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⁷ Ellis, F. (2004) *Political Correctness and the Theoretical Struggle: From Lenin and Mao to Marcus and Foucault*, Auckland: Maxim Institute.

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¹⁰ Kurzweil, R. (2006) *The Singularity is Near: When Humans Transcend Biology*, London: Penguin.

¹¹ Teilhard de Chardin, P. (2004) *The Future of Man*, New York: Doubleday.

- [12](#) See: Levering, M. (2013) *The Theology of St. Augustine*, Ada, MI: Baker Books.
- [13](#) For an introduction to Hinduism, see: Flood, G. (1996) *An Introduction to Hinduism*, Cambridge: Cambridge University Press.
- [14](#) See: de Benoist, A. (2004) *On Being a Pagan*, Augusta, GA: Ultra.
- [15](#) See, McGing, B. (2010) *Polybius's Histories*, Oxford: Oxford University Press.
- [16](#) Turchin, P. (2007) *War and Peace and War: The Rise and Fall of Empires*, New York: Plume, pp. 346–347.
- [17](#) See: Fromherz, A. (2010) *Ibn Khaldun, Life and Times*, Edinburgh: Edinburgh University Press.
- [18](#) Turchin, P. (2007) *War and Peace and War: The Rise and Fall of Empires*, New York: Plume, p. 92.
- [19](#) See: Rossides, D. (1998) *Social Theory: Its Origins, History and Contemporary Relevance*, Lanham, MD: Rowman & Littlefield. See also: Packwood Adams, H. (1970) *The Life and Writings of Giambattista Vico*, New York: Russell & Russell.
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- [21](#) Spengler, O. (1934) *The Hour of Decision*, New York: Alfred A. Knopf.
- [22](#) For a full biography see: Hughes, H.S. (1992) *Oswald Spengler*, New Brunswick, NJ: Transaction Publishers.
- [23](#) For a biography of Julian the Apostate, see: Bowersock, G.W. (1978) *Julian the Apostate*, Cambridge, MA: Harvard University Press.
- [24](#) Spengler, O. (1991) *The Decline of the West*, Oxford: Oxford University Press.
- [25](#) See Burke, P. (2005) *History and Social Theory*, Cambridge: Polity Press, p. 158.
- [26](#) Malthus, T. (1992) *An Essay on the Principle of Population*, Cambridge: Cambridge University Press.
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Eleven

Did Other Civilisations Show a Rise and Fall in General Intelligence?

We have already met the Roman historian Polybius (200–118 BC). He wrote *The Histories*, many centuries before the Fall of Rome, which is conventionally put at the year 410, when the city was invaded by Germanic hords. When Isaac Newton (1643–1727) attended school in the mid-17th century, Roman culture was considered to be so important and unsurpassable that his school taught Latin and pretty much nothing else. This is no longer the case in English schools. Though most pupils are taught about the Roman Empire at school, history classes are far more likely to focus on ‘modern history’ and, in particular, the history of the 20th century. So, before we look into the quite uncanny parallels between Roman civilisation and its successor, it would be handy to quickly recap the history of Rome.^[1]

Rome was established in the 9th century BC and was originally ruled by hereditary kings. It developed a polytheistic religion, in many ways comparable to modern day Hinduism. The emphasis was on blood bonds and ritual rather than belief, and religious practices varied substantially by Italian region. The Republic of Rome was set up in 509 BC and by the 3rd century BC Rome dominated the entire Italian peninsula. By this time around 310,000 people lived in Rome itself. The nature of Roman government, from around 509 BC, was of a senate composed of members of the Roman nobility—the ‘patricians’. In addition, there were elected popular assemblies and annually elected magistrates, which meant there was civic participation from the city’s freeborn non-noble men: the ‘plebeians’. Beneath these were the slaves. They were, however, granted various freedoms, could be highly educated and influential, and could sometimes earn enough to buy their freedom.

By the last century BC, however, Rome had developed into an empire and was bereft by conflicts. Non-Roman freemen within Italy fought for the same rights as Romans. There were wars between Rome and its allies,

who had fought for Rome and were angry that they were not sufficiently rewarded. There were also a series of slave revolts, motivated by the slaves not being treated properly or being impoverished. Italy was seriously threatened by bands of escaped slaves, led by Spartacus (c.111–71 BC), between 73–71 BC, who looted the countryside. The semi-democratic Republic was simply unable to solve these problems and it collapsed into military dictatorship under Julius Caesar (100–44 BC). With his assassination, Rome moved towards autocracy and by 44 BC it was now an imperium, under the Emperor Augustus. However, it was not a strictly hereditary imperium, in the sense of the crown passing to the eldest son. New emperors would be declared by the senate or installed by the Praetorian Guard; the emperor's body-guards. This dictatorship was, therefore, highly unstable and was characterised by civil war, autocratic leaders, rebellions, coups, and a number of emperors being assassinated, such as Caligula and Commodus. From 235, when an emperor was again assassinated, there were 26 emperors over a 50-year period.

Eventually, the Empire began to become Christian with the conversion of the Emperor Constantine (sole ruler 324–337). Further rebellion meant it was split in two, with the centre of power moving to Byzantium. By this time, Rome's population was well down from its peak of around a million. By 410, the city—corrupt and plagued by internal strife—was sacked by Germanic tribes from within the Empire. In 480, the last Roman Emperor (in Rome) was murdered and replaced by a barbarian general. The population of Rome decreased to about 100,000. Rome's population simply pillaged or recycled its cultural artefacts, a process of vandalism that continued until the Renaissance.

Rome and General Intelligence

The above is undoubtedly a simplified summary of the rise and fall of Rome. But even such a brief summary strongly hints at the place of g in the process of Rome's rise and fall. Of course, there are numerous theorists who have attempted to explain the decline of the Empire. However, many of these are simply descriptions. The British historian Edward Gibbon (1737–1794) famously wrote:

‘The victorious legions, who, in distant wars, acquired the vices of strangers and mercenaries, first oppressed the freedom of the republic, and afterwards violated the majesty of the purple. The emperors, anxious for their personal safety and the public peace, were reduced to the base expedient of corrupting the discipline which rendered them alike formidable to their sovereign and to the enemy; the vigour of the military government was relaxed, and finally dissolved, by the partial institutions of Constantine; and the Roman world was overwhelmed by a deluge of Barbarians.’^[2]

This in no way explains *why* these processes occurred and leads us to ask why Rome degenerated into dictatorship, particularly when democracy is predicted by high g . More recently, the historian Ramsey MacMullen has argued that rising corruption was the reason for the collapse of Rome.^[3] But why was there rising corruption? As we have seen, corruption is predicted by low g . Yet another idea is that lead poisoning was behind the process.^[4] The upper class were more likely to have drunk water from (lead) pipes and been poisoned by it. This, of course, seems to imply that g may have been relevant to the fall of Rome. However, critics have shown that the level of lead in the pipes simply wouldn't have been sufficient to poison people.^[5] We would suggest that the simplest explanation, which accounts for the descriptions we have looked at above, was declining g and specifically in relation to low fertility among those with higher g in the Roman Empire. Let us explore this explanation.

In the beginning, as Rome began to develop, it was a monarchy and we wouldn't expect its average g to be particularly high. But Rome would have been under the same conditions of pre-industrial selection that we observed

were the case in Early Modern Europe. So, we can reasonably expect that there would be selection for g , with the result that this would be increasing every generation. By around 400 BC, we see evidence that average g is likely to be relatively high. We have already seen that g is associated with certain forms of behaviour and attitudes; in particular cooperation, civic participation, support for democracy, high levels of trust, and the ability to solve social problems. All of these characteristics would appear to be reflected in the form of government maintained by the Roman Republic by this time. General intelligence is also associated with, really, any ability to deal with complexity, so we also see increasingly complex buildings and forms of art. Living standards would be much higher, in general, than they had been in the past, especially among the Roman elite.

As the process of increasing g and consequent increasing living standards continues, we start to see a rather interesting development, which has been set out by Gerhard Meisenberg in his book *In God's Image*.^[6] Those who are part of the elite, and whom we would therefore expect, on average, to be among those with the highest g , seem to begin to limit their fertility. This could be seen in Greece, then part of the Roman Empire, during the time of Polybius—that is, the 2nd century BC. Polybius famously wrote that:

‘In our own time, the whole of Greece has been subject to a low birth rate and a general decrease of population, owing to which cities have become deserted and land has ceased to yield fruit although there have neither been continuous wars or epidemics... For men have fallen into such a state of pretentiousness, avarice, and indolence that they did not wish to marry, or if they married to rear the children born to them or at most, as a rule, have one or two of them.’

Now, obviously, this is highly impressionistic—Polybius doesn't present us with hard data—and he is merely a source with his own motivations and should be treated as such. The above quote is likely to be mainly referring to the kinds of Greeks with which Polybius was intimately acquainted—members of the elite, rather than Greeks in general—or the population collapse would have been incredibly rapid. But, even with those reservations, the implication is that members of the Greek upper class, who

are experiencing a very high standard of living, are choosing to have only small numbers of children and, in some cases, no children at all. This observation would quite precisely parallel what has been observed in modern times. Among elite Greeks g had risen to the point that they were able to rationalise whether or not to have children. In that they were wealthy, their child mortality rate would have been relatively low, so it would have made sense to have only a small number of children, confident that they'd probably survive into adulthood. And these children could then enjoy a high standard of living, each with a larger share of the family money invested in them than they'd otherwise receive. The Ancient Greeks used various forms of contraception, those with higher g would have been more efficient users of contraception, and so we would be left in a situation where, in the 2nd century BC in Greece and very probably in Rome also, there was relatively low fertility among those with the highest g .

Certainly, two centuries later this was recorded as being the case in Rome itself. Two centuries after Polybius was writing, during the reign of the Emperor Augustus, it was commonly understood that members of the Roman aristocracy simply weren't having many children. The poet Ovid recorded this change at the time in his poem *Nux*:

‘But since more plenteous honour has come to planes that yield a sterile shade, than to any tree, we fruit-bearers also (if as a nut tree I am counted among them) have begun to luxuriate in spreading foliage. Now apples grow not every year, and injured grapes and injured berries are brought home: now she that would seem beautiful harms her womb, and rare in these days is she who would be a parent.’^[2]

There were even attempts by the Roman authorities to incentivise the upper classes to have more children, notes Meisenberg, but they simply didn't work. With access to contraception, the Roman elite were able to limit their fertility while still enjoying sex. This was not really possible for the Early Modern elite because the knowledge of contraception had been lost in the Dark Ages, but it was possible for the Roman elite and, to some extent, it would likely have permeated further down the society. The result was quite predictable: in the absence of modern medicine to check the mortality rate, the population would decrease in general, which it certainly

did. The population of Italy fell from about 7.4 million in the age of Augustus to a mere 2.4 million by 600 AD. In addition, clearly, the population would have lost g , as, in each generation, the higher- g members of the society failed to reproduce, or failed to reproduce in sufficient numbers.

It is likely that an important dimension of this fertility decline is the decline of religion. As we have seen, religiousness—in the sense of believing in and worshipping supernatural powers—is weakly negatively associated with g . As g increases, people, therefore, tend to become less religious. This can even be seen across the human lifespan, as g rises throughout childhood and adulthood to a peak in middle age, and, thereafter, cognitive decline sets in. Very young children tend to adhere to fairytale beliefs, in which almost everything can be explained by some kind of supernatural agency. Hence, they are happy to believe in Father Christmas, the Easter Bunny, and the Tooth Fairy. Older children, aged around 9, tend not to hold these beliefs, but they almost all believe in God. They tend to start questioning this belief when they are teenagers and, by middle age, atheism is at a peak. In much the same way, we would expect religiousness to go into decline as the society's level of g rises. Another dimension of religiousness, as we have seen, is stress. Those who are low in stress are generally less religious.^[8]

This being the case, we shouldn't be surprised that the middle era of the Roman Empire, in which it was at its height, sees the questioning of traditional religious values by members of the Roman upper class. A level of g and of material comfort has been reached whereby those who are highest in g and are consequently the most materially comfortable are in a psychological position where they are able to do this. Also, as we have discussed, they can gain socioeconomic status from displaying their g via signalling their altruism, pushing for a new religion based around equality. We see, in a way that had already occurred in Ancient Greece, the rise of secular philosophies, which were originally developed in Ancient Greece, such as Stoicism, which are highly questioning of traditional religion. Accordingly, some people begin to consciously renounce worldly ideals, just as already happened in Greece. In effect, argues Meisenberg, a growing group of—mainly elite —people have taken control of their lives. They no longer believe, for example, that whether or not they end up with a large family is simply in the hands of the gods. And to the extent that traditional

religion might encourage fertility, they don't really care. As such, the rise in g would be likely to go hand-in-hand with a decline in religiousness. This would compound the decline in fertility among those with the highest g in the Roman world. In the absence of the massive Flynn Effect, set off by the Industrial Revolution, these factors would be sufficient to bring on a collapse in civilisation within a few centuries, and this is precisely what happened. As already noted, by the time of Julius Caesar, Rome has degenerated into chaos and, as Spengler would predict, the response to this is the collapse of democracy, Caesarism, and Rome's Second Religion.

At around the same time, however, we see the rise of Christianity in the Roman Empire. This begins as a religion of the poor and dispossessed and, therefore, those who are likely to have relatively low g . Following Ibn Khaldun, it is the religion of Rome's desert tribesmen and it is quickly able to spread to its own dispossessed people. As the g of Roman society declined, society became increasingly stressful to live in, and even the Second Religion became debased, Christianity began to make its way through Roman society. The Roman historian Tacitus (56–120) noted that the Jews held contraception to be taboo and Christians inherited this taboo relating to contraception. Accordingly, we can reasonably assume that the fertility of the Roman lower classes, which would already have been relatively high compared to that of the upper classes, would have been further increased by the rise of Christianity. This would have helped to further reduce the average g of the Roman people. In this regard, Meisenberg has done some rough calculations of the impact. He writes:

'Let's assume that during the 14 generations from A.D. 50 to A.D. 400, Christians raised on average 20% more children than their pagan compatriots because of these religious injunctions. Without any conversions at all this would have raised the percentage of Christians in the Roman Empire 10 fold, from, say, 2% to 20%. This is almost enough to explain the rise of early Christianity.'^[9]

This process, as we have already discussed, would have been rendered even more pronounced by the Christian emphasis on not being 'worldly', which encouraged monasticism and renunciation of sex. Thus, Christians who were both high in g and highly religious would be discouraged from having any children, further reducing the average g of the population. In

addition, Christian Rome banned abortion and exposure of unwanted infants, which would normally have been practised by those of low g . This would have further helped to decrease the g of the population. Following Ibn Khaldun, Rome's g and religiousness were lowered by weakened group selection. This was because Rome was declining rather than expanding as it was no longer competing as strongly with other groups. In addition, as we have seen, religiousness can be understood as being a group selection phenomenon. Accordingly, not only would levels of Roman genius have been reduced but it would also have lacked sufficient ethnocentrism and solidarity, being religiously split. It was duly invaded by barbarians, its very own desert tribesmen.

So, in Ancient Rome, we can see a process that neatly fits with the social cycle model of the rise and fall of civilisations. In essence, the society's level of g became too high, the people too comfortable and, although it seems callous, really rather too kind for their own good. All of this coalesced into a decline in g , as the higher- g portion of society lowered its fertility, leading to fewer people, as a percentage of the population, who could maintain the mechanics of the civilisation. As g declined, society started to become religious, but, at first, this form of religion would have reduced the society's average g even further. As a religion of the poor, it was based around promoting equality and was, therefore, low in ethnocentrism, by virtue of being universalist. So, the pagan religion, which had imbued Rome with martial values and a strong sense of its own superiority, had been displaced. At the same time, remnant paganism was much less united and clear than Christianity, instead being something of a jumble of local traditions and rituals.

Clearly, it is more difficult to prove empirically that Roman g rose and fell, because there is less surviving evidence. However, one of the measures that we have used for Western civilisation is per capita rates of macro-innovation and these have been calculated for the Classical period. It has been shown that the rate of macro-innovation, in the period of Roman dominance, reached a peak somewhere between 500 and 350 BC and then went into sharp decline down to a low level by around 350 AD at which point it essentially flat-lined until the end of the Dark Ages in roughly 1050 AD.^[10] The worldwide macro-innovation rate for this period is graphed in Figure 11.

This evidence of the rise and fall of Roman genius (and thus of its average g) is consistent with the other evidence that we have presented, including low fertility among the upper class in the 2nd century BC and the collapse of Roman democracy in the 1st century AD. It shows us that Rome did indeed rise and fall and this roughly paralleled the pattern of other proxies for the rise and fall of Roman g and evidence of low fertility among those with higher g in the Roman Empire.

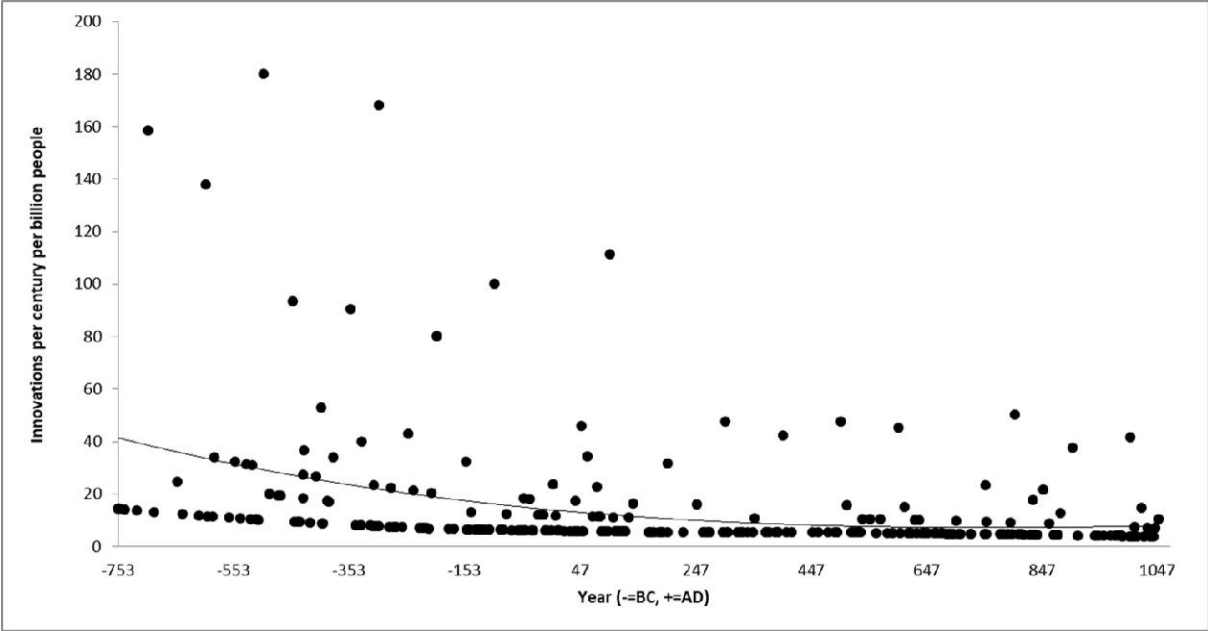


Figure 11. Rate of innovation based upon Bunch and Helleman’s list. Points are an average over 100 years, fitted to a third-order polynomial curve. [\[1\]](#)

Contraception and Christianity

But, if we want to get down to the basic cause of the collapse of Rome, it is that its level of *g* rose too high and this set off a process of *g* decline, because those with the highest levels were both able and willing to limit their fertility. This is the fate of all advanced civilisations. If they become too comfortable, which they do if their *g* reaches a certain level, they lose their religion, they lack a sense of the eternal, they run out of steam, and they start to decline. But why, then, did Roman civilisation collapse before it had time to achieve an Industrial Revolution?

Gerhard Meisenberg has made the very insightful point that the decline of Western civilisation was very likely delayed by its absolute prohibition of contraception. In Genesis 38:9, God killed Onan for practising the contraceptive method of *coitus interruptus*:

‘He knowing that the children should not be his, when he went in to his brother’s wife, he spilled his seed upon the ground, lest children should be born in his brother’s name. And therefore the Lord slew him, because he did a detestable thing.’

This was used by the Church Fathers to condemn all sex that might not lead to procreation. St Jerome’s views in *Against Jovinian* (1:19) summed up this perspective fairly well:

‘But I wonder why he set Judah and Tamar before us for an example, unless perchance even harlots give him pleasure; or Onan, who was slain because he grudged his brother seed. Does he imagine that we approve of any sexual intercourse except for the procreation of children?’

This taboo on contraception remained in place until well into the 19th century and meant that selection for *g* could continue until the first Industrial Revolution was able to take place.^[12] In Ancient Greece, Rome, and the Middle East—where contraception was acceptable—they possibly got to about the level of early 18th-century Europe and then declined.

Another difference proposed by Meisenberg is the nature of Christianity itself. Unlike the polytheistic religions, monotheistic Christianity—in its

undiluted form—is strongly anti-rational. God is not to be negotiated with through sacrifices but obeyed without question. You do not aim to become like God, but simply to prostrate yourself before Him. God does not have a personality, like Roman Gods do, He is simply perfect. He does not exhort you to comprehend His creation. In fact, attempts to do so—such as eating from the Tree of Knowledge or building the Tower of Babel—are punished by God. Leading Christian figures condemn ‘wisdom’, in other words ‘rational thought’. St Paul proclaims: ‘For the wisdom of this world is foolishness in God’s sight. As it is written: “He catches the wise in their craftiness”’ (I Cor. 3:19). Elsewhere he asserts, ‘Jews demand signs and Greeks search for wisdom, but we preach Christ crucified, a stumbling block to Jews and foolishness to Gentiles’ (I Cor. 22–24). This world, in contrast to Heaven, is considered a sinful place and everything about mankind is sinful and to be repented for. ‘Rational thought’, if it questions God’s revealed truth, is thus a form of pride and sinfulness. Your membership of the community is not via blood bonds or ritual observance but through the acceptance of certain doctrines, which are superficially illogical, such as the Trinity.^[13] As Tertullian put it, in the most infamous Christian condemnation of rational thought, ‘I believe it because it’s absurd!’

Those who don’t accept these doctrines are bound for Hell or condemned as heretics. Indeed, Christianity has condemned people to burn at the stake over the most inconsequential deviations from orthodox dogma. In essence, the Church developed a view of the world based on supposed revelation and it was not to be questioned. These included an understanding of the nature of history and the cosmos. By contrast, Islam did not develop such an unworldly theology. The world is not a sinful place, but a holy place full of pointers to comprehending the nature of God. Though those who insult the Prophet Muhammad or deny the existence of God are condemned, Islam does not impose a model of the world on its adherents to the same extent. This is a subtle difference but it does place Islam closer to paganism, where the world also tends to be understood as a sacred thing to be comprehended through observation. Meisenberg argues that Islam developed out of Jewish and Christian ideas at a later stage, when the society from which it developed was becoming more rational.

The Christianity exported to Europe, argues Meisenberg, not only reflected an earlier stage of development in the Middle East but reached

Europe at a time in which g was in decline. Accordingly, Christianity is explicitly anti-rational, very strongly discouraging people in Christian societies from questioning its dogmas in pursuit of, for example, science, although by the 19th century European Christianity had essentially been reinterpreted in such a way so as to promote scientific inquiry in the form of Neo-Thomism—no doubt reflecting the high level of g of these populations.^[14] Islam shares some of these dimensions but it can be seen as less pronounced. In the *Hadith*, the Prophet Muhammad (c.570–632) specifically exhorts Muslims to value knowledge of the world.^[15] This is in stark contrast to St. Paul, as we have seen. It is written in the *Hadith* that: ‘the Messenger of Allah said: “Whoever is asked about some knowledge that he knows, then he conceals it, he will be bridled with a bridle of fire”’ (*Hadith*, 2649); Muhammad said: ‘The seeking of knowledge is obligatory for every Muslim’ (*Hadith* 74), and ‘The Prophet also said: “Acquire knowledge and impart it to the people”’ (*Hadith* 107).

It is possible that the consequence of this difference is that European civilisation only adopted contraception, for example, at a much higher level of g than did other civilisations. It only began to question its religiousness at a higher level of g . This crucial difference permitted it to keep going for long enough to reach the breakthrough of the Industrial Revolution. Ironically, the extreme rationalism of the Enlightenment was borne directly from the adoption of extreme irrationalism.

Islamic Civilisation

Rome is far from the only historical civilisation that can be plausibly explained in terms of changes in the level of average g . In fact, we would argue that it is true of most of them, at least those that are not destroyed by natural disasters or sudden, unpredicted invasions. Let's turn to Islamic civilisation, which was the dominant power in the West during what, for Europe, was a 'Dark Age' in the wake of Rome's collapse.

Islamic civilisation began in the 6th century, led by the Prophet Muhammad. Like Christianity, it initially attracted the poor and dispossessed, in their case from among the herdsmen of the Arabian Peninsula. Fired up by religious fervour, Muhammad began a process of conquest and conversion, taking over vast areas that had previously been Christian or pagan, taking Islam as far north as Spain. Due to internal power struggles, what we might loosely call the 'Islamic World' was, rather like modern Europe, divided into a series of separate polities. However, the dominant one was the Caliphate, centred in modern day Iraq. During this process, there would have been on-going selection for higher g , something that would have been particularly pronounced, in comparison to the Christian world. This is because the Muslims were polygamists, females strongly select for status (hypogamy), and status is significantly achieved through g . In addition, unlike in Christianity, there was no prohibition on marriage for the imams, the preachers and scholars who might be regarded as roughly equivalent to priests.

Accordingly, average g would have increased each generation. This continued until the civilisation flowered into the so-called 'Golden Age of Islam', which clearly reflects a very high level of g . This period is conventionally understood to have lasted from about 800 to the sacking of Baghdad in 1258. Under the reign of Harun Al Rashid (756–809) the 'House of Wisdom' was established in Baghdad. Scholars were invited there from around the known world and funded to translate Classical knowledge into Arabic and contribute to knowledge themselves. This period saw the introduction of a simpler writing system and of paper, substantial contributions to optics, mathematics, and science, including al-Jahiz's concept of the 'struggle for existence' in zoology, and Nasir al-Din al-Tusi's proto-evolutionary idea that humans were descended from

animals. There were also contributions to medicine, such as the understanding that hospitals should be placed in areas where meat putrefies slowly. The Banu Musa brothers invented an automatic flute. The Muslims invented an early sextant, a simpler system of numerals, and even the fork. This was all underpinned by a desire for knowledge, which was felt to be demanded by certain interpretations of the *Hadith*, and a firm belief in freedom of expression.^[16]

However, there were a number of factors that undid this civilisation. Islam—which had helped to build up the civilisation—became increasingly liberal, reflecting the low stress and high standard of living which had been created. The parallels with the Fall of Rome are quite striking. There was the rise, for example, of Sufi Islam; a mysticism-based version of the faith which was also strongly focused around helping the poor. Helping the poor can be understood, to some extent, to mean helping those who have relatively low *g* to survive and procreate. The ascetic, monastic movement in Christianity—as well as the (celibate) priesthood—would have enticed those with high *g* who would be more educated and have more space to contemplate. Likewise, Sufism involved a highly ascetic movement and many of its followers—known as dervishes or fakirs—were world-renouncing celibates.^[17]

Islam prohibited both infanticide and, other than very early in the pregnancy, abortion. Meisenberg has noted that we expect both of these, due to their repulsiveness or dangerousness, to be done out of sheer desperation and thus involve women of low *g*. By contrast, Islamic advances in medicine—and an historical lack of prohibition on *coitus interruptus*—meant that relatively reliable contraception was developed in the Islamic world.^[18] Even though Islam condoned polygamy, we would expect that, as with Rome, those with higher *g*—in a context of lower child mortality—would be better at using contraception and would be more likely to only want a small family. They would also be less fervently religious and less motivated by religious injunctions to breed. Accordingly, those with lower *g* and who were more religious would ultimately outbreed them and the Gates of Learning would close. A form of Islam that was far less intellectual would thus arise. This would explain why 64% of important Muslim scientists in *The Encyclopedia of Muslim Scientific Pioneers* lived before 1250 and almost 100% lived before 1750.^[19] If we restrict the range to those who died between 700 and 1699, then 50/195

(25.6%) of the Islamic scientists on the current *Wikipedia* article ‘List of Muslim Scientists’ died in the 1000s, the largest group by century of death.^[20] This is in a context in which there was no significant population increase. So we would suggest this is the peak of Islamic macro-innovation. Interestingly, this is also the approximate centre point of the ‘Golden Age of Islam’ and in the following centuries there is decline in macro-innovation, until 1258, when the Golden Age is considered to be over. This would be consistent with the argument that changes in average *g* help to explain the rise and fall of Islamic civilisation.

Of course, there may be a multitude of reasons for the collapse of Islamic civilisation but one possible interpretation—that would also seem to explain what happened to Roman civilisation—is that *g* reached a point where contraception was developed and the upper class, at least, were comfortable and low in stress. Their levels of religiousness decreased—a key indicator of declining group selection, occurring after the age of conquest and expansion, meaning that this, combined with their ability to use contraception, reduced their fertility. At the same time, they took control of their lives and were attracted to unworldly philosophies, further reducing the fertility of those with the highest *g*. These philosophies involved helping those of low *g*, so increasing the fertility of this group. They were, thus, outbred by those of low *g* and high religiousness so the open-minded, high *g* need for civilisation was reduced and civilisation decayed and went backwards. At the same time, they were confronted by ‘desert tribesmen’ in the form of rural, Christian Europeans; barbarians in comparison to Islamic civilisation. These people would have been under strong selection for *g*, ethnocentrism, and religiousness. They would have been higher than their opponents in Asabiyyah, being more group selected. Now, it could be argued, the wheel of history has turned. It is Europeans who have declining *g* and have lost their religiousness. And it is the comparatively much more group-selected Islamic world which is entering Europe with its high Asabiyyah.

Chinese Civilisation

In many ways, Chinese civilisation flew higher than either the Middle East or Ancient Rome, and by the year 1000 it was on the verge of an Industrial Revolution, though it never quite managed it. When the Venetian Marco Polo (1254–1324) arrived in China, he was astonished at how technologically advanced it was. Ancient Chinese achievements included astrology, magnetism, arithmetic, geometry, the compass, the seismograph, the census, a civil service entered via competitive examination, matches, pesticide, fertiliser, gunpowder, and printing. In some cases, these innovations were made a millennium before they were known in Europe. Chinese engineering accomplishments included the seed drill, the propeller, the parachute, the use of natural gas as fuel, and the invention of the mechanical clock. They pioneered forensics in solving crimes, developed a working system of long distance transport, theorised that erosion changed land formations, documented super-novas, discovered the properties of numerous medicinal herbs, and developed secular philosophies.^[21]

However, most of China's achievements happened during the European Dark Ages and even earlier. China had pretty much stagnated by the time of Marco Polo's arrival, and when the Jesuits came to China in the 17th century it had gone backwards. Indeed, Western Europe had, to a great extent, pulled ahead of it by this time. General intelligence decline would seem to be a plausible explanation for this. The Chinese employed contraception, including a number of herbal methods, which the Europeans did not. As such, those with the highest g could limit their fertility in a way that was utterly taboo and even unknown in Europe. Referring back to Figure 11, it can be seen that the per capita rate of world innovation reaches a peak in about 550 BC and then goes into decline. It is generally accepted that Chinese civilisation was in serious decline by 476 BC,^[22] so this is consistent with the theory that Chinese genius—and thus g —reached a peak and then declined and, with it, Chinese civilisation declined, to be eclipsed by that of Ancient Greece.

‘What Has Been Will Be Again’

Civilisations seem to follow a fairly predictable pattern. Low *g*, stressful, religious societies undergo group expansion and selection for *g* via downward social mobility. Eventually, they blossom into civilisations. However, civilisation reduces selection for *g* due to medicine, improved living conditions, and lower levels of stress leading to kindly attitudes to the poor. Civilisation innovates contraception and reduces religiousness both by reducing stress and by reflecting an elevated level of *g*. As a consequence, the wealthiest—who also tend to have higher *g*—reach a level of rationalism and security where they take control of their lives. They understand that children arrive through their effort, not God’s will; their child mortality is relatively low, they want to give a high standard of living to their children so they can compete, and they are, anyway, interested in intellectual pursuits and irreligious ideas which incline them not to have children. So, they successfully use contraception to reduce their fertility. Those with lower *g* are less able to use contraception, insufficiently forward thinking to do so, have more stressful lives, are more religious, and are less rational. So, society’s average *g* starts to decline and civilisation eventually collapses back to a Dark Age. Selection for high *g* then strongly reasserts itself, especially when the climate becomes harsher and colder, and the process occurs all over again. ‘What has been will be again. What has been done will be done again. There is nothing new under the sun’ (Ecclesiastes, 1:9).

¹ Obviously, there are numerous histories of Rome and the Roman Empire. See, for example: Baker, S. (2010) *Ancient Rome: The Rise and Fall of an Empire*, London: BBC Books; or Taylor, B. (2008) *The Rise of the Romans: The Rise and Fall of the Roman Empire, a Chronology*, Stroud: The History Press.

² Gibbon, E. (1776) *The History of the Decline and Fall of the Roman Empire*, London: Strahan and Caddell, Ch. 38.

³ MacMullen, R. (1988) *Corruption and the Decline of Rome*, New Haven, CT: Yale University Press.

⁴ Gilfillan, S. Colum (1962) The inventive lag in Classical Mediterranean society, *Technology and Culture*, 3, pp. 85–87.

⁵ Delile, H., Blichert-Toft, J., Goiran, J.P., *et al.* (2014) Lead in Ancient Rome’s city waters, *PNAS*, 111, pp. 6594–6599.

⁶ Meisenberg, G. (2007) *In God’s Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing.

- 7 Ovid, *Nux*, Loeb Classical Library (2016) http://www.loebclassics.com/view/ovid-walnut_tree/1929/pb_LCL232.295.xml?result=9&rskey=VaAITF.
- 8 See, Dutton, E. (2014) *Religion and Intelligence*, London: Ulster Institute for Social Research.
- 9 Meisenberg, G. (2007) *In God's Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing, p. 272.
- 10 Hueber, J. (2005) Response by Jonathan Huebner, *Technological Forecasting and Social Change*, 72, pp. 995–1000, p. 999.
- 11 This was plotted using the raw data from Hueber, J. (2005) Response by Jonathan Huebner, *Technological Forecasting and Social Change*, 72, pp. 995–1000, p. 999. We would like to thank Jonathan Huebner for making these data available to us for secondary analysis.
- 12 Meisenberg, G. (2007) *In God's Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing, p. 289.
- 13 For a defence of the Trinity by a Christian theologian see, however: Sanlon, P. (2014) *Simply God: Recovering the Classical Trinity*, Leicester: Intervarsity Press.
- 14 This is a philosophy in the footsteps of the medieval philosopher St. Thomas Aquinas. For an examination of Neo-Thomism, see: Shanley, B. (2013) *The Thomist Tradition*, New York: Springer.
- 15 For a discussion of Islam and science, see: Masood, E. (2009) *Islam and Science: A History*, London: Icon Books.
- 16 Bobrick, B. (2012) *The Caliph's Splendor: Islam and the West in the Golden Age of Baghdad*, New York: Simon & Schuster.
- 17 Green, N. (2012) *Sufism: A Global History*, Hoboken, NJ: John Wiley & Sons.
- 18 Meisenberg, G. (2007) *In God's Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing.
- 19 Meisenberg, G. (2007) *In God's Image: The Natural History of Intelligence and Ethics*, Kibworth: Book Guild Publishing, p. 85.
- 20 List of Muslim Scientists, *Wikipedia*, [Online], https://en.wikipedia.org/wiki/List_of_Muslim_scientists (accessed 6th February 2017). It is appreciated that there are reliability issues with *Wikipedia* but nonetheless this is likely to be highly indicative in this case.
- 21 For a history of Chinese civilisation, see: Gernet, J. (1996) *A History of Chinese Civilization*, Cambridge: Cambridge University Press.
- 22 See Chey, O. (2011) *China Condensed: 5000 Years of History and Culture*, Singapore: Marshall Cavendish.

Twelve

Has Western Civilisation Followed the Cycle?

It is our argument that Western civilisation is collapsing and it is collapsing as a consequence of declining g . We have already presented the evidence that, in the West, g was being selected for up until the Industrial Revolution and that civilisation was developing as a consequence. With the Industrial Revolution, this selection for g went into reverse and we have demonstrated that g has declined and that serious scientific progress has slowed down and continues to do so. If this is so, we should be able to historically track the rise and fall of the West, just as we have with Rome and, albeit with less certainty, Islamic and Chinese civilisations. And it should follow a relatively similar path.

It is our contention that it is possible to do this. It might be argued that doing so is a matter of conjecture and is subjective, but there is a degree to which that is true of any argument that does not involve statistics. Most argumentation from historians is qualitative, but that doesn't mean it must be dismissed out of hand. In the following sections, we simply wish to show that there is a reasonable case—if no more than that—for arguing that the history of Western civilisation fits into the stages outlined by Spengler and there is a sound case for arguing that we are now in the winter stage based on what is now occurring. In demonstrating this, we will show that the evidence that we are in the winter of civilisation, based on Spengler's model, is already being widely discussed by experts.

The Seeds of Western Civilisation

It's perhaps simplest to understand the process by following Spengler's metaphor of the passing of the seasons. Roman civilisation collapses into a Dark Age. The European Dark Ages is, therefore, the winter of civilisation. It is characterised by mass migration—such as the Saxons and Vikings invading Britain—warfare, and violence. There is very little understanding of science, and religion is combined with belief in many folkloric explanations. Even the legal system is constructed around God's interaction with the world, with accused criminals undergoing assorted trials by ordeal in order to discern their guilt. Farm animals are smaller than they were in Roman times, because knowledge of animal husbandry has been lost.^[1] Most people, even royalty and nobility, are illiterate, with literacy the preserve of a minority of the clergy. Cities have shrunk and fallen into disrepair. Roman architecture has fallen into ruin and nobody can understand how it could ever have been built.

The society is extremely religious. The relatively low *g* of such a society is reflected in its simple architecture and its childlike, cartoonish artistic productions. Politically, the society is an autocracy led by a warrior king. Anglo-Saxon kings regularly perished on the battlefield, evidencing the unstable nature of the societal hierarchy. This is the lowest ebb of the preceding civilisation but it also provides the seeds of the civilisation that is to follow. So this period could also be characterised as the birth of civilisation.

The Spring of Civilisation

This is, essentially, the medieval period, from roughly 1000 to 1500. The society is still extremely religious but it has developed a slightly more scientific form of religiosity. This is reflected in the scholastic movement where scholars such as the Italian St. Thomas Aquinas (1225–1274) attempt to construct a form of Christianity based around logical principles. The proto-Reformation, which attempts to purify religion of folkloristic elements and thus make it more rational, can be seen towards the end of this period. The form of rule is a feudal monarchy, ultimately underpinned by militarism, but we see the beginnings of democracy, with England developing a parliament. We see the beginnings of exploration as well, such as the Crusades and Marco Polo's exploration of China. Cities grow, though the population is still heavily rural. The society develops concepts such as knightly chivalry, which involve self-control, self-sacrifice, and altruism.

In architecture, we see the construction of complex castles and cathedrals which require considerable planning and skill. We find realistic sculptures, in particular in the form of grave memorials. A number of works of literature, which remain highly influential, such as Chaucer's *Canterbury Tales*, are produced towards the end of this period. Feudalism breaks down and is gradually replaced by a semi-democratic system of rule by the nobility. All of these changes would seem to imply that society is gradually gaining *g*. As we have discussed, it is likely that the Black Death gave a very significant boost to societal levels of *g*, hastening the movement to the summer of civilisation. The period could also be characterised as the childhood of civilisation.

The Summer of Civilisation

This is approximately 1500 to the 1800s, although there may be a sound case for arguing that the cut-off point should be World War I. In modern Britain, people seem to be particularly fascinated by the Tudor period. There appears to be a constant stream of documentaries and popular books about it. The novel *Wolf Hall*, a fictionalised portrayal of Henry VIII's chief minister Thomas Cromwell, has been a bestseller and has been made into a popular television miniseries.^[2] Why does this period excite us so much more than the 15th or 17th centuries? There are many possible reasons, but one is that it is the beginning of the summer of civilisation, meaning that there are some fantastic breakthroughs in this period. We finally have realistic portraits and sculptures again, meaning we really know what the people of the time looked like. As society becomes more urban, we have far more records surviving, as a huge bureaucracy is set in motion.

Society becomes noticeably more rational in this period. The Renaissance questions many traditional religious beliefs and figures such as Galileo and later Newton revolutionise how we see the world, with amazing breakthroughs in scientific understanding. With the Reformation, a form of religion based around mysticism and obedience to authority is displaced by a, in some senses, more rational form of religion which aims to return to Christian first principles and develop a theology and lifestyle logically from there. We see a rise in Puritanism, which preaches strict sexual morality to an extent that had not been commonly practised before. There had been widespread illegitimacy among the nobility, as we have already noted. This growing rationalism is reflected in some people, like Galileo, taking an essentially philosophical world-view which hardly includes any mystical elements at all.

The society is confident in its own sense of mission and we have exploration into the New World and the beginnings of colonialism. Relatively strong nation states develop in Europe, underpinned by growing bureaucracy and perhaps growing levels of trust. Absolute monarchy is displaced, first in Britain, by a constitutional monarchy with a limited democracy. Towards the end of this period, we see the Enlightenment. Overtly highly rational, it strongly questions societal traditions, including

religious belief and the need for a monarchy. With the French Revolution, the monarchy is violently overthrown and, for a period, a secularist republic is proclaimed in France.

This period is characterised by a kind of youthful vigour. The society—due to the young age at which people die—is literally ‘young’, by modern standards. In modern Britain, 20% of the population is over 60 and about 20% is under 16. In Elizabethan England, 36% of the population is under 16 and 7% is over 60.^[3] From our discussion of age differences in personality and *g* alone we can see how this will shift behaviour patterns to a society that is more risk-taking, adventurous, creative, and self-confident. Think of all the creativity you engaged in as a student before you settled down to sit in front of a computer all day, like almost all of us do. Think of all the reckless and embarrassing experimentation you engaged in with sex, booze, and political or religious extremism as well.

Autumn

This period can be referred to as middle age. Middle age is when people tend to reach the heights of their professional achievement and many geniuses did their most important work in early middle age. The 'autumn' works well as a metaphor because autumn is harvest time, the period of abundance, the high point of the year.

This period sees the heights of Western intellectual capabilities and thus the breakthrough of the Industrial Revolution and the peak of per capita innovation levels. It is characterised by a deep rationalism in philosophy and scientific work, which very strongly questions traditional religious ideas. Accordingly, we experience the rise of atheism and the development of atheistic ideologies such as Marxism and certain forms of nationalism. The Romantic Movement, with its focus on the will of the ordinary people and its romanticising of them, may be regarded as a kind of religion, a point made by the Romanian anthropologist Mircea Eliade (1907–1986).^[4] For example, Herder's Romantic nationalism begins with the dogma that the most natural state is for peoples to live in separate nations internally bonded by shared blood, soil, language, and history. The peasant is the purest and least polluted manifestation of this 'folk culture' and, so, to rebuild it we must imitate the peasant, who is seen as diligent, honest, and the best manifestation of Man. There is also a strong sense of fate—of a kind of force behind the scenes—in Romantic nationalism, as its development is regarded as inevitable. It is the 'Spirit of the Age' if we follow Hegel's dialectic in which the world is merely a reflection of the gradual but continuous self-knowing of the god-like Absolute. But, on the other hand, Romanticism is far more rationalised than Christianity; far less mystical. There are no gods or spirits and no non-physical existence. So, it is akin to the philosophical movements of Classical times.

Perhaps not unrelated to this, it might be argued that a kind of worship of science begins to develop, in which there is a faith that science will inevitably progress forever; again introducing, in effect, a belief in fate. This can be seen in the stage theories of various 19th-century anthropologists, where it was believed to be inevitable that all societies would ultimately abandon religion and embrace an entirely scientific world-view. For example, British anthropologist Sir James Frazer (1854–

1941) argued in *The Golden Bough* that all societies pass through phases of Magic, Religion, and Science.^[5] They would not regress from this but rather continue to become increasingly scientific.

Industrialisation leads to mass migration from the countryside to the cities, a collapse in the influence of the Church, a rise in the influence of the new industrial elite, and a fall in the influence of the nobility, whose influence came from land ownership. With the decline in religious belief and power of the nobility which was upheld by religion, society begins to become much more materialistic. The fall of religion and the nobility opens up the idea that all men are equal and, by the end of the 19th century, Britain has 60% male suffrage and universal suffrage by 1928 not just for males but also females. This belief in equality can also be found in the key atheistic ideologies of the Romantic Movement. With religion displaced, ordinary people can be persuaded that they have no reason to accept an inferior position. Marxism prizes the worker as the purest manifestation of humanity, though it is not overtly interested in the rights of women or cultural minorities. Nationalism prizes the peasant, though this concept of equality is limited to members of its own nation in each case. These ideologies are taken further with feminism, which demands equality for and even idealises women; multiculturalism, which does the same with regard to non-Europeans; cultural Marxism, which extends this to sexual minorities and any minority its advocates consider disempowered; and the animal rights and environmentalist movements.

Living standards skyrocket as does the population, at least at first. But then, with the development of contraception, people begin to limit their fertility and in some European countries the population growth slows down; only increasing due to non-European immigration and high immigrant birth-rate. The emphasis on equality and the questioning of all traditional ideas continues and we see the rise of feminism, relativism, and the pervading view that life has no meaning. Assorted ideologies stemming from the Romantic Movement, such as Marxism and nationalism, attempt to re-imbue life with meaning, but they degenerate into terrible wars and their power is fleeting. Towards the end of this period, creativity starts to wane. We produce fewer and fewer macro-innovations.

Winter

Winter is civilisation's old age and, if Spengler is correct, we are already there. He predicts that we develop into a highly globalised world, which is ruled by a kind of international financial elite who are very distant from ordinary people. This is evidenced by Piketty's research, which we have already discussed, of the ever-widening gap between rich and poor in post-Industrial nations. The consequence of this is that nation states are massively limited in their ability to achieve anything and democracy is debased. Political scientists have noted that this has been found in declining voter turnout in Western countries.^[6] People despair and feel that their voice can no longer influence events and so they lose faith in democracy and democracy declines. Technology flourishes, fuelled by micro-innovation. We have already discussed the way in which levels of micro-invention seem to peak much later than do levels of major innovation. But because *g* is declining and macro-innovation rates are declining also, there is widespread economic stagnation. This stagnation situation is now being discussed by economists.^[7] Feeling completely helpless and no longer trusting party politics, people simply start to elect charismatic individuals who they feel will sort the crisis out and listen to their woes. This, again, has been highlighted by political scientists and sociologists examining recent electoral trends.^[8] And they are prepared to give them huge powers in order to do this.

We can perhaps see how this parallels the rise of Julius Caesar. It might even be argued that the rise of populism in the Western world is a reflection of this. The elite hold the ordinary people and their 'traditional' values and lifestyles in contempt. The elite compete for moral and intellectual status by advocating more and more extreme critiques of tradition and hierarchy. Art had, heretofore, focused on religion. It now begins to focus on simply portraying ordinary life and then portraying feelings, subjective perception, and a sense of confusion and, perhaps, hopelessness, a point made by the British conservative philosopher Sir Roger Scruton.^[9] Tradition is continuously disdained in favour of that which is superficially modern and new. Scruton argues that there is a pervading sense of despair reflected in the nihilistic philosophy of postmodernism; that there is no meaning and no truth and everything true is really just power and should be questioned.

Architecture and art begin to simply repeat the styles of the past—mock-Tudor, mock-Georgian—or they become a game of meaningless intellectual one-up-manship as can be seen in cows cut in half, empty rooms containing only a single light bulb, and unmade beds, all presented as cutting-edge art.^[10] People adopt an extreme humanitarian ideology—in the form of multiculturalism and cultural Marxism, at least up to the beginning of the Second Religion. These, along with postmodernism and populist nationalism, are anti-rational ideologies and their adoption should, therefore, show how far *g* has fallen. Both involve clear unquestionable dogmas: equality is the ultimate aim; this nation is superior to others. Political correctness not only hammers away at tradition even further, but encourages the displacement of the original population with outsiders who appeal to this very ideology in order to be permitted entry.^[11] The native population goes into decline. Growing areas of the nation are no longer populated by the descendants of those who established the civilisation in question in its earlier seasons. This has been highlighted in the UK by the Oxford University demographer David Coleman.^[12]

In his ‘controversial’ book *The Strange Death of Europe*, British journalist Douglas Murray articulates this condition as a kind of ‘burnout’. Having lost our religious belief, we’ve experimented with various ideological replacements but they all come crashing down in the end. Art reflects this despondency: ‘it has given up that desire to connect to something like the spirit of religion...’^[13] Popular literature, notes Murray, seems to be focused around hedonistic despondency. One of the chapter titles in Murray’s book seems to capture what this is like to live through. It is called simply, ‘The feeling that the story has run out.’

We can perhaps see parallels between cultural Marxism and the place of secular philosophy in the Fall of Rome. The result of this is a constant state of ethnic strife in increasingly diverse Western nations and massive immigration into them, which the financial elite perceive as a good thing because it keeps labour costs down and renders the populace divided, allowing the elite to retain power. Again, researchers in these areas have highlighted growing levels of ethnic conflict in Western countries which are mainly explained by increasing ethnic diversity,^[14] and that immigration deflates wages, especially of the less educated.^[15] The elite’s advocacy of this ideology, and of multiculturalism more broadly, is part of the basis of

their moral status so they fear those who would persuade the populace that multiculturalism should not be accepted.

However, there are those who want to re-imbue the populace with a sense of meaning and use the populace as a means of gaining power for themselves. The native populace, having lost faith in democracy, uses elections as a means of showing their contempt for that very elite. It could even be argued that this process can be seen in the vote for Brexit. Indeed, it is widely accepted among political commentators that this was a core dimension to Brexit.^[16] Quite what constitutes the new 'Second Religiousness' is unclear, though if Spengler is right then we should be reaching that stage by now. One possibility is that it will be a form of traditionalism in which Christianity is an inherent part. Philosophically, traditionalism is the belief that ultimate truth comes from divine revelation, all religions are responses to this perennial truth, and it is passed on by religious tradition. This being the case, the fact that something is a tradition in a religious society is a justification of it.^[17] Clearly, it is very different from Romantic nationalism, in which there is no inherent belief in a metaphysical reality. Perhaps it could be argued that European populist nationalism would seem to parallel this traditionalism. The essence of these movements is that tradition (ultimately religiously sanctioned) is positive because it is the basis of society, tradition is under threat, tradition needs to be protected, and if we do that then we will live better lives. We can do that, in particular, by reconnecting with the religious tradition upon which the society is based. So, in effect, according to this philosophy, we must force ourselves to be religious.^[18]

Another not unrelated possibility is that it will manifest as some kind of widespread revival in conservative Christianity. It has been argued, by the British historian of religion Karen Armstrong, that this is what has occurred in the USA from the 1970s onwards.^[19] And yet another possibility is the adoption of the broader belief, inherent in Christianity, that 'Wisdom is found in the East.'^[20] Thus, it may manifest in the widespread, but genuine, embracing of some form of Eastern religiosity. Both of these could be regarded as manifestations of traditionalism to some extent. Spengler notes that the Mystery Cults, which themselves often had Eastern origins, began as people's vague hobbies before being fully adopted. Many Westerners currently treat Buddhism, for example, in a similar way.^[21] But the civilisation continues to decline beyond this Silver Age. Eventually, the

society is so weakened and despondent that it can simply be invaded by a society that does have youthful vigour, perhaps the Islamic world, Russia, or China. These are, of course, societies that industrialised later than in the West and where selection for *g* only went into reverse more recently. Again, this is not merely our speculation. Others who have examined this issue in detail have predicted the same.^[22]

Clearly, this chapter is composed of possible parallels and conjectures. However, based on the available evidence, they do not appear to be unreasonable or even far-fetched and many are being seriously debated by academic experts in the related fields. There is a sound case for arguing that Western civilisation has followed the phases set out by Spengler and that it is now entering its winter. This is more than speculation. There is, at the very least, a case for it and a not unconvincing one.

[1](#) See Lacey, R. & Danziger, D. (1999) *The Year 1000: What Life was Like at the Turn of the First Millennium*, New York: Little Brown & Co., Ch. 3.

[2](#) Mantel, H. (2009) *Wolf Hall*, London: Fourth Estate.

[3](#) Mortimer, I (.2013) *The Time Traveller's Guide to Elizabethan England*, London: Vantage Books, p. 37.

[4](#) Eliade, M. (1957) *The Sacred and the Profane: The Nature of Religion*, Oxford: Oxford University Press.

[5](#) Frazer, J.G. (1890) *The Golden Bough: A Study in Comparative Religion*, London: MacMillan.

[6](#) E.g. Taylor, D. (2017) *Social Movements and Democracy in the 21st Century*, New York: Springer.

[7](#) E.g. Pichelman, K. (2014) When 'Secular Stagnation' meets Piketty's capitalism in the 21st century: Growth and inequality trends in Europe reconsidered, *Economic and Financial Affairs*, 551, DOI: 10.2765/003981.

[8](#) E.g. Mudde, C. (2016) *On Extremism and Democracy in Europe*, London: Routledge.

[9](#) Scruton, R. (2000) *Modern Culture*, London: Continuum.

[10](#) This point, about postmodern culture, has been made by Scruton, R. (2000) *Modern Culture*, London: Continuum. We, however, have illustrated it with more recent artistic examples.

[11](#) We should stress that the positive or negative dimensions to mass immigration are of no relevance to our perception that this process is occurring and it is exactly what would be predicted if we were, indeed, in the winter phase of civilisation.

[12](#) Coleman, D. (2010) Projections of the ethnic minority populations of the United Kingdom, 2006–2056, *Population and Development Review*, pp. 441–486.

[13](#) Murray, D. (2017) *The Strange Death of Europe*, London: Bloomsbury, p. 272.

[14](#) E.g. Vanhanen, T. (2012) *Ethnic Conflicts: Their Biological Roots in Ethnic Nepotism*, London: Ulster Institute for Social Research.

[15](#) Hatton, T. & Williamson, J. (2011) *The Age of Mass Migration: Causes and Economic Impact*, Oxford: Oxford University Press, p. 265. They demonstrate this by focusing on the USA between

1870 and 1910.

[16](#) E.g. Shipman, T. (2016) *All Out War: The Full Story of How Brexit Sank Britain's Political Class*, London: William Collins.

[17](#) Sauvage, G. (1912) Traditionalism, in *The Catholic Encyclopedia*, New York: Robert Appleton Company.

[18](#) For a detailed examination of traditionalism, see: Sedgwick, M. (2009) *Against the Modern World: Traditionalism and the Secret Intellectual History of the Twentieth Century*, Oxford: Oxford University Press.

[19](#) Armstrong, K. (2001) *The Battle for God: Fundamentalism in Judaism, Christianity and Islam*, London: HarperCollins.

[20](#) Sedgwick, M. (2009) *Against the Modern World: Traditionalism and the Secret Intellectual History of the Twentieth Century*, Oxford: Oxford University Press, p. 267. Sedgwick notes, for example, that a number of early traditionalist philosophers converted to Islam, including Frenchman Rene Guenon (1886–1951). A key traditionalist philosopher, he was initiated into Sufism and died in Egypt.

[21](#) This was commented on with reference to Buddhism in England as early as the 1920s. See Bluck, R. (2006) *British Buddhism: Teachings, Practice and Development*, London: Routledge, p. 7.

[22](#) E.g. Lynn, R. (2001) *Eugenics: A Reassessment*, Westport, CT: Praeger.

Thirteen

The Dying of the Light

'Shall I compare thee to a summer's day? Thou art more lovely and more temperate. Rough winds do shake the darling buds of May, And summer's lease hath all too short a date.'^[1]

All of us are going to die and most of us are going to grow old before we die. This is something that most of us, at least until we get there, put to the back of our minds, but we know that it's going to happen. Perhaps we have watched as our grandparents become elderly, and can do less and less. For as long as we can remember they've been slower and had less energy than our parents. But, as they get older, they are visiting the doctor more, they give up driving, they need a stick to walk, they become forgetful, and eventually they hardly go out at all. If they remain alive, they will start to lose the ability to walk and will require more and more care until, ultimately, they become almost childlike. Remember our discussion of cycles. Life is not a linear progression. It is a cycle that culminates in old age and death.

Those who think about this possibility of degeneration enough—and who plan for it—when they are in early old age can expect to have a far more enjoyable old age than those who try not to think about it. People who maintain an active social life in late middle age will have a much easier time later. Those who involve themselves in all kinds of civic activities—such as neighbourhood watch, the local historical society, party politics, church, or whatever it may be—will have lots of social contacts and people prepared to help them. Accordingly, when they become decrepit, assistance and friends will be at hand and they will not become the kind of elderly person who is isolated in their home, seeing nobody from one week to the next, with only the television and an occasional phone call for company.

Similarly, those who accept that they are getting old—and make changes accordingly—will have an easier time than those who refuse to do so. The obvious example with elderly people is driving. They eventually understand that they are not as young as they used to be and they are just

too ‘slow’, too forgetful, and too poor-sighted to drive. But it often takes a crash for them to realise this. On 10th November 2012, 83-year-old retired stockbroker Geoffrey Lederman was returning from a game of bridge in Hampstead in London when he lost control of his car, confusing the brake with the accelerator. He mounted the pavement, speeding in the direction of a couple in their early 30s—Ben Brookes-Dutton and his wife Desreen—and their 2-year-old son, who was in a buggy being pushed by his father. The father managed to push his son out of the way but the mother was hit and instantly killed.^[2] Careering onwards, the elderly man crashed into Amy Werner, a 23-year-old American woman who’d come to London as a postgraduate. She suffered life-threatening injuries, but survived, albeit with brain damage and complete loss of sight in one eye.^[3] If the driver had understood that he was elderly—or understood what it really meant to be elderly—this appalling tragedy could have been avoided.

In much the same way, if people appreciate, when they are younger, that old age will come then they will save for a pension and they will avoid ‘living for the now’ and wasting money on trivial things that they don’t need. As a consequence, they will have a relatively worry-free final phase of life and won’t be a burden on their family or the community. And, obviously, if they are health-conscious when they are younger they are less likely to be chronically ill in old age, suffering from diabetes, gall-stones, or heart problems. The more intelligent among us will plan for being elderly when we are not yet elderly and so it will be less difficult when it (almost) inevitably comes.

It could be argued that this is one of the reasons why it is important that we understand that civilisations work in cycles and that our civilisation is now entering old age. There are some colleagues who urged us not to be direct about this; to leave the reader with a series of possibilities that they can think about. But it must be so obvious to you, by now, what precisely our conclusions are, that this would be dishonest and patronising. As we have said, we have good data on the kinds of people who read books like this: academics, university students, former university students, and intelligent people who never went to university. There’s no point sugar-coating our view with such people. So let’s just be direct. We can make old age more bearable by realising that we are going to become elderly, we need to scale back what we do, and we need to plan for when we are really old. As we age, things we used to be able to do—marathon running, staying

up all night drinking, driving a car—will become at best dangerous and at worst impossible. After all, we saw in Chapter One that we used to be able to get from London to New York in three-and-a-half hours, but now we can't. We're too 'old' as a civilisation, and therefore our level of g is not as high as once it was, so it would be too dangerous to re-launch Concorde. When we were 'younger', and brighter, we could go to the Moon. We can talk wistfully about this, much as the elderly reminisce on what they could do when they were younger. But we don't have the skill to do it anymore. It would be far too dangerous for us.

If we do not do this, then old age will come as a shock to the system. It will be the difference between getting gradually less and less well or being hit by a car and ending up in intensive care. All of the markers of a high g society will eventually be beyond our capabilities. We won't be able to safely fly aeroplanes, or maintain a lavish system of social security, or keep the electricity on all of the time, or maintain law and order everywhere, or organise democratic government or have widespread use of the internet. If our data are correct, and there's little reason to think they aren't, we need to start to develop the infrastructure to deal with the future. Life is going to become more harsh, more dangerous, and simpler. To give an obvious example, many houses are now entirely reliant on electricity: no fireplace, no gas. What are these people supposed to do when electricity becomes unreliable? Many people now commute into London from 70 miles away or even more. How are they going to get work as trains become more and more sporadic? They need to live closer to work, just as we all once did. If we start planning for this—rather than kid ourselves that 'things can only get better'—then things will run far more smoothly when the time comes. In much the same way, we need to appreciate the fact that—like the elderly—we will be living off capital and we cannot allow this capital to run out. This means living well within our means and not wasting money on unnecessary extravagances. Every little has to count. Similarly, our 'civilisation' is likely to need 'help' as it becomes elderly just as we have long 'helped' the developing world. This needs to be borne in mind.

To put it another way, we are at the beginning of winter. Even in modern day Britain, you cannot possibly get through winter by behaving as you do in autumn. At the very least, you need fuel to heat your house, you require warmer clothes, the roads have to be gritted, the food has to be imported or grown in giant greenhouses and, if there's snow, it has to be cleared. If the

infrastructure is not there to do these things then there will be chaos. Snow almost always leads to chaos in Britain, unlike in Scandinavia or Canada, because we are simply not prepared for it.

Eugenics

So, one possibility is to prepare for old age and winter and simply accept it as fate. But there are others. We have already seen that Sir Francis Galton highlighted the problem of those with lower g outbreeding those with higher g in the 19th century in his 1869 book *Hereditary Genius*. Later, he argued that this problem could be solved by a programme of ‘eugenics’. This would involve financially incentivising those with higher g to have more children. Galton was perceptive enough to realise that g is associated with intellect, being interested in ideas, and thus, to some extent, being disinterested in having children. And so his proposal combined offering financial incentives with inculcating people with a kind of latter-day religiosity, which emphasised the importance of improving the ‘human stock’.^[4] Likewise, we have already met Richard Lynn. In his book *Eugenics: A Reassessment*, Lynn has defended Galton’s idea (despite the obvious terrible press which eugenics has received) and provided more detail, for example advocating licensing to have children, with the permitted number dictated by the couple’s IQ level.^[5]

Advances in understanding the genetic basis of traits like g , educational attainment, and various diseases have led some to propose a *liberal eugenics* which is based on voluntaristic (rather than coercive) approaches to improving the inborn characteristics of one’s descendants.^[6] Certain bioethicists, such as the Australian bioethicist Julian Savulescu, who is based at Oxford University, have even argued that individuals are morally obliged to use genetic enhancements on their descendants, so as to bring about greater human flourishing. A key problem with this liberal eugenics is that it is unlikely to ever ‘catch on’, owing to what bioethicists call the ‘yuck factor’—this is a basic and visceral rejection of meddling in human nature that colours much of the debate about the desirability of eugenic intervention among Western populations in particular. Gerhard Meisenberg (who we met earlier) conducted a study into the attitudes of 1,464 medical students on whether or not and also under what conditions reproductive genetic intervention should be acceptable.^[7] He found that ‘the strongest and most consistent influence [on attitudes towards the desirability of reproductive genetic intervention] was an apparently moralistic stance against active and aggressive interference with natural processes in

general.’ In other words the sample had negative attitudes towards reproductive genetic intervention, especially if the objective was human enhancement. This suggests that the majority of individuals would likely fail to take advantage of ‘genetic enhancements’, even if they were cheaply and legally available to prospective parents, these simply being too ‘yucky’ to contemplate. The fact that leading a horse to water doesn’t necessarily entail it drinking is less of a problem, however, than the uses to which the increasingly distant and unaccountable globalist elites—the ones that Spengler predicted would come to dominate the political life of civilisations in winter time, and indeed did—may put such technologies. Recall that the historical period associated with rising levels of g was also associated with group selection—essentially g could only rise to the extent that it benefitted the group via provision of geniuses, whose innovations could create new opportunities for group expansion. An elite that is anti-group selected (i.e. purely self-interested) is likely to enhance in their offspring those traits that were most important to its success—traits such as psychopathy.^[8] Thus such a ‘liberalised’ eugenics is more likely than not to make things worse for civilisation in its winter years.

Nurturing Genius

Dutton and Charlton offer another solution, however, and this is a return to a society that actively encourages genius. We need to recognise the importance of genius, identify potential geniuses, and then give them the space they need to do genius work. In essence, they need the things that they find difficult—that is, practical things that ordinary people have no problem with, like driving a car—dealt with. Otherwise, as unworldly people they won't require much beyond basic sustenance and minimum financial security. There should be no pressure to publish, or deal with bureaucracy, or attend conferences. They must simply be permitted to get on with it, as Newton was. If we can do this, then it is possible that a genius will come up with ideas regarding how to break the cycle of civilisation, just as they once came up with a way for pretty much breaking the Malthusian cycle.

But the cynic might counter that our geniuses did not come up with a way of doing this in the 19th century when they were much more intelligent than our geniuses are now and when they were seriously contemplating this issue. So, it's extremely unlikely that our modern day, far lower g , geniuses are going to have much of a chance of solving such an intractable problem. Maybe the best we can hope for is that, given the right environment, some geniuses can work out a way of colonising Mars before our g dips too low. The colonists will then take current technology to Mars but may well find themselves subject to intense selection for g for a considerable period due to the planet's extremely harsh conditions: no breathable air, little air pressure, intense solar radiation; the need to constantly and very carefully plan ahead. Assuming that we want scientific progress to continue—after all, 90% of us would never have lived if it hadn't taken off—this may be our best hope. But even this is very uncertain.

Religion

Furthermore, it assumes that we have the will to carry on; the fight in us to wish to keep civilisation going forever; some kind of sense of the eternal. Increasingly, people don't have this in Western countries. The philosopher Sir Roger Scruton, whom we met earlier, has argued that the solution is for us to 'live as if' our lives have eternal significance.^[9] But it's unclear how we can actually do that if we don't really believe it.

So, we come back to Galton's idea that those with influence should inculcate the population with some form of religiosity and somehow force themselves—through so-called 'self-deception'—to believe it, something which tends to make people more persuasive. It seems it is possible to persuade yourself to believe something if the pay-off is sufficient. Indeed, it has been argued that this is why IQ predicts liberal views in a society in which it is considered civilised to hold liberal views. Cleverer children are more likely to adopt such views.^[10] In an extremely religious society, which made a point of valuing large families, we would expect those with higher *g* to have larger families and so slow down the decline of civilisation. As such, the adoption of traditionalism—which argues for the return to a religious society—would potentially yield some benefits. It could slow it down enough that we are able to work out how to colonise another planet. Also, any slow-down would mean that the civilisation that follows ours, drawing upon our achievements, will be able to go even further, before collapsing itself.

Following in Galton's footsteps, Cattell (who we met earlier) proposed that a 'new morality from science', which he termed *Beyondism*, be promoted so as to promote eugenic aims and spread eugenic virtues. Beyondism basically advocates a society organised along scientific lines, with a 'priestly caste' of evolutionary biologists who regulate and plan the evolutionary development of the society. Cattell was acutely aware of the role played by group selection in the evolution of higher levels of *g* and genius, and consequently proposed that 'cooperative competition' be employed by the various Beyondist 'actors' on the world stage, whereby:

'[L]ike players in some greater more vital game than men usually play, cultural groups recognize that the maintenance of inter-group

competition is indispensable to evolution and they agree to cooperate in whatever rules are necessary to maintain it in effective action.’^[11]

Cattell also foresaw the problems highlighted previously, in our dealings with eugenics, specifically in relation to the hazards associated with the genetic enhancements favoured by the ‘liberal eugenicists’ of the present day. He saw these and other ‘eugenical tools’ as needing to ultimately serve the interests of the group in order for societies to flourish:

‘A group positively planning well for its future will employ all three of the above: (1) differential birth/death rates, (2) rhythms of segregation and well-chosen-hybridization, and (3) creation of mutations along with genetic engineering... These methods we need to use toward group goals to bring about by a collective movement of its citizens (a) *survival* of the group, and (b) launching out on its own evolutionary adventure.’^[12]

So, Cattell’s Beyondism seems to solve the problem of a eugenics that is unbound to the concerns of the groups (or that could even be used to subvert the group in the case of ‘liberal eugenics’), at least in theory. It can be looked at as a sort of super-charged eugenics, which even fleshes out Galton’s ‘eugenic spirituality’ into a fully developed religious-ethical system. In practice, however, within Beyondism the consequences to a group of losing out in cooperative competition are dire—amounting to an essential ‘phasing out’ of that population. Granted, Cattell saw the ‘rules of the game’ as being essentially voluntary—something that individual nations would agree too—much like arms limitation treaties, and presumably the Beyondist equivalent of the UN or the EU would ensure that the rules were scrupulously adhered to. Such an abstract morality is unlikely to appeal to ordinary people and would in all likelihood need to be forced onto those people—and thus would be unacceptably coercive, to most. Were it imposed, it would likely lead to war, hastening the collapse of civilisation.

Long-Term Knowledge Storage

Have you ever wondered how much more advanced we would be today had the Royal Library of Alexandria not been burned in 48 AD? How many novel mathematical proofs had to be rediscovered simply because the originals were destroyed? How much more knowledge of the ancient world, its customs, its triumphs and failures, would we have had at our fingertips had the library survived? There is much good in the current world that is worth preserving for future generations, profound mathematical proofs, brilliant scientific and philosophical insights, beautiful prose and inspiring artwork. Let's say for a moment that the collapse and new Dark Age is inevitable—that it will happen and that not even Beyondism can save us. Imagine if whilst some future civilisation was starting to crest the wave of rising g it received a gift—from the past—in the form of a giant time capsule; a doomsday vault in fact containing physical copies of all that is great and worth preserving from the present era. Imagine how much further than us that civilisation could soar with the benefit of present day advances. Hundreds of years need not be wasted on rediscovering lost knowledge. Instead the past can simply be 'data-mined', and our present day knowledge enhanced by a high- g future civilisation at the peak of its powers. Foreknowledge of things like the decline in g may even lead to novel solutions being found to the problems. Perhaps future politicians could benevolently guide some kind of voluntaristic eugenics programme which, if implemented early enough in that future civilisation's autumn years, may help it to stave off collapse, allowing technology to advance and maybe even reach that vaunted Singularity of Vinge's.

Making a gift of knowledge to future civilisations would be a good idea, even if everything that we have proposed turns out to be wrong, as there are a multitude of other ways in which civilisation could abruptly end, including an asteroid strike, a super-volcano, nuclear war, or even a new Ice Age. This is the mission of 'The Long Now Foundation',^[13] which was established in 1996 to encourage the sort of long-term thinking that might safeguard knowledge for 10,000 years or more. And this is crucial because there does not appear to be anything we can realistically do to avert the collapse of civilisation. It seems that it cannot be stopped.

The Bleak Mid-Winter

We have seen that there are probably ways to slow down the collapse of civilisation, so that civilisation can be taken elsewhere, but that will be for a small minority if it happens at all, and those people will have to survive very harsh conditions. All most of us can really do is prepare for the winter that is upon us and safely store the knowledge that our civilisation has produced. Eventually, the winter will give way to spring and then summer. Perhaps, with a gift of knowledge from the present to the future, because we have come so far this time, the next Renaissance will take those who are to come even further. But we—you and us—will be long gone by then. Winter has come and it's only going to get colder. Wrap up warm.

[1](#) Shakespeare, Sonnet 18.

[2](#) The father in question has published a bestselling memoir of what happened: Brookes-Dutton, B. (2014) *It's Not Raining Daddy, It's Happy: Surviving Grief, a Father and Son Start Again*, London: Hachette UK. Brookes-Dutton is not related to Edward Dutton.

[3](#) *BBC News* (22nd December 2014) Pensioner jailed after 'pedal confusion' collision kills mother, [Online], <http://www.bbc.com/news/uk-england-london-30578887>.

[4](#) Galton, F. (1904) Eugenics: Its definition, scope and aims, *The American Journal of Sociology*, 10, pp. 1–25.

[5](#) Lynn, R. (2001) *Eugenics: A Reassessment*, Westport, CT: Praeger.

[6](#) Salter, F. (2015) Eugenics, ready or not: Part I, *Quadrant*, 59, pp. 41–51.

[7](#) Meisenberg, G. (2009) Designer babies on tap? Medical students' attitudes to pre-implantation genetic screening, *Public Understanding of Science*, 18, pp. 149–166.

[8](#) Australian psychologist Nathan Brooks found that as many as 1 in 5 corporate executives exhibited psychopathic personality, see: Brooks, N. (2016) *Understanding the Manifestations of Psychopathic Personality Characteristics Across Populations*, PhD Thesis, Bond University.

[9](#) Scruton, R. (2000) *Modern Culture*, London: Continuum, p. 71.

[10](#) Woodley of Menie, M.A. & Dunkel, C. (2015) Beyond the cultural mediation hypothesis: A response to Dutton (2013), *Intelligence*, 49, pp. 186–191.

[11](#) Cattell, R.B. (1972) *A New Morality from Science: Beyondism*, New York: Pergamon, p. 86.

[12](#) Cattell, R.B. (1987) *Beyondism: Religion from Science*, Westport, CT: Praeger, pp. 210–211, italics in original.

[13](#) The Long Now Foundation, [Online], <http://longnow.org>.

About the Authors

Edward Dutton is a freelance researcher and writer. Born in London in 1980, he lives in Oulu in northern Finland. Dutton was educated at Durham University, where he graduated in Theology in 2002, and Aberdeen University, from which he received his PhD in Religious Studies in 2006. His thesis was a participant observation study of evangelical Christian students. Dutton has been a guest researcher at Leiden University in the Netherlands, guest researcher at Umeå University in Sweden, and he is academic consultant for a research group at King Saud University in Saudi Arabia. Dutton's other books include: *Meeting Jesus at University: Rites of Passage and Student Evangelicals* (Ashgate, 2008; Routledge, 2016), *The Finnuit: Finnish Culture and the Religion of Uniqueness* (Akademian Kiato, 2009), *Religion and Intelligence: An Evolutionary Analysis* (Ulster Institute for Social Research, 2014), and *The Genius Famine: Why We Need Geniuses, Why They're Dying Out and Why We Must Rescue Them* (University of Buckingham Press, 2015; jointly with Bruce Charlton). Dutton's research has been reported in newspapers worldwide and he has been interviewed on BBC Radio, on the French Channel *Arte* and in newspapers including *The Telegraph*, *The Times*, and *Le Monde*. He has written for such newspapers as *The Guardian*, *The Telegraph*, and *The Times Higher Education*. In his spare time, Dutton enjoys genealogy and has published widely on the subject, such as his book *The Ruler of Cheshire: Sir Piers Dutton, Tudor Gangland and the Violent Politics of the Palatine* (Leonie Press, 2015). He is married to a Finnish Lutheran priest and has two young children.

Michael A. Woodley of Menie, Yr. was born in Guildford, in the south of England, in 1984. He took his Bachelor's degree at Columbia University, New York, majoring in Evolution, Ecology and Environmental Biology. His PhD work concerned the molecular characterisation of aspects of the life history ecology of the thale cress *Arabidopsis thaliana*, and was undertaken at the University of London (Royal Holloway). Shortly after completing this work, Woodley of Menie switched his focus from plant to human evolutionary and behavioral ecology. His interests include life history theory and personality, primatology, and the evolution of general intelligence. It is with respect to the last that he is perhaps best known, as

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