

## Bounce

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### CHAPTER 1: The Hidden Logic of Success

- For a period in the 1980s, this one street, and the surrounding vicinity, produced more outstanding table tennis players than the rest of the nation combined
- Of course not: the success of Silverdale Road was about the coming together of factors of a beguilingly similar kind to those that have, from time to time, elevated other tiny area
- Not that I was a bad table tennis player; rather, it is that I had powerful advantages not available to hundreds of thousands of youngsters.
- Practically every man or woman who triumphs against the odds is, on closer inspection, a beneficiary of unusual circumstances. The delusion lies in focusing on the individuality of their triumph without perceiving—or bothering to look for—the powerful opportunities stacked in their favor.
- “But in fact they are invariably the beneficiaries of hidden advantages and extraordinary opportunities and cultural legacies that allow them to learn and work hard and make sense of the world in ways others cannot.”
- **By the age** of twenty, the best violinists had practiced an average of ten thousand hours, more than two thousand hours more than the good violinists and more than six thousand hours more than the violinists hoping to become music teachers. These differences are not just statistically significant; they are extraordinary. Top performers had devoted thousands of additional hours to the task of becoming master performers.
- Purposeful practice
- “Instead we argue that the differences between expert performers and normal adults reflect a life-long persistence of deliberate effort to improve performance.”
- Been found that a minimum of ten years is required to reach world-class status in any complex task.
- \* One rather obvious proviso: in activities where there are not many participants, world-class status can be achieved in somewhat less than ten thousand hours. After all, it is not difficult to be among the best in the world in a sport—or, indeed, anything else—that few others play seriously.
- This is what Ericsson calls the iceberg illusion. When we witness extraordinary feats of memory (or of sporting or artistic prowess), we are witnessing the end product of a process measured in years
- “There are apparently no limits to improvements in memory skill with practice.”
- By implication, be remembering around eighty letters. By a process ‘of “chunking,” you have been able to remember as many letters as SF remembered numbers
- SF’s “words” were, in effect, mnemonics based on his experience as a club runner. This is what psychologists call a retrieval structure.
- As soon as the language of chess is disrupted by the random positioning of pieces, chess masters find themselves looking at a jumble of letters, just like the rest of us.
- It is also worth noting that the development of motor expertise (skilled movement) is inseparable from the development of .perceptual expertise (chunking patterns).

- We're making choices based on unexpected factors; it was that they did not seem to be making choices at all. They were contemplating the situation for a few moments and then just deciding, without considering the alternatives.
- The most important ingredient in any expert system is knowledge
- It is the rapid escalation in the number of variables in many real-life situations—including sports—that makes it impossible to sift the evidence before making a decision: it would take too long. Good decision making is about compressing the informational load by decoding the meaning of patterns derived from experience. This cannot be taught in a classroom; it is not something you are born with; it must be lived and learned. To put it another way, it emerges through practice.
- There are around thirty ways to move toward the beginning of a game, and thirty ways in which to respond. That amounts to around 800,000 possible positions after two moves each. A few moves after that, and the number of positions are measured in trillions. Eventually, there are more possible positions than there are atoms in the known universe. To be successful, a player must cut down on the computational load by ignoring moves unlikely to result in a favorable outcome and concentrating on those with greater promise. Kasparov is able to do this by understanding the meaning of game situations. Deep Blue is not.
- Think, for example, of the damage done to the governance of Britain by the tradition of moving ministers—the most powerful men and women in the country—from department to department without giving them the opportunity to develop an adequate knowledge base in any of them. It is estimated that the average tenure of a ministerial post in recent years in Britain has been 1.7 years. John Reid, a long-serving member of Tony Blair's government, was moved from department to department no less than seven times in seven years. ^
- This is no less absurd than rotating Tiger Woods from golf to perform expertly in every arena.

## **CHAPTER 2 Miraculous Children**

- He has to care about what he is doing, not because a parent or a teacher says so, but for its own sake. Psychologists call this "internal motivation," and it is often lacking in children who start too young and are pushed too hard.

## **CHAPTER 3 The Path to Excellence**

- What happens when I drive my car? I am certainly clocking up countless hours at the wheel, but does this constitute the acquisition of knowledge? It is not as if I am straining to improve. Rather, my mind is on other things: I am figuring out what to make for dinner; I am speaking to my passenger; I am listening to the radio and strumming my fingers against the steering wheel. I am, in effect, driving on autopilot. This may sound like an extreme example, but it applies (to only a slightly lesser extent) to a surprising number of us. We do our jobs, but often with our minds absent—partially—or wholly—from what we are doing.
- Mere experience, if it is not matched by deep concentration, does not translate into excellence
- Demand deep application

List A	List B
FAHTER	HERFAT
FOOTBLAL	LBOFTOAL
DCOTOR	RTOCOD
OUTCOEM	ECMUTOO
TEACHRE	EERTACH

- **If you solved** the anagrams from both lists you will have noticed that they actually refer to precisely the same words: FATHER, FOOTBALL, DOCTOR, OUTCOME, and TEACHER. The only difference is that in List A, the anagrams were easy, requiring only a single movement of adjacent letters. In List B, however, the letters were completely jumbled up, making the solution far more difficult. But here's the curious thing. When researchers had participants work on lists of anagrams like those in List A, they found that, when later questioned, the participants were not very good at remembering the words. Even though they had successfully solved the anagrams, their recall was poor. When participants worked on more difficult anagrams, however, their recall soared.
- Why such a dramatic difference? With difficult anagrams the jumble of letters forces you to do something other than breeze through. You have to stop for a few moments and think; you have to deepen your concentration and engage with the anagram to figure out what it is.
- **Expert practice** is different. It entails considerable, specific and sustained effort to do something you can't do well—or even at all. Research across domains shows that it is only by working at what you can't do that you turn into the expert you want to become.”
- **Ericsson calls** it “deliberate practice,” to distinguish it from what most of the rest of us get up to. I am going to call it purposeful practice. Why? Because the practice sessions of aspiring champions have a specific and never-changing purpose: progress. Every second of every minute of every hour, the goal is to extend one's mind and body, to push oneself beyond the outer limits of one's capacities, to engage so deeply in the task that one leaves the training session, literally, a changed person
- That is worth stating again: world-class performance comes by striving for a target just out of reach, but with a vivid awareness of how the gap might be breached.
- Elite skaters attempt jumps that are more difficult even when measured relative to their superior abilities!
- **Purposeful** practice is about striving for what is just out of reach and not quite making it; it is about grappling with tasks beyond current limitations and falling short again and again.
- Futsal is a perfect example of how well-designed training can accelerate learning; how the knowledge that mediates any complex skill can be expanded and deepened at breathtaking speed with the right kind of practice
- But careful study has shown that creative innovation follows a very precise pattern: like excellence itself, it emerges from the rigors of purposeful practice.
- That it provided the perfect conditions for feedback.
- By creating a perfectly reproducible stroke, I was able to instantly identify what had gone wrong when I made a mistake, leading to automatic refinement and readjustment.
- Turn paves the way for a new theory. A theory that is not testable (i.e., a theory that is immune from feedback) can never be improved upon.

- **Feedback is, in effect**, the rocket fuel that propels the acquisition of knowledge, and without it no amount of practice is going to get you there.
- Now imagine a radically different training system, proposed by Anders Ericsson, where students have access to a library of digitized mammograms for which the correct diagnosis and the location of any tumors have already been confirmed. Students would be able to make diagnoses on an ^ hour-by-hour basis and would receive instant feedback
- As one business expert has put it, “Very few businesses have introduced the principles of [purposeful] practice into the workplace. Sure, the hours may be long in some jobs. But the tasks are often repetitive and boring and fail to push employees to their creative limits and beyond. There is very little mentoring or coaching . . . and objective feedback is I virtually nonexistent, often comprising little more than a halfhearted annual review.”

#### CHAPTER 4 Mysterious Imparks and Life-Changing Mind-Sets

- To the astonishment of Walton and Cohen, the motivation level for the students in the shared-birthday group did not just nudge up, or even jump up: it soared. The matched students persevered on the insoluble puzzle a full 65 percent longer than those in the non-matched group. They also reported significantly more positive attitudes toward math and greater optimism about their abilities. To be clear: These were students who shared the same attitudes toward math before they read Jackson’s story.
- “They were in a room by themselves taking the test,” Walton said in an interview with the author Daniel Coyle. “The door was shut; they were socially isolated; and yet [the birthday connection] had meaning for them. They weren’t alone. The love and interest in math became part of them. They had no idea why. Suddenly it was us doing this, not just me. “Our suspicion is that these events [what we have called sparks] are powerful because they are small and indirect. If we had told them this same information directly, if they had noticed it, it would have had less effect. It’s not strategic; we don’t think of it as being useful because we are not even thinking it at all, It’s automatic.”
- Intelligence can be transformed through effort had a growth mind set
- Both I groups understood that the test was measuring their intelligence. So far, so good. But those in the fixed mind-set had a further belief: that the test was also measuring how intelligent t they would be in the future.
- Dweck’s research hands us the answer: it is because she did not interpret falling down as failure. Armed with a growth mind-set, she interpreted falling down not merely as a means of improving.
- Took four hundred fifth-graders and gave them a series of simple puzzles. Afterward, each of the students was given his or her score, plus something else: six words of praise.
- They didn’t want to risk losing their “smart” label by potentially failing at the harder test. But 90 percent of the effort-praised group chose the tough test: they were not interested in success, but in exploring a potentially fruitful challenge.
- **There was a dramatic** difference between the ways they responded to failure. Those praised for intelligence interpreted their failures as proof that they were no good at puzzles after all. The group praised for effort persevered on the test far longer, enjoyed it far more. And did not suffer any loss in confidence.

- And all of these differences turned on the difference in six simple words spoken after the very first test.
- We should praise effort not talent
- **How abilities** can be transformed through application; that we should teach others and ourselves to see challenges as learning opportunities rather than threats; that we should interpret failure not as an indictment but as an opportunity.
- I say, 'Whoops, I guess that was too easy. I apologize for wasting your time. Let's do something you can really learn from!
- Bollettieri has become a byword for excellence since his academy was established in 1978 on Florida's west coast. But as I stride around the courts—indoor and outdoor—it becomes clear that it is not the quality of the coaching that sets this place apart from other tennis centers around the world. J Rather, it is the quality of the attitude.
- Here the youngsters train with devotion; they undertake physical training as if it is a privilege, not a chore; they eat food like it is fuel. This is simply not what it is like at other tennis centers.
- "Praise experiments, but everything he says and does is perfectly calibrated to evoke the growth mind-set in his pupil: a 12 year old I French player called Yves.
- He praises effort, never talent; he eulogizes about the transformational power of practice at every opportunity; he preaches the vital importance of hard work during every interruption in play. And he does not regard failure in his students as either good or bad, but as an opportunity to improve. "That's fine," he says as his student hits a forehand long. "You are on the right track. It's not the mistakes; it's ^ how you respond to them."
- The only way for a growth mind-set to bed down is for effort-oriented praise to be constantly repeated—not easy in a world where the talent myth rules supreme.
- Showing tremendous discipline, and by taking responsibility for their actions. That is what ultimately separates the best from the rest."
- When she looked at the children praised for effort, Dweck found that almost all of them had told the truth about their performance. Only one child in the group had doctored his score. But in the group praised for intelligence, an extraordinary 40 percent had lied about their scores. "Doing well was so important to them that they felt compelled to distort their performance in order to impress unknown peers," Dweck said.
- That talent is what ultimately determines success and failure in the corporate world; that pure reasoning ability matters far more than domain-specific knowledge
- "Don't be afraid to promote stars without specifically relevant experience. Seemingly over their heads." Success in the corporate world. The authors contended, requires "the talent mind-set"—the "deep-seated belief that having better talent at all levels is how you out perform your competitors

## **CHAPTER 5 The Placebo Effect**

- The thing that often separates the best from the rest is a capacity to believe things that are not true but which are incredibly effective.
- **In early** 1944, Allied forces launched an offensive array at Anzio in northern Italy during World War II. It turned out to be a disastrous maneuver, with American forces trapped in the caves of Pozzoli for over a week. Henry Beecher, a young doctor from Harvard, was the man responsible for treating the influx of injured American soldiers at a makeshift field hospital at the

beachhead. Such was the scale of casualties that Beecher soon ran out of anesthetic. Confronted with a soldier with gaping wounds and needing to operate quickly, he therefore instructed his nurse to administer a saltwater injection instead of morphine. The patient, assuming that a proper dose of anesthesia had been administered, lay back in preparation for his operation. What happened next would come to shake the medical world. Beecher found that the soldier was not merely comforted by the injection of salt water; he was able to tolerate the agonies of surgery as well as if he had been injected with “real” anesthetic. Over the next few weeks Beecher was to replicate the result with dozens of wounded soldiers, each of whom could bear, with seemingly miraculous stoicism, the trauma of surgery with nothing more than salt water running through their veins.

- One factor in the credibility of the placebo treatment is, of course, that the drug is administered by a qualified doctor. But there are countless others. Color, for example, is strongly connected in certain cultures with certain types of effect: red is buzzy, blue or white are cool and soothing. Drug companies play on these meanings. Goldacre reports that stimulant medication tends to come in red or orange, antidepressants in blue, and so on.
- Packaging, too, confers cultural meaning that can bolster the placebo effect. Research has found that aspirins contained in snazzy, all-singing-all-dancing packaging are more effective than aspirins contained in dull, boring boxes.
- It self can deliver a placebo effect. So, too, can price. Dan Ariely, the behavioral economist, has shown that cheap painkillers are less effective than painkillers identical in every respect except for a more expensive price tag.
- “I am now convinced that if you expect the best, you are given some strange kind of power to create the conditions that produce the desired results.” Anne Harrington of Harvard University makes the same point: “There is an innate capacity for our bodies to bring into being, to the best of their ability. The optimistic scenarios in which we fervently believe-
- With my mind nice and still, I would begin the process of what psychologists call positive imagery; in my case a series of vivid recollections of the greatest and most inspiring table tennis matches I had ever played. First I would be looking in from the outside, like a spectator, seeing the marvelous strokes, applauding the audacious attacks, marveling at the array and diversity of skills.
- Then the perspective would switch, and I would be inhabiting my own body, feeling the sensuousness of the ball on the paddle, the uninhibited flow of my movement, and the exhilaration of playing to the best of my ability and beyond. Then I’d switch the focus and imagine myself playing my upcoming opponent, executing the tactics discussed with my coach and sensing a deep and growing feeling of optimism.
- You may have heard this expression quite a lot—“taking the positives”—from top sportsmen and sportswomen. It is a psychological technique so universal that it has become a part of the lexicon. What does it mean? Well, it means what it says: it is about ignoring aspects of a performance that contradict one’s prior optimism while focusing on the good tactics, the winning shots, etc., that support it. To put it another way, top athletes have learned to filter out unwanted evidence in order to sustain an exaggerated belief in their own abilities.
- And guess what? The “positive thinking” group completed the tasks significantly more quickly than the “negative thinking” group, even though there was no difference in ability between the two groups

## **CHAPTER 6 The Curse of Choking and how to Avoid It**

- “But when the hitters were asked to indicate whether their bat was moving up or down at the instant the tone sounded. Their performance levels plummeted. Why? Because this time the secondary task forced them to direct their attention towards the swing itself
- Choking is a problem of psychological reversion: the flipping from a brain system used by experts to one used by novices.
- Choking, then, is a kind of neural glitch that occurs when the brain switches to a system of explicit monitoring in circumstances when it ought to stick to the implicit system.
- But we can now see that the truth is precisely the reverse. It is only an expert performer—someone who has practiced long enough to automate a skill—who has the capacity to choke. For a novice—still wielding the explicit system— ^ any additional attention is likely to benefit execution, not hinder it.
- So, the key psychological skill for someone with a tendency to choke is to ditch that belief in the minutes before competition and to replace it with the belief that the race does not really matter. It is a form of psychological manipulation, and it takes a lot of work to masters
- “But that is precisely the belief that is most likely to trigger a choking response. So, the key psychological skill for someone with a tendency to choke is to ditch that belief in the minutes before competition and to replace it with the belief that the race does not really matter. It is a form of psychological manipulation, and it takes a lot of work to masters

## **CHAPTER 7 Baseball Rituals, pigeons, and Why Great Sportsmen Feel Miserable After Winning**

## **CHAPTER 8 Optical illusions and A-Ray Vision**

- “Plumbing” of perception: in the case of vision, there are more downward fibers from the cortex to the brain’s relay stations than there are bottom-up from the eyes. So when we look at. Say, a face, there is more data traveling downward from the knowledge areas of our brains than traveling upward from our eyes
- We can get an idea from the remarkable cases where blind people gain sight late in life. Sidney Bradford, a British man, developed sight at the age of fifty-two after receiving corneal grafts at the Wolver Hampton and Midland Counties Eye Infirmary. Here is how researchers reported his experience when he looked at the face of his surgeon after the bandages were removed:
- He heard a voice coming from in front of him and to one side: he turned to the source of the sound, and saw a “blur.” He realized that this must be a face. Upon careful questioning, he seemed to think that he would not have known that this was a face if he had not previously heard the voice and known that voices came from faces
- That’s right: When Bradford looked at a face, he saw a blur. He had access to the same visual information as everyone else (the light entering his retina was identical, as was the retinal image), but he saw it differently because he lacked the knowledge—drawn from experience—to mold the sensory data into a meaningful form. Even after a few months, Bradford was unable to recognize people through vision alone, even when meeting them for the third or fourth time. Instead, he had to rely on acoustic information such as tone of voice.
- The ability of experts to see things that are invisible to the rest of us may sound a little weird but is actually quite familiar. It is the reason why Eskimos, with their long experience of arctic

conditions, can discern shades of white invisible to westerners; it is why Charles Revlon, head of the cosmetics chain, was able to see four shades of black; it is why highly

**CHAPTER 9 Drugs in Sport, Schwarzenegger Mice, and the Future of Mankind**

**CHAPTER 10 Are Blacks Superior Runners:**