DECISION MAKING

UNDER UNCERTAINTY



Mastery Manual

Mental Model Club

The Value Of Your Membership

#1: Membership allows you to leverage our time and expertise.

Eben and I have each read thousands of books across dozens of disciplines over the last 20 years. That's 15,000+ hours of time. Over the last month, we've spent 100+ hours putting together this manual for you. It takes the best of what we know and the best of what humanity knows and tightly packages it so you can take action and get results across your life. And you get all this for less than it costs to take someone out to dinner.

We've been lucky enough to spend nearly our whole careers doing what we love: learning, applying what we learn to our own lives, and then teaching others to do the same. Learning about the most important mental models, learning how to combine them, and learning how to apply them to different areas of our lives has transformed our health, our wealth, our impact, and our relationships, and we hope it does the same for you.

#2: You receive links to our most life-changing resources.

One of the biggest challenges with learning is information overwhelm. The amount of knowledge in the world is exploding fast. While there are more life-changing books, videos, and articles than ever, they are harder than ever to find because they are like needles hidden in a "haystack" of noise and distraction. The process of finding gems involves trial and error. In our experience, it takes reading 10 books that we thought might be life-changing to find one that actually is.

Mastery Manuals are rich in links to books, videos, and articles that have changed our lives. We share these resources so you don't have to go through the same trial-and-error process that we did.

#3: You dramatically increase your "return on experience" from life.

The difference between someone who doesn't collect and synthesize mental models and someone who does is the difference between someone who ultimately sees knowledge as fragmented between disciplines and one who sees it as an interconnected tapestry. By having the knowledge densely connected in your mind, you learn much more from every experience, because you're able to make connections that no one else would be able to make.

NOW, THE BALL IS IN YOUR COURT

The value you receive from this Mastery Manual is directly proportional to the amount of time you put in. We invite you to:

- Read through this Mastery Manual multiple times.
- Complete each of the exercises.
- Explore the links to other resources we provide.

This Mastery Manual is intended for a single recipient, but occasional forwarding is totally fine!

If you would like to order multiple subscriptions for your team with a group discount (minimum 5), please contact me directly at **michael@learningritual.com**.

In case you're not already a member and would like to receive a manual like this every month, in addition to a live masterclass where we actually talk about these things and work through them, you can try the Mental Model Club for just $1 at MentalModelClub.com.

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Summary

In this manual, we discuss making decisions when things are uncertain and when the stakes are high.

	Certain	Uncertain
High Stakes		
Low Stakes		

We all know that uncertainty is increasing exponentially right now across more dimensions of life, and it appears that trend will probably continue. And when we're making decisions and things are uncertain...

- There's a lot of stress
- The stakes are going up
- There are more long-term implications

And you have to figure out how to do it because if we can be more effective at making decisions in this context, it allows us to turn challenges, stress, and crisis into an opportunity for ourselves and for those that we care about.

In this manual, we will take a look at the mindset of decision-making.

What exactly makes decision-making so hard, even in normal circumstances? The reasons are many, but they boil down to these...

1. We have no way of knowing how our decision will impact the future.
2. When we get stressed, we become less strategic.

Making a decision requires taking literally unimaginable risks: We don't know what's going to happen tomorrow, in a month, in a year, in 10 years. When you make a decision, you alter the path of time and causality. You push over a domino that has a whole bunch of other dominoes branching out in front of it that branch out, and you can't see most of the branches.

For complex decision-making, it's good to keep in mind that some things we can calculate, some things we can't. **But even so, we have to go ahead and try anyway.**

Getting into the right mindset for decision-making means that we need to ...

1. Own responsibility for the decisions we make.
2. Practice self-regulation, and make no decisions while we're triggered.
3. Collaborate with others and not isolate ourselves when making decisions, especially the big ones.

Once we get into the right state of mind, it's time to look at the model: how to go about making big decisions in a world with unprecedented uncertainty?

Many people face a huge blind spot here: **They focus on what they know for sure versus understanding the uncertainty and how to map it.** However, as "a problem well-stated is a problem half-solved," by understanding uncertainty on a more granular level, we can make better decisions.

To undertake our own mapping of the unknown, inside this manual we will look at it on five different levels:

- Known vs. Unknown
- Internal vs. External
- Known Unknowns vs. Unknown Unknowns
- Known Probabilities vs. Unknown Probabilities
- Big vs. Small

Mapping Uncertainty Model Takeaways

The key idea behind this model is to help you map the uncertainty that goes along with decision-making.

1. Practice self-regulation and make no decisions when triggered.
2. Don't isolate. Don't abdicate. Collaboration is key to high-quality decisions.
3. To succeed in the future, you don't need to have a crystal ball and make perfect forecasts. There isn't a crystal ball.
4. By understanding the current situation and yourself better now, you can out-think others and create a better future for yourself.
5. Being a little bit better can make all of the difference.
6. Don't be ready for one future, be ready for all futures.

Why It's So Important To Master Decision-Making Now

Making a decision might be one of the hardest things we do as human beings. If you look carefully, you'll notice that most people avoid what we might call true decision-making. They avoid actually making the call and saying, "This is what we're going to do." Instead, they follow the path they think others expect of them, or simply let life unfold without actively making decisions.

Why is it that decisions are challenging and stressful, and most people avoid taking the responsibility to make them?

Reason #1: We Have No Way Of Knowing How Our Decision Will Impact The Future

Decisions burn a lot of thought energy, psychic energy, or *chi* if you will. They burn willpower. When you make a decision, you must choose what you're going to do and you say, whether it be a physical path of doing something in the material world, whether it be a relational path of saying something to another person, or building an alliance, or breaking an alliance, or having a conflict, or mending one, whether it's an intellectual decision about what you're going to believe, or what something means to you, or the story you're going to tell or the story you're going to believe — whatever the issue **when you're making a decision it requires taking literally unimaginable risks across different dimensions of life.**

What do I mean when I say that making a decision requires taking literally unimaginable risks?

We don't know what's going to happen tomorrow, in a month, in a year, in 10 years. **When you make a decision, you alter the path of time in a certain sense of causality,** and that is like pushing over a domino that has a whole bunch of other dominoes in front of it that branch out — and you can't see most of the branches.

> **We don't really know what any decision is going to mean in the future.**

"Should I eat a meal right now or should I wait an hour?" Seems like an insignificant decision. But, if you wait an hour, there might be somebody interesting who you want to have lunch with, and that might be a relationship that turns out to become a partnership and then takes your life in a whole different direction.

And we have dozens or hundreds of these decisions to make every day that seem small, but actually some of them will have huge impacts.

With some of them, we know they will have a big impact — a career change, getting married, having a child, moving from one place to another, we know that these are going to have cascading impacts through our lives. These decisions get more complex and higher-stakes and more inter-dimensional as we grow up, as we become adults, as we move through life, and as we become leaders in our fields.

I want to give you a couple of my favorite parables. One of them goes like this.

> *For the want of a nail the shoe was lost,*
> *For the want of a shoe the horse was lost,*
> *For the want of a horse the rider was lost,*
> *For the want of a rider the battle was lost,*
> *For the want of a battle the kingdom was lost,*
> *And all for the want of a horseshoe-nail.*
>
> **Benjamin Franklin**

The other one is:

> *Thousands of years ago in China, one day, a beautiful horse came riding into a man's property and it ran right into his stable. His neighbors came over and said, "What a miracle that is." And he said, "Who knows if it's good or bad?"*
>
> *The next day, one of his sons went out and said, "I want to try to ride that horse." He got on the horse and started riding it, and the horse threw him and it broke his leg. His neighbors came over and said, "You poor thing, you thought you got this great horse and now your son broke his leg." He said, "Who knows if it's good or bad?"*
>
> *The next day, the army came through. There was a war and they were drafting soldiers, but his son had just broken his leg so he couldn't go off to war. The neighbors said, "Wow, how fortunate you are!" And he said, "Who knows if it's good or bad?"*

I like to keep these parables in mind when I come up against complex decisions, especially when there's a lot of pressure or stress because there's some part of me that really needs to remember that **while there are implications that we can model and that we can consider, there are a much greater number of them that we can't, and we just don't know what the impact is going to be.**

The coronavirus is now moving around the planet. We're dealing with something that none of us have ever seen in our lives. It reminds me of the horseshoe nail. This tiny little thing just echoes up, it goes from a bat to another animal to a human and then to a group of humans, then it spreads around the planet, and then all of a sudden the whole planet shuts down because of a microscopic virus particles.

> Philosophically, these are good things to keep in mind for complex decision-making: remember that some things we can calculate, some things we can't. **But even so, we have to go ahead and try anyway.**

When we grow up and become more mature, we have more responsibility in life, in our families, with our friends and our community, with children, and as role models. We have to:

1. **Be willing to look at more levels,** more orders of cause and effect, or circles of relationship influence, or orders of meaning and knowledge.

2. **Own responsibility for the decisions we make,** and even take some responsibility for that which we didn't consider.

We have to put on our big-boy and big-girl pants. We have to really be adults in this particular frame.

Reason #2: When We Get Stressed, We Become Less Strategic

Another reason why decisions are so hard is that complex decisions cause us stress. When we get stressed, we tend to get triggered and go into our lower brains, which puts us in a “negative” frame of body, emotion, or mind. This makes our decisions much less effective. In this frame of mind, we are much less strategic. The executive centers stop functioning as well, the lizard brain takes over, and we become more fear-oriented. We also tend to focus on what we want to run from rather than run toward. We become more “away from” motivated,

more loss-aversive. We want to avoid losing and being harmed. We want to avoid ambiguity and uncertainty.

So, this is the whole "devil you know" situation: **we're willing to make a bad choice now because at least we know what we're getting**.

This is a problem because if we're not thinking strategically at the time when the decision is going to make the biggest impact on our future, we're probably impacting ourselves in ways we can't even imagine. It's one thing to go into a casino and start gambling your money and giving your money to the house. It's another thing to lose all your money, get upset, and then say, "I have to get my money back," run to the ATM and borrow thousands of dollars and keep betting in a desperate attempt to recover the money. This is the metaphor for making decisions when we're particularly irrational.

> **Noticing when we're stressed and triggered is one of the keys to making good decisions.**

I see a lot of people focused on decision theory and game theory and all of these cognitive models, but that stuff's irrelevant most of the time for most people who are making important strategic decisions. The reason it's irrelevant is: **if you're triggered and freaked out, you're not going to pull up all your good decision models anyway.**

This is why 90% of individual investors lose money in the stock market because they're making irrational decisions in the moment based on the short term. They lose the strategic approach and wind up making all kinds of decisions that they can't think through. Self-regulation is very important, and we're going to talk about that in a moment.

Reason #3: We Often Don't Notice The Taboo Trade-Offs

The third reason decision-making is so challenging is due to something called **taboo trade-offs.** Philip Tetlock has a great paper on the idea of taboos and making these kinds of decisions and trade-offs with them.

Different cultures have different versions of what is sacred and what is taboo. For instance:

- It is taboo in our culture to marry your sibling, but for ancient Egyptian royalty, the practice was common and sacred.
- Likewise, it is taboo for us to drink blood, but for Maasai warriors, drinking cow's blood is common.
- It is generally taboo in many cultures to sell anything considered "sacred" for money, such as sexual or religious favors (as in the Middle Ages when the Catholic Church sold "indulgences").

When we're making complex decisions, and particularly when we're under pressure, there's often a taboo trade-off that's lurking underneath that we don't quite see.

Even if it's not a taboo trade-off, it's what we could call an unfair trade-off. It's a decision that no one should have to make.

Right now, for example, with coronavirus going around, if you start to feel a pain in your lower abdomen, you might wonder if it's an upset stomach or your appendix, and whether you should go to the hospital. Whereas in the past you might have gone to the hospital, now you might hesitate, given that you're more likely to catch COVID in a hospital ER. So you might take the risk and just stay home and hope it's nothing serious. This is the kind of unfair trade-offs we're talking about when we talk about taboo trade-offs.

> In your own life, when you come up against a complex or a tough decision, look underneath to see if there's some unfair trade-off at play or some perceived traid-ff that involves anything you'd consider sacred or taboo. If there is, you want to face it head-on, name it, assign a value, and get some perspective on it.

Mapping Uncertainty Model

When it comes to problem-solving, novices tend to jump right into solutions. Experts, on the other hand, focus on properly defining the problem first.

There is a similar dynamic in decision-making. Novice decision-makers jump right into brainstorming alternatives and go with the first one that feels good enough. Great decision-makers first take a step back and look at the models they're using of how the world works and how to make decisions. From there, they start to explore alternatives.

I really learned this way of problem-solving and decision-making from self-made billionaire entrepreneur and investor, Ray Dalio. Dalio started the largest hedge fund in the world, with over $170 billion under management, and his track record is 40+ years.

The following recent post shows Dalio's unique way of thinking...

> *I'm on a mission to figure out how the world works and to gain timeless and universal principles for dealing with it well. It's both a passion and a necessity for me. (...) Because I view this as an audacious, humbling, necessary, and fascinating undertaking, I am worried about missing important things and being wrong, so my process is iterative. I do my research, write it up, show it to the world's best scholars and practitioners to stress test it, explore potential improvements, write it up again, stress test it again, and so on until I get to the point of diminishing returns. This study is the product of that exercise.*
>
> **Ray Dalio**

In short, Dalio does the following...

- Builds mental models of the cause/effect relationships in the world
- Stress tests his models
- Collaborates with other people to create better models.

Most people, on the other hand, unconsciously and automatically build their own model of how the world works and just assume it works without stress-testing it.

It is with Dalio's spirit, that we undertake our own mapping of the unknown...

- Known vs. Unknown
- Internal vs. External
- Known Unknowns vs. Unknown Unknowns
- Known Probabilities vs. Unknown Probabilities
- Big vs. Small

Level #1: Known Vs. Unknown

A lot of times, we focus on what we know. The unknown is an amorphous blob.

When it comes to situations with a lot of uncertainty, the unknown is large and important. And, while we may not be able to eliminate the uncertainty, we can certainly map it by:

- Identifying categories
- Ascribing importance to the different categories

One of my very good friends, Spencer Greenberg, who has a Ph.D. in math, naturally maps the unknowns, and he created a great video when the Coronavirus first started spreading that maps out the uncertainties. It's about half an hour long (at the double speed you can watch it in 15 minutes) and I highly recommend you watch it.



Inspired by Spencer's video, I created a research-based scenario planning document where I listed out:

- All of the possibilities I could imagine happening
- Sorted the possibilities from good to bad
- Assigned probabilities of occurrence to each outcome

Going through this process helped me get clarity in a few ways. It helped me understand...

- What the linchpins were
- Prioritize certain types of information
- Be much more focused on the news I consumed
- Made me feel comfortable ignoring almost all of the news

Howard Marks, another self-made billionaire entrepreneur and investor with $129 billion takes a similar approach. In March, near the peak of uncertainty, Marks wrote a memo to his clients called Uncertainty. The first section of the memo is called "All We Don't Know." In this section, Marks narrows down the uncertainty to five key areas.

In the next section, Marks points out the complexity of the situation and then goes on to ask 17 questions that are important to get answered. Here is how Marks' describes the problem:

> *For investors, the future is determined by thousands of factors, such as the internal workings of economies, the participants' psyches, exogenous events, governmental action, weather, and other forms of randomness. Thus the problem is enormously multi-variate.*

Similar to Ray Dalio, we can see that Marks really thinks a lot about modeling as well. Marks clearly thinks about all of the factors and how they interrelate with each other. Here's the next paragraph:

> *Where am I going with this? My point is that very few people can balance all these considerations to figure out our collective risk.... Who can respond to these many questions, come up with valid answers, consider their interaction, appropriately weigh the various considerations on the basis of their importance, and process them for a useful conclusion regarding the virus's impact? It would take an exceptional mind to deal with all these factors simultaneously and reach a better conclusion than most other people. (I believe a computer couldn't do so either, especially given all the subjective decisions required in the absence of historic precedent.)*

How To Map Uncertainty

The following step-by-step process is a synthesis of Dalio:

1. Create a model of the situation
    a. What are the different components
    b. What is the cause-effect relationship between those components
2. Identify the unknowns.
3. Rank them by importance.
4. Identify how you could reduce the uncertainty.
5. Methodically collect the right information:
    a. Who has that right information?
    b. How should you weigh that information in order to improve the underlying model?
6. Stress-test your model with diverse experts and ask them to challenge your assumptions

Level #2: Internal Vs. External



When thinking about uncertainty, a lot of people mainly think about the external uncertainty of the future — what will happen to markets, societies, careers. But they fail to consider an internal perspective, i.e. it's impossible to predict who you will be (values, curiosities, goals, etc. in the future? Internal uncertainty is an important uncertainty because when we make decisions now, we are making it for our future self.

The philosopher L.A. Paul helps us understand internal perspective in her recent book Transformative Experience.

Paul defines transformative experience as an experience that you can't really fathom until you experience it yourself.

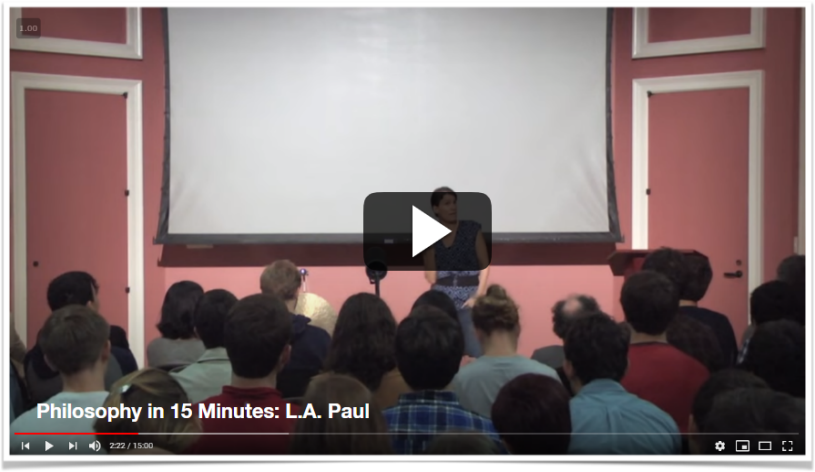
As an example, she talks about how, if you've never seen the color red, then no amount of explanation will help you understand it. This could also be said of experiences such as:

- Taking a new job
- Moving to another country
- Starting a business
- Having a child
- Getting married

Other people might describe these things before you experience them, but it's helpful to remember that even when their descriptions help you feel like you understand these experiences, you actually don't understand them until you do them.
Paul brings up a dilemma: **As you don't know what an experience will be like, you can't compare it to your current situation and use the tools of rationality and do a cost-benefit analysis.**

She gives a brilliant thought experiment.

THOUGHT EXPERIMENT: WOULD YOU BECOME A VAMPIRE IF YOU HAD THE CHANCE?



Imagine that you have a one-time-only chance to become a vampire. With one swift, painless bite you'll be instantly transformed into an elegant and fabulous creature of the

night, you'll have amazing new powers, you'll glide around quietly and you'll look fabulous in everything that you wear.

The negative is, you're going to have to drink blood. But modern vampires are the equivalent of today's vegetarians, so they only drink the blood of humanely farmed animals — chicken blood, cow blood — so it's not too bad.

The question is: Is this something that you'd want to do?

You reflect on this possibility. "I really don't know what it would be like to be undead, it sounds like a pretty big change."

So, you investigate a little bit and you discover that all of your friends and family members have decided to become vampires as well, so you ask them what it's like and they say: "It's absolutely fabulous, it's the best thing I've ever done with my life, but using your human mind, you really can't understand what it's like to become a vampire. To understand what it's like to become a vampire, you have to become a vampire yourself, so take it from me, I think you should do it."

And now the question is, when you're faced with this situation, because this is an irreversible choice, whether you become undead or whether to remain human — how could you possibly make the choice? And in particular, how could you possibly make the choice in a way that was rational, that obeyed the way that we think we should make decisions? In particular, we're talking about a way of making decisions so as to maximize utility, in other words, to do the best thing for yourself, to maximize the value of what it's like to live your life.

And the thought is that in this situation, in fact, given that we think it's absolutely crucial to make a rational choice — to make a choice about the rest of your life that's going to be the best possible choice — the problem is it doesn't seem like we have the information that we need in order to confront this choice rationally. And the reason why we don't have that information is that we can't assign values in the relevant sense to the outcomes.

The problem is when you face a decision, you're supposed to look at the different outcomes, assign them values, look at how likely those different outcomes are, and perform a kind of calculation where you act so as to maximize your expected value or utility. That's the standard picture. And you find that picture all over, not just in philosophy — in economics, in psychology and sociology, in cognitive science, pretty much across the board.

That lays out the challenge that we face, which is often not really addressed or at most, glossed over. Whenever I'm listening to something or digesting it, I try to put it in a model or way of thinking about it so I can process it better. Here's how I process what she said:

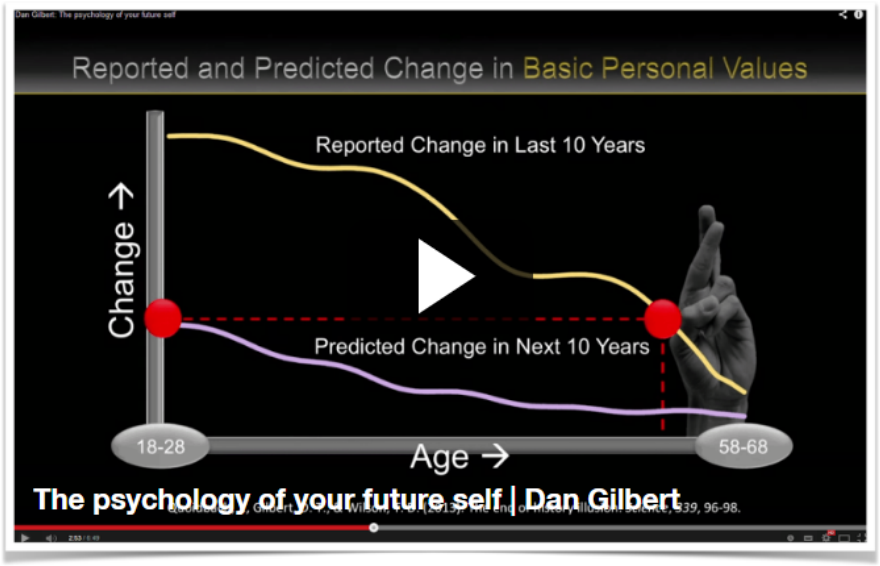
- We have our **current self and our current ideas** of what we want.
- Sometimes we go to the **second-person perspective** and rely on the testimony of others (she talks about the challenges of that).
- Other times we go to the **third-person perspective** and try to get an objectified perspective on what the authorities/science say we should do.
- There's also the future to consider, as **we're making a decision for our future self.** In a way, we are making this decision not for “ourselves” but for a potentially different person, because it's hard to predict who we're actually going to be in the future. Maybe our future self will like something we currently don’t like.

This scenario brings up further conflicts or internal dilemmas.

Conflict #1: Current Vs. Future

This conflict happens for a few reasons...

1. **We're really, really bad at predicting how we’ll feel in the future.** In a great book called Stumbling On Happiness the author Daniel Gilbert shows how bad we are at predicting how certain experiences will make us feel in the future. The prototypical example is a lottery ticket: we feel like a lottery ticket will completely change our lives for the better, but we know from the research that’s been done on lottery winners that actually, overall life satisfaction and happiness often *decrease*.
2. **We believe we won’t change,** that we’ll have the same preferences in the future that we do now. Gilbert calls this “the end of history illusion.”



He's done studies where people report the change that's happened in their last 10 years, and then they predict the change that will happen in the next 10 years. He's found that there's a huge delta, that we often underestimate how much we're going to change in the future. He says:

> *Human beings are works in progress that mistakenly think they're finished. The person you are right now is as transient, as fleeting and as temporary as all the people you've ever been. The one constant in our lives is change.*
>
> **Daniel Gilbert**

Given these two dilemmas we have to ask ourselves: Instead of focusing solely on our current preferences, should we use the testimony of people who have already been through the experience and let that weigh more in our choice?

Conflict #2: First Person Vs. Third Person

The conflict between first and third-person perspectives happens when we can't go to an objectified perspective on what the authorities/science say we should do. In this case, we can't get to an objectified perspective because...

1. Social and behavioral sciences are still in their infancy.
2. They're incomplete.
3. There are limits to the data.

L.A. Paul puts it like this:

> *"Empirical disciplines such as psychology, economics, and sociology collect data on large groups, and subdivide these groups based on externally determined criteria, giving us information about how different types of people tend to respond to different experiences. The research is often focused on broad demographic categories, for example, on what people of different socioeconomic classes, genders, races, and cultures tend to do, often with further subdivisions based on general characteristics like age, health, background, life stage, leisure pursuits, personal abilities, and personality traits.*
>
> *... When an individual is making decisions for herself, this information is, at best, only partially useful. This is because the data just do not give us the kind of fine-grained information about how a person who is just like us, a person with just our particular blend of personal abilities and personality traits, our likes and dislikes, our work ethic and neuroses, and so forth, is most likely to respond to a particular experience."*

At a larger level, she makes the case that **rather than just relying on typical decision-making methods, we need a meta principle when there's a conflict between our own experiences and the secondhand information or our future experiences.** These are the last few paragraphs of the book:

> *When we choose to have a transformative experience, we choose to discover its intrinsic experiential nature, whether that discovery involves joy, fear, peacefulness, happiness, fulfillment, sadness, anxiety, suffering, or pleasure, or some complex mixture thereof. If we choose to have the transformative experience, we also choose to create and discover new preferences, that is, to experience the way our preferences will evolve, and often, in the process, to create and discover a new self.*
>
> *On the other hand, if we reject revelation, we choose the status quo, affirming our current life and lived experience.*

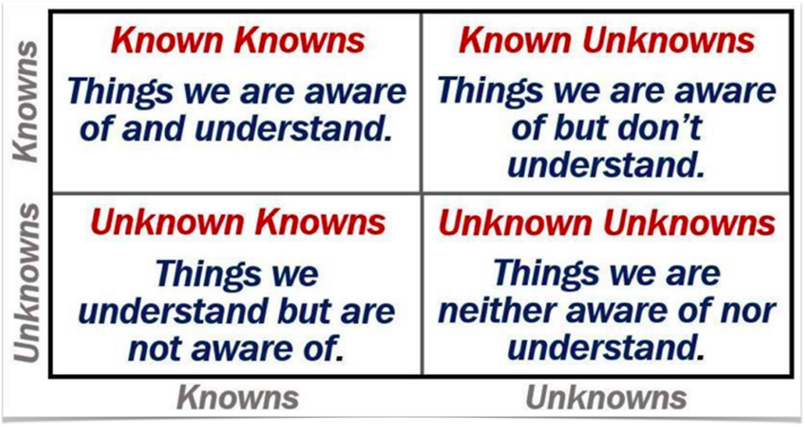
A life lived rationally and authentically, then, as each big decision is encountered, involves deciding whether or how to make a discovery about who you will become.

If revelation comes from experience, independently of the (first-order) pleasure or pain of the experience, there can be value in discovering how one's preferences and lived experience develop, simply for what such experience teaches. One of the most important games of life, then, is the game of Revelation, a game played for the sake of play itself.

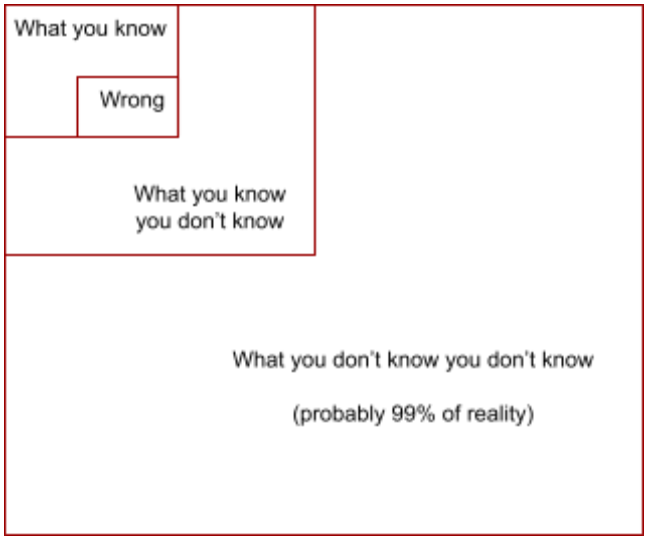
As we think about the uncertainty, it's also an opportunity to think about what type of person we want to be. Do we want to be a person who affirms our current life experiences and lived experience or a person who chooses to go into more transformative experiences knowing that there's going to be not just the positive emotions that come from it, but the full-range experience?

Level #3: Known Unknowns Vs. Unknown Unknowns

Often we just assume there's one type of unknown, but there are actually different types:



Here's another way of mapping it:



The World Is Much More Random Than We Think

As someone who grew up reading Napoleon Hill books about how to think and grow rich, set goals, and control your life, I think I've underestimated the role that randomness plays in some of the biggest areas of life, such as meeting my wife during freshman orientation, among 5,000 other students. That event changed the course of my entire life, and it was completely random.

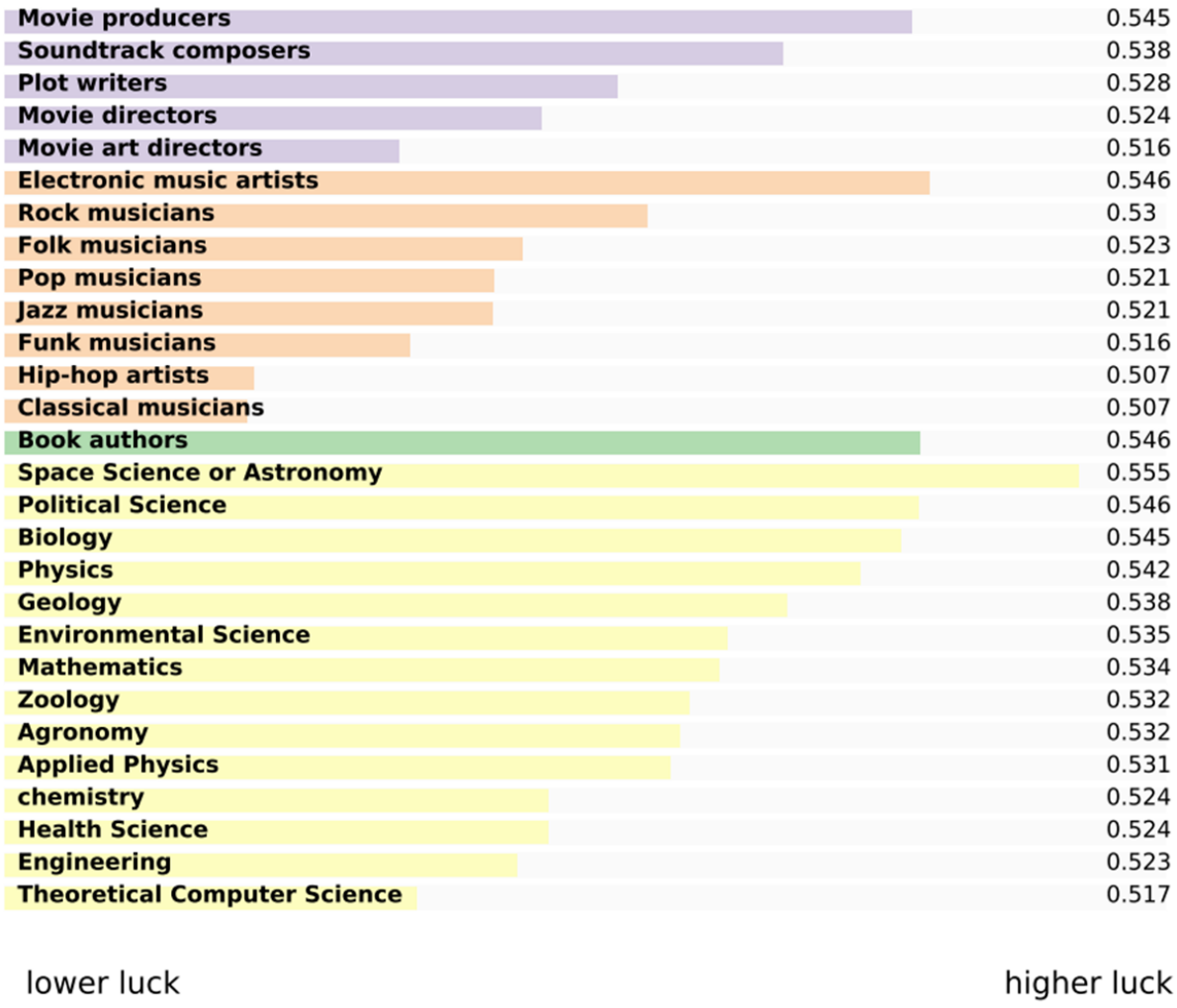
For better or worse, and despite the many steps most of us take to control our situation, many of the effects the coronavirus has had on health, society, and economies is also random. No one could see this exactly coming. Some people could predict parts of it, but not all the consequences, which are still developing daily.

Some different ways to think about uncertainty:

Equal Odds Rule

The equal odds rule says that if you're in a creative field — a writer, an entrepreneur, a movie producer, an academic researcher — **at any point, the odds of having your biggest hit are equal.** It's counterintuitive because you think that the odds of having your biggest hit would always be increasing as you get older, wiser, more experienced, and more connected. However, that's not what the research says.

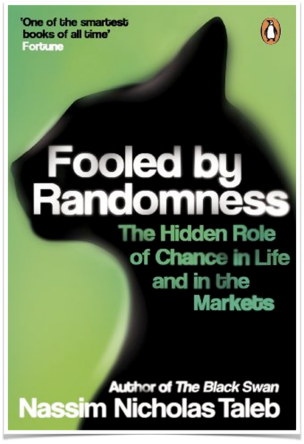
In a study called Success And Luck In Creative Careers, researchers looked at people across professions and found that **a huge amount of what happened in their career trajectories was up to randomness.**



Implication: The way to get through that is to have higher productivity.

If you're having more ideas and releasing more ideas into the world, then you have more chances of one of those being a big hit.

Black Swan Situation (Problem Of Induction)



For me personally, I'm trying to ramp up as much experimentation as I can.

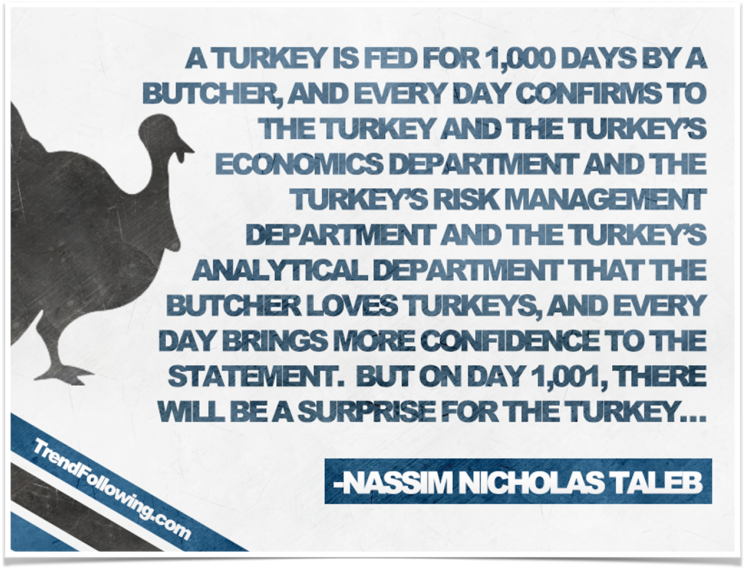
The number one book in my life for understanding randomness deeper and fully appreciating it is Fooled By Randomness by Nassim Nicholas Taleb. In it, he talks about the idea of **induction:**

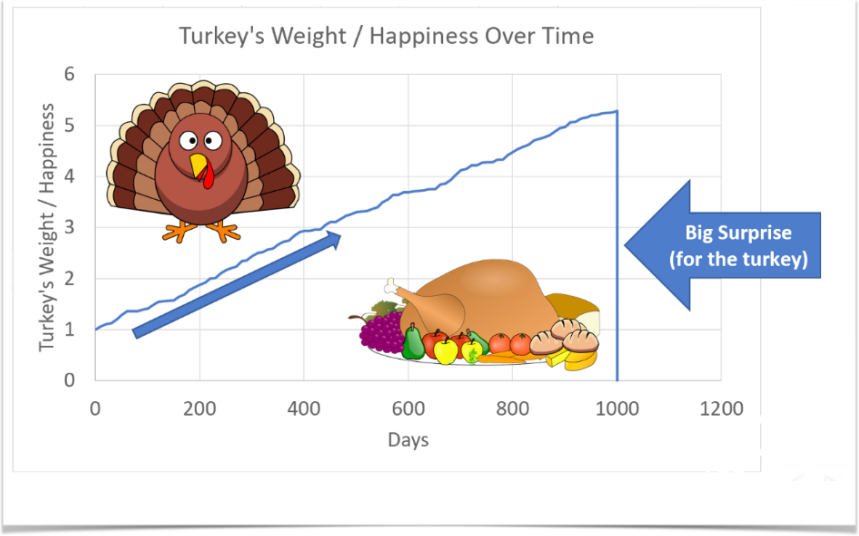
- We take the past data from something,
- We find the pattern,
- Then we extrapolate it into the future.

It's a conventional approach to understanding and predicting the future.

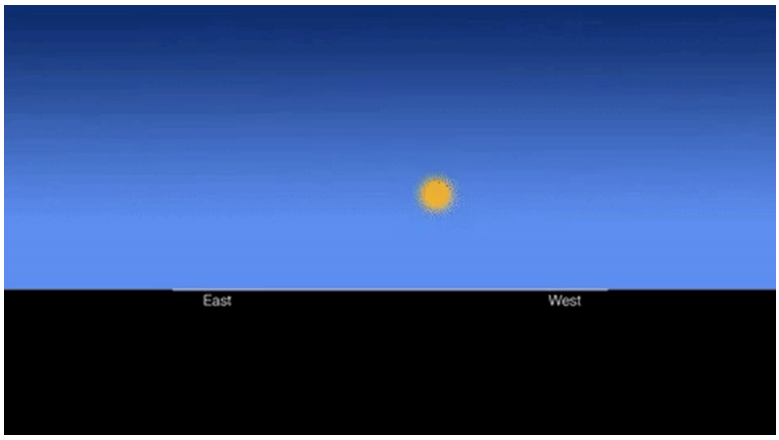
However, there's a problem with inductive knowledge, as he shows through examples:

1. **The turkey problem:** Imagine a turkey who's been well-fed for 1,000 days — until Thanksgiving.





2. Every day throughout history, up until 1543, we watched the sun and the moon circling us and assumed **we therefore must be located at the center of the universe** because there were billions of examples of observations confirming our perspective.



3. **The black swan:** just because we tend to see more white swans, maybe even hundreds or thousands of them, and just because we may have never seen a black swan, doesn't mean that black swans don't exist.



I find this model really helpful for making predictions and cycles. So many of our predictions of the future are based on looking back at the past and expecting the trends to go forward, and the coronavirus is a great example of the limitations of that. **There are these rare big events that completely change everything,** and you have to throw away the typical approach.

People such as Ray Dalio or Howard Marx, who have done exhaustive studies of looking back at different times in history and trying to find how this time is similar to another time, still have trouble finding any similarities.

Outliers Can Be Explained By Pure Randomness

Another example of the important role of randomness is this thought experiment that Nassim Taleb gives in his book, which I've simplified here.

> RANDOMNESS THOUGHT EXPERIMENT
>
> Imagine 100 people flip a quarter six times. There's a 50:50 chance of flipping heads or tails. The question is, **what are the odds that one person gets heads every time?** And the answer is **1.56%.**
>
> **Implications?**

> On the one hand, 1.56% is a really small chance, but on the other hand, if you think about the world population, if there were 7 billion people constantly flipping coins, you'd expect a small number of people to have these incredible outlier results.
>
> However, culturally, when someone becomes successful, we assume they are successful because of skill. We read their biography and articles about them. I was brought up under the paradigm of "success leaves clues," so if somebody happens to be a successful investor or starts a company, that means that they're a genius. But if hundreds of thousands of people around the world, perhaps millions, are trying to start companies at any one time, it's inevitable that a handful of them will become hugely successful. That variability can be explained by randomness alone.

Narrative Fallacy

Finally, there's the idea of **narrative fallacy**. We humans are very good at looking back at past data, seeing patterns, assuming that what happened was inevitable, and coming up with a story about why it was. That tendency or ability makes it seem like the world is much more controllable and less random than it actually is.

For me, this one has taken me a few years to fully process because when you fully accept the randomness of life, it can be hard emotionally.

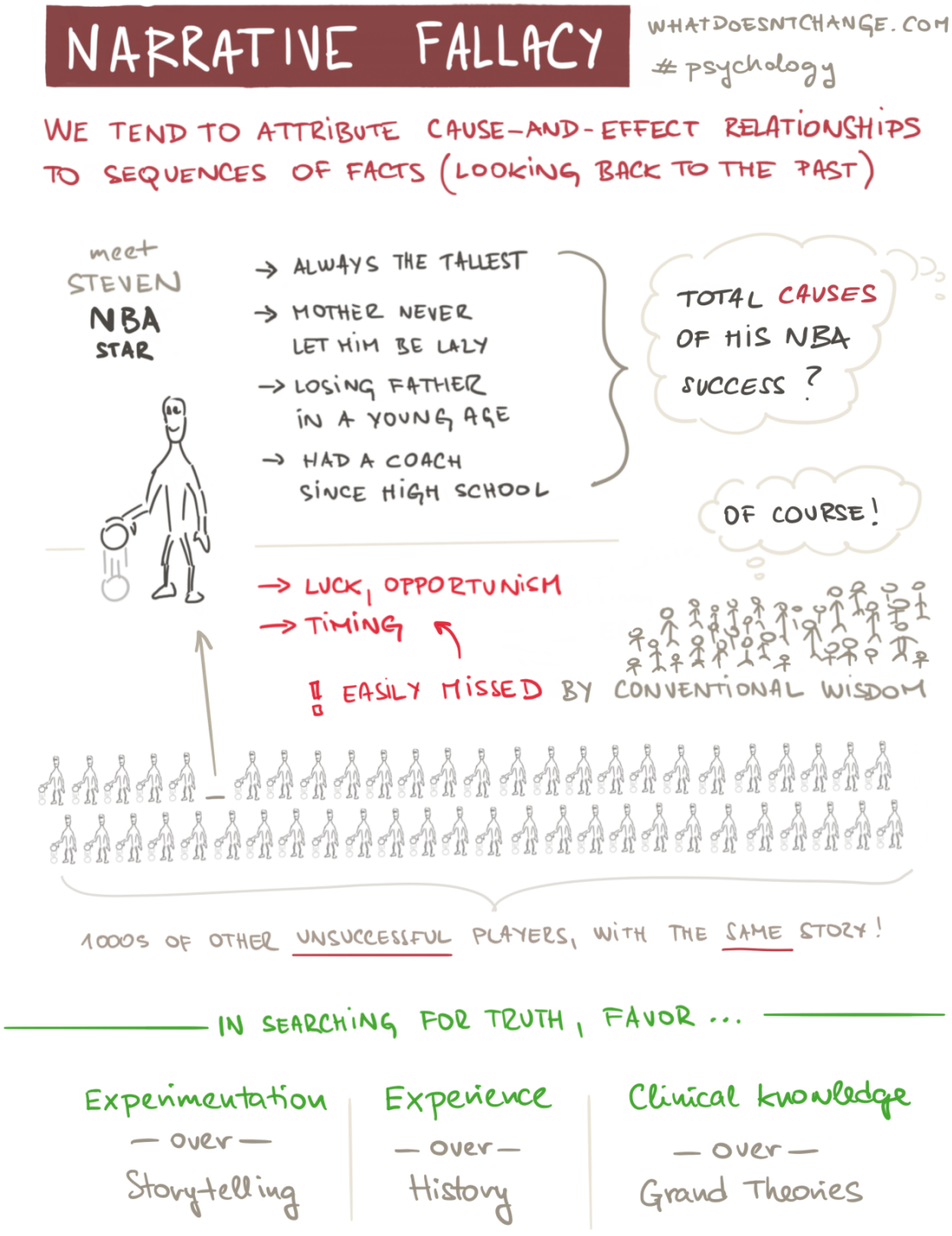


Image Credit: WhatDoesntChange.com

Level #4: Known Probabilities Vs. Unknown Probabilities

Another factor at play: It's not only the uncertainties about what the potential outcomes are, but there's also **uncertainty about the probabilities of each of those outcomes happening.**

Level #5: Big Vs. Small

Often when we think about uncertainty, we think about **big uncertainty:** "Oh, this is just an uncertain situation," rather than breaking it down to specific things. Right now, there's uncertainty around different issues:

- The virus itself, and when the vaccine will come
- How the economy will react
- What the government will do
- How businesses will respond

If we start to break it out a little bit more, we can then start to get clarity or look for information that could reduce the uncertainty.

The Future Probability Stream Case Study: Elon Musk

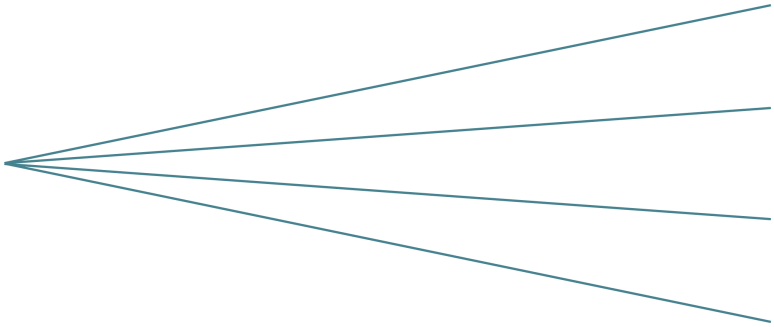
One of the best case studies of someone who maps probabilities and breaks the unknown down to specifics is Elon Musk.

In a TED interview, he said:

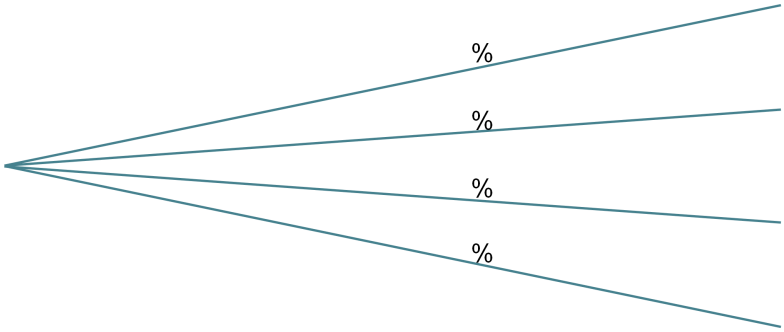
> *I look at the future from the standpoint of probabilities. It's like a branching stream of probabilities, and there are actions that we can take that affect those probabilities or that accelerate one thing or slow down another thing. I may introduce something new to the probability stream.*

This short statement includes few underlying models:

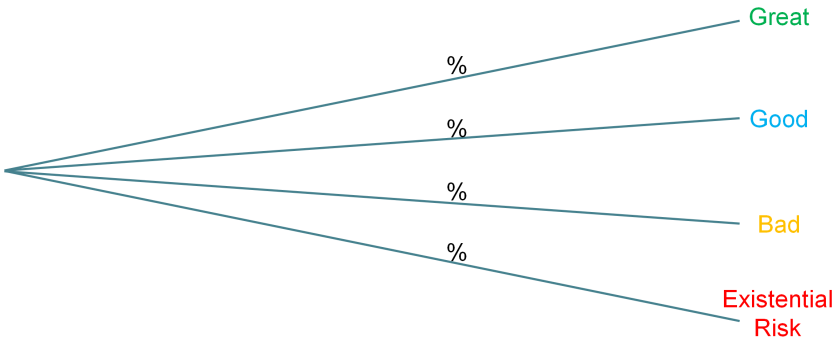
1. **The future could have multiple outcomes,** and he spends time thinking about what those could be.



2. There are **percentages attached to those outcomes,** probabilities he can assign.



3. **Some outcomes are good, some are great, some are bad, and some are terrible,** including worst-case scenarios that pose an existential risk to a company or a person.



THE BIG TAKEAWAY: THERE ARE ACTIONS WE CAN TAKE TO IMPACT THE PROBABILITY STREAM

By breaking down a big unknown to more specific unknowns, by trying to predict the outcomes and assigning them probabilities, you could go into that probability stream and have the power to:

- Slow down something bad from happening
- Accelerate something good
- Introduce something new that wouldn't happen otherwise

Musk goes on in that interview to talk about how his different companies fit into that framework.

Introducing something new to the probability stream:

- *"Being a space-faring multi-planetary civilization is definitely not inevitable."*
- *"People are mistaken when they think that technology just automatically improves ... By itself, it will actually degrade."*
- *"It only improves if a lot of people work very hard to make it better."*
- *"In 1969, we were able to send someone to the moon."*
- Examples of technology de-evolution:



Accelerating something good:

- *"Sustainable energy would happen no matter what."*
- *"If you don't have sustainable energy, it means you have unsustainable energy."*
- *"Eventually, the economics will drive civilization toward sustainable energy inevitability."*
- *"The fundamental value of Tesla is the degree to which it accelerates the advent of sustainable energy faster than it would otherwise occur."*

Decelerating something bad:

- Neuralink gives people brain implants
- So that they can keep up as the speed of AI increases
- And power isn't concentrated in a few people

Mapping Uncertainty Model Takeaways

The key idea behind this model is to help you not only map what's happening but map the uncertainty as well.

1. Practice self-regulation and make no decisions when triggered.
2. Collaboration is key to high-quality decisions. Don't isolate. Don't abdicate.
3. To succeed in the future, you don't need to have a crystal ball and make perfect forecasts. There isn't a crystal ball.
4. By understanding the situation now better and yourself better, you can out-think others and create a better future for yourself.
5. Being a little bit better can make all of the difference.
6. Don't be ready for one future, be ready for all futures.

Take Action

Action Step #1: Practice Self-Regulation And Make No Decisions When Triggered

When we get stressed out, we're going to our lower brain, and our strategic mind shuts off. Or, it gets co-opted, which can be even worse: we become paranoid because our fear is making all these negative scenarios. The bottom line is, we start thinking: "Avoid loss." We start thinking short-term and we start doing things that are highly irrational that may appear very rational at the moment. **We basically can't make a good decision when we're triggered.**

It would be accidental at best to make a great decision when we're triggered. If you haven't gotten enough sleep, if you're stressed out, if you've gotten in a fight with your partner, if you had a bad day at work and then you come home and your partner is trying to make a decision about a family issue such as savings, investments, vacations, or childcare … pause. Don't get involved in important decisions when you're upset, overly stressed, triggered. These include all long-term decisions and commitments in either direction: Don't end any relationships or start any long-term relationships when you're in one of these states.

You might want to look back on your life and think through times where you made decisions when you were triggered or upset, and look at how those things turned out. Most of the time they don't turn out well.

Practice self-regulation. If you notice yourself upset, stop and take time out from whatever you're doing. Close your eyes. Breathe. Feel your feet. Feel your legs. Feel your body. Keep your attention on your body. Just breathe and feel the emotion. Let it go through its cycle until it works itself out. You'll notice when you come back to yourself, when your higher mind is available, you'll notice your state changes and you can think more clearly about the future.

One great way to get into a higher mental state is to exercise regularly. I try to do a 45-minute jog or walk in the morning, and then in the afternoon or evening, our family has been doing a ritual where we go out to a field across the street to run around, play tag, or go for a walk. Everyone who exercises knows that there's something to it.

There are these times during the day where you can more reliably find yourself in better states, and they're usually earlier in the day. If you have social interaction with some friends, that's also the sort of thing that gets you into a higher state. Get yourself into a better state more often, and if you find yourself thinking negatively, try to go do one of those things that gets you into a better state.

Once you're in one of those better states, remember to look at the issues that you've been thinking about when you were triggered.

Action Step #2: Collaborate

As we've talked about in the Mental Model Club, relationships and collaboration have an intelligence of their own. If you remember that a relationship has a kind of intelligence beyond just the sum of its parts, if you put some faith in it and trust the collaborative mind, then when you are under pressure and it's time to make an important decision, you'll go to others you trust and ask for their help to make a great decision. If you have a romantic partner or a business partner, go to them and try to work on making the decision together. Collaborate.

Imagine two people in any close relationship with a circle around them that represents the relationship itself, which has an intelligence of its own. Imagine the relationship participants trying to get in touch with what the relationship "thinks."

This isn't as simple as it sounds. We live in a culture with a fiercely individual bias. We are taught to be captains of our own ship, masters of our own universe. So when we confront a challenge and feel upset or stressed, many of us tend to **isolate**. We don't want to share our perceived weakness with others. We don't want to burden or upset anyone. We don't want to end up owing them anything. We want to protect our reputation. So we work on the problem alone, forgetting the inherent power of collaboration.

Let's say you want to start exercising, eating right, getting to the gym. If you're embarrassed to tell anyone about it if you isolate yourself with your mental goal, what are you likely to do next time you're stressed out or lonely? You're likely to eat junk food and skip your workout. After all, who will know about your binge except you? Whereas if you had shared your challenge with a partner or friend, you'd have them to turn to in moments of stress.

But collaboration can go too far in the other direction as well. Some people, instead of isolating themselves with a problem, tend to **abdicate** responsibility for the decision to everyone else. This is the class person who tells every single friend they have about their problem and asks every single person what they should do. Then they wait for the answer so that they don't have to own the results should things go wrong. **We want to avoid both isolating and abdicating. We want to collaborate with others.**

So, if we notice that we're under stress and facing a big trade-off, we say, "OK, this is a big decision, this is important. My state matters." Allow the emotions to process. Wait them out. Get into a more optimal natural or even peak state, and then look at the situation. Avoid

isolating and avoid abdicating. Find other people that you trust, collaborate and work together to find the intelligence of the relationship.

This process gives big decisions the respect they deserve and helps us take responsibility for them, knowing we don't have to do it totally alone. I've found it produces much better results.

> OUR INTELLIGENCE FLUCTUATES
>
> There's a great article from Scott Barry Kaufman called Toward A New Frontier In Human Intelligence: The Person-Centered Approach. Kaufman shows how science is moving from a general theory of intelligence to measuring individual intelligence, similar to how our knowledge of genetics has moved us from general theories of health to individual health profiles. One of his big findings is summed in this quote:
>
> > *"Not only have they demonstrated that the cognitive functioning of* ***most*** *people fluctuates quite a bit throughout the day and across days, but that some people fluctuate quite a bit more than others."*
>
> So, not only are we emotionally triggered on certain days, but we're also more or less intelligent on certain days as well.

Action Step #3: Start A Decision Journal

Annie Duke, a professional poker player, wrote a book about decision making, Thinking In Bets, where she makes the case that **making decisions in life** (under uncertainty, guessing the outcome) **is similar to how the best poker players make decisions,** and we can learn a lot from studying poker players.

In the book, she says:

> ***Over time, those world-class poker players taught me to understand what a bet really is: a decision about an uncertain future.*** *The implications of treating decisions as bets made it possible for me to find learning opportunities in uncertain environments.* ***Treating decisions as bets, I discovered, helped***

> ***me avoid common decision traps, learn from results in a more rational way, and keep emotions out of the process as much as possible.***

> *Life is not like chess. Chess contains no hidden information and very little luck. Life is more like poker. You could make the smartest, most careful decision and still have it blow up in your face.*
>
> **Annie Duke,** Thinking In Bets

The big thesis of her book is: **beware of resulting.**

Let's say you make a decision. There will be an outcome. If it's a good outcome, then you conclude you made a good decision, but if the outcome is bad, that means your decision was wrong. That's what she calls resulting.

Resulting is not the right way to look at it. Duke says:

> ***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.'*

> *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.*

> *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.*

To avoid hindsight bias, start a decision journal.

The idea of a decision journal comes from Daniel Kahneman, economist and a Nobel laureate, author of Thinking, Fast And Slow. He says:

> *Go down to a local drugstore and buy a very cheap notebook and start keeping track of your decisions. And the specific idea is whenever you're making a consequential decision, something going in or out of the portfolio, just take a moment to think, write down:*
>
> - *what you expect to happen*
> - *why you expect it to happen*
> - *how you feel about the situation, both physically and even emotionally. Just, how do you feel? I feel tired. I feel good, or this stock is really draining me. Whatever you think. (optional)*
>
> *The key to doing this is that it prevents something called hindsight bias, which is no matter what happens in the world, we tend to look back on our decision-making process, and we tilt it in a way that looks more favorable to us, right? So we have a bias to explain what has happened.*
>
> **Daniel Kahneman**

Exercises

Exercise #1: Making Big Decisions

Not all decisions are created equal and not all decisions are worth putting in the time to actually make them right.

If you lost your keys, for example, you will use a very basic framework to find them versus spending a lot of time thinking about all the different approaches you could use to find the keys. But then there are decisions like:

- "What skills should I learn next?"
- "Where should I focus my time between all these different projects?"
- "Where should I invest this money I've inherited?"

These have more layers and can impact your life and business in a massive way, so you want to give them more time and thought.

For starters, let's decide which big decisions you want to focus on first.

What are the big decisions that you're facing right now? 

Which one is the most important to make? 

Exercise #2: Maximizing Options

> *A decision is only as good as the alternatives listed.*
>
> **Céline Scheidt,** senior research engineer at Stanford

Your next step is to think about all of the options you wrote down, and one of the things to be aware of here is **the availability bias:** Typically, when we are making decisions, we go with the first thing that makes sense to us and we stop searching for options.

Thomas Edison, for example, once gave an employee the task of testing out different variations of an invention and trying out all the different options. The employee came back and said, "These are the options I found." Edison asked, "Have you tried everything?" and the employee said, "Yes, there are no other ways of doing this." Edison then took the problem home with him over the weekend, worked on it, and came back with over a hundred new options.

What are the available options?

How could you increase the options you have on the table?

Exercise #3: Understanding Outcomes

Think through all the positive and negative outcomes, and try to get as wide of a range of outcomes as possible.

It's helpful to bring back the interview in which Elon Musk talks about his decision making:

> *I look at the future from the standpoint of probabilities. It's like* ***a branching stream of probabilities, and there are actions that we can take that affect those probabilities*** *or that accelerate one thing or slow down another thing. I may introduce something new to the probability stream.*
>
> **Elon Musk**

There's a lot to unpack in Musk's approach:

1. The future can have multiple outcomes.
2. Each outcome has a different probability of happening.
3. Some outcomes are good, some are bad, so you either want to bring them on or avoid them.
4. We can actually control that by:
    a. Slowing down something bad from happening.
    b. Accelerating something good.
    c. Introducing something new that wouldn't happen otherwise.

What are the potential outcomes of your decision?



What is the probability of those outcomes?



Assign probabilities the best you can based on your current knowledge.

Which outcomes are the best and the worst?



How can you influence these probabilities?



- *Is there something bad that you could stop from happening, or slow down?*
- *Is there something good you can accelerate?*
- *Is there something new you could introduce that wouldn't happen otherwise?*

Exercise #4: Mapping Uncertainty

Once you have all the outcomes and the probabilities, you can start to think about the areas where more information would help you make a better decision.

What are the uncertainties around your decision?



Categorize those uncertainties: Which of them are knowable, and which aren't?



Knowable ***Unknowable***

How can you collect info on uncertainties?



What is the cost of collecting info? Is it acceptable?



Exercise #5: Maximizing Rationality

Finally, even if we have all the data and see all the options available, our state of mind could still bring us to make a less-than-ideal decision. Add uncertainty to the equation, and the chances of that happening skyrocket.

Our rationality when it comes to decision-making is mostly influenced by:

1. **Our mental and emotional state,** which is why we recommend earlier in this manual that you **never make big decisions when triggered.**

2. **Our cognitive biases,** the errors in judgment that most of the time we don't even notice. To counter these biases, you can use this cheat sheet we prepared based on Charlie Munger's checklist: whenever making an investment decision, he goes through a bias checklist and thinks about how to reduce the risk of each of these biases.

Are you in a good state to make this decision?



What are the relevant biases?



Exercise #6: Start Your Decision Journal

Start your decision journal in a physical notebook, on your computer, or use the Decision Tracker Template I started creating a few years ago.

You will make the most out of your decision journal if you make it a habit to note and reflect on the decisions you are making.

Step 1: What decisions are coming up for you?



Step 2: Go through your decision-making process.



For example, you can see my process in the Decision Tracker Template (and use it, if it works for you).

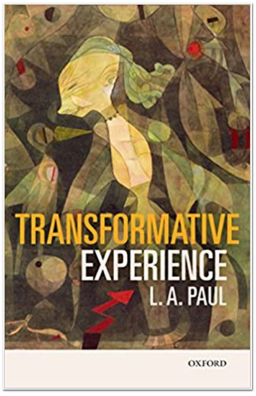
Step 3: How often will you be reviewing decisions in your journal?



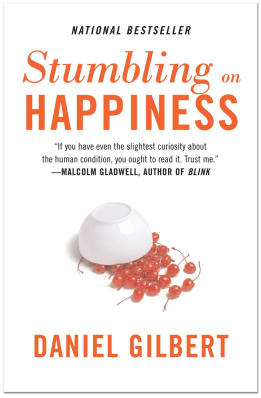
Daily, biweekly, monthly, annually

Resources

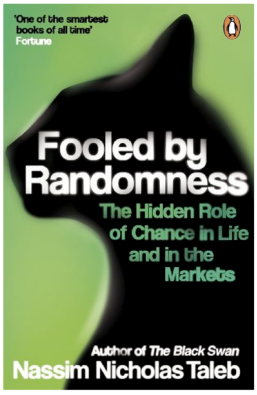
Books



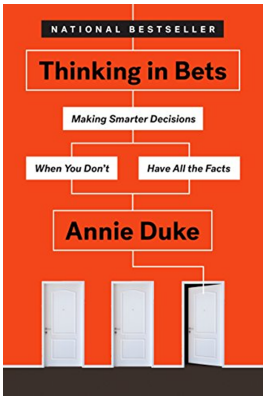
[Transformative Experience]
L. A. Paul



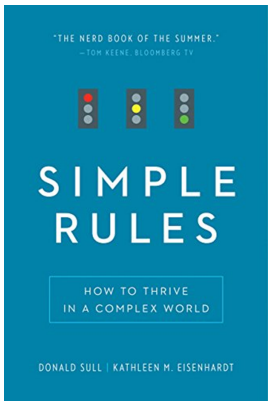
[Stumbling On Happiness]
Daniel Gilbert



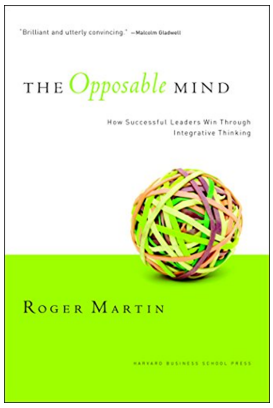
[Fooled By Randomness]
Nassim Nicholas Taleb



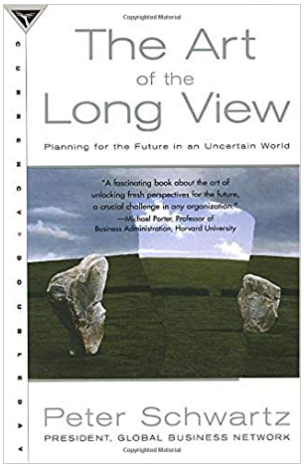
[Thinking In Bets: Making Smarter Decisions When You Don't Have All The Facts]
Annie Duke



[Simple Rules: How To Thrive In A Complex World]
Kathleen Eisenhardt
Donald Sull



[The Opposable Mind: How Successful Leaders Win Through Integrative Thinking]
Roger L. Martin



[The Art Of The Long View: Planning For The Future In An Uncertain World]
Peter Schwartz


Conditions for Intuitive Expertise

A Failure to Disagree

Daniel Kahneman
Gary Klein

Princeton University
Applied Research Associates

This article reports on an effort to explore the differences between two approaches to intuition and expertise that are often viewed as conflicting: heuristics and biases (HB) and naturalistic decision making (NDM). We argue that the obvious fact that professional intuition is sometimes marvelous and sometimes flawed, the authors attempt to map the boundary conditions that separate true intuitive skill from overconfident and biased impressions. They conclude that evaluating the likely quality of an intuitive judgment requires an assessment of the predictability of the environment in which the judgment is made and of the individual's opportunity to learn the regularities of that environment. Subjective experience is not a reliable indicator of judgment accuracy.

Keywords: intuition, expertise, overconfidence, heuristics, judgment

In this article we report on an effort to compare our views on the issues of intuition and expertise and to discuss the evidence for our respective positions. When we launched this project, we expected to disagree on many issues, and with good reason: One of us (GK) has spent much of his career thinking about ways to promote reliance on expert intuition in executive decision making and identifying the limits of intuition, whereas the other (DK) has been a leader in research on the systematic biases of intuitive judgment. Both of us have been identified with the "heuristics and biases" (HB) approach to the field.

A surprise awaited us when we got together to consider our joint field of interest. We found ourselves agreeing most of the time. When we initially disagreed, we were usually able to converge upon a common position. Our shared beliefs are much more specific than the commonplace that expert intuition is sometimes remarkably accurate and sometimes off the mark. We accept the commonplace, of course, but we also have views and opinions about more specific questions: Who are the experts in which they are the activities in which experience is more likely to produce overconfidence than genuine skill? Because we largely agree about the answers to these questions we also favor generally similar recommendations to organizations seeking to improve the quality of judgments and decisions. In spite of all this agreement, however, we find that we are still separated in many ways by divergent attitudes, preferences about facts, and feelings about fighting words such as "bias." If we are to understand the differences between our professional communities, such emotions must be taken into account.

We begin with a brief review of the origins and precursors of the NDM and HB approaches, followed by a discussion of the most prominent points of contrast between them (NDM: Klein, Orasanu, Calderwood, & Zsambok, 1993; HB: Gilovich, Griffin, & Kahneman, 2002; Tversky & Kahneman, 1974). Next we present some claims about the conditions under which skilled intuitions develop, followed by several suggestions for ways to improve the quality of judgments and choices.

Two Perspectives

Origins of the Naturalistic Decision Making Approach

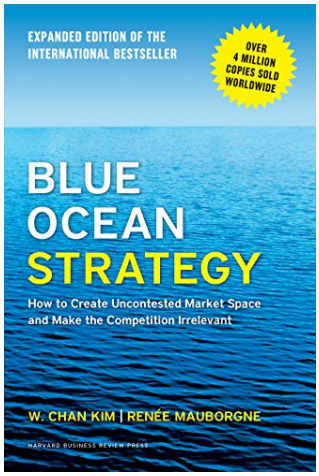
The NDM approach, which focuses on the successes of expert intuition, grew out of early research on master chess players conducted by deGroot (1946/1978) and later by Chase and Simon (1973). DeGroot showed that chess grand masters were generally able to identify the most promising moves rapidly, while mediocre chess players of the same level of skill did not. He found that chess grand masters mainly differed from weaker players in their unusual ability to appreciate the dynamics of complex positions and quickly judge a line of play as promising or fruitless. Chase and Simon (1973) described the performance of chess experts as a form of perceptual skill in which complex patterns are recognized. They estimated that chess masters acquire a repertoire of 50,000 to 100,000 immediately recognizable patterns, and that this repertoire enables them to identify a good move without having to calculate all possible contingencies. Strong players need a decade of serious play to assemble this large collection of basic patterns, but of course they achieve impressive levels

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[Conditions For Intuitive Expertise: A Failure To Disagree]
Gary Klein & Daniel Kahneman



[Blue Ocean Strategy: How To Create Uncontested Market Space And Make The Competition Irrelevant]
W. Chan Kim | Renee Mauborgne

Investors

Some of the investors I follow and recommend are really good to watch. My reasoning is that we're all making investing decisions about where to put our time, money, and resources in our personal and professional lives, so in essence, we are all investors.

Some of the people I follow are:

- **Howard Marks** and I recommend reading his memos.
- **Ray Dalio,** who is sharing a lot of his insights for free right now: He's putting his next book online, one chapter at a time. It's very relevant. We've covered in many manuals how Dalio develops models: He thinks across disciplines and consults experts, not just theoretically or as a pundit.

The amazing thing about these investors is that you can see their track record over many different types of environments over many decades. You could look at other investors as well, but these two are particularly good at communicating their knowledge, and as you're reading what they write, you can pull out their mental models, and that is going to give you a mental model answer to which information can you trust or not trust. It's not just related to what's happening with the coronavirus. It's a part of this larger trend of **how you can trust anything,** with bot armies and Russian interference and polarization in the media business model that's mainly funded by advertising.

Academic Resources

- **Value conflict/taboo trade-offs / Protecting the sacred**, Philip Tetlock
- **Success And Luck In Creative Careers**, Milan Janosov, Federico Battiston, Roberta Sinatra

Other Resources

- **Toward A New Frontier In Human Intelligence: The Person-Centered Approach**, Scott Barry Kaufman (article)
- **COVID-19 End Games - where do we go from here? Four strategies and six big unknowns.** Spencer Greenberg (video)
- **Elon Musk TED Interview: The Future We're Building — And Boring** (video)
- **The 25 Psychological Biases That Cause Us To Make Bad Decisions**
- **Decision Tracker Template** (Google Doc, make your copy to be able to edit it)

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