

CHAPTER 1

Life Is Poker, Not Chess

Pete Carroll and the Monday Morning Quarterbacks

One of the most controversial decisions in Super Bowl history took place in the closing seconds of Super Bowl XLIX in 2015. The Seattle Seahawks, with twenty-six seconds remaining and trailing by four points, had the ball on second down at the New England Patriots' one-yard line. Everybody expected Seahawks coach Pete Carroll to call for a handoff to running back Marshawn Lynch. Why wouldn't you expect that call? It was a short-yardage situation and Lynch was one of the best running backs in the NFL.

Instead, Carroll called for quarterback Russell Wilson to pass. New England intercepted the ball, winning the Super Bowl moments later. The headlines the next day were brutal:

- *USA Today*: “What on Earth Was Seattle Thinking with Worst Play Call in NFL History?”
- *Washington Post*: “‘Worst Play-Call in Super Bowl History’ Will Forever Alter Perception of Seahawks, Patriots”
- *FoxSports.com*: “Dumbest Call in Super Bowl History Could Be Beginning of the End for Seattle Seahawks”
- *Seattle Times*: “Seahawks Lost Because of the Worst Call in Super Bowl History”
- *The New Yorker*: “A Coach’s Terrible Super Bowl Mistake”

Although the matter was considered by nearly every pundit as beyond debate, a few outlying voices argued that the play choice was sound, if not brilliant. Benjamin Morris's analysis on FiveThirtyEight.com and Brian Burke's on Slate.com convincingly argued that the decision to throw the ball was totally defensible, invoking clock-management and end-of-game considerations. They also pointed out that an interception was an extremely unlikely outcome. (Out of sixty-six passes attempted from an opponent's one-yard line during the season, zero had been intercepted. In the previous fifteen seasons, the interception rate in that situation was about 2%.)

Those dissenting voices didn't make a dent in the avalanche of criticism directed at Pete Carroll. Whether or not you buy into the contrarian analysis, most people didn't want to give Carroll the credit for having thought it through, or having *any* reason at all for his call. That raises the question: Why did so many people so strongly believe that Pete Carroll got it so wrong?

We can sum it up in four words: the play didn't work.

Take a moment to imagine that Wilson completed the pass for a game-winning touchdown. Wouldn't the headlines change to "Brilliant Call" or "Seahawks Win Super Bowl on Surprise Play" or "Carroll Outsmarts Belichick"? Or imagine the pass had been incomplete and the Seahawks scored (or didn't) on a third- or fourth-down running play. The headlines would be about those other plays. What Pete Carroll called on second down would have been ignored.

Carroll got unlucky. He had control over the quality of the play-call decision, but not over how it turned out. It was exactly because he didn't get a favorable result that he took the heat. He called a play that had a high percentage of ending in a game-winning touchdown or an incomplete pass (which would have allowed two more plays for the Seahawks to hand off the ball to Marshawn Lynch). He made a good-quality decision that got a bad result.

Pete Carroll was a victim of our tendency to equate the quality of a decision with the quality of its outcome. Poker players have a word for this: "resulting." When I started playing poker, more experienced players warned me about the dangers of resulting, cautioning me to resist the temptation to change my strategy just because a few hands didn't turn out well in the short run.

Pete Carroll understood that his universe of critics was guilty of resulting. Four days after the Super Bowl, he appeared on the *Today* show and acknowledged, “It was the worst *result* of a call ever,” adding, “The call would have been a great one if we catch it. It would have been just fine, and nobody would have thought twice about it.”

Why are we so bad at separating luck and skill? Why are we so uncomfortable knowing that results can be beyond our control? Why do we create such a strong connection between results and the quality of the decisions preceding them? How can we avoid falling into the trap of the Monday Morning Quarterback, whether it is in analyzing someone else’s decision or in making and reviewing the decisions in our own lives?

The hazards of resulting

Take a moment to imagine your best decision in the last year. Now take a moment to imagine your worst decision.

I’m willing to bet that your best decision preceded a good result and the worst decision preceded a bad result.

That is a safe bet for me because resulting isn’t just something we do from afar. Monday Morning Quarterbacks are an easy target, as are writers and bloggers providing instant analysis to a mass audience. But, as I found out from my own experiences in poker, resulting is a routine thinking pattern that bedevils all of us. Drawing an overly tight relationship between results and decision quality affects our decisions every day, potentially with far-reaching, catastrophic consequences.

When I consult with executives, I sometimes start with this exercise. I ask group members to come to our first meeting with a brief description of their best and worst decisions of the previous year. I have yet to come across someone who doesn’t identify their best and worst *results* rather than their best and worst decisions.

In a consulting meeting with a group of CEOs and business owners, one member of the group identified firing the president of his company as his worst decision. He explained, “Since we fired him, the search for a replacement has been awful. We’ve had two different people on the job.

Sales are falling. The company's not doing well. We haven't had anybody come in who actually turns out to be as good as he was."

That sounds like a disastrous result, but I was curious to probe into why the CEO thought the decision to fire his president was so bad (other than that it didn't work out).

He explained the decision process and the basis of the conclusion to fire the president. "We looked at our direct competitors and comparable companies, and concluded we weren't performing up to their level. We thought we could perform and grow at that level and that it was probably a leadership issue."

I asked whether the process included working with the president to understand his skill gaps and what he could be doing better. The company had, indeed, worked with him to identify his skill gaps. The CEO hired an executive coach to work with him on improving his leadership skills, the chief weakness identified.

In addition, after executive coaching failed to produce improved performance, the company considered splitting the president's responsibilities, having him focus on his strengths and moving other responsibilities to another executive. They rejected that idea, concluding that the president's morale would suffer, employees would likely perceive it as a vote of no confidence, and it would put extra financial pressure on the company to split a position they believed one person could fill.

Finally, the CEO provided some background about the company's experience making high-level outside hires and its understanding of the available talent. It sounded like the CEO had a reasonable basis for believing they would find someone better.

I asked the assembled group, "Who thinks this was a bad decision?" Not surprisingly, everybody agreed the company had gone through a thoughtful process and made a decision that was reasonable given what they knew at the time.

It sounded like a bad result, not a bad decision. The imperfect relationship between results and decision quality devastated the CEO and adversely affected subsequent decisions regarding the company. The CEO had identified the decision as a mistake solely because it didn't work out. He obviously felt a lot of anguish and regret because of the decision. He stated very clearly that he thought he should have known that the decision

to fire the president would turn out badly. His decision-making behavior going forward reflected the belief that he made a mistake. He was not only resulting but also succumbing to its companion, hindsight bias. Hindsight bias is the tendency, after an outcome is known, to see the outcome as having been inevitable. When we say, “I should have known that would happen,” or, “I should have seen it coming,” we are succumbing to hindsight bias.

Those beliefs develop from an overly tight connection between outcomes and decisions. That is typical of how we evaluate our past decisions. Like the army of critics of Pete Carroll’s decision to pass on the last play of the Super Bowl, the CEO had been guilty of resulting, ignoring his (and his company’s) careful analysis and focusing only on the poor outcome. The decision didn’t work out, and he treated that result as if it were an inevitable consequence rather than a probabilistic one.

In the exercise I do of identifying your best and worst decisions, I never seem to come across anyone who identifies a bad decision where they got lucky with the result, or a well-reasoned decision that didn’t pan out. We link results with decisions even though it is easy to point out indisputable examples where the relationship between decisions and results isn’t so perfectly correlated. No sober person thinks getting home safely after driving drunk reflects a good decision or good driving ability. Changing future decisions based on that lucky result is dangerous and unheard of (unless you are reasoning this out while drunk and obviously deluding yourself).

Yet this is exactly what happened to that CEO. He changed his behavior based on the quality of the result rather than the quality of the decision-making process. He decided he drove better when he was drunk.

Quick or dead: our brains weren’t built for rationality

The irrationality displayed by Pete Carroll’s critics and the CEO should come as no surprise to anyone familiar with behavioral economics. Thanks

to the work of many brilliant psychologists, economists, cognitive researchers, and neuroscientists, there are a number of excellent books that explain why humans are plagued by certain kinds of irrationality in decision-making. (If you are unaware of these books, see the Selected Bibliography and Recommendations for Further Reading.) But here's a summary.

To start, our brains evolved to create certainty and order. We are uncomfortable with the idea that luck plays a significant role in our lives. We recognize the existence of luck, but we resist the idea that, despite our best efforts, things might not work out the way we want. It feels better for us to imagine the world as an orderly place, where randomness does not wreak havoc and things are perfectly predictable. We evolved to see the world that way. Creating order out of chaos has been necessary for our survival.

When our ancestors heard rustling on the savanna and a lion jumped out, making a connection between “rustling” and “lions” could save their lives on later occasions. Finding predictable connections is, literally, how our species survived. Science writer, historian, and skeptic Michael Shermer, in *The Believing Brain*, explains why we have historically (and prehistorically) looked for connections even if they were doubtful or false. Incorrectly interpreting rustling from the wind as an oncoming lion is called a type I error, a false positive. The consequences of such an error were much less grave than those of a type II error, a false negative. A false negative could have been fatal: hearing rustling and always assuming it's the wind would have gotten our ancestors eaten, and we wouldn't be here.

Seeking certainty helped keep us alive all this time, but it can wreak havoc on our decisions in an uncertain world. When we work backward from results to figure out why those things happened, we are susceptible to a variety of cognitive traps, like assuming causation when there is only a correlation, or cherry-picking data to confirm the narrative we prefer. We will pound a lot of square pegs into round holes to maintain the illusion of a tight relationship between our outcomes and our decisions.

Different brain functions compete to control our decisions. Nobel laureate and psychology professor Daniel Kahneman, in his 2011 best-selling *Thinking, Fast and Slow*, popularized the labels of “System 1” and “System 2.” He characterized System 1 as “fast thinking.” System 1 is what

causes you to hit the brakes the instant someone jumps into the street in front of your car. It encompasses reflex, instinct, intuition, impulse, and automatic processing. System 2, “slow thinking,” is how we choose, concentrate, and expend mental energy. Kahneman explains how System 1 and System 2 are capable of dividing and conquering our decision-making but work mischief when they conflict.

I particularly like the descriptive labels “reflexive mind” and “deliberative mind” favored by psychologist Gary Marcus. In his 2008 book, *Kluge: The Haphazard Evolution of the Human Mind*, he wrote, “Our thinking can be divided into two streams, one that is fast, automatic, and largely unconscious, and another that is slow, deliberate, and judicious.” The first system, “the reflexive system, seems to do its thing rapidly and automatically, with or without our conscious awareness.” The second system, “the deliberative system . . . deliberates, it considers, it chews over the facts.”

The differences between the systems are more than just labels. Automatic processing originates in the evolutionarily older parts of the brain, including the cerebellum, basal ganglia, and amygdala. Our deliberative mind operates out of the prefrontal cortex.

Colin Camerer, a professor of behavioral economics at Caltech and leading speaker and researcher on the intersection of game theory and neuroscience, explained to me the practical folly of imagining that we could just get our deliberative minds to do more of the decision-making work. “We have this thin layer of prefrontal cortex made just for us, sitting on top of this big animal brain. Getting this thin little layer to handle more is unrealistic.” The prefrontal cortex doesn’t control most of the decisions we make every day. We can’t fundamentally get more out of that unique, thin layer of prefrontal cortex. “It’s already overtaxed,” he told me.

These are the brains we have and they aren’t changing anytime soon.* Making more rational decisions isn’t just a matter of willpower or consciously handling more decisions in deliberative mind. Our deliberative capacity is already maxed out. We don’t have the option, once we recognize the problem, of merely shifting the work to a different part of the brain, as if you hurt your back lifting boxes and shifted to relying on your leg muscles.

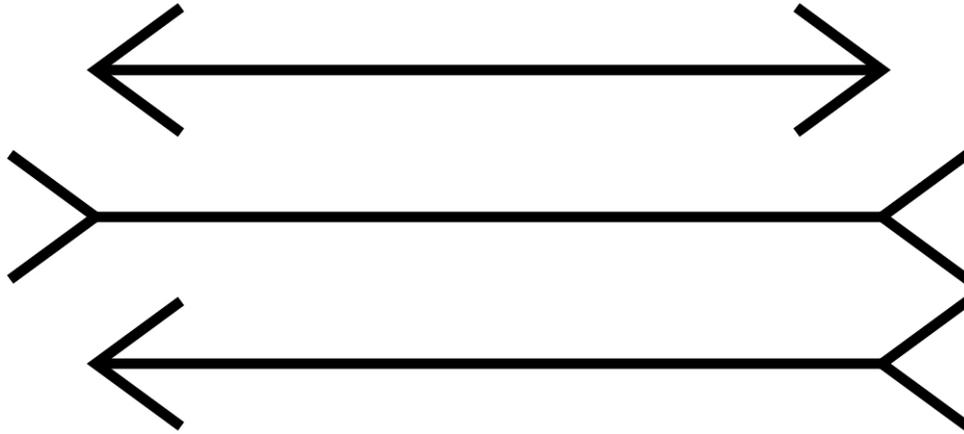
Both deliberative and reflexive mind are necessary for our survival and advancement. The big decisions about what we want to accomplish recruit

the deliberative system. Most of the decisions we execute on the way to achieving those goals, however, occur in reflexive mind. The shortcuts built into the automatic processing system kept us from standing around on the savanna, debating the origin of a potentially threatening sound while its source devoured us. Those shortcuts keep us alive, routinely executing the thousands of decisions that make it possible for us to live our daily lives.

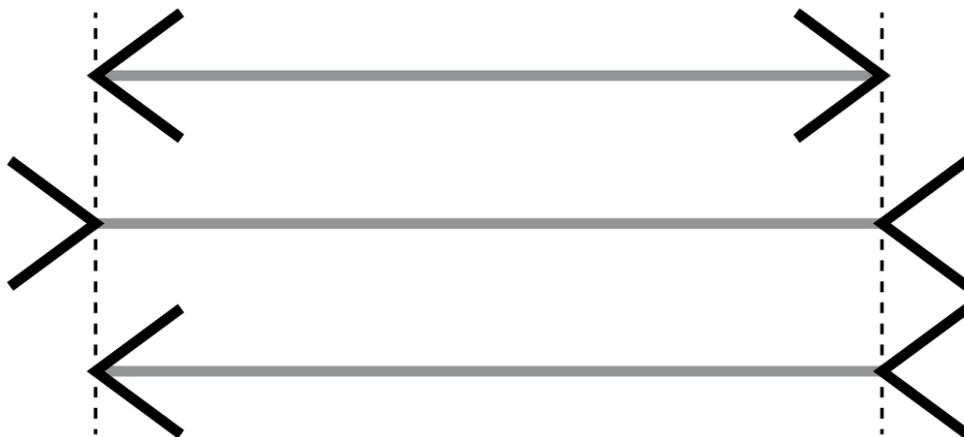
We need shortcuts, but they come at a cost. Many decision-making missteps originate from the pressure on the reflexive system to do its job fast and automatically. No one wakes up in the morning and says, “I want to be closed-minded and dismissive of others.” But what happens when we’re focused on work and a fluff-headed coworker approaches? Our brain is already using body language and curt responses to get rid of them without flouting conventions of politeness. We don’t deliberate over this; we just do it. What if they had a useful piece of information to share? We’ve tuned them out, cut them short, and are predisposed to dismiss anything we do pick up that varies from what we already know.

Most of what we do daily exists in automatic processing. We have habits and defaults that we rarely examine, from gripping a pencil to swerving to avoid an auto accident. The challenge is not to change the way our brains operate but to figure out how to work within the limitations of the brains we already have. Being aware of our irrational behavior and wanting to change is not enough, in the same way that knowing that you are looking at a visual illusion is not enough to make the illusion go away. Daniel Kahneman used the famous Müller-Lyer illusion to illustrate this.

MÜLLER-LYER ILLUSION



Which of these three lines is longest? Our brain sends us the signal that the second line is the longest, but you can see from adding the measurement lines that they are the same length.



We can measure the lines to confirm they are the same length, but we can't make ourselves unsee the illusion.

What we can do is look for practical work-arounds, like carrying around a ruler and knowing when to use it to check against how your brain processes what you see. It turns out that poker is a great place to find practical strategies to get the execution of our decisions to align better with our goals. Understanding how poker players think can help us deal with the decision challenges that bedevil us in our workplaces, financial lives, relationships—even in deciding whether or not passing the ball was a brilliant play.

Two-minute warning

Our goal is to get our reflexive minds to execute on our deliberative minds' best intentions. Poker players don't need to know the underlying science to understand the difficulty of reconciling the two systems. Poker players have to make multiple decisions with significant financial consequences in a compressed time frame, and do it in a way that lassoes their reflexive minds to align with their long-term goals. This makes the poker table a unique laboratory for studying decision-making.

Every poker hand requires making at least one decision (to fold your starting cards or play them), and some hands can require up to twenty decisions. During a poker game in a casino card room, players get in about thirty hands per hour. An average hand of poker takes about two minutes to complete, including the time it takes for the dealer to gather, shuffle, and deal the cards between hands. Poker sessions typically last for several hours, with many decisions in every hand. This means a poker player makes hundreds of decisions per session, all of which take place at breakneck speed.

The etiquette and rules of the game discourage players from slowing down the game to deliberate, even when huge financial consequences ride on the decision. If a player takes extra time, another player can "call the clock" on them. This gives the deliberating player all of *seventy seconds* to now make up their mind. That is an eternity in poker time.

Every hand (and therefore every decision) has immediate financial consequences. In a tournament or a high-stakes game, each decision can be worth more than the cost of an average three-bedroom house, and players have to make those decisions more quickly than we decide what to order in a restaurant. Even at lower stakes, most or all of the money a player has on the table is potentially at stake in every decision. Poker players, as a result, must become adept at in-the-moment decision-making or they won't survive in the profession. That means finding ways to execute their best intentions (deliberated in advance) within the constraints of the speed expected at the table. Making a living at poker requires interpolating between the deliberative and reflexive systems. The best players must find ways to harmonize otherwise irresolvable conflicts.

In addition, once the game is over, poker players must learn from that jumbled mass of decisions and outcomes, separating the luck from the skill, the signal from the noise, and guarding against resulting. That's the only way to improve, especially when those same under-pressure situations will recur in a variety of forms.

Solving the problem of how to execute is even more important than innate talent to succeed in poker. All the talent in the world won't matter if a player can't execute; avoiding common decision traps, learning from results in a rational way, and keeping emotions out of the process as much as possible. Players with awe-inspiring talent clean up on their best nights but go broke plenty of other nights if they haven't confronted this challenge. The poker players who stand the test of time have a variety of talents, but what they share is the ability to execute in the face of these limitations.

We all struggle to execute our best intentions. Poker players have the same struggle, with the added challenges of time pressure, in-your-face uncertainty, and immediate financial consequences. That makes poker a great place to find innovative approaches to overcoming this struggle. And the value of poker in understanding decision-making has been recognized in academics for a long time.

Dr. Strangelove

It's hard for a scientist to become a household name. So it shouldn't be surprising that for most people the name John von Neumann doesn't ring a bell.

That's a shame because von Neumann is a hero of mine, and should be to anyone committed to making better decisions. His contributions to the science of decision-making were immense, and yet they were just a footnote in the short life of one of the greatest minds in the history of scientific thought. (And, not coincidentally, he was a poker player.)

After a twenty-year period in which he contributed to practically every branch of mathematics, this is what he did in the last ten years of his life: played a key role on the Manhattan Project, pioneered the physics behind

the hydrogen bomb, developed the first computers, figured out the optimal way to route bombers and choose targets at the end of World War II, and created the concept of mutually assured destruction (MAD), the governing geopolitical principle of survival throughout the Cold War. Even after being diagnosed with cancer in 1955 at the age of fifty-two, he served in the first civilian agency overseeing atomic research and development, attending meetings, though in great pain, in a wheelchair for as long as he was physically able.

Despite all he accomplished in science, somehow von Neumann's legacy in popular culture is as one of the models for the title character in Stanley Kubrick's apocalyptic comedy, *Dr. Strangelove*: a heavily accented, crumpled, wheelchair-bound genius whose strategy of relying on mutually assured destruction goes awry when an insane general sends a single bomber on an unauthorized mission that could trigger the automated firing of all American and Soviet nuclear weapons.

In addition to everything else he accomplished, John von Neumann is also the father of game theory. After finishing his day job on the Manhattan Project, he collaborated with Oskar Morgenstern to publish *Theory of Games and Economic Behavior* in 1944. The Boston Public Library's list of the "100 Most Influential Books of the Century" includes *Theory of Games*. William Poundstone, author of a widely read book on game theory, *Prisoner's Dilemma*, called it "one of the most influential and least-read books of the twentieth century." The introduction to the sixtieth-anniversary edition pointed out how the book was instantly recognized as a classic. Initial reviews in the most prestigious academic journals heaped it with praise, like "one of the major scientific achievements of the first half of the twentieth century" and "ten more such books and the progress of economics is assured."

Game theory revolutionized economics, evidenced by at least eleven economics Nobel laureates connected with game theory and its decision-making implications, including John Nash (a student of von Neumann's), whose life story was chronicled in the Oscar-winning film *A Beautiful Mind*. Game theory has broad applications outside economics, informing the behavioral sciences (including psychology and sociology) as well as political science, biomedical research, business, and numerous other fields.

Game theory was succinctly defined by economist Roger Myerson (one of the game-theory Nobel laureates) as “the study of mathematical models of conflict and cooperation between intelligent rational decision-makers.” Game theory is the modern basis for the study of the bulk of our decision-making, addressing the challenges of changing conditions, hidden information, chance, and multiple people involved in the decisions. Sound familiar?

Fortunately, you don’t need to know any more than this about game theory to understand its relevance. And the important thing for this book is that John von Neumann modeled game theory on a stripped-down version of poker.

Poker vs. chess

In *The Ascent of Man*, scientist Jacob Bronowski recounted how von Neumann described game theory during a London taxi ride. Bronowski was a chess enthusiast and asked him to clarify. “You mean, the theory of games like chess?”

Bronowski quoted von Neumann’s response: “‘No, no,’ he said. ‘Chess is not a game. Chess is a well-defined form of computation. You may not be able to work out the answers, but in theory there must be a solution, a right procedure in any position. Now, real games,’ he said, ‘are not like that at all. Real life is not like that. Real life consists of bluffing, of little tactics of deception, of asking yourself what is the other man going to think I mean to do. And that is what games are about in my theory.’”

The decisions we make in our lives—in business, saving and spending, health and lifestyle choices, raising our children, and relationships—easily fit von Neumann’s definition of “real games.” They involve uncertainty, risk, and occasional deception, prominent elements in poker. Trouble follows when we treat life decisions as if they were chess decisions.

Chess contains no hidden information and very little luck. The pieces are all there for both players to see. Pieces can’t randomly appear or disappear from the board or get moved from one position to another by chance. No one rolls dice after which, if the roll goes against you, your

bishop is taken off the board. If you lose at a game of chess, it must be because there were better moves that you didn't make or didn't see. You can theoretically go back and figure out exactly where you made mistakes. If one chess player is more than just a bit better than another, it is nearly inevitable the better player will win (if they are white) or, at least, draw (if they are black). On the rare occasions when a lower-ranked grand master beats a Garry Kasparov, Bobby Fischer, or Magnus Carlsen, it is because the higher-ranked player made identifiable, objective mistakes, allowing the other player to capitalize.

Chess, for all its strategic complexity, isn't a great model for decision-making in life, where most of our decisions involve hidden information and a much greater influence of luck. This creates a challenge that doesn't exist in chess: identifying the relative contributions of the decisions we make versus luck in how things turn out.

Poker, in contrast, is a game of *incomplete information*. It is a game of decision-making under conditions of uncertainty over time. (Not coincidentally, that is close to the definition of game theory.) Valuable information remains hidden. There is also an element of luck in any outcome. You could make the best possible decision at every point and still lose the hand, because you don't know what new cards will be dealt and revealed. Once the game is finished and you try to learn from the results, separating the quality of your decisions from the influence of luck is difficult.

In chess, outcomes correlate more tightly with decision quality. In poker, it is much easier to get lucky and win, or get unlucky and lose. If life were like chess, nearly every time you ran a red light you would get in an accident (or at least receive a ticket). If life were like chess, the Seahawks would win the Super Bowl every time Pete Carroll called that pass play.

But life is more like poker. You could make the smartest, most careful decision in firing a company president and still have it blow up in your face. You could run a red light and get through the intersection safely—or follow all the traffic rules and signals and end up in an accident. You could teach someone the rules of poker in five minutes, put them at a table with a world champion player, deal a hand (or several), and the novice could beat the champion. That could never happen in chess.

Incomplete information poses a challenge not just for split-second decision-making, but also for learning from past decisions. Imagine my difficulty as a poker player in trying to figure out if I played a hand correctly when my opponents' cards were never revealed. If the hand concluded after I made a bet and my opponents folded, all I know is that I won the chips. Did I play poorly and get lucky? Or did I play well?

If we want to improve in any game—as well as in any aspect of our lives—we have to learn from the results of our decisions. The quality of our lives is the sum of decision quality plus luck. In chess, luck is limited in its influence, so it's easier to read the results as a signal of decision quality. That more tightly tethers chess players to rationality. Make a mistake and your opponent's play points it out, or it is capable of analysis afterward. There is always a theoretically right answer out there. If you lose, there is little room to off-load losing to any other explanation than your inferior decision-making. You'll almost never hear a chess player say, "I was robbed in that game!" or, "I played perfectly and caught some terrible breaks." (Walk the hallways during a break in a poker tournament and you'll hear a lot of that.)

That's chess, but life doesn't look like that. It looks more like poker, where all that uncertainty gives us the room to deceive ourselves and misinterpret the data. Poker gives us the leeway to make mistakes that we never spot because we win the hand anyway and so don't go looking for them, or the leeway to do everything right, still lose, and treat the losing result as proof that we made a mistake. Resulting, assuming that our decision-making is good or bad based on a small set of outcomes, is a pretty reasonable strategy for learning in chess. But not in poker—or life.

Von Neumann and Morgenstern understood that the world doesn't easily reveal the objective truth. That's why they based game theory on poker. Making better decisions starts with understanding this: uncertainty can work a lot of mischief.

A lethal battle of wits

In one of the more famous scenes in *The Princess Bride*, the Dread Pirate Roberts (the love-besotted Westley) catches up to Vizzini, the mastermind who kidnapped Princess Buttercup. Having vanquished Fezzik the Giant in a battle of strength and having outdueled swordsman Inigo Montoya, the Dread Pirate Roberts proposes he and Vizzini compete in a lethal battle of wits, which provides a great demonstration of the peril of making decisions with incomplete information. The pirate produces a packet of deadly iocane powder and, hiding two goblets of wine from view, he empties the packet, and puts one goblet in front of himself and the other in front of Vizzini. Once Vizzini chooses a goblet, they will both drink “and find out who is right and who is dead.”

“It’s all so simple,” Vizzini scoffs. “All I have to do is deduce, from what I know of you, the way your mind works. Are you the kind of man who would put the poison into his own glass, or into the glass of his enemy?” He provides a dizzying series of reasons why the poison can’t (or must) be in one cup, and then in the other. His rant accounts for cleverness, anticipating cleverness, iocane’s origin (the criminal land of Australia), untrustworthiness, anticipating untrustworthiness, and dueling presumptions related to Westley defeating the giant and the swordsman.

While explaining all this, Vizzini diverts Westley’s attention, switches the goblets, and declares that they should drink from the goblets in front of them. Vizzini pauses for a moment and, when he sees Westley drink from his own goblet, confidently drinks from the other.

Vizzini roars with laughter. “You fell victim to one of the classic blunders. The most famous is ‘Never get involved in a land war in Asia,’ but only slightly less well known is this: ‘Never go in against a Sicilian when death is on the line.’”

In the midst of laughing, Vizzini falls over, dead. Buttercup says, “To think, all that time it was your cup that was poisoned.”

Westley tells her, “They were both poisoned. I’ve spent the last two years building up immunity to iocane powder.”

Like all of us, Vizzini didn’t have all the facts. He considered himself a genius without equal: “Let me put it this way. Have you ever heard of Plato, Aristotle, Socrates? *Morons.*” But, also like all of us, he underestimated the amount and effect of what he didn’t know.

Suppose someone says, “I flipped a coin and it landed heads four times in a row. How likely is that to occur?”

It feels like that should be a pretty easy question to answer. Once we do the math on the probability of heads on four consecutive 50-50 flips, we can determine that would happen 6.25% of the time ($.50 \times .50 \times .50 \times .50$).

That’s making the same mistake as Vizzini. The problem is that we came to this answer without knowing anything about the coin or the person flipping it. Is it a two-sided coin or three-sided or four? If it is two-sided, is it a two-headed coin? Even if the coin is two-sided (heads and tails), is the coin weighted to land on heads more often than tails (but maybe not always)? Is the flipper a magician who is capable of influencing how the coin lands? This information is all incomplete, yet we answered the question as if we had examined the coin and knew everything about it. We never considered that both goblets might be poisoned. (“Inconceivable” would have been Vizzini’s term, had he been able to comment on his own death.)

Now if that person flipped the coin 10,000 times, giving us a sufficiently large sample size, we could figure out, with some certainty, whether the coin is fair. Four flips simply isn’t enough to determine much about the coin.

We make this same mistake when we look for lessons in life’s results. Our lives are too short to collect enough data from our own experience to make it easy to dig down into decision quality from the small set of results we experience. If we buy a house, fix it up a little, and sell it three years later for 50% more than we paid, does that mean we are smart at buying and selling property, or at fixing up houses? It could, but it could also mean there was a big upward trend in the market and buying almost any piece of property would have made just as much money. Or maybe buying that same house and not fixing it up at all might have resulted in the same (or even better) profit. A lot of previously successful house flippers had to face that real possibility between 2007 and 2009.

When someone asks you about a coin they flipped four times, there is a correct answer: “I’m not sure.”

“I’m not sure”: using uncertainty to our advantage

Just as we have problems with resulting and hindsight bias, when we evaluate decisions solely on how they turn out, we have a mirror-image problem in making prospective decisions. We get only one try at any given decision—one flip of the coin—and that puts great pressure on us to feel we have to be certain before acting, a certainty that necessarily will overlook the influences of hidden information and luck.

Famed novelist and screenwriter William Goldman (who wrote *The Princess Bride*, as well as *Misery* and *Butch Cassidy and the Sundance Kid*) reflected on his experiences working with actors like Robert Redford, Steve McQueen, Dustin Hoffman, and Paul Newman at the height of their successful careers. What did it mean to be a “movie star”? He quoted an actor who explained the type of characters he wanted to play: “I don’t want to be the man who learns. I want to be the man who *knows*.”

We are discouraged from saying “I don’t know” or “I’m not sure.” We regard those expressions as vague, unhelpful, and even evasive. But getting comfortable with “I’m not sure” is a vital step to being a better decision-maker. We have to make peace with *not knowing*.

Embracing “I’m not sure” is difficult. We are trained in school that saying “I don’t know” is a bad thing. Not knowing in school is considered a failure of learning. Write “I don’t know” as an answer on a test and your answer will be marked wrong.

Admitting that we don’t know has an undeservedly bad reputation. Of course, we want to encourage acquiring knowledge, but the first step is understanding what we don’t know. Neuroscientist Stuart Firestein’s book *Ignorance: How It Drives Science* champions the virtue of recognizing the limits of our knowledge. (You can get a taste of the book by watching his TED Talk, “The Pursuit of Ignorance.”) In the book and the talk, Firestein points out that in science, “I don’t know” is not a failure but a necessary step toward enlightenment. He backs this up with a great quote from physicist James Clerk Maxwell: “Thoroughly conscious ignorance is the prelude to every real advance in science.” I would add that this is a prelude to every great decision that has ever been made.

What makes a decision great is not that it has a great outcome. A great decision is the result of a good process, and that process must include an attempt to accurately represent our own state of knowledge. That state of knowledge, in turn, is some variation of “I’m not sure.”

“I’m not sure” does not mean that there is no objective truth. Firestein’s point is, in fact, that acknowledging uncertainty is the first step in executing on our goal to get closer to what is objectively true. To do this, we need to stop treating “I don’t know” and “I’m not sure” like strings of dirty words.

What if we shifted our definition of “I don’t know” from the negative frame (“I have no idea” or “I know nothing about that,” which feels like we lack competence or confidence) to a more neutral frame? What if we thought about it as recognizing that, although we might know something about the chances of some event occurring, we are still not sure how things will turn out in any given instance? That is just the truth. If we accept that, “I’m not sure” might not feel so bad.

What good poker players and good decision-makers have in common is their comfort with the world being an uncertain and unpredictable place. They understand that they can almost never know exactly how something will turn out. They embrace that uncertainty and, instead of focusing on being sure, they try to figure out how *unsure* they are, making their best guess at the chances that different outcomes will occur. The accuracy of those guesses will depend on how much information they have and how experienced they are at making such guesses. This is part of the basis of all bets.

To be sure, an experienced poker player is more likely to make a better guess than a novice player at determining the chances they will win or lose a hand. The experienced player knows the math better and is better able to narrow down what their opponents’ cards might be based on how players behave with certain types of hands. They will also be better at figuring out the choices their opponents are likely to make with those cards. So, yes, more experience will allow the player to narrow down the possibilities. None of that experience, however, makes it possible for a poker player to know how any given hand will turn out.

This is true in any field. An expert trial lawyer will be better than a new lawyer at guessing the likelihood of success of different strategies and picking a strategy on this basis. Negotiating against an adversary whom we

have previously encountered gives us a better guess at what our strategy should be. An expert in any field will have an advantage over a rookie. But neither the veteran nor the rookie can be sure what the next flip will look like. The veteran will just have a better guess.

It is often the case that our best choice doesn't even have a particularly high likelihood of succeeding. A trial lawyer with a tough case could be choosing among strategies that are all more likely to fail than to succeed. The goal of a lawyer in that situation is to identify the different possible strategies, figure out their best guess of the chance of success for each unpromising alternative, and pick the least awful one to maximize the quality of the outcome for their client. That's true in any business. Start-ups have very low chances of succeeding but they try nonetheless, attempting to find the best strategy to achieve the big win, even though none of the strategies is highly likely to create success for the company. This is still worthwhile because the payoff can be so large.

There are many reasons why wrapping our arms around uncertainty and giving it a big hug will help us become better decision-makers. Here are two of them. First, "I'm not sure" is simply a more accurate representation of the world. Second, and related, when we accept that we can't be sure, we are less likely to fall into the trap of black-and-white thinking.

Imagine you're stepping on a traditional medical scale. It has two weight bars, one with notches at fifty-pound intervals and the other with notches at one-pound intervals. This allows the user to measure their weight down to the pound. What would happen if your doctor used a scale with only one bar with just two notches, one at fifty pounds and one at five hundred pounds, with no way to measure anything in between? Good luck getting medical advice after the person weighing you writes one or the other on your chart. You could only be morbidly obese or severely underweight. It would be impossible to make good decisions about your weight with such a poor model.

The same holds true for just about all of our decisions. If we misrepresent the world at the extremes of right and wrong, with no shades of grey in between, our ability to make good choices—choices about how we are supposed to be allocating our resources, what kind of decisions we are supposed to be making, and what kind of actions we are supposed to be taking—will suffer.

The secret is to make peace with walking around in a world where we recognize that we are not sure and that's okay. As we learn more about how our brains operate, we recognize that we don't perceive the world objectively. But our goal should be to *try*.

Redefining wrong

When I attend charity poker tournaments, I will often sit in as the dealer and provide a running commentary at the final table. The atmosphere at these final tables is fun and raucous. Everyone running the event has had a long night and is breathing a sigh of relief. There is typically a big crowd around the table including friends and families of the players, rooting them on (or vocally rooting against them). If people have been drinking, then . . . people have been drinking. Everyone is having a good time.

When players have put all their chips in the pot, there is no more betting on the hand. After an all-in situation, the players in the hand turn their cards faceup on the table so that everyone can see them before I deal the remaining cards. This makes it fun for the audience, because they get to see each player's position in the hand and the drama mounts. With the cards faceup, I can determine the likelihood each player will win the hand, and announce the percentage of the time each hand will win in the long run.

At one such tournament, I told the audience that one player would win 76% of the time and the other would win 24% of the time. I dealt the remaining cards, the last of which turned the 24% hand into the winner. Amid the cheers and groans, someone in the audience called out, "Annie, you were wrong!"

In the same spirit that he said it, I explained that I wasn't. "I said that would happen 24% of the time. That's not zero. You got to see part of the 24%!"

A few hands later, almost the same thing happened. Two players put all of their chips in the pot and they turned their cards faceup. One player was 18% to win and the other 82% to win the hand. Again, the player with the worse hand when they put in their chips hit a subsequent lucky card to win the pot.

This time that same guy in the crowd called out, “Look, it was the 18%!” In that aha moment, he changed his definition of what it meant to be wrong. When we think in advance about the chances of alternative outcomes and make a decision based on those chances, it doesn’t automatically make us wrong when things don’t work out. It just means that one event in a set of possible futures occurred.

Look how quickly you can begin to redefine what it means to be wrong. Once we start thinking like this, it becomes easier to resist the temptation to make snap judgments after results or say things like “I knew it” or “I should have known.” Better decision-making and more self-compassion follow.

The public-at-large is often guilty of making black-and-white judgments about the “success” or “failure” of probabilistic thinking. When the UK voted to leave the European Union (“Brexit”) in July 2016, it was an unlikely result. Betting shops had set odds heavily favoring a vote for Remain. That does not mean the betting shops had an opinion that Remain would win the day. The goal of the bookmaker is to make sure the amount of money bet on either side is equal, so that the losers essentially pay the winners while the bookmaker just takes their fee. They aim to have no stake in the outcome and adjust the odds accordingly. The bookmaker’s odds reflect the market’s view, essentially our collective best guess of what is fair.

That didn’t stop even sophisticated people from resulting, declaring after the vote came in Leave that the bookmakers made a mistake. The chief strategist at one Swiss bank told the *Wall Street Journal*, “I can’t remember any time when the bookies were so wrong.” One of America’s most famous lawyers and professors, Alan Dershowitz, made this same error. Asserting in September 2016 that the Clinton-Trump election was too difficult to make any predictions about, he said, “Think about the vote on Brexit. Virtually all the polls—including exit polls that asked voters how they voted—got it wrong. The financial markets got it wrong. The bookies got it wrong.”

Just like my spectator, Dershowitz missed the point. Any prediction that is not 0% or 100% can’t be wrong solely because the most likely future doesn’t unfold. When the 24% result happened at the final table of the charity tournament, that didn’t reflect inaccuracy about the probabilities as

determined before that single outcome. Long shots hit some of the time. Blaming the oddsmakers or the odds themselves assumes that once something happens, it was bound to have happened and anyone who didn't see it coming was wrong.

The same thing happened after Donald Trump won the presidency. There was a huge outcry about the polls being wrong. Nate Silver, the founder of FiveThirtyEight.com, drew a lot of that criticism. But he never said Clinton was a sure thing. Based on his aggregation and weighting of polling data, he had Trump between 30% and 40% to win (approximately between two-to-one and three-to-two against) in the week before the election. An event predicted to happen 30% to 40% of the time will happen a lot.

Being a poker player, I've played out more two-to-one shots in my tournament career than I could possibly count. A lot of those have been situations where the tournament was on the line for me. If I lose the hand, I'm out of the tournament. If I win, I earn a huge pot, maybe even winning the entire tournament. I know viscerally how likely 60–40 and 70–30 favorites are to lose (and, of course, the opposite). When people complained that Nate Silver did his job poorly because he had Clinton favored, I thought, "Those people haven't gotten all their chips in a pot with a pair against a straight draw and lost." Or, more likely, they've had those things happen throughout their lives and didn't realize that's what 30% or 40% feels like.

Decisions are bets on the future, and they aren't "right" or "wrong" based on whether they turn out well on any particular iteration. An unwanted result doesn't make our decision wrong if we thought about the alternatives and probabilities in advance and allocated our resources accordingly, as my client the CEO and Pete Carroll both did. It would be absurd for me, after making a big bet on the best possible starting hand (a pair of aces) and losing, to spend a lot of time thinking that I was wrong to make the decision to play the hand in the first place. That would be resulting.

When we think probabilistically, we are less likely to use adverse results alone as proof that we made a decision error, because we recognize the possibility that the decision might have been good but luck and/or incomplete information (and a sample size of one) intervened.

Maybe we made the best decision from a set of unappealing choices, none of which were likely to turn out well.

Maybe we committed our resources on a long shot because the payout more than compensated for the risk, but the long shot didn't come in this time.

Maybe we made the best choice based on the available information, but decisive information was hidden and we could not have known about it.

Maybe we chose a path with a very high likelihood of success and got unlucky.

Maybe there were other choices that might have been better *and* the one we made wasn't wrong or right but somewhere in between. The second-best choice isn't wrong. By definition, it is more right (or less wrong) than the third-best or fourth-best choice. It is like the scale at the doctor's office: there are a lot more choices other than the extremes of obesity or anorexia. For most of our decisions, there will be a lot of space between unequivocal "right" and "wrong."

When we move away from a world where there are only two opposing and discrete boxes that decisions can be put in—right or wrong—we start living in the continuum between the extremes. Making better decisions stops being about wrong or right but about calibrating among all the shades of grey.

Redefining wrong is easiest in situations where we know the mathematical facts in advance. In the charity-tournament final-table example with the players' cards faceup, or when I get all my chips in with the best possible starting hand, the hidden information is removed. We can make a clear calculation. If we have that unquestionably right and make an allocation of resources (a bet) on the calculation, we can more naturally get to "I wasn't wrong just because it didn't turn out well and I shouldn't change my behavior." When the chances are known, we are tethered more tightly to a rational interpretation of the influence of luck. It feels a little more like chess that way.

There is no doubt it is harder to get there when we add in hidden information on top of the influence of luck. Untethered from seeing what the coin actually looks like, we are more likely to anchor ourselves to the way things turned out as the sole signal for whether we were right or wrong. We are more likely to declare, "I told you so!" or "I should have known!"

When we start doing that, compassion goes out the window. Just ask Pete Carroll.

Redefining wrong allows us to let go of all the anguish that comes from getting a bad result. But it also means we must redefine “right.” If we aren’t wrong just because things didn’t work out, then we aren’t right just because things turned out well. Do we win emotionally to making that mindset trade-off?

Being right feels really good. “I was right,” “I knew it,” “I told you so”—those are all things that we say, and they all feel very good to us. Should we be willing to give up the good feeling of “right” to get rid of the anguish of “wrong”? Yes.

First, the world is a pretty random place. The influence of luck makes it impossible to predict exactly how things will turn out, and all the hidden information makes it even worse. If we don’t change our mindset, we’re going to have to deal with being wrong a lot. It’s built into the equation.

Poker teaches that lesson. A great poker player who has a good-size advantage over the other players at the table, making significantly better strategic decisions, will still be losing over 40% of the time at the end of eight hours of play. That’s a whole lot of wrong. And it’s not just confined to poker.

The most successful investors in start-up companies have a majority of bad results. If you applied to NASA’s astronaut program or the NBC page program, both of which have drawn thousands of applicants for a handful of positions, things will go your way a minority of the time, but you didn’t necessarily do anything wrong. Don’t fall in love or even date anybody if you want only positive results. The world is structured to give us lots of opportunities to feel bad about being wrong if we want to measure ourselves by outcomes. Don’t fall for it!

Second, being wrong hurts us more than being right feels good. We know from Daniel Kahneman and Amos Tversky’s work on loss aversion, part of prospect theory (which won Kahneman the Nobel Prize in Economics in 2002), that losses in general feel about two times as bad as wins feel good. So winning \$100 at blackjack feels as good to us as losing \$50 feels bad to us. Because being right feels like winning and being wrong feels like losing, that means we need two favorable results for every one unfavorable result just to break even emotionally. Why not live a smoother

existence, without the swings, especially when the losses affect us more intensely than the wins?

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Are you ready to really wrap your arms around uncertainty, like great decision-makers do? Are you ready to embrace this redefinition of wrong, and to recognize you are always guessing and that those guesses drive how you place your resources? Getting comfortable with this realignment, and all the good things that follow, starts with recognizing that you've been betting all along.