The Most Important Mental Model,

or On Being a Fallibilist[1]

"The first principle is that you must not fool yourself –
and you are the easiest person to fool."
- Richard Feynman

On a brisk day last October in Manhattan, I had the opportunity to spend a day with Annie Duke, former professional poker player (the only woman to have won the World Series of Poker championship), and author of *Thinking in Bets*: *Making Smarter Decisions When You Don't Have All The Facts*. While Duke has extensively studied the literature on behavioral psychology (she dropped out of a PhD program in the field to play poker full time), she is first and foremost a successful practitioner of decision-making under uncertainty. She had skin in the game as a professional poker player for two decades.

While wide-ranging, our discussion centered on optimizing processes in domains in which there is some element of randomness in outcomes. As Duke writes in *Thinking in Bets*, "Poker is a game of incomplete information. It is a game of decision-making under conditions of uncertainty over time…valuable information remains hidden. There is also an element of luck in any outcome."[2]

Like poker, investing is a domain with incomplete information and decision-making under uncertainty.[3] In poker as well as investing, you can have a bad process (bluffing randomly, acting on hot stock tips), but still be rewarded with positive outcomes in the short term. Additionally, the possibility exists that one can have a sound process, and make good decisions, yet still have a negative outcome.

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[1] Excerpted from Maran Capital Management 2Q 2019 Letter to Partners. To sign up for our distribution list, get in touch with us here.

[2] p 21.

[3] Of course investing deals with risks and uncertainties of greater magnitudes as well as of different kinds. Poker, unlike investing, does not have an element of epistemic uncertainty. The rules of the game are well-defined. Sure, there is more of an element of skill in poker than there is in Blackjack, dice rolling, or coin tossing, but the framework of the game is still well defined. Consider a poker game in which you didn't know, a priori, the number of cards in the deck, or which cards were wild, or whether a friendly casino manager would come around on a random schedule and replace a few cards from the game with different ones. This is more akin to the type of uncertainty and risk present in investing. We investors face not only aleatory uncertainty, but epistemic uncertainty as well.

I have been honing and refining my process over the 15+ years I have been a professional investor – I think that for the most part it would garner Annie Duke's approval. But I am constantly trying to improve upon it.

Duke reinforced the importance of many elements of my process that I consider essential, including the use of an investment checklist, the practice of pre-mortems, the use of "organized skepticism" or "red team" decision groups (actively seeking disconfirming evidence), the use of precise probability assignments to forecasts (decision trees), and the tracking of past decisions.

Ultimately, I think, in a domain in which you can't always assess the quality of a decision by the outcome, a good process is one that makes it hard for you to fool yourself.

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In 1994, Charlie Munger spoke to a class of business school students at the University of Southern California. The transcript of his talk was printed in Outstanding Investors Digest the following spring, under the title "A Lesson on Elementary, Worldly Wisdom as it Relates to Investment Management and Business." Five years later, Robert Hagstrom's *Investing, the Last Liberal Art*, was published (title of Chapter 1: "A Latticework of Mental Models"), which brought more attention to the idea. The transcript of the talk was finally reprinted in *Poor Charlie's Almanack: The Wit and Wisdom of Charlie Munger* in 2005.

The thesis of the talk is captured in a few short lines from the speech:

> What is elementary, worldly wisdom? Well, the first rule is that you can't really know anything if you just remember isolated facts and try and bang 'em back. If the facts don't hang together on a latticework of theory, you don't have them in a usable form.
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> You've got to have models in your head. And you've got to array your experience—both vicarious and direct—on this latticework of models. You may have noticed students who just try to remember and pound back what is remembered. Well, they fail in school and in life. You've got to hang experience on a latticework of models in your head.

He goes on to discuss a number of such mental models from the fields of math, engineering, biology, psychology, accounting, and more. It is a great speech, and I recommend that you read it if you haven't.[4]

The ideas in the "latticework" speech have become value investing orthodoxy, having permeated the field over the past 25 years. The concepts have endured for good reason; they are indeed wise. The mental model framework is absolutely the right approach to thinking about many types

[4] Link.

of problems. Having a large toolkit of mental models is powerful; I believe that it is worth spending time on their acquisition and study. Without a range of good theories, it is difficult to begin analyze what we need to analyze: businesses, industries, competitive dynamics, human behavior.

As Munger went on:

> The first rule is that you've got to have multiple models—because if you just have one or two that you're using, the nature of human psychology is such that you'll torture reality so that it fits your models, or at least you'll think it does…It's like the old saying, "to the man with only a hammer, every problem looks like a nail…"
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> And the models have to come from multiple disciplines—because all the wisdom of the world is not to be found in one little academic department.

It is worth having inch-deep knowledge of a broad array of mental models, and much deeper knowledge of a few dozen of them, learned through repeated application. Every investor, executive, entrepreneur, bartender, and matador is going to have their own toolkit of mental models that they know better than others. And this is perfectly reasonable.

I utilize and apply sound mental models (good theories) where appropriate, and try to avoid the misapplication of mental models (or the application of faulty mental models) as well. This is a core element of my process. A few examples that I utilize frequently: Bayes Theorem ("inside view vs. outside view" – see Bayes, Kahneman, Maouboussin), "jobs to be done" (Christensen), reverse engineering, price umbrellas, the ideas of Cialdini, etc; I could go on and on.[5] I believe that there are scores of mental models that are worth having in one's toolkit, and I read broadly in an effort to acquire more.

But I am going to let everyone in on a little secret. There is one mental model that is *the single most important* mental model, period. In a way, it is the ur-model, and the ultimate meta model.

I say this despite Munger's correct assertion that we need a diverse toolkit of mental models, and wary about falling prey to man with a hammer syndrome. I don't feel that I am going out, even a little bit, on a limb in saying that one mental model is the *most* important. It is, of course, scientific rationalism (or, alternately, the scientific method). This mental model catapulted humanity from centuries, indeed millennia, of slow progress, into rapid and open-ended growth in knowledge and wealth, in a period of a few decades, during a period we now call the Scientific Revolution, or The Enlightenment.

The scientific method is based on conjecture and falsification. In plain English: you make a guess, and then try to prove it wrong. If you *can* prove it wrong: congrats! Your theory is wrong. (On to the next one.) But if you can't prove it wrong, and others can't prove it wrong, and it fits the

[5] For more on mental models, see Farnam Street's compendium of 109 mental models - https://fs.blog/mental-models/, as well as Scott Page's new book, *The Model Thinker*.

data and is not easily varied, then maybe your hypothesis – your conjecture, your guess – becomes the best theory for the time being.

Notice I didn't say that your hypothesis is proven "right." The idea that we can never be certain about our theories is called fallibilism. Physicist David Deutsch, who has had as much influence on my thinking as anyone in the past few years, writes, "Fallibilists expect even their best and most fundamental explanations to contain misconceptions in addition to truth, and so they are predisposed to try to change them for the better."[6] [7]

Physicist Carlo Rovelli also highlights this distinction:

> The reliability of science is not based on the fact that its answers are certain. It is based on the fact that its answers are the best available ones. They are the best available ones because science is a way of thinking in which nothing is considered certain, and therefore remains open to adopt better answers if better ones become available. In other words, science is the discovery that the secret of knowledge is being open to learning, not believing that we have already tapped into ultimate truth. The reliability of science is based not on certainty but on a radical lack of certainty.[8]

Without using the term itself, Annie Duke propounds fallibilism via her advice to shift one's thinking away from certainty to a state of "I'm not sure." She suggests having the mindset of "I believe this to be true, and I'm 80% on it," rather than *knowing* that something is true.

Knowing that there are likely errors in what we believe to be true, with the idea that we should be constantly seeking better explanations, is a fundamentally optimistic worldview. It is a growth mindset.

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Ultimately, an honest, open-minded (fallibilist) application of the scientific method (conjecture and falsification seeking good explanations that fit facts/evidence/reality and are hard to vary) makes it harder to fool oneself. Applied to our domain: making an investment process more "scientific" sounds like it might involve more computers, algorithms, or quantitative methods. But that is not the case. Scientific rationalism, and the associated fallibilist mindset, are simply an approach to epistemology which can be applied to business, investing, and life.

[6] Deutsch, *The Beginning of Infinity*, p9.
[7] Gravity – gravitational force – was humanity's best *theory* (on the topic of, well, gravity) for over 200 years until Einstein disproved its existence over 100 years ago (replacing it with general relativity – curved space-time – as an even better theory). He was clearly a fallibilist.
[8] Rovelli, *Anaximander*, p 124-5.

Bibliography

David Deutsch, *The Beginning of Infinity*

Annie Duke, *Thinking in Bets*

Richard Feynman, *Surely You're Joking, Mr. Feynman*

Robert Hagstrom, *Investing: The Last Liberal Art*

Peter Kaufman, ed., *Poor Charlie's Almanack*

Scott Page, *The Model Thinker*

Carlo Rovelli, *Anaximander*

Carlo Rovelli, *Reality Is Not What It Seems*

Select Quotations from David Deutsch and Carlo Rovelli

On Good Explanations:

"The quest for good explanations is, I believe, the basic regulating principle not only of science, but of the Enlightenment generally. It is the feature that distinguishes those approaches of knowledge from all others, and it implies all those other conditions for scientific progress…:It trivially implies that prediction alone is insufficient. Somewhat less trivially, it leads to the rejection of authority…and hence it also implies the need for a tradition of criticism. It also implies a methodological rule – *a criterion for reality* – namely that a particular thing is real if and only if it figures in our best explanation of something." Deutsch, *Infinity*, p 23.

"A good explanation is an explanation that is hard to vary while still accounting for what it purports to account for." – Deutsch, *Infinity*, p 31.

"That is what a good explanation will do for you: it makes it harder for you to fool yourself." Deutsch, *Infinity*, p 27.

On the Scientific Method:

"Science works because, after hypothesis and reasoning, after intuitions and visions, after equations and calculations, we can check whether we have done well or not: the theory gives predictions about things we have not yet observed, and we can check whether these are correct, or not." Rovelli, *Reality*, p 210.

On Fallibilism:

"The reliability of science is not based on the fact that its answers are certain. It is based on the fact that its answers are the best available ones. They are the best available ones because science is a way of thinking in which nothing is considered certain, and therefore remains open to adopt better answers if better ones become available. In other words, science is the discovery that the secret of knowledge is being open to learning, not believing that we have already tapped into ultimate truth. The reliability of science is based not on certainty but on a radical lack of certainty." Rovelli, *Anaximander,* p 124-5.

"In order for us to understand the world, we must be aware that our worldview may be mistaken and we can redraw it…This is the main characteristic of scientific thinking: what seems most obvious to us about the world can be false…Knowledge is born from a respectful but radical act of rebellion against what we currently think. This is the richest heritage the West has bequeathed to today's global culture, its finest contribution." Rovelli, *Anaximander*, p 180.

"The central insight of Karl Popper, the great philosopher of science, is that science is not a collection of verifiable propositions; rather, it is a set of theories that, at best, can be wholly falsified." Rovelli, *Anaximander*, p 114.

On Evidence:

"We must distinguish between clues and strong evidence. Clues are what set Sherlock Holmes on the right track, allowing him to solve a mysterious case. Strong evidence is what the judge needs to sentence the guilty. Clues put us on the right path toward a correct theory. Strong evidence is that which subsequently allows us to trust whether the theory we have built is a good one or not. Without clues, we search in the wrong directions. Without evidence, a theory is not reliable." Rovelli, *Reality*, p 213.

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