



3 JUNE 2020

## The Growth Mindset and the Abundance Mentality

PROFESSOR ALEX EDMANS

### The Talent Myth and the Power of Learning

The traditional view is that our abilities are determined by our talent – a gift given to us at birth through the genes we inherit. Indeed, common language assumes this idea. A “gifted” child is one who’s given a talent that he/she didn’t need to work for; that child is a “natural” who can perform at a high level without any effort. This view isn’t entirely fatalistic – effort still matters, but only to determine how much of our potential you can reach; that potential itself is fixed by your genes. In their book *Peak*, psychologist Anders Ericsson and science writer Robert Pool use the analogy of a cup. Your cup is your potential; effort aims to fill as much of the cup as possible but the size of the cup is determined by genetics.

But there’s a new view that’s buttressed by evidence – that our abilities are not given by genetics but expandable through effort. Thus, effort can not only fill more of the cup, but change the size of the cup. Indeed, Ericsson and Pool use the example of perfect pitch, which used to be thought of as a genetic ability. If so, whether a child has it or not should be independent of his/her early upbringing. But it’s more common among kids who receive musical training aged 3-5. It’s also more common among kids who speak tonal languages such as Mandarin – but not if they’re brought up in the West, so it’s speaking Asian languages, rather than having Asian genes, that’s associated with perfect pitch. Indeed, in 2014, Ichionkai Music School in Japan attempted to teach 24 children perfect pitch and succeeded with all of them.

And this is true for adults also. In Lecture 1 ([Time Management](#)), I discussed the neuroplasticity of the brain – that the formation of our brain isn’t completed during childhood, but that we can continue to develop it as adults. In 1973, David Spencer memorised 511 digits of pi. Now the official world record stands at 67,890 (with an unofficial record of 111,701). This demonstrates that the adult memory isn’t limited by a pre-determined size dictated by genetics, but can be developed through learning.

Indeed, this idea is backed up by neuroscience. One famous study investigated London taxi drivers, who need to learn thousands of streets and landmarks to pass The Knowledge, the test required to obtain a taxi licence.<sup>1</sup> They had a larger rear hippocampus (the part of the brain responsible for memory) than not only the regular population, but also bus drivers. As I stressed in Lecture 5 ([Critical Thinking](#)), correlation doesn’t imply causation for two reasons. The first is *omitted variables*. Perhaps it’s driving in general, rather than having to memorise thousands of streets and landmarks, that enlarges the hippocampus? However, the researchers showed that there was no such enlargement for bus drivers, who drive the same route each day and thus have fewer memory demands. Thus, it’s memorisation, rather than driving, that’s associated with a larger hippocampus. The second is *reverse causality*. Perhaps people are born with different-sized brains, and those with larger brains have better memories and are thus more likely to become taxi drivers? However, there was no difference in the hippocampus size of prospective taxi drivers when they started training – the difference only emerged afterwards, between those who successfully completed the training and those that dropped out of training or failed the test (because they hadn’t succeeded in memorisation).

---

<sup>1</sup> Maguire, Eleanor A., Katherine Woollett, and Hugo J. Spiers (2006): “London taxi drivers and bus drivers: a structural MRI and neuropsychological analysis.” *Hippocampus* 16, 1091-1101.



A second study found that the part of the brain that controls the left hand is significantly larger in violinists, cellists, and guitarists – who need substantial left hand dexterity for the fingering required to play their instruments – than the regular population.<sup>2</sup> There was no corresponding difference in the part of the brain that controls the right hand, which is used for bowing or strumming, for which less dexterity is required.

## Two Mindsets

These studies underpin two mindsets famously coined by psychologist Carol Dweck. The first is the *fixed mindset* which assumes that your abilities are set in stone by genetics. Thus, there's no need for effort. If you're talented, then you can succeed without effort – you're a “natural”. If you're not talented, then no matter how hard you try, you won't succeed. And not only is effort unnecessary, but it also reduces the perception of your talent. At my secondary school, your grades had two components: attainment, which ranged from 9 (best) to 1 (worst) and effort where the scale was from A (best) to D (worst). The most coveted grade was a 9D as it suggested that you were a natural – you'd achieved success without having to work for it. You'd always try to exaggerate how little work you were doing; in contrast, kids who work hard were labelled as “swots” or “try-hards”, as if effort were something to be ashamed of. Even at university, some students would boast about how they went out the night before an exam or wrote their essay the night before a tutorial, as if they had a magical gift to pass the exam or write the essay without effort. Indeed, this mindset is instilled from an early age in kids' TV shows and comic books. They feature superheroes who have extra powers that ordinary people don't have, and being able to succeed without effort suggests that you have a superpower.

The second is the *growth mindset*, which views our abilities as expandable – we can develop new skills and aren't limited by genetics. To paraphrase a comic book (Spiderman), while this mindset gives us great power, it also gives us the great responsibility of working hard. If we lack an ability, rather than convincing ourselves that we're born without it, it's our responsibility to develop it. As one of my fitness trainers, a former Royal Marines Commando, says: “If you convince yourself you can't do something without any evidence, that's crazy. Try and if you fail after 7 seconds, that's OK. Next week you do 14 seconds. Then 20.”<sup>3</sup> Those with the fixed mindset will be reluctant to remedy the deficiency (e.g. a student with sub-par mathematical ability taking a remedial maths course) as they're unwilling to admit their weakness. This is a similar mindset to the one that led Enron to cook the books rather than acknowledge their weak financial performance.

Not only is effort productive even if you don't currently possess a skill, it's necessary even if you do. There are many examples of star sportsmen with huge ability when young who never end up fulfilling their potential; in some cases, this is because they think their talent absolves them the need to exert effort and they're instead distracted by the outside opportunities their star status offers. Relatedly, upon seeing an achievement, we should praise the person's effort rather than abilities, to dissuade the myth that success without effort is either (i) possible or (ii) something to be proud of. In Lecture 3 (*Public Speaking Without Fear*), I described how I had little public speaking ability at school or even university, so I decided to work very hard at it during my PhD.<sup>4</sup> In my first year as an assistant professor, I gave a talk and a senior professor came up to me and said. “That was a great presentation. You must have worked really hard on it.” I was crestfallen. I wish he'd have said “That was a great presentation. You must be a natural public speaker.” I wanted him to give me a 9D grade. But that would have been false, because I wasn't a natural at all. The only way I was able to give a coherent talk was because of the countless hours I'd spent working on public speaking in general, and rehearsing, recording, and playing back that talk in particular even though I was tempted to lie to myself that I didn't need to work on it.

## Practicing the Growth Mindset

### *Freedom to Dare*

---

<sup>2</sup> Elbert, Thomas, Christo Pantev, Christian Wienbruch, Brigitte Rockstroh, and Edward Taub (1995): “Increased cortical representation of the fingers of the left hand in string players.” *Science* 270, 305-307.

<sup>3</sup> Jay Copley of Barry's.

<sup>4</sup> This account is in the talk of Lecture 3 but not the transcript for conciseness.



Besides the general idea of “work hard”, how do we actually practice the growth mindset? I’ll stress three ways. The first is to have *freedom to dare* – to actively embrace failure and see it as part of life. As I discussed in Lecture 4 (Mental and Physical Wellness), I used to play for the England junior chess team.<sup>5</sup> When I started out, I used to cry when I lost important games, and it took me a while to realise that losing is a normal outcome of a chess game – at the end of most games, there’s a winner and a loser.<sup>6</sup> Even the best baseball teams only win 60% of games; a great batter might only successfully hit the ball 30% of the time. As psychologist M. Scott Peck wrote in *The Road Less Travelled*, “Once you know that life is difficult, then life is no longer difficult”.

Not only is failure part of life, it’s also a necessary path to growth. *Ex ante* (before attempting a challenge), you need to be willing to fail, otherwise you’ll duck out of the challenge. Chess players or sportsmen may avoid playing a difficult opponent to preserve their winning record, but challenging yourself is critical to constant improvement. Otherwise you’ll plateau – your abilities will be limited by the abilities of your opponents. The same principle applies to individual challenges where there are no improvements. When I was learning to ski, I tried to measure my improvement by the number of times I fell over. I’d keep a tally of my number of falls in the morning and then have a separate tally for the afternoon. If I fell fewer times in the afternoon than in the morning, that would be improvement. If I fell fewer times on Saturday morning than Friday morning, that would also be improvement. But I quickly devised a way to manipulate the statistics. The easiest way to avoid falling was to ski on the easiest slopes. Even if I got around this by forcing myself to graduate from the green (easy) to blue (moderate) slopes, I’d quickly figure out what the easiest blue slopes were and ski on them. And even if I tried to do a “controlled experiment”, by skiing on the same blue slope and trying to reduce the number of times I fell on the way down, I’d simply take more turns lower my speed and avoid falling. The absence of “failure” was how I defined success. But as author JK Rowling said in her 2008 Harvard graduation speech, “it is impossible to live without failing at something, unless you live so cautiously that you might as well not have lived at all – in which case, you fail by default”.

### *The Value of Feedback*

The second way to practice the growth mindset is to *actively seek feedback*. And this highlights a second benefit of failure. Not only is a willingness to fail necessary *ex ante*, but the failures themselves are also valuable *ex post* as they allow us to learn. Indeed, this is one reason why artificial intelligence is so powerful – it can fail often and thus learn what works and what doesn’t work.<sup>7</sup> Humans like to bury our failures and not have to replay them, but reviewing our failures helps us learn not to make the same mistake twice. With skiing, I started off blaming a fall on an unexpected patch of ice or another skier distracting me, and only later learned to pinpoint what I did just before to trigger the wipeout. Similarly, we sometimes console kids upon a loss or a failure that “it doesn’t matter”. While well-intentioned, this approach often backfires because, if the kid thinks it doesn’t matter, then there’s no need to exert effort.<sup>8</sup> The failure does matter, but it doesn’t mean the kid lacks ability. Instead of being indifferent to failure, the failure should (mildly) sting – giving the kid the hunger to learn from it and avoid future failures.

In his book of the same name, author Matthew Syed names this mindset “Black Box Thinking”, after the black boxes in aeroplanes that record the plane’s movements and cockpit conversations.<sup>9</sup> These boxes allow authorities to investigate the cause of a plane crash, helping to prevent future disasters. Similarly, we can actively seek feedback from our boss on a presentation, our team-mates or coaches after a sports game, or our bandmates after a musical performance or practice. Particularly valuable is developing the habit of evaluating ourselves, for example by recording ourselves sing or giving a talk and scrutinising the tape afterwards. Many shy away from this, because they find watching themselves sing or speak particularly uncomfortable – but as stressed in Lecture 4 (Mental and Physical Wellness), and as developed through exercise, it’s important to be comfortable being uncomfortable.

### *Deliberate Practice*

---

<sup>5</sup> This account is in the talk of Lecture 3 but not the transcript for conciseness.

<sup>6</sup> Some games end in a draw, but draws are rare when starting out.

<sup>7</sup> Syed, Matthew: *Black Box Thinking*

<sup>8</sup> Waitzkin, Josh: *The Art of Learning*

<sup>9</sup> The boxes are actually coloured orange.



The third way to practice the growth mindset is to engage in *deliberate practice*. Note that deliberate practice is critically different from merely undertaking an activity. In his book *Outliers*, Malcolm Gladwell introduced the 10,000 hours rule, which says that if you practice something for 10,000 hours, you'll become an expert. This idea has become extremely popular, in part due to confirmation bias (see Lecture 5, [Critical Thinking](#)) – people would like to believe that you can do anything you put your mind to. While this is indeed true under the growth mindset, it's also critical to stress that developing a skill requires hard work and discomfort, not just time – as the saying goes, “it's not the hours you put in, but what you put into the hours”.

Indeed, the work of Anders Ericsson and coauthors that Gladwell cites in support of the 10,000 rule never makes this claim. As Ericsson explains in *Peak*, his research focused on violinists and may not be generalisable to other fields. Moreover, there's nothing special about 10,000 hours - while his research documented that the best violinists had practiced for 10,000 hours by age 20, they had practiced for 7,400 hours by age 18 but Gladwell likely chose 10,000 as it's a nice round number. (Moreover, there's nothing special about the number of hours practiced by age 20, since musicians typically win international competitions age 30). Relatedly, it's a logical error (see Lecture 5, [Critical Thinking](#)) to interpret “the best violinists practiced for 10,000 hours” as implying that “10,000 hours of practice make you a best violinist” – just as “all company CEOs are humans” does not imply that “all humans are company CEOs”. (In mathematical terms, 10,000 hours may only be a necessary condition for success, not a sufficient condition).

These errors alone may not matter. If their main implication is to encourage people to practice more, then it doesn't matter so much that the number of hours required to succeed might be 8,235 for one activity and 12,538 for another activity, or that time is only a necessary rather than sufficient condition for success. Gladwell should definitely be credited for highlighting the power of practice and debunking the myth that you're born without certain skills. Indeed, a positive implication of the rule is to make practice a habit – to schedule it into your calendar, even if practice is a solo activity that doesn't require other people. As discussed in Lecture 1, [Time Management in the Digital Age](#), a key to time management is to prioritise important items, even if they're not urgent, and one way of doing so is to schedule them. Doing so also protects practice time from other activities that may demand your time.

However, there are two potentially negative consequences. The first is that a 10,000 hours rule may discourage, rather than encourage effort. Someone contemplating developing a skill may think that they can't commit 10,000 hours and so shouldn't bother; however, there is no evidence to suggest that effort isn't productive unless you can commit 10,000 hours. Similarly, they may think that, once 10,000 hours have been reached, they're an expert and no further effort is necessary, which is again not backed up by the evidence.

The more serious consequence is that it implies that it's simply activity, rather than the uncomfortable, deliberate practice that is needed to improve. Indeed, when claiming that The Beatles spent 10,000 hours on music, Gladwell includes the time they spent performing at concerts. However, Ericsson's research found that the only difference between the best violinists and other violinists was not the time they spent performing, or practicing with others, but engaging in solo practice which the violinists reported as being the least enjoyable. Gladwell argues that any activity related to the skill counts as part of the 10,000 hours, which may encourage people to choose the most pleasant activities to rack up the hours - such as skiing on the easiest slopes.

So what is deliberate practice? It involves three components. The first is that it's *purposeful* - it has clear goals. For example, practicing a talk shouldn't simply involve “rehearsing” it (i.e. going through it), but practicing it with a deliberate objective – for example, to give it with more vocal variety, or more body language. If the activity has quantifiable goals (that cannot be manipulated, as with skiing), you should measure them to determine whether the practice was successful and hold yourself accountable. When I rowed at university, we had to do 5,000m practice sessions on the rowing machine. I used to cover up the display (which tracked your distance and speed), only looking at my time at the end, to absolve myself of the responsibility to row at a particular pace or hit a particular time. This was a very bad habit. In Lecture 4, I mentioned how I write down a group exercise workout afterwards. Back then I mentioned one benefit – it gives a sense of accomplishment. But it also gives a sense of accountability, as I might realise that I could have done some of the sprints faster or lifted heavier.



The second is that it's *challenging*, and pushes yourself outside your comfort zone. A study found that elite figure skaters devoted more time to difficult jumps and spins than routines that they hadn't mastered, while other skaters simply skated. As mentioned earlier, violinists reported that solo practice was less enjoyable than performing or group practice. Certain activities (such as tennis or chess) must be practiced with others; as alluded to earlier, chess players or athletes develop more by playing stronger opponents.

The third is that it's *informed*. It's guided by a teacher who's an expert in the established techniques, and can both coach these methods and correct you when you deviate from these methods. It's also guided by feedback and modification in response to feedback, either from the teacher or a recording of a practice combined with self-correction – even though this may be initially uncomfortable.

© Professor Alex Edmans, 2020

Some of this summary is adapted from my book, *Grow the Pie: How Great Companies Deliver Both Purpose and Profit* (Cambridge University Press). This summary only covers the “growth mindset” topic of the talk to ensure it remains concise. Please see the lecture for the “abundance mentality” part. This part discusses how resources and happiness are not a fixed pie – someone else's happiness or success need not be at the expense of yours; similarly, serving others need not be at the detriment to you. It stresses the importance of win-win thinking and provides guidance for how to serve others most effectively with limited time.