

THE  
BLUEPRINT  
TENNIS  
MANIFESTO

2012



What  
Every  
Aspiring  
Player  
Needs  
To  
Know

# THE BLUEPRINT TENNIS MANIFESTO

## WHO'S IT FOR?

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- Junior tennis players and their parents and coaches
- Anyone who dreams of playing professional tennis
- Anyone who isn't sure whether they have what it takes to become a top player

## WHAT YOU'LL LEARN.

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- Why so many fail to achieve their tennis goals
- Why natural talent is not important and how it can sabotage your career
- Why great players are not constrained by innate talents
- How to improve more rapidly than the rest
- A proven formula for greatness that you can use to guide your tennis career

## OUR AIM

### TO EMPOWER KIDS TO ACHIEVE THEIR GOALS BY REALISING:

1. *They are playing tennis on a level playing field where only practice matters*
2. *There is no genetic ceiling on their performance*
3. *The real battle is to become an expert at practice*
4. *Only by studying the top players can they get an appreciation for how the best players really got to the top*

Written by Dave Gillen

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This Manifesto may be shared freely, in its original unedited form.

I believe the lessons within can help more kids achieve their goals in tennis and in life.

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# THE BLUEPRINT TENNIS MANIFESTO

WHAT EVERY ASPIRING PLAYER NEEDS TO KNOW

## 1. THE MURKY EQUATION OF TENNIS PERFORMANCE

### WHAT MOST PEOPLE BELIEVE

While playing as a junior, I always thought that your tennis skills were calculated from a murky equation that combined practice with your underlying natural co-ordination or talent for the sport (perhaps in roughly equal measure). While I knew there was a positive correlation between practice and performance (if you practice you get better), I was also playing against other kids whose practice levels and natural ability were unknown to me.

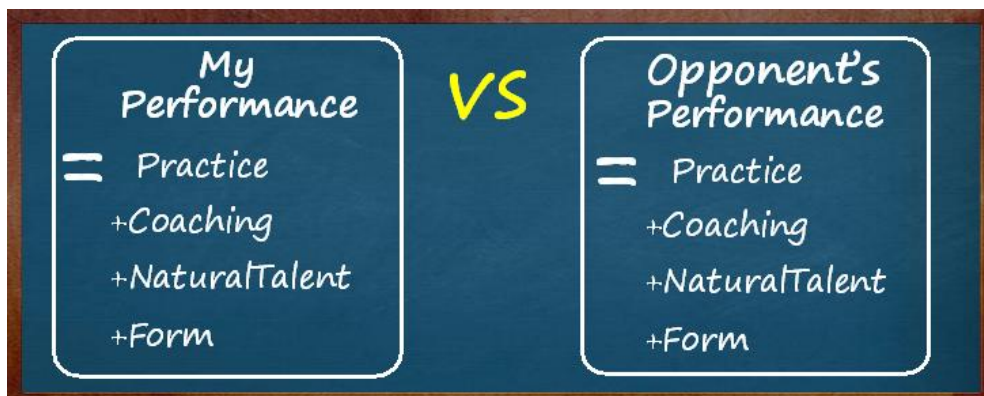
So when someone beat me in a match, it was very difficult to pin down the real cause. The possible reasons were:

- He is more naturally talented than me
- He is getting better coaching than me
- He practices more than me
- He had a better day than me

So my ability relative to others was based on a combination of the following factors:

<i>My Opponent's</i>	<i>Known?</i>	<i>My Own</i>	<i>Known?</i>
<i>Amount of Practice</i>	<i>✗</i>	<i>Amount of Practice</i>	<i>✓</i>
<i>Quality of Coaching</i>	<i>✗</i>	<i>Quality of Coaching</i>	<i>Partially</i>
<i>Natural Talent</i>	<i>✗</i>	<i>Natural Talent</i>	<i>Subjective</i>
<i>Form on Match Day</i>	<i>✗</i>	<i>Form on Match Day</i>	<i>Subjective</i>

So our equation for performance looks something like this:



### WHY IS THIS EQUATION SO HARMFUL?

There are too many unknown variables in this equation, so players can't see the exact relation between practice and performance (or investment and reward). This seriously decreases motivation to practice. It's not that players aren't willing to work hard, but that they aren't willing to work hard for an uncertain return on their time and effort. Think about it...would you spend hours, days, and weeks working for someone without knowing whether you'd be paid \$2 per hour or \$50 per hour? Well it's the same with tennis practice: does practice make up 20%, 50%, or 80% of our performance? Is natural talent worth 10% or 60%? The unknown variables also allow us to very readily blame poor performance on one of the factors that are out of our control such as talent. As a result, we are not convinced we need to change anything to change our results and therefore tend to continue on the same path we were on. The familiar excuse "I just had a bad day" has the same effect.

### WHAT IS THE SOLUTION?

The solution we provide in this manifesto is to define the **real** relationship between practice and performance, so that you know what rewards you can expect for your investment in training. Once you have confidence in the exact role of practice, we then explore what kind of practice causes the most rapid improvement, and why.

## 2. ENEMY #1: NATURAL TALENT

### WHAT IS NATURAL TALENT

Natural talent is a concept that goes back thousands of years. Ancient mythology is full of stories of vastly skilled masters of their craft who are said to have been born with their gift, and in these early times in particular, these were seen as gifts from the gods. The idea of being born with a natural talent has persisted to modern times and is heard most in relation to either great sportspeople or musicians, or to someone who is new to a sport and yet shows some early skill or aptitude for it. The dictionary defines natural talent as having an innate or inborn gift for a specific activity, either allowing one to demonstrate some immediate skill without practice, or to gain skill rapidly with minimal practice. The key advantage of natural talent is that it allows the individual a steep learning curve, whereby he or she acquires skills readily with less practice or hard work than the average person. As well as the advantage of learning quickly, natural talent is also said to increase one's maximum potential. This implies that each individual has a ceiling that caps the highest level of performance they could attain, no matter how hard or long they train. For gifted performers, this ceiling is said to be higher.

We all know the concept, and it is woven into every part of our lives. People are said to be “gifted”, or “born to play X”, or “a natural”. The natural or inborn aspect is now even implied in the word talent itself. It is the cornerstone of many talent scouting programs, which look to recruit children with raw or untapped talent that they can build upon with refined training. This is because at least some natural talent is regarded as an absolutely essential (and unchangeable) component of a top performer, and it is thought that without it you can only go so far.

### WHY IS THIS IMPORTANT?

The concept of natural talent is important to explore because it is one of the key ingredients considered essential for success by almost everyone (if you think you're immune to the idea, how many times have you said you're not suited to some activity, or given up quickly because you demonstrated no skill for it). While it is a poorly understood element, it is so ingrained into people's beliefs that it often goes unquestioned. While the general public goes on merrily using a lack of natural talent as a reason not to pursue certain activities, there are researchers who are interested in what really makes great performers great. We review some of their important findings below.

### 3. WHAT RESEARCHERS HAVE REVEALED ABOUT NATURAL TALENT

Natural talent has been a focus of many studies that have been designed to reveal the secrets of top performers in wide ranging fields. Such studies asked: what makes the world's top performers the best at what they do? And many expected to reveal that there are certain people who learn much more quickly than others in their chosen activity, and progress their skills more rapidly. Leaders in this type of research include Anders Ericsson, Bill Chase, Carol Dweck, Benjamin Bloom, and more recently, books by Daniel Coyle (The Talent Code)<sup>[1]</sup>, Geoff Colvin (Talent is Overrated)<sup>[2]</sup>, Matthew Syed (Bounce)<sup>[3]</sup>, and Malcolm Gladwell (Outliers)<sup>[4]</sup> have brought their ideas further into the public domain. I highly recommend reading these books, as the principles explored have the potential to change your approach not only to tennis, but to everything you do. Reading these books and follow-up research on their ideas has inspired me to write this manifesto because I feel that this knowledge is absolutely crucial for anyone who wants to achieve great things. Below I have drawn from all of the above sources to share with you the most useful findings about performance and natural talent.

#### 1. ELITE PERFORMERS DID NOT LEARN QUICKER THAN ANYONE ELSE

Natural talent is assumed to be essential in music more than any other field (followed by sport), and accordingly, researchers have targeted music in their search for evidence of natural talent. One of these studies was an English study of 257 music students from novices to virtuosos<sup>[5]</sup>. Students were interviewed and tested extensively, with the standard of their performance measured by a uniform national grading system, and the results were analysed to isolate which factors consistently influenced performance. **It turned out one factor, and only one factor, predicted how musically accomplished the students were: how much they practiced.** They could not find any evidence of talent accounting for differences in ability. Now, the best students DID reach higher levels of achievement at younger ages, BUT the number of practice hours taken to achieve a given level was the same for both average performers and top performers. For example all levels of performers averaged 1500 hours to achieve the level 5 standard. In other words the best players got there sooner (and younger) but only because they practiced more each day.

The two most important findings of this study were: 1) **the direct relationship between practice and performance**; and 2) **top performers learnt their skills at the same rate as everyone else** (they just started earlier, practiced more often, or continued for a greater number of years). These findings are being repeated in more fields as they are studied, and are further emphasised by the well known 10,000 hour rule.

## THE 10,000 HOUR RULE

Following the observations of Herbert Simon and Bill Chase that no-one seemed to reach the top ranks of chess without a decade or more of intensive study<sup>[6]</sup>, it was proposed that no-one had achieved world-class expertise without 10 years of intensive practice in **any** field. Further research (in particular the wide-ranging work of Anders Ericsson, a world-leading authority on expert performance) has since validated this rule (found to equate to roughly 10000 hours of practice) across numerous fields including tennis, music, mathematics, swimming, running, and even professions such as writers and scientists, poets, doctors, artists<sup>[7]</sup>. This consistent finding provided strong evidence that even those most strongly touted as naturals, were not exempt from ANY of the hard work or persistence required. They were not afforded an easier path to the top, and there were simply NO exceptions to the rule.

This finding seriously weakens the argument for natural talent (specifically the argument that a talented person can gain expertise more rapidly), and places an emphasis firmly on practice as the primary component of great performance, and possibly the only component that really matters.

## 2. THERE ARE NO EXCEPTIONS TO THE 10,000 HOUR RULE.

To illustrate the idea of natural talent, people automatically look to the truly great performers such as Roger Federer, Tiger Woods, Bobby Fischer, Mozart, and Michelangelo, because the level of performance attained by these people seems to defy belief, and because wherever an obvious explanation is not clear, natural talent is lurking nearby to take the credit. This stems from the classic nature vs nurture debate, where if something cannot be explained by environmental influences, then it is attributed to nature. However when you examine the childhood and practice history of these master performers, they turn out to be shining examples of the 10 year or 10000 hour principle.

Their histories are well documented and without exception they had extraordinary childhoods. Tiger for example watched his father hit ball after ball in their garage before he could walk, and was given his first club before he turned 1 and was being coached by a professional at age 4<sup>[8]</sup>, while Mozart's father (himself a famous composer) started him composing and performing intensively at age 3<sup>[2]</sup>, and Bobby Fischer at age 12 joined one of the world's strongest chess clubs (the Manhattan Chess Club) and was well on his way to becoming the best educated chess theoretician in modern times, with a collection of about 400 books and thousands of magazines and journals on chess<sup>[9]</sup>.

Even still they did not produce world-leading performances until later. Woods won his first Major at the young age of 21, but had been in the game for nearly 2 decades already. Mozart produced his greatest works only after he'd been composing for two decades<sup>[10]</sup>. Fischer became more of a world force in his late teens and his greatest performances (including becoming world champion) came in his late 20s<sup>[9]</sup>. Federer won his first grand slam just before his 22<sup>nd</sup> birthday. Michelangelo produced his first great work *The Pieta* at 24. These examples show that there's only one way that greats are made: slowly over many years.



A symptom of the 10 year rule is that there are very few who have risen to the top of world sport at ages younger than 16. Tennis has produced notable challengers to this statistic including Jennifer Capriati who had reached the French Open semi-final and reached world #8 before she was 15, and Martina Hingis who won the Australian Open at 16 and 3 months (and won a grand slam doubles title at 15 and 9 months). But again they had exceptional upbringings, and started playing at 2 and 3 years old respectively, and STILL had already clocked over 10 years of dedicated practice in their sport.

These examples show that given a super-early starting age it's not impossible to get there before 16, but the attempt to do so involves hard training from a very young age, and produces burnout in more cases than not. The large number of child prodigies that disappear and never go on to adult success are evidence of this fact, and the spectacular burnout that derailed Capriati's career at only 17 years old is a common tale. To her credit she mounted a successful comeback in later years.

These examples refute the idea that they were natural talents who were able to learn their professions more quickly or more easily than others. In reality they chalked up more practice hours from a very young age, and in some cases (notably Tiger and Mozart) probably more than anyone before them in history. The lack of exceptions to the rule places serious doubt over the idea of natural talent. If natural talent was as important as people think, surely some *exceptionally* talented individuals through history would have proven the *exception* to this rule.

*Note: The point is not that 10,000 hours guarantees success, nor that 10,000 hours is any more correct than 8000 or 15000 hours for each particular sport (the number is lower for less competitive sports). **But that there are no shortcuts!** And within a single sport such as tennis we do not see any examples of vastly "talented" individuals who manage to get to the top with far less practice than the rest. For a more detailed discussion please read our blog post [To the 10,000 Hour Haters: It's Not About the Number.](#)*

#### PRACTICE OUTSIDE OF SCHEDULED LESSONS

One of the key findings of Ericsson's important 1993 study titled "The role of deliberate practice in the acquisition of expert performance" <sup>[7]</sup> is that the amount of extra-curricular practice in particular (i.e. practice alone or separate to scheduled lessons or competitions) was the key difference between good and elite performers. This is where top players get ahead of their peers: away from the standard training and the scheduled lessons that everyone else takes. The top players tend to stay behind and practice after training, and they voluntarily give up leisure time to do a bit extra. They seem to know that their practice really does count and that extra practice is the key to improving more quickly than others.

### 3. EXPERT SPEED, REACTION TIME, AND MEMORY ARE NOT LIMITED BY INNATE ABILITIES

Believers in natural talent put forward an argument that says we are born with certain qualities that advantage or disadvantage us for specific activities. They say that disadvantages can be partially overcome with training, but will ultimately put a cap on the highest level we can attain. Researchers have examined this claim by taking athletes with exceptional abilities in their sport, and testing what relationship exists between their advanced learned skills, and basic skills that can be measured readily such as speed (of simple movements) and non-specific reaction time.

Experts are much faster than less accomplished performers. But surprisingly, superior speed in their sport of expertise does not show up in more general tests of their speed. Matthew Syed in *Bounce* <sup>[3]</sup> recounts a story of the time Desmond Douglas (a top table-tennis player with world-renowned lightning-quick reflexes) was given a test of his reaction speed. The test involved pushing a button in response to a light cue, and to everyone's amazement he was found to have the slowest reaction time of the entire England team. The result was so surprising that the machine was considered faulty. This result has been repeated time and time again with other athletes.

#### SO WHERE DO THEY GET THEIR SPEED?

Outside their domain of expertise, their reaction times are no different to the average person. This includes skills that are very relevant to an activity such as the finger speed of expert typists. Surely fast typists have fast finger speed? Nope...average <sup>[7]</sup>. Yet these people clearly are able to move and react more quickly while performing, so what is happening?



Matthew Syed explains that the secret lies in their extensive acquired knowledge in their domain of expertise. This knowledge (gained by extensive experience) allows athletes to react to subtle cues to anticipate events before they happen. In typing it means being able to read ahead to anticipate what's coming up and cut down the time between successive letters. In tennis, the world's best returners of serve react to cues in the server's movements to anticipate where he or she will serve the ball. They are therefore able to start moving in the right direction much earlier, rather than waiting to see where the ball is going before reacting. **In this way, experts find shortcuts that allow them to bypass the normal restrictions imposed by basic physical abilities.** <sup>[7][11][12]</sup>

The ability to anticipate and prepare in advance is critical in tennis. Roger Federer himself has stated that his powers of anticipation are a critical factor in the superiority of his game: *"I have the impression that I sense how a ball is coming and my reactions are automatic"*. <sup>[13]</sup> Abernethy and Russel (1987) studied the returns of tennis and badminton players specifically, and found that top players can anticipate where their opponent is going to hit the ball (or shuttle) better than novice players. This was due to expert players picking up cues earlier during the service or hitting action of their opponent before contact was made. So an expert returner's ability to return is not limited by his or her raw reaction time, but instead relies on his or her deep tennis knowledge, which is gained from extensive experience. These conclusions are supported by the findings of a 2005 study <sup>[12]</sup> which showed that skilled tennis players responded more than 25% faster when returning a

groundstroke performed by a live hitter compared to a ball machine due to being able to see the movement pattern of the player. The 50 millisecond time saving they found would allow the player to increase his/her court coverage by as much as 1.2 m (0.6 m on both the forehand and backhand side).

This ability to anticipate is an example of the heightened awareness in game situations that defines sporting greats perhaps more than any other quality or skill. Wayne Gretzky (one of the most dominant athletes in all of professional sport) was said to skate “ahead of the puck”, turning up at the right spot before the puck got there. But Gretzky, more than anyone, was aware that it was not because he had faster reactions or was a faster skater than the rest. He readily admits: *“I wasn’t naturally gifted in terms of size and speed; everything I did in hockey I worked for”, and “The highest compliment you can pay me is to say that I worked hard every day...That’s how I came to know where the puck was going before it even got there”* <sup>[3]</sup>

So, to summarise, the speed and fluency of complex motor skills for expert performers do not depend on raw reaction times or faster muscle contractions (i.e. the speeds of the individual movements that make up the skill). Instead, it is more important how a series of skills is integrated <sup>[7]</sup>. This means that motor-skill speed can be faster than predicted by the speed of component movements/reactions, and this fact opposes the idea that there are fixed elements that can limit our ultimate performance level. These findings are particularly important because the abilities discussed above such as speed and reaction time are typical of those that are most often cited as innate and unchangeable.

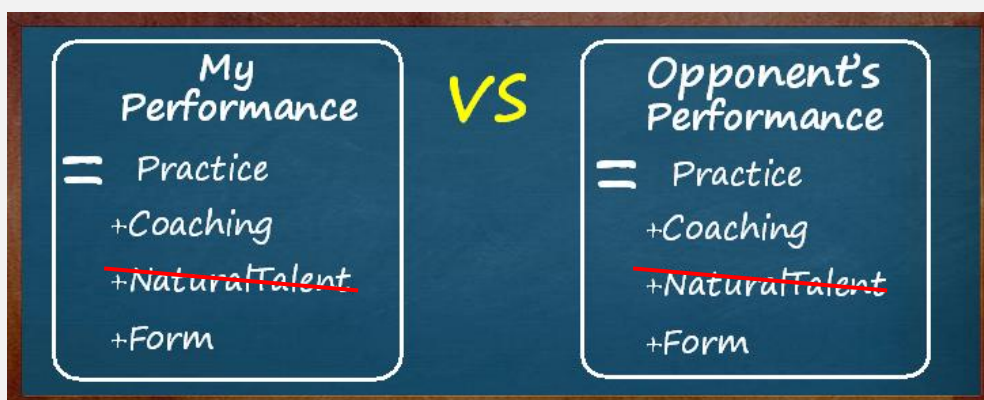
#### WHAT DOES ALL THIS MEAN FOR MY TENNIS?

It means that you do not need to be born or blessed with any of the above-mentioned abilities because not only can they be learned, they can ONLY be learned.

*TO SUMMARIZE THE STORY SO FAR...*

- 1) People are not born with an ability to learn a specific skill or set of skills any faster or more easily than anyone else; AND
- 2) The performance of complex skills is not limited or capped by innate (genetic) abilities.

Since these are precisely the claims that define natural talent, the available evidence clearly does not support the concept of natural talent, and so it cannot remain a part of our equation for performance.



## IF NATURAL TALENT DOESN'T EXIST, WHY IS THE THEORY SO POPULAR?

The illusion of natural talent remains popular for a number of reasons:

- 1) **It's romantic.** Everyone loves the story of someone with a rare gift that the rest of us don't have. It almost seems like a super power, and is highly valued. A natural talent is considered special, whereas the reality of dogged acquisition of a skill by repetitive practice seems far more everyday and less glamorous.
- 2) **Starting early gives skills and expertise that are unexpected for one so young.** This surprises people and is labelled natural talent by those who don't know the training history of the child.
- 3) **Acquired skills FEEL automatic.** Even when we have worked hard to develop a skill, once gained the skill feels natural. This effect becomes even more dramatic the more we practice, and by the time mastery occurs it feels utterly natural as if we were born with it, and it is easy to forget much of the hard work that went towards gaining it. It also by this stage looks very natural to any outside observer.
- 4) **The multiplier effect.** This effect occurs where the slightly better performance of one child provides encouragement and opportunities that aren't given to other children. By taking advantage of extra opportunities and practice, the gap between the child and their peers is multiplied. The accelerated learning that results is commonly mistaken for a natural ability to gain skills more quickly than others. Again this is because of failure to look objectively at the training history of the child. An understanding of the multiplier effect is of primary importance for anyone looking to perform at a high level and is therefore discussed in further detail below. Its importance is discussed in detail by Ceci and others, 2003 (*Developing Childhood Proclivities into Adult Competencies: The Overlooked Multiplier Effect*)<sup>[14]</sup>.

## 4. THE MULTIPLIER EFFECT

A slightly above average tennis ability will often stimulate encouragement from parents (and coaches) to pursue further training and practice. If a parent adopts the idea that their child is special and has a chance to be successful (for whatever reason, be it an unexplained “natural” ability, early exposure to tennis, size or developmental advantages, early praise, or even pure parental bias), this can be the single most powerful factor in driving the child’s continued commitment to training, and therefore their success. Regardless of the cause, the **increased opportunities for quality practice** that follow are the source of the extraordinary power of the multiplier effect.

In tennis the multiplier effect works something like this:

- First try at tennis, shows better ability than average for his or her age. For a 3 year old, contributing factors could be anything from a love of chasing butterflies with sticks, to a love of tennis balls; for a 9 year old it may be learning quickly due to good hand-eye co-ordination and athletic ability from playing other sports. It could also be the delusions of a loving parent.
- Whatever the reason, this encourages continued participation and encouragement.
- Enjoyment by the child may cause him/her to seek out further opportunities to play (with friends, against the garage wall, at school, in the backyard etc). They may also begin to watch tennis on TV, adopt a favourite player and dream of emulating them.
- This increased playing time quickly raises their skills ahead of their peers. Any gap in ability that existed in comparison to other kids the same age, has now been exaggerated, and if the original talent was imagined it is real now.
- As a result of standing out from the crowd they are selected for coaching groups that train more often. In these groups, coaches notice his or her ability, earmark the child as talented and encourage the parents and child, and private coaching is offered.
- Now taking private and group coaching, the child is soon a standout for his/her age, perhaps wins a local tournament, and is selected for a regional squad with highly experienced coaches. They are now being offered opportunities that the other kids are not.

As you can see a small initial advantage made possible another small advantage, which led to another. Each advantage presented an opportunity for **greater quality and quantity of practice**. Pretty soon a wide gap has opened between the player who had the initial advantage and one who didn’t. This gap can be so surprising to people that Daniel Coyle calls it the HSE (holy sh#t effect), because that’s what people say when they see a 6 year old with the skills of a 10 or 12 year old <sup>[1]</sup>.

A 2001 German study <sup>[15]</sup> showed that this initial advantage need not have anything to do with natural abilities. They showed that players born closer to the cut-off date for an age-group (i.e. the older performers in the age-group) had an initial advantage (due to a size and developmental headstart) that triggered the multiplier effect because these players were more likely to be selected for representative teams which were then given more specialised coaching. This effect is also discussed in detail in Malcolm Gladwell’s *Outliers: The story of success* <sup>[4]</sup>.

The research of Dr Carol Dweck and Benjamin Bloom has shown that the rate of improvement of students can even be influenced solely by the feedback given. <sup>[16][17]</sup> In these cases positive feedback and praise for effort (rather than results) strongly influenced the desire of children to practice an

activity further. In doing so, the studies created an artificial multiplier effect that caused a subset of the children to progress their skills more quickly than others (through improved attitude to practice), and yet was unrelated to actual ability levels.

The multiplier effect highlights some of the reasons why it is difficult for late starters to catch up to early starters (who continue with optimum training levels):

- 1) **The top coaching organisations select those who perform best in their age-group** (the same applies to sponsorship, scholarships, and selection for representative teams). These people then get more specialised training that it is difficult for others to match without the same support.
- 2) **Accumulated practice hours count, not current practice levels.** Which means that to catch up you have to practice more or better than players already at the top. This is difficult if they are already training at near-optimum levels. Drastically increased training loads for the late starter are difficult to maintain and could lead to injury and burnout.
- 3) **Belief in their own ability/potential (as well as the belief of parents and coaches) is primarily based on their performances.** Only the best in their age-group will attract the strongest support and the best resources, and if you are not one of them you will not attract as much support.

### THE MULTIPLIER EFFECT ON STEROIDS

In 1981, Sherwin Rosen outlined a concept called the "superstar effect" <sup>[18]</sup>. This refers to a phenomenon where the best performer in a field gets a disproportionate amount of attention compared to other (almost as good) performers. Tournament wins and media attention ensure that people take notice, people will remember your name and label you as talented or gifted. Then months later when choosing a squad to represent your region or to attend a training camp, they will be strongly inclined to select you (based on your reputation) in preference to someone who has attracted less attention than you, even if they are just as good a player. In other words the multiplier effect can be supercharged for anyone who makes headlines or establishes themselves as #1 because you attract an almost unfair amount of support from others.

### THE ILLUSION OF NATURAL TALENT IS IMPORTANT TO UNDERSTAND

Although the concept of natural talent is not supported by evidence, the illusion itself is very real indeed. It motivates parents and coaches to provide crucial support (time and money) and encouragement, so if you are able to get to a level above your age-group peers, you are best positioned to tap in to the multiplier effect.

## 5. WHAT'S THE BEST KIND OF PRACTICE?

Now that we've established that natural talent is a pile of you-know-what, and that practice matters more than we thought, let's start learning about how we learn skills. This is the first step to figuring out why practice works, what type of practice works best, and how we can supercharge our practice so that we can maximise our improvement every time we step onto the court.

### THE MYELIN SKILL-BUILDING MECHANISM

Every human skill is created by chains of nerve fibres carrying a tiny electrical pulse, in other words a signal travelling through a circuit in our brain (that's right, our skills exist in our brain rather than in our muscles). When we perform a specific skill, the specific circuit controlling that skill is activated. Repeated firing of this circuit, stimulates the growth of a substance called myelin. Myelin begins as tiny strands that attach to the stimulated circuit, and with continued firing forms a sheath that insulates this circuit <sup>[19]</sup>.

This sheath can be likened to the insulation of copper electrical wiring, which prevents leakage of current from the circuit and short circuiting. The thicker the myelin casing becomes, the better insulated the circuit becomes, and the more reliable the circuit. This transformation can be likened to converting a narrow potholed road into a multi-laned freeway. Daniel Coyle calls it a superhighway or "broadband for your brain", as it allows information to travel at much higher speeds and successive signals to be sent much more rapidly, boosting your overall ability to process information by up to 3000x. Each layer of myelin increases the speed and accuracy of the skill being performed, and more importantly this IS what makes up a skill (i.e. each skill is a reinforced circuit in your brain). Every skill we have (from tying a shoelace to a backhand overhead smash) has been built this way. If we have a skill, it is because we have fired the circuit for it (by practicing or performing it) repeatedly until enough myelin was formed to make the skill repeatable, reliable, and fluent. Weak skills are weakly myelinated and our best skills are the the most myelinated.

Myelin explains why the 10,000 hour rule applies across so many different types of performance, including a wide range of sports as well as non-sporting fields: because there is a common physiological mechanism that is responsible for the rate of skill acquisition in all fields. While over time incredible transformations can occur, the rate that anyone can improve over shorter time periods is limited by this mechanism. This is why all humans are only able to reach mastery bit by bit, day by day, and research has shown that that is the only way anybody ever has achieved greatness in any field.

The big shift from traditional thinking is to think of skill as a muscle that can be built. When you use your muscles in a specific way by training them to their maximum, those muscles will respond by getting stronger. In a similar way by firing your skill circuits in a specific way (by struggling to perform a skill at or above your current limits) they will respond by getting faster and more fluent. <sup>[1]</sup>

**How can this help our practice?** Understanding the myelin mechanism helps us to understand a lot about practice, most importantly why practice works, and how we can make our practice more effective by better harnessing the myelin mechanism.



## WHY PRACTICE WORKS

Any tennis player knows that the use of repetition is fundamental in tennis coaching, but now we can see why. Repeated firing of a skill circuit builds myelin, which improves the speed, capacity and reliability of the circuits responsible for a skill, and therefore improves our performance of the skill.

## HOW CAN WE PRACTICE BETTER?

Geoff Colvin used the observations of researchers on the practice regimes of wide ranging experts, to develop a framework for what constitutes the most effective practice. The most important features of this “perfect practice” or “deliberate practice” are summarised below, and fit extremely well with the skill-building myelin mechanism we learnt about above.

### PRACTICE ACTIVITIES ARE DESIGNED TO ACHIEVE VERY SPECIFIC GOALS

Top performers identify sharply defined elements of performance to improve, to ensure stimulation of a narrower range of circuits a greater number of times. They apply this concept to large complex skills by working on small specific components. “Play” and non-directed practice do not target any particular skill circuits with the necessary focus, and represent lower quality practice. Note however, that play is essential in younger years when enjoyment should be the primary concern. <sup>[17]</sup>

### ACTIVITIES ARE CHOSEN AT THE EDGE OF CURRENT ABILITIES

Top athletes are continually attempting skills that are beyond their comfort zone. Practicing what you can already do won't improve anything. Practice is designed this way so that small failures can be embraced and corrected. The most powerful learning stems from failure and correction over and over. Coyle's study of talent hotbeds (particular schools, academies, and clubs that produce a disproportionately high number of world class athletes) characterised great practice as follows: **Try, fail, stop, think. Try again, get a bit better or a bit further, fail, stop, think (analyse errors), repeat.** He likens this process to ice-climbing, where crucially the person is seeking out the slippery slopes, purposely operating at the very edge of their abilities, so that they WILL screw up. This is the key to accelerated improvement. By contrast, effortless, comfortable practice is a poor way to learn.

## REPETITION

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Now that we know why repetition works, how is it best implemented? Coyle found that the training academies producing the best performers used the following strategy to achieve deep practice, which enables repetition to be more effective.

**Chunking.** This involves dividing a skill up into small fragments or chunks, resulting in smaller and less complex skills that can be learned and perfected individually. Using this method the student becomes intimately familiar with the components of each skill. These components or fragments of the skill can then be strung together into chunks of increasing size until eventually the complete skill has been constructed. Chunking should be preceded by getting an impression of the whole skill (e.g. watching it being performed and imitating), so that the student can visualise the final goal.

**Repetition.** The foundation of practice, but more is not always better. More is better only if you are in a state of intense concentration. You must be: 1) at the edge of your abilities; and 2) still paying close attention to mistakes.

**Feel it.** Learn to feel the struggle that represents the edge of your abilities, the struggle of maintaining concentration and the feeling of striving for a specific goal, falling short, evaluating and trying again.

These steps are strongly embraced by the Spartak Tennis Club in Moscow, Russia. This club has only one tennis court, and a bare minimum of facilities, yet has used the principles above to create a quality of practice that is perhaps unrivalled. The proof is in their results. This one small club has produced Anna Kournikova, Marat Safin, Anastasia Myskina, Elena Dementieva, Dinara Safina, Mikhail Youzhny, and Dimitri Tursinov; and churned out more top twenty ranked women from 2005-2007 than the whole United States. <sup>[1]</sup>

## CONTINUOUS FEEDBACK IS CRUCIAL

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The performance of top players is carefully monitored for errors and ways to improve further. They take advantage of a range of feedback sources including coaching, self monitoring, competition results, and match statistics. The crucial role of your coaches is to keep you in the learning zone (near the limit of your skills) and to provide continual feedback. Experience allows them to assess where you are and the best route to your goal, and therefore what you should strive for next.

### EVALUATE YOUR COACH.

Ensure that they have you: **a)** regularly identifying goals; **b)** defining specific skills and abilities to improve (there should be a specific purpose to every lesson and every shot); **c)** pushing you to extend beyond your current abilities; **d)** giving continual feedback; and **e)** giving you things to work on (homework) outside your coaching sessions. Having the right coach for you is crucial. Coaches play a key role in developing a love for the sport in young children, and this is their most important role as they teach the basics of tennis. As children grow older and more self-driven, the technical expertise of a coach (and their track record of having produced top players) becomes more important. Accordingly players will generally change coaches a few times as they advance. The research of Benjamin Bloom found that choosing coaches was one of the most important roles of parents.

### MENTALLY DEMANDING LEVELS OF CONCENTRATION

Deliberate practice must be difficult and draining. This is because of the intense concentration and close attention to errors that is required, particularly because (as noted above) you should be operating close to the limit of your abilities. Practice without such concentration is not only unhelpful, but can even be detrimental to performance (not being highly attentive to errors can encourage flaws and less refined technique to be developed, due to insulation or reinforcement of the wrong skill circuits). The best strategy therefore is to focus on shorter more regular sessions to ensure higher concentration levels during practice.

### DURATION OF PRACTICE

Because it is necessary to maintain full concentration during the entire session, the length of time that high quality practice can be sustained is limited. Anders Ericsson, in his landmark 1993 paper *The role of deliberate practice in the acquisition of expert performance*, reviewed several studies that have shown **no benefit from durations exceeding 4hrs per day**, and reduced benefits after 2hr, due to decreased ability to maintain sharp concentration.<sup>[7]</sup> Among his own study subjects he found practice sessions among elite performers averaged 1-1.5 hrs, with experts completing **more of these short sessions per week rather than practicing for longer periods**.

The myelin mechanism needs 10000 hours of practice to build world class skills, but it is the limitations on duration of high quality practice sessions that cause this development to take place over 10 years. In other words theoretically at 6 hours per day you could churn out 10000 hours of practice in 5 years, BUT research shows that the number of high quality practice hours would likely be much lower and the workload would also be far less sustainable.

For further discussion read our blog post: [Optimal Duration of Practice for Tennis Players](#)

***In Summary...***

Knowledge of the mechanism responsible for all skill building allows us to design our practice to exploit this mechanism to enable accelerated improvement.

Studying the training of experts and of training academies that are producing amazing numbers of top athletes allows us to discover their most potent training methods. These include:

- Specially designed practice
- Choosing specific skills at the limit of your capabilities
- Seeking continuous feedback that is focussed on correcting errors
- Repeating over and over, but only as long as high levels of concentration can be maintained.

These principles work because they harness the power of our brain's skill-building mechanism.

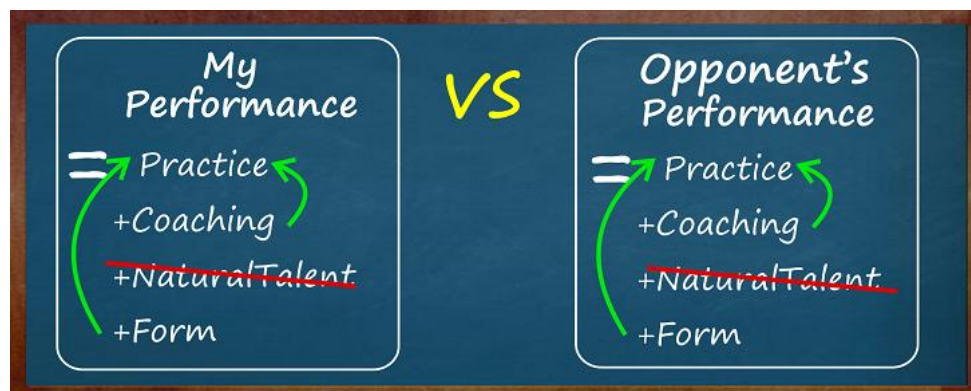
The methods described here build an ideal picture of what your practice sessions could be. While reading through this chapter you probably realised how far most "coaching" falls short of these ideals. The gap between typical coaching and the training described above, is where the power lies for you to shift your training to a new gear and make improvements quicker than others could imagine.

## 6. SOLVING THE EQUATION

*Let's recap what we've covered so far:*

- Part 1: We outlined the factors that most tennis players think are important for performance. The biggest problem with the common model is that the perceived relationship between practice and performance is very vague.
- Part 2: We explored natural talent and why it's an important concept. It's important because so many people believe in it and invest in it.
- Part 3: We showed that natural talent is an illusion. The evidence shows that: expertise in well-studied cases is completely explained by practice history; there are not portions of the population that learn more quickly or easily than the rest; and that innate abilities do not constrain the performance of experts.
- Part 4: We covered a super-super-critical concept that every parent and player must be aware of. The Multiplier Effect multiplies your advantages by creating new opportunities to improve.
- Part 5: We reviewed strategies that allow us to tap into the brain's physiological skill-building mechanism, so that we can create the best possible training sessions. These strategies will help us learn faster.

Let's look at how our original equation has changed.



We can now see that: 1) natural talent no longer matters to us; 2) coaching is merely a way of enabling the quality and managing the quantity of our practice; and 3) our form on the day we can view in a much more specific way. We can see that form is tied to practice, and with our new attitude of identifying specific elements of our game to improve we are better equipped to isolate the specific cause of our poor performance, whether it be an inconsistent slice backhand, choking on big points, poor focus against lesser players, or managing fatigue in the third set. We are able to take full responsibility for our own game.

The most important thing we have learned is that performance is explained by practice alone, and that practice has two components, quality and quantity. The best practice puts a focus on quality first, and is systematic and consistent with quantity. So our new equation for performance becomes:

$\text{My Performance} = \text{Practice [Quality x Quantity]}$
<p style="color: yellow; font-weight: bold; font-size: 1.2em;">VS</p>
$\text{Opponent's Performance} = \text{Practice [Quality x Quantity]}$

This new formula describes a strict relationship between accumulated practice and performance that continues to be proven accurate by more and more studies. This relationship is remarkably consistent, not just in tennis but in any activity. This formula is not complex or revolutionary, but its strict simplicity has the power of removing doubt about how great performance is attained. It is incredibly empowering to know that your training is everything, and that the making of superstars follows an explainable formula. It's not magic, not inborn, and not a gift, but earned. To me there's nothing more inspiring than realising there's no tennis gene, no tennis gift, and that all skills are built bit by bit by practice, even those skills that seem superhuman or unachievable.

The following flow chart shows how the other major components such as coaching, motivation, and knowledge (and any others you can think of) relate to performance only through enabling more quality and/or quantity of practice. The multiplier effect acts like a turbocharger for your improvement and your career.



## ARE YOU AN EXPERT AT PRACTICE?

The real key to becoming a top player is to become an expert in the art of training. That is - designing, scheduling, executing and maintaining high quality practice.

Nick Bollettieri, while talking about his famous tennis academy in Florida (which has produced players such as Agassi, Courier, Seles, Pierce, Hingis, Sharapova, Kournikova, and Jankovic) to Matthew Syed, strongly endorses the change in mindset that we are encouraging here:

“You know why this place is successful? Because none of the kids leave here without their mindset transformed. They may arrive thinking they can cruise their way to success, but they quickly learn that nobody has got anywhere in life without working hard, by showing tremendous discipline, and by taking responsibility for their actions. That is ultimately what separates the best from the rest.” <sup>[3]</sup>

The importance of this knowledge for young players is summed up in the following statement by Geoff Colvin in “Talent is Overrated” <sup>[2]</sup>. It also captures perfectly why I was inspired to write this manifesto.

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*“What you really believe about the source of great performance becomes the foundation of what you will achieve. If you believe that if you do enough work, with the right design and focus for hours a day and years on end, your performance will grow dramatically until it reaches the highest levels, then there is a chance you will do the work and achieve the desired performance. But if you believe that your performance is forever limited by your innate talents, then you won’t. There will be setbacks and challenges, but you need to believe that with the right kind of work you can overcome them. Those who see setbacks as evidence that they lack the necessary gift will give up.”*

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## 7. WHAT'S THE NEXT STEP?

OK, now that we have a pretty good idea how to improve our performance, how do we set new goals to strive for? And how do we measure our progress?

### CLIMBING A MOUNTAIN

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Well, let's say you wanted to climb Mt Everest. How would you go about it? Obviously you need to be good at walking uphill in the cold, but how do you prepare? You could go out and walk up hills in your jocks in winter, but is that enough? How would you find out?

Surely you must look to those who have done it before, because you want to know what the task involves, how to prepare, how long they spent preparing, what equipment and supplies they took, what route they took, how many people they took, what were the biggest challenges, what were the costs, and so on. If it were me I'd be reading every book written by those who have climbed Mt Everest, and digging further for diaries and logbooks of these climbers, and I would talk to as many as I could to get a good sense of what the journey will entail, and how best to prepare.

### THE EVEREST OF TENNIS

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Now surely it's the same for reaching the top of the tennis world. You can play tennis every day and hope that works, but is that enough? Are we on track or not? We know that our performance is solely a product of our training, so we must train like those we wish to become. To do this you need to know how they train, and perhaps most importantly how they have created opportunities for more and better quality practice than other players.

### STUDY THE GREATS AND YOUR COMPETITION

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Take another look at our equation for performance. So far we have only looked at one side of the equation (our own performance), but to be successful we need to look at other players to figure out where we stand. In tennis your performance is measured against other players, so you must measure your practice against the practice of others. Practicing 5 hours per week for example doesn't mean much unless you know how that compares to others. If you want to be a top player, then you will have to find out how the top players train and how they get quality training and then emulate or better their methods. This could involve the following investigation:

- Learn about the great players of past and present to get a sense of what levels of commitment, hard work, good fortune, and support from others that it took to get to the top.
- Find out what the top players in your town, area, state, country etc (depending on your desired level of success) are doing or have done to reach that standard. You might be surprised how much they (or their parents) will be willing to share with you.



# THE 2012 BLUEPRINT SERIES

To help you get started, we are putting together a series of case studies called Blueprints, so that young players can see what it really takes to become a top player. These Blueprints are biographies of the top players in tennis, but with a focus on examining the key factors that got them to the top.

These Blueprints examine topics such as the childhood, coaches, training, logistics, attitude, and junior results of top players, and what we can learn from their success. The first is The Federer Blueprint, and it's out now!

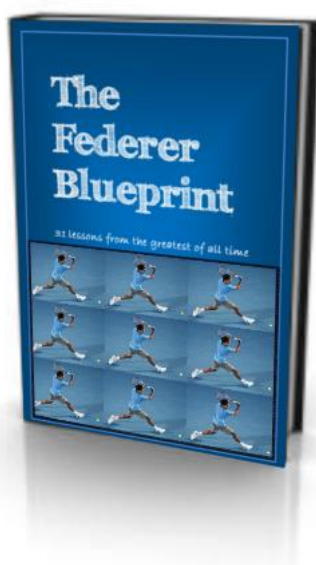
WOULD YOU ROB A BANK WITHOUT KNOWING THE LAYOUT? THE BEST WAY IN? EXITS?  
TIMETABLE, OPENING AND CLOSING HOURS, LUNCHBREAKS, PREVIOUS ROBBERY ATTEMPTS  
AND STRATEGIES???

NO WAY.

IN THE SAME WAY, HOW COULD YOU EXPECT TO BREAK INTO PRO TENNIS WITHOUT A  
DETAILED ANALYSIS OF HOW OTHERS HAVE DONE IT AND WHAT ROUTES THEY TOOK?

DON'T JUST HOPE THAT ONE DAY YOU'LL MAKE IT. STUDY THE BEST...LEARN WHAT YOU NEED  
TO DO...DRAW UP YOUR STRATEGY...DECIDE HOW BADLY YOU WANT IT...COMMIT  
YOURSELF...ATTACK IT...ACHIEVE YOUR DREAMS.

[Click here to learn more about The Federer Blueprint](#)



## FURTHER RESOURCES

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SOME TOPICS WE HAVE DISCUSSED FURTHER ON THE BLUEPRINTTENNIS BLOG:

[To the 10000 Hour Haters: It's Not About the Number](#)

[Optimal Duration of Practice for Tennis Players](#)

[Every Tennis Parent Needs Help: How to Get It](#)

[The Tennis Parent's Guide to Motivation: 9 Lessons](#)

## REFERENCES

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FOR THE FULL LIST OF REFERENCES USED IN THIS MANIFESTO PLEASE VISIT THE FOLLOWING  
[Reference Page](#) ON OUR WEBSITE

*See the following page for a 1-page summary of our manifesto...*

## THE BLUEPRINT TENNIS 1 PAGE MANIFESTO

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**1INSPIRE IN KIDS A LOVE FOR THE GAME**, a thirst for competition, a hunger to be better. Then take it from there.

**2NATURAL TALENT IS AN ILLUSION.** People see the results and form an opinion on the spot, but misjudge the practice behind the scenes that got them there.

**3THE PERFORMANCE OF THE WORLD'S BEST ATHLETES CAN BE EXPLAINED ENTIRELY BY THEIR PRACTICE.** There is no gap that needs to be filled by a magic talent or mysterious X-factor. The real X-factor is possessing the drive and opportunity to achieve such high levels of practice.

**4IT WILL TAKE AT LEAST 10,000 HOURS OF QUALITY PRACTICE TO BE WORLD CLASS.** Being special doesn't mean you don't need to work as hard, special is being able to work harder than the rest.

**5PERFORMANCE = QUALITY X QUANTITY OF PRACTICE.** So becoming an expert at practice is the real battle.

**6THE BEST PRACTICE IS DESIGNED, SPECIFIC, REPETITIVE, AT THE EDGE OF ABILITIES.** And it is very demanding because of the intense concentration required.

**7PERFORMANCE IS NOT LIMITED BY INNATE FACTORS.**  
Only by the practice accumulated.

**8THE MULTIPLIER EFFECT IS THE KEY TO ACHIEVING STAGGERING RESULTS OVER TIME.** Every advantage you get that helps you improve faster than others, will bring you closer to further opportunities. Tennis careers are built on a powerful series of successive opportunities that accelerated their improvement so much that other players could not keep up.

**9LEARN AS MUCH AS YOU CAN ABOUT TOP PLAYERS.** By learning what it really takes to become great, you can better align your actions with your goals.