Part I

Decision Analysis

AlphaBrain: How a Group of Iconoclasts Are Using Cognitive Science to Advance the Business of Alpha Generation, First Edition. Stephen Duneier.

Chapter 1

Marginal Improvement, Significant Impact

Decision-Making as a Skill

What we do as human beings is make decisions. Whether we are investment managers, athletes, parents, or students, the one true commonality we share is the decision itself. Regardless of the implications, who is making the decision or the field in which it is being made, the decision-making process always has the same basic components and should always follow the same path.

Decision-making is a skill. In fact, I would argue it is *the* skill that we humans possess. However, it is rarely understood to be the underlying source of all other more readily identifiable skills. Instead, we look at a tennis player and think, he is skilled at swinging a racquet or chasing down balls. We look at a politician and think, she is particularly adept at negotiating or salesmanship. We think of successful fund managers and attribute their success to their ability to identify patterns or steel their nerves under pressure. In reality, steeling your nerves is a decision, a skill that can be taught and learned. Swinging a racquet properly

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and influencing others are decisions as well. They can be taught and learned. They can be practiced and improved via the decision-making process. When you truly grasp this concept, and are able to properly frame everything by the decision, to view the world through the lens of the decision-making process, you come to realize that in order to truly excel at anything in life, both personally and professionally, you must focus on the decision as a problem to be solved.

A professional athlete cannot simply turn off the decision-making process when they aren't on the playing field. To make optimal decisions at the baseline, they must make the right nutritional decisions, practice decisions, footwork decisions, rest decisions, investment decisions, coaching decisions, and so on, even when they are nowhere near the court. To be world-class tennis stars, they must analyze their decisions, refine them, gather data on them, and approach them deliberately. It is a 24/7 job to reach and maintain their positions as among the greatest players of all time. Same goes for surgeons, actors, and yes, investors.

Becoming a world-class decision maker isn't a 9-to-5 job, it is a lifestyle. It requires not just practice, but repeated, deliberate practice. The kind that requires the employment of cognitive strain, a concept we will return to over and over again throughout this book. It is challenging. It requires sacrifice and a significant investment of time and effort. *AlphaBrain* is fundamentally a book about how to improve your decision-making as it applies to institutional investing, but the concepts and the science behind it are applicable to any one of the millions of decisions made on a daily basis by every single one of us in every aspect of our lives.

Spectators in Our Own Decisions

Far more often than any of us would like to believe, we are mere spectators in the decisions we make, even in decisions of great consequence. If we are spectators in the decisions we make, it means we are bystanders, as opposed to the active participants we perceive ourselves to be, in the investments we make, the businesses we run, and even the lives we lead.

I know what you are thinking. You're smart, highly educated, experienced, and very successful. What I am saying doesn't apply to you. As it happens, not only don't those qualities keep us from being spectators or grant us immunity from the problems it can cause, but they often make us even more vulnerable. I understand it may be a difficult pill to swallow, so let's consider a study that might help prove the point.

Professors Brian Wansink and Junyong Kim conducted an experiment among north Philadelphia's moviegoers. To half the participants, they provided a free large bucket of popcorn while the other half received a very large bucket. Half of each group were provided fresh delicious-tasting popcorn. The other half received 14-day-old stale popcorn which participants later rated a 2 out of 10.

If we are rational decision-makers there are only two primary reasons for us to consume food: we eat to be satiaed and/or because it tastes good. Therefore, if we are active participants in the decisions we make, the size of the portion should not affect how much we eat but the perceived taste should. As it happens, those who received the fresh, delicious tasting popcorn in a very large bucket ate just over 40% more than those who received it in the smaller container. On the other hand, those who were provided with popcorn that they themselves described as "terrible" and "disgusting" in a very large bucket, consumed just under 40% more than those who ate it from the smaller one.

Dr. Wansink has conducted numerous experiments of a similar nature, the most famous one involving bottomless bowls of soup, always delivering similar results. Regardless of the fact that we are awake and aware when faced with choices, very often we don't actively participate in the decisions we make.

Perhaps you are thinking that the poor snacking habits of moviegoers falls short of proving that we are spectators in decisions of great consequence. After all, we go to the movies to escape the real world, so perhaps it's only natural that we would leave our rational decision-maker hat at home for those couple of hours. Before you summarily dismiss studies regarding eating habits of any kind though, consider this. Excess weight and obesity play a role in roughly 80% of all American deaths and disabilities.

In any event, let's turn our attention to a rather well-known study involving the entire adult populations of some of the most advanced and highly educated countries in the world as it relates to a decision most would perceive to be of great consequence. Johnson gathered data regarding countrywide organ-donor participation rates across a number of major Western European countries. In Denmark he found that just 4% of the country's adult population had elected to donate their organs upon death. Meanwhile, right across the bay in Sweden, the participation rate was 86%. Fourteen percent of the citizens of the United Kingdom had volunteered their body parts while just across the English Channel nearly 100% of the French had done so. Perhaps most surprisingly, while only 12% of the German population was willing to donate their internal organs, Austria, a country that shares a language and so many cultural aspects with Germany, and separated only by an imaginary line on the ground, had a participation rate of roughly 100%.

The question that must be asked is, how could the overwhelming majority of the populations in countries that enjoy so many cultural similarities and are geographically connected arrive at polar opposite conclusions regarding a decision of such great consequence? The answer is really quite simple, and yet astonishing. They all approach decisions in exactly the same way. Sounds counterintuitive, right? After all, every individual is considering the same set of relevant factors and has the same two options from which to choose, so how can it be that they could all consider those factors in the same way and yet arrive at polar opposite conclusions?

As it turns out, the countries with low participation rates run "opt-in" programs. In those countries, if you do not take action (i.e., make a decision), you will not be an organ donor. On the other hand, those with very high participation rates run "opt-out" programs, meaning if you do not take action you *will* be an organ donor. In other words, the common bond shared by the great majority of these predominantly educated decision-makers in some of the most advanced nations on earth is that the overwhelming majority of them are little more than spectators in at least some of their own decisions, even decisions of great consequence.

Of course, if you were to stop an average Austrian on the streets of Vienna, show them these statistics and ask, "Why is it that Austrians are

so giving, so selfless?" You can be sure they would tell you about their culture of kindness and compassion. What is very unlikely is that they would tell you the answer is simply that the majority of Austrians don't participate in their own decisions but instead let others choose for them. And yet, that is the reality.

This is significant because if we aren't actively participating in decisions such as how much popcorn we eat or whether to donate our organs, yet these decisions are being made, then someone else must be making them for us. In effect, we are outsourcing some our most important decisions to people and institutions we haven't vetted, typically without even realizing it. For many of your most important decisions, regardless of whether you realize it or not, you aren't the decision-maker. In the case of the free popcorn, the most influential person in the decision-making process isn't the moviegoer, but rather it is the person who decides the size of the bucket. For the hundreds of millions of adults around the world who are or are not organ donors, the most influential person in the decision was not the potential donor, but the person who framed the question as opt-in or opt-out. Consider that for a moment. The difference between hundreds of millions of lives being saved versus lost is affected by individuals who no one knows, no one voted into office, and no one vetted for their qualifications and beliefs. In fact, it's very likely even they don't appreciate the power they wield. After all, everyone is free to make their own choice. The question maker's only input is to ask, "If you would like to be an organ donor, check here" versus "If you would not like to be an organ donor, check here."

When studies like these brought to light just how little decision-makers participate in their own choices, it was a game changer. Whereas in the past, corporations and government entities would attempt to educate workers on things like the value of saving for retirement and rainy days, it became apparent there is a much more effective and efficient way to get people to make decisions in their own best interest while still allowing them to exercise free will. Simply reframe the question when they enroll in savings plans. Rather than asking if they'd like to participate in a savings plan, the default is to deduct the maximum amount from their paycheck each month. If they would like to opt out, they must check a box. That seemingly inconsequential adjustment can be the

difference between an entire population needing a government-funded social safety net or not.

What we've discovered as a result of decades of research in the cognitive sciences is that humans make decisions in fairly predictable ways, where even the smartest, most educated, experienced, and successful among us are unconsciously affected by things that have the potential to produce systematic errors in our judgment. Marketers are well aware of this and have been capitalizing on it for generations. Now that policymakers have become aware of this tendency as well, attempts are being made to influence the decisions of their constituents to help them make decisions that are in their own best interest simply by reframing the way decision problems are presented to them. It is a concept known as, *decision architecture*. A powerful, yet simple approach to nudging decision makers in the right direction without impeding their free will. We will return to this idea of decision architecture time and again throughout AlphaBrain, for it is one of the most powerful tools for overcoming decision-related mistakes, and as such, it is fundamental to the approach presented in this book. Be forewarned though, it will be applied differently than you've seen it before.

Marginal Improvement and Its Outcomes

Novak Djokovic spent years as the number one ranked men's tennis player in the world, but that wasn't always the case. Back in 2004, when he first turned professional, he was ranked 680th. In fact, in his first two years he didn't come close to breaking into the top 100. At the time, he averaged $250,000 per year in prize money and lost more matches than he won. It wasn't until the end of his third year that he skyrocketed up the ranks to finish third in the world. For the next four years, he held that spot, earning an average of $5 million in prize money per year and winning an impressive 79% of the matches in which he competed.

Truth is, his number-three ranking belied an undeniable truth that was apparent to everyone, except perhaps Novak himself. Although Djokovic was ranked just one notch below Switzerland's Roger

Table 1.1 Novak Djokovic's overall performance, 2004–2016

	2004–2005	**2006–2010**	**2011–2016**
Rank	100+	3	1
Annual Prize Money	$300,000	$5 million	$14 million
Matches Won (%)	49%	79%	90%

Federer and Spain's Rafael Nadal, his game had more in common with 30th-ranked Radek Stepanek than the superstars at the top. As each tournament approached, commentators, writers, and even the fans spoke of the field as though it were comprised of Federer, Nadal, and then everyone else. Over and over again, Djokovic was snubbed, and he wore the hurt on his sleeves. In press conferences and on-court interviews he came across as arrogant and disrespectful of his opponents and everyone else involved with the game, including the fans. The more he demanded respect, the less he garnered. Novak's character, maturity, and mental strength were questioned with every loss and outburst.

Four years later, everything changed. He leapfrogged the superstars to attain the top ranking and remained there for years to come. In addition to tripling the prize money he earns each year, Djokovic now wins an astounding 90% of all the matches that he plays (Table 1.1). Not surprisingly, that chip on his shoulder disappeared along with the losses. Novak is now a fan and establishment favorite. When all is said and done he will likely be remembered as one of the greatest to ever play the game.

What is most interesting about all of his incredibly impressive statistics – the ones that everyone quotes and that we use to define Novak Djokovic as a future hall of famer – is that he doesn't directly control any of them since they are outcomes rather than inputs. If he has a tough match, he wouldn't go home and say to his coach, "I'd like to work on winning more matches." His coach, in turn, wouldn't respond by suggesting that instead he should work on winning more prize money.

Although we cannot control them, the decisions we make affect the probability that one outcome will occur relative to all other possibilities.

The better our decisions, the more likely we are to achieve the outcome we desire. Due to the continuous and compounding nature of all the millions of decisions we face on a regular basis, even a marginal improvement in the decision-making process itself can have a huge impact on our results.

Novak Djokovich's career provides evidence of the power of marginal adjustments. We can quantify and track his ability to make better decisions as his career progressed by looking at the percentage of points that he has won, because in tennis the typical point involves just slightly more than one decision. Therefore, we can think of his points-won percentage as his *decision success rate*. Back when Djokovic was winning 49% of the matches in which he participated, he was winning 49% of the points he played. In order to win 79% of his matches, he had to improve his decision success rate to just 52%. Then, to attain the number-one ranking, to earn an average of $14 million per year in prize money alone, and to win a dominating 90% of his matches, he had to raise his decision success rate to a surprisingly mundane, 55% (Table 1.2).

As you just read about Novak's progress and how he improved his game, perhaps you find it difficult to connect the gains to decisions rather than physical actions. After all, tennis is a physical endeavor. To get better, you might expect that Djokovich worked on his serve, maybe adding more spin or racquet speed making it harder for his opponents to return it. Some might speculate that he practiced sprinting drills in order to improve foot speed so that he could run down more of the difficult shots. He may have worked with a yoga instructor on improving his flexibility, allowing him to stretch further and expand his reach, thereby increasing his ability to defend more of the court.

Table 1.2 Novak Djokovic's performance, 2004–2016, including points won

	2004–2005	**2006–2010**	**2011–2016**
Rank	100+	3	1
Annual Prize Money	$300,000	$5 million	$14 million
Matches Won (%)	49%	79%	90%
Points Won (%)	49%	52%	55%

These are all excellent ways to improve one's tennis game, and it's very possible Djokovich worked on some or even all of them. Although we may think of each of these improvements as physical actions, they are also decisions. He must decide that he wants to play the game of tennis, win more matches, reduce the odds of his opponent returning his serve, reduce the odds of him being aced or not being able to reach a passing shot. Each objective, known in decision analysis as an *outcome,* is a problem he seeks to solve. The action, physical or otherwise, is the solution he chooses to solve that problem. Each aspect – from defining the outcome, to understanding what factors affect our ability to achieve it, and finally, choosing the action that gives us the best odds of doing so – is an integral part of the decision-making process. (We'll do a deeper dive into this shortly.)

In Novak's case, if he had decided that he wanted his opponents to miss more of his serves he may have increased the spin and/or racquet speed. He may have chosen that as a course of action because it would be more difficult for his opponent to hit a ball that changes direction sharply and even erratically, especially when they have less time to react. It's a perfectly logical decision, and precisely the type of approach that springs to mind anytime we contemplate how to improve results. If you want to improve results, you must get better by raising the level of your game. Swing *quicker*, spin *more*, run *faster*, jump *higher*. It seems so obvious that is what we need to do in order to achieve better outcomes. There is, however, an easier, more powerful, and indeed more rational approach.

Marginally Speaking

The start of a new year is that moment when many of us vow to improve by making some adjustment to our behavior that will make us happier, prouder, wealthier. Although it's tempting to set grand pronouncements of the radical changes we will implement in the coming year, there are two reasons that may not be the correct approach. Marginal change is not only more powerful than you might think; as shown by Novak Djokovic, it is also far more likely to be implemented. Exercising more is one of the

most common New Year's resolutions. When many of us set this goal, it's likely with an alcoholic drink (or turkey leg) in hand. Exercising for just 30 minutes a day three times a week sounds easily achievable, but it's not. Otherwise, it wouldn't be the most commonly unresolved resolution.

In reality, how we spend the majority of our time is nearly set in stone. What differentiates one year from the next is what happens on the margin. It is there in those moments that we define our lives: the year we lost weight, bought a new home, markets crashed, kids went off to college. As big as these events are, they all exist on the margin of our lives, where everyday, we eat, work, sleep, watch TV, and relieve our bowels in an almost rhythmic pattern. It is the marginal stuff, the things we don't do regularly, that require effort and attention. It makes us uncomfortable, and it challenges and rewards us far more than what happens in the bulk of our time.

According to the US Department of Agriculture (USDA), the average man with a sedentary lifestyle should take in about 2,300 calories per day. The reason is that the average sedentary man burns approximately 2,300 calories each day. The sum total of mundane activities such as sleeping, eating, brushing your teeth, and watching TV requires the energy provided by 2,300 calories. On the other hand, for the average active man, the USDA suggests taking in 2,700 calories per day. Yes, the difference between living a sedentary lifestyle and an active one requires just 400 extra calories a day, or roughly what you will consume in a large cup of Coca-Cola.

My point is that the bulk of what we consume and burn is predetermined, unalterable. Diets and exercise regimes exist on the margin. In the scheme of things, they are little more than minor adjustments to our daily routines, but the impact can be life changing. One less glass of wine at dinner. Small fries rather than large. Whole grain pasta instead of refined. Seemingly tiny adjustments that can produce dramatic results, yet generate enough friction in the moment to keep us from doing what is in our own best interest longer term.

The same applies to how we perform at work, no matter what the job is, but let's look at the portfolio manager (PM) as an example. The role involves just three fundamental aspects: developing a view, deciding how to express it, and when. For most PMs, the majority of what they

do is also fairly set in stone. They acquire information in the same way, utilize the same instruments, invest in the same assets, and use the same indicators to determine timing that they have used for years. Truth be told, much of the accumulation of information used to derive views happens with very little thought, being predetermined by geography, firm, and industry. So, as it is with diet and exercise, adjustments and improvements at work occur at the margin.

When I took over the investment process at a hedge fund years ago, it was my job to turn PMs who had excellent sell-side pedigrees, but very little success on the buy-side, into positive performers. Although it was expected that I would make sweeping changes, I understood that after 25 years in the business, they were, for the most part, who they would always be. Like a good fitness trainer, my job was to understand their deeply entrenched habits and suggest the marginal behavioral adjustments that could unleash dramatic improvement.

Over the next 13 months, thanks to one seemingly minor tweak, namely forcing the PMs to formally answer the simple question, "Why?" whenever they made a decision, resulted in all of them achieving the best buy-side performance of their careers by a very wide margin and the firm outperforming its benchmark index by 2500 basis points. I didn't change how the portfolio managers gathered information. I didn't have them use different instruments, invest in different asset classes, discover new technical indicators, or tighten up their stop-losses. I simply had them become more aware of their own actions, challenging them to recognize when their decisions were inconsistent with their own beliefs.

Truth is, no matter how good the trainer, how beautiful the gym, or powerful the juicer, the great majority of people fail to stick with even marginal adjustments. The same goes for PMs, but the question is, why?

It is at the margins where vast potential exists, but it is also where you are challenged, feel uncomfortable, unnatural even, and that can be exhausting. If it wasn't, it wouldn't be on the margin; it would be a fundamental part of who you are.

What makes an exercise routine effective is resistance. Without it, you don't get stronger or more fit. You must get your heart pumping, the lactic acid flowing, and the oxygen churning. As they say, "No pain,

no gain." Well, the same goes for your mental well-being. You need to challenge how you think, read publications that fire up neurons, and create new connections in the brain by questioning your beliefs. Not just those about the US dollar, but about the type of information you should be gathering and even how you spend your time.

The Power of Avoiding Mistakes

Since 2000 Bill Belichick has been far and away the most successful head coach in the NFL. Having won slightly more than 80% of their 200 regular season games since then, his team the New England Patriots is head and shoulders above the competition. At the time of writing, they are the reigning Super Bowl champs for a record fifth time under his leadership and have won 24 playoff games. The results speak for themselves, but when compared to the other 31 coaches in the league they are simply astounding (Figure 1.1).

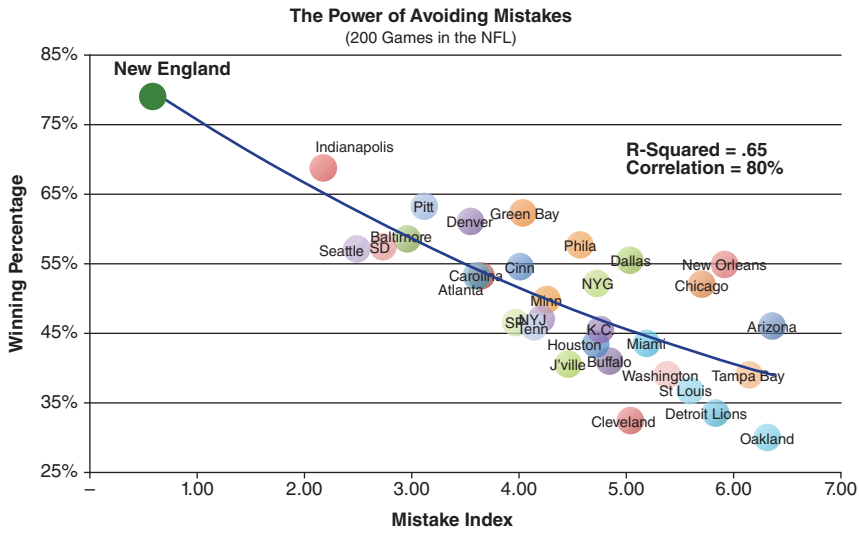

Figure 1.1 The Power of Avoiding Mistakes

In fact, his record is so spectacular that many have accused him of cheating, seeing no other way to explain his incredible success. The reason even the experts are at such a loss for an explanation is that none of the usual explanations apply. Although Belichick has exceptional players on his roster, they rarely come to him as stars. He has something of a knack for turning unsung players into superstars who are then poached for their "outlier" skills. Yet time and again, those same players fade back to mediocrity when traded to other teams. The only true constant has been quarterback Tom Brady, a sixth-round pick from the 2000 draft when 198 players, including six quarterbacks, were selected ahead of him. Indeed, Brady is regarded by most as a superstar, but unlike all the other role players in Belichick's regime who have garnered that kind of praise while on his roster, Brady never left, so whether he would be such a success with another team is up for debate. There is actually one other semiconstant for Belichick's Patriots, though. They've always had one of the league's best place kickers. Initially, it was Adam Vinatieri and since 2006, Stephen Gostkowski. Two of the greatest to ever play the position. The fact that these are the only two constants is actually very significant. More on that in a moment.

In the absence of a clear explanation for why Belichick has been so successful, the experts have resorted to creating narratives that appeal to deep-seated beliefs. Truth is, if they really want to understand the secret of his success, all they need to do is listen to what he says in every pre and postgame interview. Although the press describes him as evasive, the reality is, the faulty communication lies in the experts' inability to see past their own flawed, unsubstantiated bias. Coach Belichick's answers to questions like, "How did you prepare your team for your opponent's explosive offense or dominating defense?" is repeated so often it has become a slogan used on T-shirts and billboards. The answer goes something like this. "We didn't prepare for them. We prepared ourselves. If all 11 players on offense, 11 on defense, and 11 on special teams simply do their job, we have a good chance to win."

Since it's not sexy nor does it sound scientific, and because it's assumed that everyone needs to do their job in order for a team to win, commentators simultaneously complain about and mock his evasiveness. Although it may sound like a stock answer, he's actually giving away

his secret. Not everyone has ignored his mantra, though. Two of the top four playoff contenders in the 2016 college football playoffs were coached by Belichick disciples, Nick Saban's University of Alabama and Kirk Ferentz's University of Iowa. Listen to their press conferences and you'll hear an eerily similar message.

I'll be honest, they are my favorite press conferences, because they speak my language, as well as that of the only other coach to lead four teams to Super Bowl victories, Chuck Noll of the Pittsburgh Steelers. His mantra delivered the same message. "Before you can win a game, you first have to not lose it." Whether you use Noll's words or Belichick's, "Do your job," the message is the same: don't make mistakes. Although that may sound obvious, surprisingly few experts in fields that involve elements of luck and skill (like ours), truly grasp just how different the approach is from the norm. Watch any football game with this mantra in mind, and you'll see the game in a whole new light. You will discover that in almost every game, the outcome is determined by one team making fewer mistakes than the other. Don't take my word for it though. The data makes the strongest argument.

In order to create a "mistake index," I selected the one statistic from each of the three aspects of the game (offense, defense, and special teams) that best represents a mistake in its purest form. It turns out there is a phenomenal correlation between a team's mistake index and their winning percentage over time. Truth be told, because of the natural competitive edge created with ball possession, the predictive power is nearly identical if we limit the inputs to two simple statistics—offensive giveaways and field goal conversions. In other words, if the player on offense who touches the ball most frequently can avoid handing it over to the opponent and the player responsible for converting a field goal/extra point attempt into points can do so with great frequency, you are likely to wind up with a far better record than your opponents. See how Brady and Gostkowski fit in now?

Think about Tom Brady and what adjectives are most commonly attached to his name. It's not "explosive," "powerful," or even "creative," but rather "calm" and "unflappable." In looking for someone to manage his offense, Belichick doesn't seek out the scrambler or the guy who can thread the needle. First and foremost, he wants someone who won't relinquish the competitive edge they have when simply possessing the

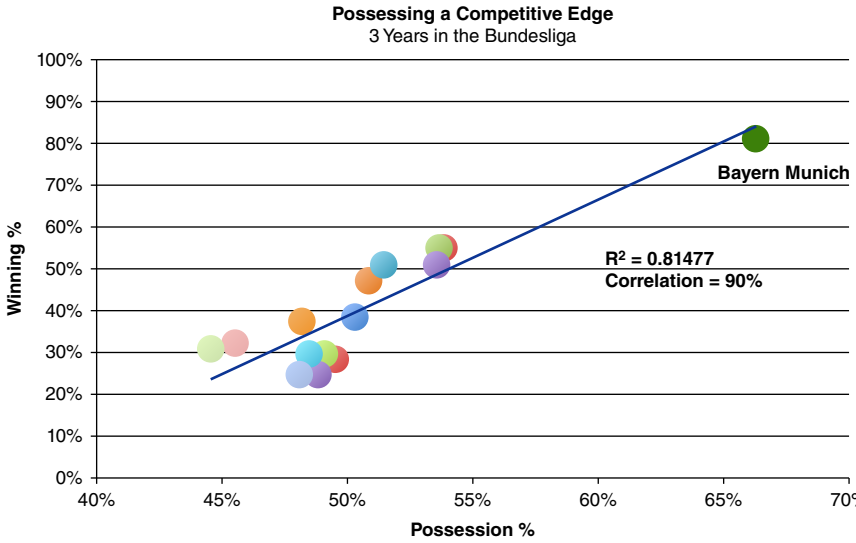

Figure 1.2 Possessing a Competitive Edge

ball. That is Brady's strength. Combined with Stephen Gostkowski's 88% field goal percentage, Belichick's team provides a formidable foe for any opponent.

As it turns out, Belichick, Noll, Saban, and Ferentz aren't the only ones to discover the power of avoiding the mistake of relinquishing a competitive advantage to the opponent. Since taking the helm in 2013, Bayern Munich's coach, Pep Guardiola, has zeroed in on the very same aspect of his game (Figure 1.2). Although his mantra has been adjusted to fit soccer, the message is exactly the same. Above all else, he drills into his players that ball possession is of the utmost importance. While in possession of the ball his team is more likely to score and less likely to incur a penalty than its opponent. In other words, as it is for American football, simply possessing the ball creates a competitive edge. Therefore, it should only be relinquished when attempting a high probability shot on goal. By pushing time of possession to extreme levels, opponents have a greater tendency to become frustrated, making them more emotional, thereby leading to more mistakes. Those mistakes generate penalty kicks and breakaway opportunities for Pep's squad, both of which lead to high probability shots on goal.

None of this is rocket science. In fact, it's all fairly obvious. Why then don't all coaches and athletes focus on reducing mistakes? Much of it can be explained by cognitive bias and incentives.

Commentators, highlight reels, and the most often quoted statistics all tend to focus on the upside outlier. If an athlete wants to increase his pay, he need only create a narrative that appeals to our cognitive bias for extreme events. A single, spectacular one-handed catch shown repeatedly on ESPN's Sports Center and retweeted a few million times will override the mundanity of a hundred dropped passes over the course of a season. Just ask Odell Beckham Jr. or, if you're a basketball fan, Jeremy Lin. Simply scoring a goal won't set you apart from your peers, but just one well-placed bicycle kick might. A low probability missed shot (so long as it isn't taken in the final seconds of a big game) will fade into the background of a team sport with numerous players, all of whom share in the blame for a loss. However, one spectacular shot, and by spectacular I mean a low-probability shot that required more luck than skill, will be attributed to the shooter and much of the success laid at her feet. As a result of this skewed risk/reward attribution, much of which we owe to a cognitive shortcoming, athletes expend less effort trying to tilt the odds of success in favor of them and their teams over time by reducing mistakes, and instead concentrate on threading the needle, swinging for the fences, and unleashing the bone jarring hit in the hopes of being noticed.

There's another reason we focus on creating the memorable play, even at the expense of winning more games. We have a natural predilection for stories that help us make sense of the world in which we exist, even if those stories run in direct opposition to reality. It's more appealing to look at Belichick's phenomenal win/loss record and concoct a spectacular story of deceit and chicanery than to accept that he has crushed his competition by simply reducing mistakes. The same goes for athletes like Novak Djokovic competing in individual sports. When we are presented with the statistics that show just how dominant he is, we create a narrative of extraordinary dominance over his opponents. He was ranked number one in the world from 2011 to 2016, amassed nearly $17 million in prize money in 2016 alone, and wins roughly 90% of the matches he plays. Given those statistics, who in their right mind would expect him to lose to anyone, let alone a young upstart? In explaining

such dominance, we go to great lengths to create a story of almost superhuman ability, but the reality is quite different. In achieving everything just described, he still wins just 55% of all the points he plays. That's a mere 3% better than when he was ranked third and earned one-third the prize money. Even more interesting, when he was ranked 680th in the world and earning less than $100,000 per year, he was winning 49% of the points he played. As it turns out, the difference between good, great, and once-in-a-generation is smaller than we think. Novak isn't superhuman. He simply makes slightly fewer mistakes than every one of his competitors.

No matter what it is you want to become better at, it can only be achieved by reducing mistakes. Consider the simple objective of running faster, for example. In order to run faster you must actually run less slowly. The question then is, what is it that tends to reduce our running speed? Perhaps we become fatigued or run out of breath quickly. If we simply run more often, this speed impediment will gradually affect us less quickly and less frequently. Ever wonder what someone coaching an athlete like Usain Bolt, the fastest man to ever compete in the 100 meter dash could possibly offer, day in and day out? The answer is, suggestions for making fewer mistakes. If you move your elbow out to the side even a millimeter, it forces an adjustment in another part of your body to keep you simultaneously upright and moving forward. So, if you keep the elbow flowing in the correct direction, it makes you faster. Reduce friction between your legs, between your skin and the air. Reduce your weight. Reduce your need to breath harder. Gains are all a function of the reduction of mistakes. When one runs faster than anyone else, we define them as "superhuman." To be superhuman is to be free of the mistakes common to most human beings attempting the same feat.

So what does this have to do with investing? Everything. Making money in our business comes down to two things; having a portfolio with more winners than losers and/or bigger winners than losers. As it is with most coaches and athletes, investment managers tend to focus on the latter, and that has a great impact on every aspect of their game, from the risk management techniques employed to the rise in popularity of momentum trading. In placing greater focus and importance on skewed returns per trade, much like athletes, we tend to sacrifice the winners to

losers ratio. So, if we want to know how to break away from the pack, we should tear a page out of the playbook of those who have already done it, focusing more on making fewer mistakes by relinquishing that competitive edge only when a high probability shot on goal is available. Simply stated, it's easier to improve our winners to losers ratio by avoiding mediocre trades than it is to win the lottery, a few times per year.

The same principle applies to all athletics, as well as politics, medicine, policymaking, business, and investment management. Name any goal, dream, or aspiration of yours, personal or professional, from losing weight to clearing your bucket list, from generating better investment returns to identifying higher quality managers, and you have defined an outcome that you desire. Improve your decision-making even marginally, and your odds of realizing that outcome go up dramatically, as it has for Djokovic, Belichick, and Guardiola. The way to improve your decision-making is by reducing mistakes. It sounds simple enough, but as anyone who has ever tried to lose weight, improve their golf game by even a couple of strokes, or consistently beat the S&P knows, it is not.