e Cook and the Chef: Musk's Secret Sauce

ember 6, 2015 By Tim Urban

the last part of a four-part series on Elon Musk's companies. For an explanation of why this is happening and how Musk is involved, start with Part 1. ← also click these

quick notes:

and ebook options: We made a fancy PDF of this post for printing and offline viewing (see a preview here), and an ebook containing the whole four-part Elon Musk series:

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2) Here's a G-rated version of the post, appropriate for all ages (with its own URL, so safe to share too).

3) Extra big thanks to our Patreon supporters for making WBW sustainable and for being immensely patient during the long wait.

Welcome to the last post in the series on the world of Elon Musk.

It's been a long one, I know. A long series with long posts and a long time between posts. It turns out that when it comes to Musk and his shit, there was a lot to say.

Anyone who's read the first three posts in this series is aware that I've not only been buried in the things Musk is doing, I've been drinking a tall glass of the Elon Musk Kool-Aid throughout. I'm very, very into it.

I kind of feel like that's fine, right? The dude is a steel-bending industrial giant in America in a time when there aren't supposed to be steel-bending industrial giants in America, igniting revolutions in huge, old industries that aren't supposed to be revolutionable. After emerging from the 1990s dotcom party with $180 million, instead of sitting back in his investor chair listening to pitches from groveling young entrepreneurs, he decided to start a brawl with a *group* of 900-pound sumo wrestlers—the auto industry, the oil industry, the aerospace industry, the military-industrial complex, the energy utilities—and he might actually be *winning*. And all of this, it really seems, for the purpose of giving our species a better future.

Pretty Kool-Aid worthy. But someone being exceptionally rad isn't Kool-Aid worthy enough to warrant 90,000 words over a string of months on a blog that's supposed to be about a wide range of topics.

During the first post, I laid out the two objectives for the series:

1) To understand why Musk is doing what he's doing.

2) To understand why Musk is *able to* do what he's doing.

So far, we've spent most of the time exploring objective #1. But what *really* intrigued me as I began thinking about this was objective #2. I'm fascinated by those rare people in history who manage to dramatically change the world during their short time here, and I've always liked to study those people and read their biographies. Those people know something the rest of us don't, and we can learn something valuable from them. Getting access to Elon Musk gave me what I decided was an unusual chance to get my hands on one of those people and examine them up close. If it were just Musk's

money or intelligence or ambition or good intentions that made him so capable, there would be more Elon Musks out there. No, it's something else—what TED curator Chris Anderson called Musk's "secret sauce"—and for me, this series became a mission to figure it out.

The good news is, after a *lot* of time thinking about this, reading about this, and talking to him and his staff, I think I've got it. What for a while was a large pile of facts, observations, and sound bites eventually began to congeal into a common theme—a trait in Musk that I believe he shares with many of the most dynamic icons in history and that separates him from almost everybody else.

As I worked through the Tesla and SpaceX posts, this concept kept surfacing, and it became clear to me that this series couldn't end without a deep dive into exactly what it is that Musk and a few others do so unusually well. The thing that tantalized me is that this secret sauce is actually accessible to everyone and right there in front of us—if we can just wrap our heads around it. Mulling this all over has legitimately affected the way I think about my life, my future, and the choices I make—and I'm going to try my best in this post to explain why.

Two Kinds of Geology

In 1681, English theologian Thomas Burnet published *Sacred Theory of the Earth,* in which he explained how geology worked. What happened was, around 6,000 years ago, the Earth was formed as a perfect sphere with a surface of idyllic land and a watery interior. But then, when the surface dried up a little later, cracks formed in its surface, releasing much of the water from within. The result was the Biblical Deluge and Noah having to deal with a ton of shit all week. Once things settled down, the Earth was no longer a perfect sphere—all the commotion had distorted the surface, bringing about mountains and valleys and caves down below, and the whole thing was littered with the fossils of the flood's victims.

And bingo. Burnet had figured it out. The great puzzle of fundamental theology had been to reconcile the large number of seemingly-very-old Earth features with the much shorter timeline of the Earth detailed in the Bible. For theologians of the time, it was their version of the general relativity vs. quantum mechanics quandary, and Burnet had come up with a viable string theory to unify it all under one roof.

It wasn't just Burnet. There were enough theories kicking around reconciling geology with the verses of the Bible to today warrant a 15,000-word "Flood Geology" Wikipedia page.

Around the same time, another group of thinkers started working on the geology puzzle: scientists.

For the theologian puzzlers, the starting rules of the game were, "Fact: the Earth began 6,000 years ago and there was at one point an Earth-sweeping flood," and their puzzling took place strictly within that context. But the scientists started the game with no rules at all. The puzzle was a blank slate where any observations and measurements they found were welcome.

Over the next 300 years, the scientists built theory upon theory, and as new technologies brought in new types of measurements, old theories were debunked and replaced with new updated versions. The science community kept surprising themselves as the apparent age of the Earth grew longer and longer. In 1907, there was a huge breakthrough when American scientist Bertram Boltwood pioneered the technique of deciphering the age of rocks through radiometric dating, which found elements in a rock with a known rate of radioactive decay and measured what portion of those elements remained intact and what portion had already converted to decay substance.

Radiometric dating blew Earth's history backwards into the billions of years, which burst open new breakthroughs in science like the theory of Continental Drift, which in turn led to the theory of Plate Tectonics. The scientists were on a roll.

Meanwhile, the flood geologists would have none of it. To them, any conclusions from the science community were moot because they were breaking the rules of the game to begin with. The Earth was *officially* less than 6,000 years old, so if radiometric dating showed otherwise, it was a flawed technique, period.

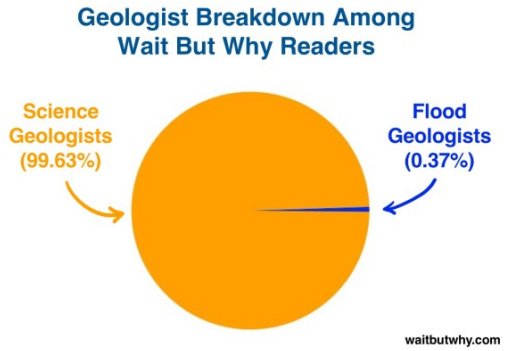
But the scientific evidence grew increasingly compelling, and as time wore on, more and more flood geologists threw in the towel and accepted the scientist's viewpoint-maybe they had had the rules of the game wrong.

Some, though, held strong. The rules were the rules, and it didn't matter how many people agreed that the Earth was billions of years old—it was a grand conspiracy.

Today, there are still many flood geologists making their case. Just recently, an author named Tom Vail wrote a book called *Grand Canyon: A Different View*, in which he explains:

Contrary to what is widely believed, radioactive dating has not proven the rocks of the Grand Canyon to be millions of years old. The vast majority of the sedimentary layers in the Grand Canyon were deposited as the result of a global flood that occurred after and as a result of the initial sin that took place in the Garden of Eden.

If the website analytics stats on Chartbeat included a "Type of Geologist" demographic metric, I imagine that for Wait But Why readers, the breakdown would look something like this:



It makes sense. Whether religious or not, most people who read this site are big on data, evidence, and accuracy. I'm reminded of this every time I make an error in a post.

Whatever role faith plays in the spiritual realm, what most of us agree on is that when seeking answers to our questions about the age of the Earth, the history of our species, the causes of lightning, or any other physical phenomenon in the universe, data and logic are far more effective tools than faith and scripture.

And yet—after thinking about this for a while, I've come to an unpleasant conclusion:

When it comes to most of the way we think, the way we make decisions, and the way we live our lives, we're much more like the flood geologists than the science geologists.

And Elon's secret? He's a scientist through and through.

Hardware and Software

The first clue to the way Musk thinks is in the super odd way that he talks. For example:

Human child: "I'm scared of the dark, because that's when all the scary shit is gonna get me and I won't be able to see it coming."

Elon: "When I was a little kid, I was really scared of the dark. But then I came to understand, dark just means the absence of photons in the visible wavelength—400 to 700 nanometers. Then I thought, well it's really silly to be afraid of a lack of photons. Then I wasn't afraid of the dark anymore after that." [2]

Or:

Human father: "I'd like to start working less because my kids are starting to grow up."

Elon: "I'm trying to throttle back, because particularly the triplets are starting to gain consciousness. They're almost two." [3]

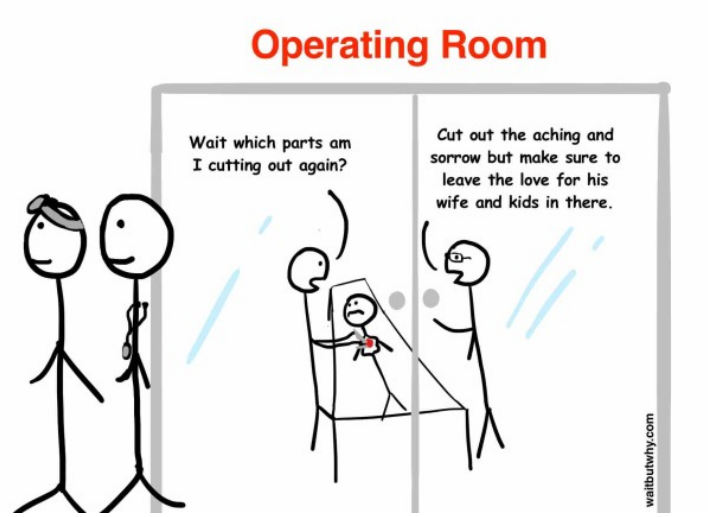
Or:

Human single man: "I'd like to find a girlfriend. I don't want to be so busy with work that I have no time for dating."

Elon: "I would like to allocate more time to dating, though. I need to find a girlfriend. That's why I need to carve out just a little more time. I think maybe even another five to 10 — how much time does a woman want a week? Maybe 10 hours? That's kind of the minimum? I don't know." [4]

I call this MuskSpeak. MuskSpeak is a language that describes everyday parts of life as exactly what they actually, literally are.

There are plenty of instances of technical situations when we all agree that MuskSpeak makes much more sense than normal human parlance—



—but what makes Musk odd is that he thinks about *most* things in MuskSpeak, including many areas where you don't usually find it. Like when I asked him if he was afraid of death, and he said having kids made him more comfortable with dying, because "kids sort of are a bit you. At least they're half you. They're half you at the hardware level, and depending on how much time you have with them, they're that percentage of you at the software level."

When you or I look at kids, we see small, dumb, cute people. When Musk looks at his five kids, he sees five of his favorite computers. When he looks at you, he sees a computer. And when he looks in the mirror, he sees a computer—*his* computer. It's not that Musk suggests that people are *just* computers—it's that he sees people as computers on top of whatever else they are.

And at the most literal level, Elon's right about people being computers. At its simplest definition, a computer is an object that can store and process data—which the brain certainly is.

And while this isn't the most poetic way to think about our minds, I'm starting to believe that it's one of those areas of life where MuskSpeak can serve us well—because thinking of a brain as a computer forces us to consider the distinction between our hardware and our software, a distinction we often fail to recognize.

For a computer, hardware is defined as "the machines, wiring, and other physical components of a computer." So for a human, that's the physical brain they were born with and all of its capabilities, which determines their raw intelligence, their innate talents, and other natural strengths and shortcomings.

A computer's software is defined as "the programs and other operating information used by a computer." For a human, that's what they know and how they think—their belief systems, thought patterns, and reasoning methods. Life is a flood of incoming data of all kinds that enter the brain through our senses, and it's the software that assesses and filters all that input, processes and organizes it, and ultimately uses it to generate the key output—a decision.

The hardware is a ball of clay that's handed to us when we're born. And of course, not all clay is equal—each brain begins as a unique combination of strengths and weaknesses across a wide range of processes and capabilities.

But it's the software that determines what kind of tool the clay gets shaped into.

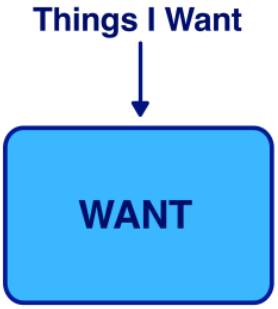
When people think about what makes someone like Elon Musk so effective, they often focus on the hardware—and Musk's hardware has some pretty impressive specs. But the more I learn about Musk and other people who seem to have superhuman powers—whether it be Steve Jobs, Albert Einstein, Henry Ford, Genghis Khan, Marie Curie, John Lennon, Ayn Rand, [2] or Louis C.K.—the more I'm convinced that it's their software, not their natural-born intelligence or talents, that makes them so rare and so effective.

So let's talk about software—starting with Musk's. As I wrote the other three posts in this series, I looked at everything I was learning about Musk—the things he says, the decisions he makes, the missions he takes on and how he approaches them—as clues to how his underlying software works.

Eventually, the clues piled up and the shape of the software began to reveal itself. Here's what I think it looks like:

Elon's Software

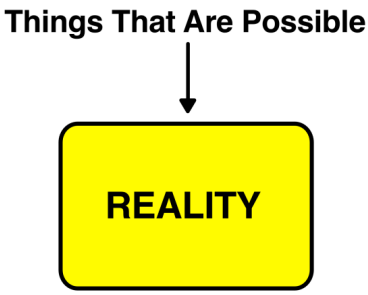
The structure of Musk's software starts like many of ours, with what we'll call the Want box:



This box contains anything in life where you want Situation A to turn into Situation B. Situation A is currently what's happening and you want something to change so that Situation B is what's happening instead. Some examples:

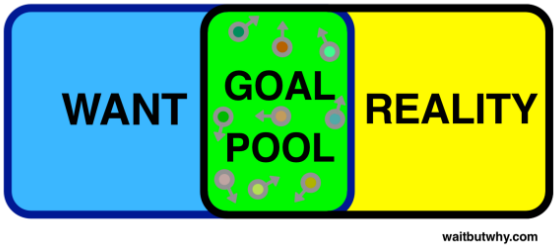
SITUATION A	SITUATION B
I have a small amount of money	I have a larger amount of money
I'm in a job I don't like	I'm in a job I like
There's a lot of poverty in Chad	There's a little less poverty in Chad
I don't have a cookie	I have a cookie
I'm moderately desirable to date	I'm pretty desirable to date
I don't know how to play the cello	I know how to play the cello
The education system is outdated	The education system makes sense for today
I can run 3 miles in 25 minutes	I can run 3 miles in 20 minutes

Next, the Want box has a partner in crime—what we'll call the Reality box. It contains all things that are possible:



Pretty straightforward.

The overlap of the Want and Reality boxes is the Goal Pool, where your goal options live: [3]



So you pick a goal from the pool—the thing you're going to try to move from Point A to Point B.

And how do you cause something to change? You direct your power towards it. A person's power can come in various forms: your time, your energy (mental and physical), your resources, your persuasive ability, your connection to others, etc.

The concept of employment is just Person A using their resources power (a paycheck) to direct Person B's time and/or energy power toward Person A's goal. When Oprah publicly recommends a book, that's combining her abundant power of connection (she has a huge reach) and her abundant power of persuasion (people trust her) and directing them towards the goal of getting the book into the hands of thousands of people who would have otherwise never known about it.

Once a goal has been selected, you know the *direction* in which to point your power. Now it's time to figure out the most effective way to use that power to generate the outcome you want—that's your strategy:

Simple right? And probably not that different from how you think.

But what makes Musk's software so effective isn't its structure, it's that he uses it like a scientist. Carl Sagan said, "Science is a way of thinking much more than it is a body of knowledge," and you can see Musk apply that way of thinking in two key ways:

1) He builds each software component himself, from the ground up.

Musk calls this "reasoning from first principles." I'll let him explain:

I think generally people's thinking process is too bound by convention or analogy to prior experiences. It's rare that people try to think of something on a first principles basis. They'll say, "We'll do that because it's always been done that way." Or they'll not do it because "Well, nobody's ever done that, so it must not be good." But that's just a ridiculous way to think. You have to build up the reasoning from the ground up—"from the first principles" is the phrase that's used in physics. You look at the fundamentals and construct your reasoning from that, and then you see if you have a conclusion that works or doesn't work, and it may or may not be different from what people have done in the past.[5]

In science, this means starting with what evidence shows us to be true. A scientist doesn't say, "Well we know the Earth is flat because that's the way it looks, that's what's intuitive, and that's what everyone agrees is true," a scientist says, "The part of the Earth that I can see at any given time appears to be flat, which would be the case when looking at a small piece of many differently shaped objects up close, so I don't have enough information to know what the shape of the Earth is. One reasonable hypothesis is that the Earth is flat, but until we have tools and techniques that can be used to prove or disprove that hypothesis, it is an open question."

A scientist gathers together only what he or she knows to be true—the first principles—and uses those as the puzzle pieces with which to construct a conclusion.

Reasoning from first principles is a hard thing to do in life, and Musk is a master at it. Brain software has four major decision-making centers:

1) Filling in the Want box

2) Filling in the Reality box

3) Goal selection from the Goal Pool

4) Strategy formation

Musk works through each of these boxes by reasoning from first principles. Filling in the Want box from first principles requires a deep, honest, and independent understanding of yourself. Filling in the Reality box requires the clearest possible picture of the actual facts of both the world and your own abilities. The Goal Pool should double as a Goal Selection Laboratory that contains tools for intelligently measuring and weighing options. And strategies should be formed based on what you know, not on what is typically done.

2) He continually adjusts each component's conclusions as new information comes in.

You might remember doing proofs in geometry class, one of the most mundane parts of everyone's childhood. These ones:

Given: A = B
Given: B = C + D
Therefore: A = C + D

Math is satisfyingly exact. Its givens are exact and its conclusions are airtight.

In math, we call givens "axioms," and axioms are 100% true. So when we build conclusions out of axioms, we call them "proofs," which are also 100% true.

Science doesn't have axioms or proofs, for good reason.

We could have called Newton's law of universal gravitation a proof—and for a long time, it certainly seemed like one—but then what happens when Einstein comes around and shows that Newton was actually "zoomed in," like someone calling the Earth flat, and when you zoom *way* out, you discover that the *real* law is general relativity and Newton's law actually stops working under extreme conditions, while general relativity works no matter what. So then, you'd call general relativity a proof instead. Except then what happens when quantum mechanics comes around and shows that general relativity fails to apply on a tiny scale and that a new set of laws is needed to account for those cases.

There are no axioms or proofs in science because nothing is for sure and everything we feel sure about might be disproven. Richard Feynman has said, "Scientific knowledge is a body of statements of varying degrees of certainty—some most unsure, some nearly sure, none absolutely certain." Instead of proofs, science has *theories*. Theories are based on hard evidence and treated as truths, but at all times they're susceptible to being adjusted or disproven as new data emerges.

So in science, it's more like:

Given (for now): A = B
Given (for now): B = C + D
Therefore (for now): A = C + D

In our lives, the only true axiom is "I exist." Beyond that, nothing is for sure. And for most things in life, we can't even build a real scientific theory because life doesn't tend to have exact measurements.

Usually, the best we can do is a strong hunch based on what data we have. And in science, a hunch is called a hypothesis. Which works like this:

Given (it seems, based on what I know): A = B
Given (it seems, based on what I know): B = C + D
Therefore (it seems, based on what I know): A = C + D

Hypotheses are built to be tested. Testing a hypothesis can disprove it or strengthen it, and if it passes enough tests, it can be upgraded to a theory.

So after Musk builds his conclusions from first principles, what does he do? He tests the shit out of them, continually, and adjusts them regularly based on what he learns. Let's go through the whole process to show how:

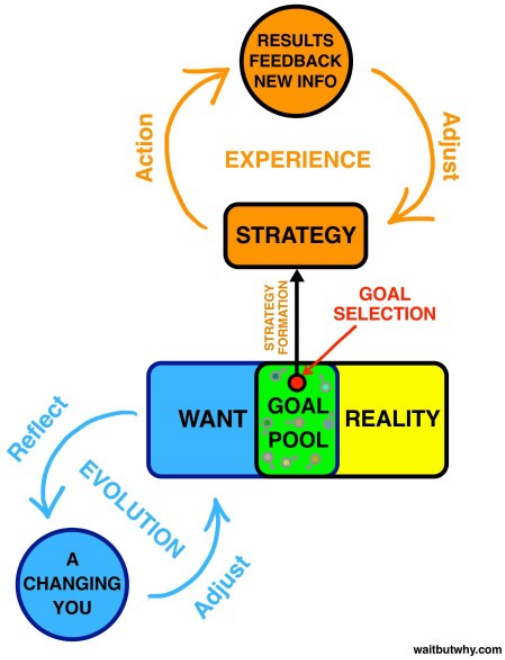
You begin by reasoning from first principles to A) fill in the Want box, B) fill in the Reality box, C) select a goal from the pool, and D) build a strategy—and then you get to work. You've used first principles thinking to decide where to point your power and the most effective way to use it.

But the goal-achievement strategy you came up with was just your first crack. It was a hypothesis, ripe for testing. You test a strategy hypothesis one way: action. You pour your power into the strategy and see what happens. As you do this, data starts flowing in—results, feedback, and new information from the outside world. Certain parts of your strategy hypothesis might be strengthened by this new data,

others might be weakened, and new ideas may have sprung to life in your head through the experience—but either way, some adjustment is usually called for:

As this strategy loop spins and your power becomes more and more effective at accomplishing your goal, other things are happening down below.

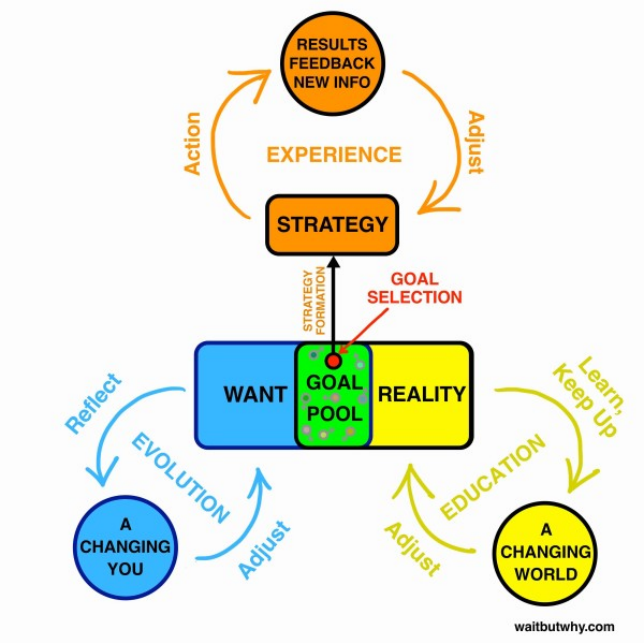
For someone reasoning from first principles, the Want box at any given time is a snapshot of their innermost desires the last time they thought hard about it. But the contents of the Want box are also a hypothesis, and experience can show you that you were wrong about something you thought you wanted or that you want something you didn't realize you did. At the same time, the inner you isn't a statue—it's a shifting, morphing sculpture whose innermost values change as time passes. So even if something in the Want box was correct at one point, as *you* change, it may lose its place in the box. The Want box should serve the current inner you as best possible, which requires you to update it, something you do through reflection:



A rotating Want loop is called evolution.

On the other side of the aisle, the Reality box is also going through a process. "Things that are possible" is a hypothesis, maybe more so than anything else. It takes into account both the state of the world and your own abilities. And as your own abilities change and grow, the world changes even faster. What was possible in the world in 2005 is *very* different from what's possible today, and it's a huge (and rare) advantage to be working with an up-to-date Reality box.

Filling in your Reality box from first principles is a great challenge, and keeping the box current so that it matches actual reality takes continual work.

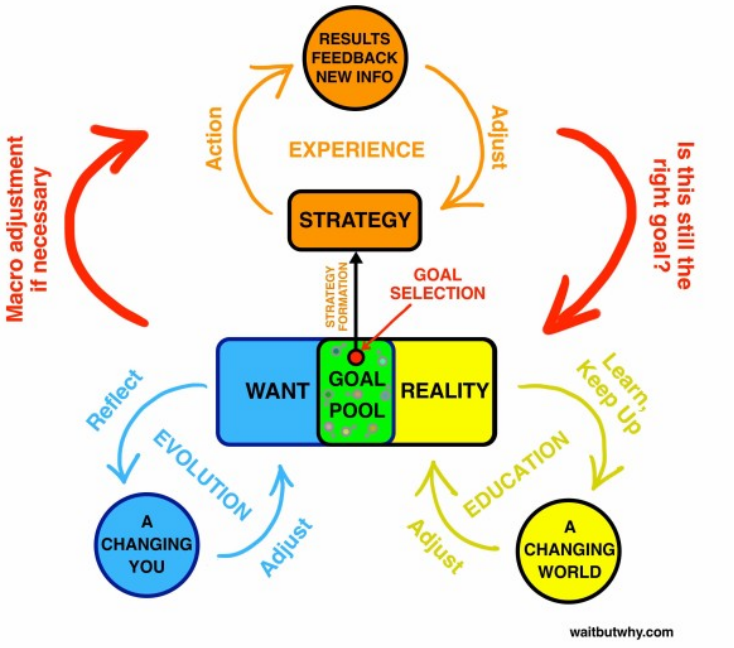


For each of these areas, the box represents the current hypothesis and the circle represents the source of new information that can be used to adjust the hypothesis. It's our duty to remember that the circles are the boss, not the boxes—the boxes are only trying their best to do the circles proud. And if we fall out of touch with what's happening in the circles, the info in the boxes becomes obsolete and a less effective source for our decision-making.

Thinking about the software as a whole, let's take a step back. What we see is a goal formation mechanism below and a goal attainment mechanism above. One thing goal attainment often requires is laser focus. To get the results we want, we zoom in on the micro picture, sinking our teeth into our goal and honing in on it with our strategy loop.

But as time passes, the Want box and Reality box adjust contents and morph shape, and eventually, something else can happen—the Goal Pool changes.

The Goal Pool is just the overlap of the Want and Reality boxes, so its own shape and contents are totally dependent on the state of those boxes. And as you live your life inside the goal attainment mechanism above, it's important to make sure that what you're working so hard on remains in line with the Goal Pool below—so let's add in two big red arrows for that:



Checking in with the large circle down below requires us to lift our heads up from the micro mission and do some macro reflection. And when enough changes happen in the Want and Reality boxes that the goal you're pursuing is no longer in the goal pool, it calls for a macro life change—a breakup, a job switch, a relocation, a priority swap, an attitude shift.

All together, the software I've described is a living, breathing system, constructed on a rock solid foundation of first principles, and built to be nimble, to keep itself honest, and to change shape as needed to best serve its owner.

And if you read about Elon Musk's life, you can watch this software in action.

How Musk's software wrote his life story

Getting started

Step 1 for Elon was filling in the contents of the Want box. Doing this from first principles is a huge challenge—you have to dig deep into concepts like right and wrong, good and bad, important and trivial, valuable and frivolous. You have to figure out what you respect, what you disdain, what fascinates you, what bores you, and what excites you deep in your inner child. Of course, there's no way for anyone of any age to have a clear cut answer to these questions, but Elon did the best thing he could by ignoring others and independently pondering.

I talked with him about his early thought process in figuring out what to do with his career. He has said many times that he cares deeply about the future well-being of the human species—something that is clearly in the center of his Want box. I asked how he came to that, and he explained:

The thing that I care about is—when I look into the future, I see the future as a series of branching probability streams. So you have to ask, what are we doing to move down the good stream—the one that's likely to make for a good future? Because otherwise, you look ahead, and it's like "Oh it's dark." If you're projecting to the future, and you're saying "Wow, we're gonna end up in some terrible situation," that's depressing.

Fair. Honing in on his specific path, I brought up the great modern physicists like Einstein and Hawking and Feynman, and I asked him whether he considered going into scientific discovery instead of engineering. His response:

I certainly admire the discoveries of the great scientists. They're discovering what already exists—it's a deeper understanding of how the universe already works. That's cool—but the universe already sort of knows that. What matters is knowledge in a human context. What I'm trying to ensure is that knowledge in a human context is still possible in the future. So it's sort of like—I'm more like the gardener, and then there are the flowers. If there's no garden, there's no flowers. I could try to be a flower in the garden, or I could try to make sure there is a garden. So I'm trying to make sure there is a garden, such that in the future, many Feynmans may bloom.

In other words, both A and B are good, but without A there is no B. So I choose A.

He went on:

I was at one point thinking about doing physics as a career—I did undergrad in physics—but in order to really advance physics these days, you need the data. Physics is fundamentally governed by the progress of engineering. This debate—"Which is better, engineers or scientists? Aren't scientists better? Wasn't Einstein the smartest person?"—personally, I think that engineering is better because in the absence of the engineering, you do not have the data. You just hit a limit. And yeah, you can be real smart within the context of the limit of the data you have, but unless you have a way to get more data, you can't make progress. Like look at Galileo. He engineered the telescope—that's what allowed him to see that Jupiter had moons. The limiting factor, if you will, is the engineering. And if you want to advance civilization, you must address the limiting factor. Therefore, you must address the engineering.

A and B are both good, but B can only advance if A advances. So I choose A.

In thinking about where exactly to point himself to best help humanity, Musk says that in college, he thought hard about the first principles question, "What will most affect the future of humanity?" and put together a list of five things: "the internet; sustainable energy; space exploration, in particular the permanent extension of life beyond Earth; artificial intelligence; and reprogramming the human genetic code." [6]

Hearing him talk about what matters to him, you can see up and down the whole stack of Want box reasoning that led him to his current endeavors.

He has other reasons too. Next to wanting to help humanity in the Want box is this quote:

I'm interested in things that change the world or affect future in wondrous new technology where you see it and you're like, "How did that even happen? How is that possible?"[7]

This follows a theme of Musk being passionate about super-advanced technology and the excitement it brings to him and other people. So given all of the above, an ideal endeavor for Musk would be something involving engineering, something in an area that will be important for the future, and something to do with cutting-edge technology. Those broad, basic Want box items alone narrow down the goal pool considerably.

Meanwhile, he was a teenager with no money, reputation, or connections, and limited knowledge and skills. In other words, his Reality box wasn't that big. So he did what many young people do—he focused his early goals not around achieving his Wants, but expanding the Reality box and its list of "things that are possible." He wanted to be able to legally stay in the US after college, and he also wanted to gain more knowledge about engineering, so he killed two birds with one stone and applied to a PhD program at Stanford to study high energy density capacitors, a technology aimed at coming up with a more efficient way than traditional batteries to store energy.

U-turn to the internet

Musk had gone into the Goal Pool and picked the Stanford program, and he moved to California to get started. But there was one thing—it was 1995. The internet was in the early stages of taking off and moving much faster than people had anticipated. It was also a world Musk could dive into without money or a reputation. So he added a bunch of internet-related possibilities into his Reality box. The early internet was also more *exciting* than he had anticipated—so getting involved in it quickly found its way into his Want box.

These rapid adjustments caused big changes in his Goal Pool, to the point where the Stanford PhD was no longer what his software's goal formation center was outputting.

Most people would have stuck with the Stanford program—because they had already told everyone about it and it would be weird to quit, because it was Stanford, because it was a more normal path, because it was safer, because the internet might be a fad, because what if he were 35 one day and was a failure with no money because he couldn't get a good job without the right degree.

Musk quit the program after two days. The big macro arrow of his software came down on the right, saw that what he was embarking on wasn't in the Goal Pool anymore, and he trusted his software—so he made a macro change.

He started Zip2 with his brother, an early cross between the concepts of the Yellow Pages and Google Maps. Four years later, they sold the company and Elon walked away with $22 million.

As a dotcom millionaire, the conventional wisdom was to settle down as a lifelong rich guy and either invest in other companies or start something new with other people's money. But Musk's goal formation center had other ideas. His Want box was bursting with ambitious startup ideas that he thought could have major impact on the world, and his Reality box, which now included $22 million, told him that he had a high chance of succeeding. Being leisurely on the sidelines was nowhere in his Want box and totally unnecessary according to his Reality box.

So he used his newfound wealth to start X.com in 1999, with the vision to build a full-service online financial institution. The internet was still young and the concept of storing your money in an online bank was totally inconceivable to most people, and Musk was advised by many that it was a crazy plan. But again, Musk trusted his software. What he knew about the internet told him that this was inside the Reality box—because his reasoning told him that when it came to the internet, the Reality box had grown *much* bigger than people appreciated—and that was all he needed to know to move forward. In the top part of his software, as his strategy-action-results-adjustments loop spun, X.com's service changed, the team changed, the mission changed, even the name changed. By the time eBay bought it in 2002, the company was called PayPal and it was a money transfer service. Musk made $180 million.

Following his software to space

Now 31 years old and fabulously wealthy, Musk had to figure out what to do next with his life. On top of the "whatever you do, definitely don't risk losing that money you have" conventional wisdom, there was also the common logic that said, "You're awesome at building internet companies, but that's all you know since you've never done anything else. You're in your thirties now and it's too late to do something big in a whole different field. This is the path you chose—you're an internet guy."

But Musk went back to first principles. He looked inwards to his Want box, and having reflected on things, doing another internet thing wasn't really in the box anymore. What was in there was his still-burning desire to help the future of humanity. In particular, he felt that to have a long future, the species would have to become much better at space travel.

So he started exploring the limits of the Reality box when it came to getting involved in the aerospace industry.

Conventional wisdom screamed at the top of its lungs for him to stop. It said he had no formal education in the field and didn't know the first thing about being a rocket scientist. But his software told him that formal education was just another way to download information into your brain and "a painfully slow download" at that—so he started reading, meeting people, and asking questions.

Conventional wisdom said no entrepreneur had ever succeeded at an endeavor like this before, and that he shouldn't risk his money on something so likely to fail. But Musk's stated philosophy is, "When something is important enough, you do it even if the odds are not in your favor."

Conventional wisdom said that he couldn't afford to build rockets because they were too expensive and pointed to the fact that no one had ever made a rocket that cheaply before—but like the scientists who ignored those who said the Earth was 6,000 years old and those who insisted the Earth was flat, Musk started crunching numbers to do the math himself. Here's how he recounts his thoughts:

Historically, all rockets have been expensive, so therefore, in the future, all rockets will be expensive. But actually that's not true. If you say, what is a rocket made of? It's made of aluminum, titanium, copper, carbon fiber. And you can break it down and say, what is the raw material cost of all these components? And if you have them stacked on the floor and could wave a magic wand so that the cost of rearranging the atoms was zero, then what would the cost of the rocket be? And I was like, wow, okay, it's really small—it's like 2% of what a rocket costs. So clearly it would be in how the atoms are arranged—so you've got to figure out how can we get the atoms in the right shape much more efficiently. And so I had a series of meetings on Saturdays with people, some of whom were still working at the big aerospace companies, just to try to figure out if there's some catch here that I'm not appreciating. And I couldn't figure it out. There doesn't seem to be any catch. So I started SpaceX.[8]

History, conventional wisdom, and his friends all said one thing, but his own software, reasoning upwards from first principles, said another—and he trusted his software. He started SpaceX, again with his own money, and dove in head first. The mission: dramatically lower the cost of space travel to make it possible for humanity to become multi-planetary.

Tesla and beyond

Two years later, while running a growing SpaceX, a friend brought Elon to a company called AC Propulsion, which had created a prototype for a super-fast, long-range electric car. It blew him away. The Reality box of Musk's software had told him that such a thing wasn't yet possible, but it turns out that Musk wasn't aware of how far lithium-ion batteries had advanced, and what he saw at AC Propulsion was new information about the world that put "starting a top-notch electric car company" into the Reality box in his head.

He ran into the same conventional wisdom about battery costs as he had about rocket costs. Batteries had never been made cheaply enough to allow for a mass-market, long-range electric car because the cost of making a battery was simply too high. He used the same first principles logic and a calculator to determine that most of the problem was the cost of middlemen, not raw materials, and decided that actually, conventional wisdom was wrong and batteries could be much cheaper in the future. So he co-founded Tesla with the mission of accelerating the advent of a mostly-electric-vehicle world—first by pouring in resources power and funding the company, and later by contributing his time and energy resources as well and becoming CEO.

Two years after that, Musk co-founded SolarCity with his cousins, a company whose goal was to revolutionize energy production by creating a large, distributed utility that would install solar panel systems on millions of homes. Musk knew that his time/energy power, the one kind of power that has hard limits, no matter who you are, was mostly used up, but he still had plenty of resources power—so he put it to work on another goal in his Goal Pool.

Most recently, Musk has jumpstarted change in another area that's important to him—the way people transport themselves from city to city. His idea is that there should be an entirely new mode of transport that will whiz people hundreds of miles by zinging them through a tube. He calls it the Hyperloop. For this project, he's not using his time, energy, or resources. Instead, by laying out his initial thoughts in a white paper and hosting a competition for engineers to test out their innovations, he's leveraging his powers of connection and persuasion to create change.

There are all kinds of tech companies that build software. They think hard, for years, about the best, most efficient way to make their product. Musk sees people as computers, and he sees his brain software as the most important product he owns—and since there aren't companies out there

designing brain software, he designed his own, beta tests it every day, and makes constant updates. That's why he's so outrageously effective, why he can disrupt *multiple* huge industries at once, why he can learn so quickly, strategize so cleverly, and visualize the future so clearly.

This part of what Musk does isn't rocket science—it's common sense. Your entire life runs on the software in your head—why *wouldn't* you obsess over optimizing it?

And yet, not only do most of us not obsess over our own software—most of us don't even *understand* our own software, how it works, or why it works that way. Let's try to figure out why.

Most People's Software

You always hear facts about human development and how so much of who you become is determined by your experiences during your formative years. A newborn's brain is a malleable ball of hardware clay, and its job upon being born is to quickly learn about whatever environment it's been born into and start shaping itself into the optimal tool for survival in those circumstances. That's why it's so easy for young children to learn new skills.

As people age, the clay begins to harden and it becomes more difficult to change the way the brain operates. My grandmother has been using a computer as long as I have, but I use mine comfortably and easily because my malleable childhood brain easily wrapped itself around basic computer skills, while she has the same face on when she uses her computer that my tortoise does when I put him on top of a glass table and he thinks he's inexplicably hovering two feet above the ground. She'll use a computer when she needs to, but it's not her friend.

So when it comes to our brain software—our values, perceptions, belief systems, reasoning techniques—what are we learning during those key early years?

Everyone's raised differently, but for most people I know, it went something like this:

We were taught all kinds of things by our parents and teachers—what's right and wrong, what's safe and dangerous, the kind of person you should and shouldn't be. But the idea was: I'm an adult so I know much more about this than you, it's not up for debate, don't argue, just obey. That's when the cliché "Why?" game comes in (what MuskSpeak calls "the chained why").

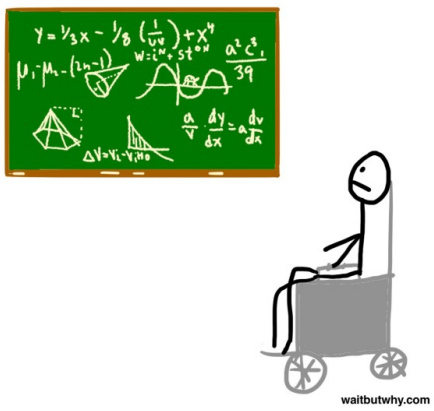
A child's instinct isn't just to know what to do and not to do, she wants to *understand* the rules of her environment. And to understand something, you have to have a sense of how that thing was built. When parents and teachers tell a kid to do XYZ and to simply obey, it's like installing a piece of already-designed software in the kid's head. When kids ask Why? and then Why? and then Why?, they're trying to deconstruct that software to see how it was built—to get down to the first principles underneath so they can weigh how much they should actually care about what the adults seem so insistent upon.

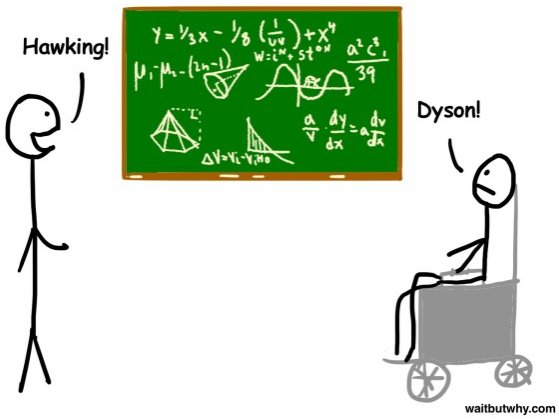
The first few times a kid plays the Why game, parents think it's cute. But many parents, and most teachers, soon come up with a way to cut the game off:

Because I said so.

"Because I said so" inserts a concrete floor into the child's deconstruction effort below which no further Why's may pass. It says, "You want first principles? There. There's your floor. No more Why's necessary. Now fucking put your boots on because I said so and let's go."

Imagine how this would play out in the science world.




Hawking!
Dyson!
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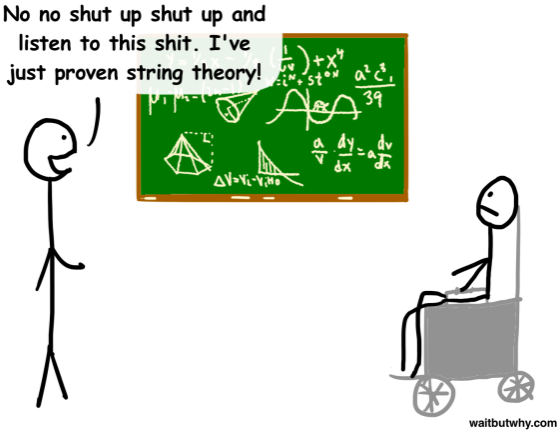
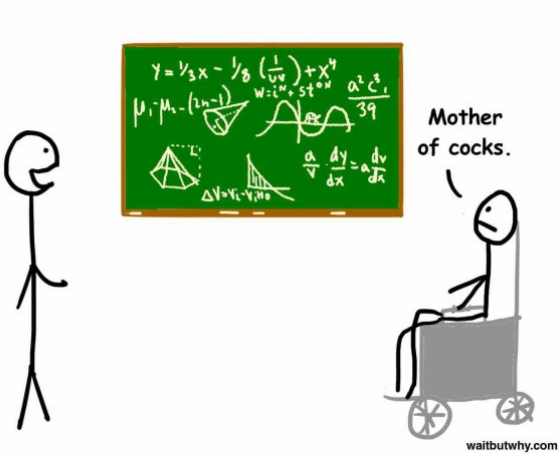
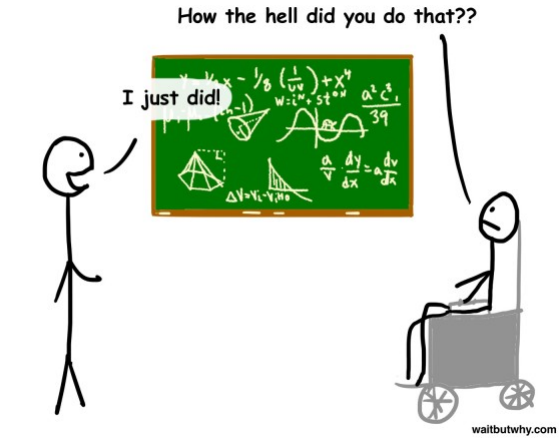
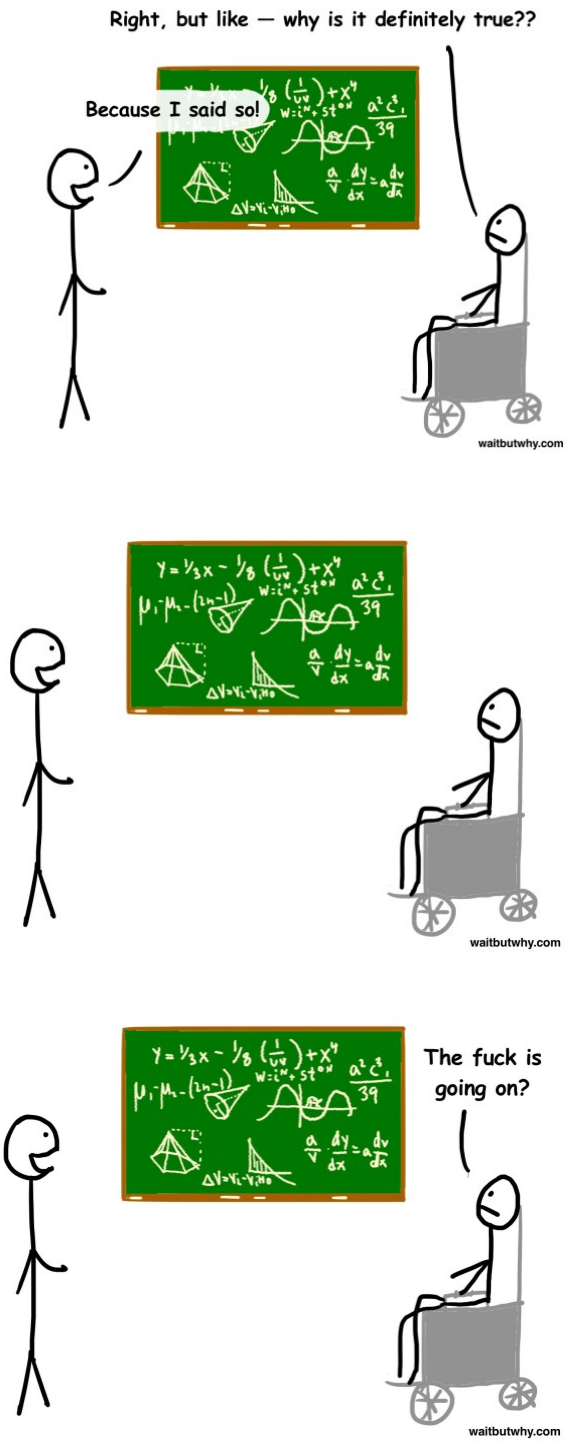

No no shut up shut up and listen to this shit. I've just proven string theory!
waitbutwhy.com


Mother of cocks.
waitbutwhy.com


How the hell did you do that??
I just did!
waitbutwhy.com



In fairness, parents' lives suck. They have to do all the shit they used to have to do, except now on top of that there are these self-obsessed, drippy little creatures they have to upkeep, who think parents exist to serve them. On a busy day, in a bad mood, with 80 things to do, the Why game is a nightmare.

But it might be a nightmare worth enduring. A command or a lesson or a word of wisdom that comes without any insight into the steps of logic it was built upon is feeding a kid a fish instead of teaching them to reason. And when that's the way we're brought up, we end up with a bucket of fish and no rod —a piece of installed software that we've learned how to use, but no ability to code anything ourselves.

School makes things worse. One of my favorite thinkers, writer Seth Godin (whose blog is bursting with first principles reasoning wisdom), explains in a TED Talk about school that the current education system is a product of the Industrial Age, a time that catapulted productivity and the standard of living. But along with many more factories came the need for many more factory workers, so our education system was redesigned around that goal. He explains:

The deal was: universal public education whose sole intent was not to train the scholars of tomorrow—we had plenty of scholars. It was to train people to be willing to work in the factory. It was to train people to behave, to comply, to fit in. "We process you for a whole year. If you are defective, we hold you back and process you again. We sit you in straight rows, just like they organize things in the factory.

We build a system all about interchangeable people because factories are based on interchangeable parts."

Couple that concept with what another favorite writer of mine, James Clear, explained recently on his blog:

In the 1960s, a creative performance researcher named George Land conducted a study of 1,600 five-year-olds and 98 percent of the children scored in the "highly creative" range. Dr. Land re-tested each subject during five year increments. When the same children were 10-years-old, only 30 percent scored in the highly creative range. This number dropped to 12 percent by age 15 and just 2 percent by age 25. As the children grew into adults they effectively had the creativity trained out of them. In the words of Dr. Land, "non-creative behavior is learned."

It makes sense, right? Creative thinking is a close cousin of first principles reasoning. In both cases, the thinker needs to *invent* his own thought pathways. People think of creativity as a natural born talent, but it's actually much more of a *way of thinking*—it's the thinking version of painting onto a blank canvas. But to do that requires brain software that's skilled and practiced at coming up with new things, and school trains us on the exact opposite concept—to follow the leader, single-file, and to get really good at taking tests. Instead of a blank canvas, school hands kids a coloring book and tells them to stay within the lines. [4]

What this all amounts to is that during our brain's most malleable years, parents, teachers, and society end up putting our clay in a mold and squeezing it tightly into a preset shape.

And when we grow up, without having learned how to build our own style of reasoning and having gone through the early soul-searching that independent thinking requires, we end up needing to rely on whatever software was installed in us for everything—software that, coming from parents and teachers, was probably itself designed 30 years ago.

30 years, if we're lucky. Let's think about this for a second.

Just say you have an overbearing mother who insists you grow up with her values, her worldview, her fears, and her ambitions—because she knows best, because it's a scary world out there, because XYZ is respectable, because she said so.

Your head might end up running your whole life on "because mom says so" software. If you play the Why? game with something like the reason you're in your current job, it may take a few Why's to get there, but you'll most likely end up hitting a concrete floor that says some version of "because mom says so."

But why does mom say so?

Mom says so because *her* mom said so—after growing up in Poland in 1932, where she was from a home where *her* dad said so because *his* dad—a minister from a small town outside Krakow—said so after his grandfather, who saw some terrible shit go down during the Siberian Uprising of 1866, ingrained in his children's heads the critical life lesson to never associate with blacksmiths.

Through a long game of telephone, your mother now looks down upon office jobs and you find yourself feeling strongly about the only truly respectable career being in publishing. And you can list off a bunch of reasons why you feel that way—but if someone *really* grilled you on your reasons and on the reasoning beneath them, you end up in a confusing place. It gets confusing way down there because the first principles foundation at the bottom is a mishmash of the values and beliefs of a bunch of people from different generations and countries—a bunch of people who aren't you.

A common example of this in today's world is that many people I know were raised by people who were raised by people who went through the Great Depression. If you solicit career advice from someone born in the US in the 1920s, there's a good chance you'll get an answer pumped out by this software:

The person has lived a long life and has made it all the way to 2015, but their software was coded during the Great Depression, and if they're not the type to regularly self-reflect and evolve, they still do their thinking with software from 1930. And if they installed that same software in their children's heads and their children then passed it on to their own children, a member of Generation Y today might feel too scared to pursue an entrepreneurial or artistic endeavor and be totally unaware that they're actually being haunted by the ghost of the Great Depression.

When old software is installed on new computers, people end up with a set of values not necessarily based on their own deep thinking, a set of beliefs about the world not necessarily based on the reality of the world they live in, and a bunch of opinions they might have a hard time defending with an honest heart.

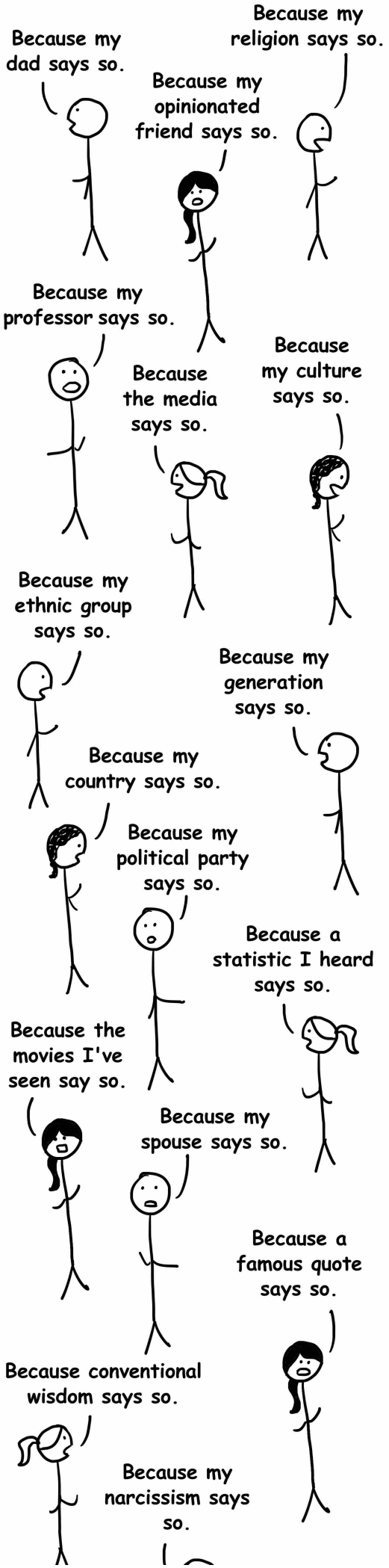
In other words, a whole lot of convictions not really based on actual data. We have a word for that.

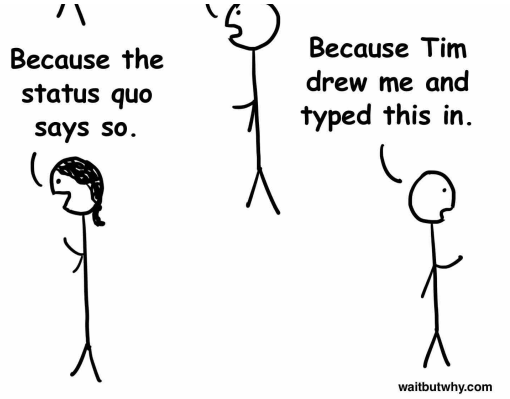
Dogma

I don't know what's the matter with people: they don't learn by understanding, they learn by some other way—by rote or something. Their knowledge is so fragile! —Richard Feynman

Dogma is everywhere and comes in a thousand different varieties—but the format is generally the same:

X is true because [authority] says so. The authority can be many things.


Because my dad says so.
Because my religion says so.
Because my opinionated friend says so.
Because my professor says so.
Because the media says so.
Because my culture says so.
Because my ethnic group says so.
Because my generation says so.
Because my country says so.
Because my political party says so.
Because a statistic I heard says so.
Because the movies I've seen say so.
Because my spouse says so.
Because a famous quote says so.
Because conventional wisdom says so.
Because my narcissism says so.



Dogma, unlike first principles reasoning, isn't customized to the believer or her environment and isn't meant to be critiqued and adjusted as things change. It's not software to be coded—it's a printed rulebook. Its rules may be originally based on reasoning by a certain kind of thinker in a certain set of circumstances, at a time far in the past or a place far away, or it may be based on no reasoning at all. But that doesn't matter because you're not supposed to dig too deep under the surface anyway—you're just supposed to accept it, embrace it, and live by it. No evidence needed.

You may not like living by someone else's dogma, but you're left without much choice. When your childhood attempts at understanding are met with "Because I said so," and you absorb the implicit message "Your own reasoning capability is shit, don't even try, just follow these rules so you don't fuck your life up," you grow up with little confidence in your own reasoning process. When you're never forced to build your own reasoning pathways, you're able to skip the hard process of digging deep to discover your own values and the sometimes painful experience of testing those values in the real world and learning you want to adjust them—and so you grow up a total reasoning amateur.

Only strong reasoning skills can carve a unique life path, and without them, dogma will quickly have you living someone else's life. Dogma doesn't know you or care about you and is often completely wrong for you—it'll have a would-be happy painter spending their life as a lawyer and a would-be happy lawyer spending their life as a painter.

But when you don't know how to reason, you don't know how to evolve or adapt. If the dogma you grew up with isn't working for you, you can reject it, but as a reasoning amateur, going it alone usually ends with you finding another dogma lifeboat to jump onto—another rulebook to follow and another authority to obey. You don't know how to code your own software, so you install someone else's.

People don't do any of this intentionally—usually if we reject a type of dogma, our intention is to break free of a life of dogmatic thinking altogether and brave the cold winds of independent reasoning. But dogmatic thinking is a hard habit to break, especially when it's all you know. I have a friend who just had a baby, and she told me that she was so much more open-minded than her parents, because they wanted her to have a prestigious career, but she'd be open to her daughter doing anything. After a minute, she thought about it, and said, "Well actually, no, what I mean by that is if she wanted to go do something like spend her life on a farm in Montana, I'd be fine with that and my parents never would have been—but if she said she wanted to go work at a hedge fund, I'd kill her." She realized mid-sentence that she wasn't free of the rigid dogmatic thinking of her parents, she had just changed dogma brands.

This is the dogma trap, and it's hard to escape from. Especially since dogma has a powerful ally—the group.

Tribes

Some things I think are very conservative, or very liberal. I think when someone falls into one category for everything, I'm very suspicious. It doesn't make sense to me that you'd have the same solution to every issue. —Louis C.K.

What most dogmatic thinking tends to boil down to is another good Seth Godin phrase:

People like us do stuff like this.

It's the rallying cry of tribalism.

There's an important distinction to make here. Tribalism tends to have a negative connotation, but the concept of a tribe itself isn't bad. A tribe is just a group of people linked together by something they have in common—a religion, an ethnicity, a nationality, family, a philosophy, a cause. Christianity is a tribe. The US Democratic Party is a tribe. Australians are a tribe. Radiohead fans are a tribe. Arsenal fans

are a tribe. The musical theater scene in New York is a tribe. Temple University is a tribe. And within large, loose tribes, there are smaller, tighter, sub-tribes. Your extended family is a tribe, of which your immediate family is a sub-tribe. Americans are a tribe, of which Texans are a sub-tribe, of which Evangelical Christians in Amarillo, Texas is a sub-sub-tribe.

What makes tribalism a good or bad thing depends on the tribe member and their relationship with the tribe. In particular, one simple distinction:

Tribalism is good when the tribe and the tribe member both have an independent identity and they *happen* to be the same. The tribe member has chosen to be a part of the tribe because it happens to match who he really is. If either the identity of the tribe or the member evolves to the point where the two no longer match, the person will leave the tribe. Let's call this **conscious tribalism.**

Tribalism is bad when the tribe and tribe member's identity are one and the same. The tribe member's identity is determined by whatever the tribe's dogma happens to say. If the identity of the tribe changes, the identity of the tribe member changes with it in lockstep. The tribe member's identity can't change independent of the tribal identity because the member has no independent identity. Let's call this **blind tribalism.**

With conscious tribalism, the tribe member and his identity comes *first*. The tribe member's identity is the alpha dog, and *who he is determines the tribes he's in.* With blind tribalism, the tribe comes first. The tribe is the alpha dog and *it's the tribe that determines who he is.*

This isn't black and white—it's a spectrum—but when someone is raised without strong reasoning skills, they may also lack a strong independent identity and end up vulnerable to the blind tribalism side of things—especially with the various tribes they were born into. That's what Einstein was getting at when he said, "Few people are capable of expressing with equanimity opinions which differ from the prejudices of their social environment. Most people are even incapable of forming such opinions."

A large tribe like a religion or nation or political party will contain members who fall across the whole range of the blind-to-conscious spectrum. But some tribes themselves will be the type to attract a certain type of follower. It makes logical sense that the more rigid and certain and *dogmatic* the tribe, the more likely it'll be to attract blind tribe members. ISIS is going to have a far higher percentage of blind tribe members than the London Philosophy Club.

The allure of dogmatic tribes makes sense—they appeal to very core parts of human nature.

Humans crave connection and camaraderie, and a guiding dogma is a common glue to bond together a group of unique individuals as one.

Humans want internal security, and for someone who grows up feeling shaky about their own distinctive character, a tribe and its guiding dogma is a critical lifeline—a one-stop shop for a full suite of human opinions and values.

Humans also long for the comfort and safety of certainty, and nowhere is conviction more present than in the groupthink of blind tribalism. While a scientist's data-based opinions are only as strong as the evidence she has and inherently subject to change, tribal dogmatism is an exercise in faith, and with no data to be beholden to, blind tribe members believe what they believe with certainty.

We discussed why math has proofs, science has theories, and in life, we should probably limit ourselves to hypotheses—but blind tribalism proceeds with the confidence of the mathematician:

Given (because the tribe says so): A = B
Given (because the tribe says so): B = C + D
Therefore, with certainty: A = C + D

And since so many others in the tribe feel certain about things, your own certainty is reassured and reinforced.

But there's a heavy cost to these comforts. Insecurity can be solved the hard way or the easy way—and by giving people the easy option, dogmatic tribes remove the pressure to do the hard work of evolving into a more independent person with a more internally-defined identity. In that way, dogmatic tribes are an *enabler* of the blind tribe member's deficiencies.

The sneaky thing about both rigid tribal dogma and blind membership is that they like to masquerade as open-minded thought with conscious membership. I think many of us may be closer to the blind membership side of things with certain tribes we're a part of than we recognize—and those tribes we're a part of may not be as open-minded as we tend to think.

A good test for this is the intensity of the *us* factor. That key word in "People like us do stuff like this" can get you into trouble pretty quickly.

Us feels great. A major part of the appeal of being in a tribe is that you get to be part of an Us, something humans are wired to seek out. And a loose Us is nice—like the Us among conscious, independent tribe members.

But the Us in blind tribalism is creepy. In blind tribalism, the tribe's guiding dogma doubles as the identity of the tribe members, and the Us factor enforces that concept. Conscious tribe members reach conclusions—blind tribe members *are* conclusions. With a blind Us, if the way you are as an individual happens to contain opinions, traits, or principles that fall outside the outer edges of the dogma walls, they will need to be shed—or things will get ugly. By challenging the dogma of your tribe, you're challenging both the sense of certainty the tribe members gain their strength from and the clear lines of identity they rely on.

The best friend of a blind Us is a nemesis Us—*Them*. Nothing unites Us like a collectively hated anti-Us, and the blind tribe is usually defined almost as much by hating the dogma of Them as it is by abiding by the dogma of Us.

Whatever element of rigid, identity-encompassing blindness is present in your own tribal life will reveal itself when you dare to validate any part of the rival Them dogma.

Give it a try. The next time you're with a member of a tribe you're a part of, express a change of heart that aligns you on a certain topic with whoever your tribe considers to be Them. If you're a religious Christian, tell people at church you're not sure anymore that there's a God. If you're an artist in Boulder, explain at the next dinner party that you think global warming might actually be a liberal hoax. If you're an Iraqi, tell your family that you're feeling pro-Israel lately. If you and your husband are staunch Republicans, tell him you're coming around on Obamacare. If you're from Boston, tell your friends you're pulling for the Yankees this year because you like their current group of players.

If you're in a tribe with a blind mentality of total certainty, you'll probably see a look of horror. It won't just seem wrong, it'll seem like *heresy*. They might get angry, they might passionately try to convince you otherwise, they might cut off the conversation—but there will be no open-minded conversation. And because identity is so intertwined with beliefs in blind tribalism, the person actually might feel less close to you afterwards. Because for rigidly tribal people, a shared dogma plays a more important role in their close relationships than they might recognize.

Most of the major divides in our world emerge from blind tribalism, and on the extreme end of the spectrum—where people are complete *sheep*—blind tribalism can lead to terrifying things. Like those times in history when a few charismatic bad guys can build a large army of loyal foot soldiers just by displaying strength and passion. Because blind tribalism is the true villain behind our grandest-scale atrocities:

Most of us probably wouldn't have joined the Nazi party, because most of us aren't on the extreme end of the blind-to-conscious spectrum. But I don't think many of us are on the *other* end either. Instead, we're usually somewhere in the hazy middle—in the land of cooks.[5]

The Cook and the Chef

The difference between the way Elon thinks and the way most people think is kind of like the difference between a cook and a chef.

The words "cook" and "chef" seem kind of like synonyms. And in the real world, they're often used interchangeably. But in this post, when I say chef, I don't mean any ordinary chef. I mean the *trailblazing chef*—the kind of chef who *invents* recipes. And for our purposes, everyone else who enters a kitchen—all those who *follow* recipes—is a cook.

Everything you eat—every part of every cuisine we know so well—was at some point in the past created for the *first time*. Wheat, tomatoes, salt, and milk go back a long time, but at some point, *someone* said, "What if I take those ingredients and do this…and this…..and this……" and ended up with the world's first pizza. That's the work of a chef.

Since then, god knows how many people have made a pizza. That's the work of a cook.

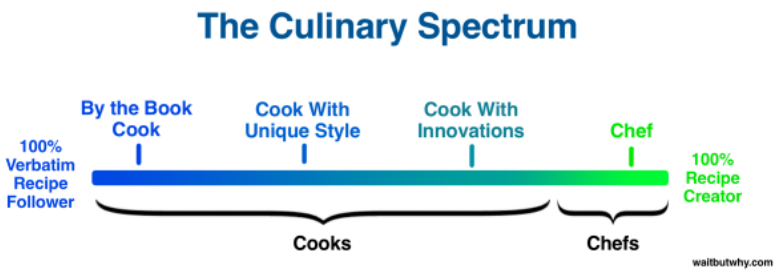
The chef reasons from first principles, and for the chef, the first principles are raw edible ingredients. Those are her puzzle pieces, her building blocks, and she works her way upwards from there, using her experience, her instincts, and her taste buds.

The cook works off of some version of what's already out there—a recipe of some kind, a meal she tried and liked, a dish she watched someone else make.

Cooks span a wide range. On one end, you have cooks who only cook by following a recipe to the T—carefully measuring every ingredient exactly the way the recipe dictates. The result is a delicious meal that tastes exactly the way the recipe has it designed. Down the range a bit, you have more of a confident cook—someone with experience who gets the general gist of the recipe and then uses her skills and instincts to do it her own way. The result is something a little more unique to her style that tastes like the recipe but not quite. At the far end of the cook range, you have an innovator who makes her own concoctions. A lamb burger with a vegetable bun, a peanut butter and jelly pizza, a cinnamon pumpkin seed cake. [6]

But what all of these cooks have in common is their starting point is something that already exists. Even the innovative cook is still making an iteration of a burger, a pizza, and a cake.

At the very end of the spectrum, you have the chef. A chef might make good food or terrible food, but whatever she makes, it's a result of her own reasoning process, from the selection of raw ingredients at the bottom to the finished dish at the top.



In the culinary world, there's nothing wrong with being a cook. Most people are cooks because for most people, inventing recipes isn't a goal of theirs.

But in life—when it comes to the reasoning "recipes" we use to churn out a decision—we may want to think twice about where we are on the cook-chef spectrum.

On a typical day, a "reasoning cook" and a "reasoning chef" don't operate that differently. Even the chef becomes quickly exhausted by the mental energy required for first principles reasoning, and usually, doing so isn't worth his time. Both types of people spend an average day with their brain software running on auto-pilot and their conscious decision-making centers dormant.

But then comes a day when something new needs to be figured out. Maybe the cook and the chef are each given the new task at work to create a better marketing strategy. Or maybe they're unhappy with that job and want to think of what business to start. Maybe they have a crush on someone they never expected to have feelings for and they need to figure out what to do about it.

Whatever this new situation is, auto-pilot won't suffice—this is something new and neither the chef's nor the cook's software has done this before. Which leaves only two options:

Create. Or copy.

The chef says, "Ugh okay, here we go," rolls up his sleeves, and does what he always does in these situations—he switches on the active decision-making part of his software and starts to go to work. He looks at what data he has and seeks out what more he needs. He thinks about the current state of the world and reflects on where his values and priorities lie. He gathers together those relevant first principles ingredients and starts puzzling together a reasoning pathway. It takes some hard work, but eventually, the pathway brings him to a hypothesis. He knows it's probably wrong-ish, and as new data emerges, he'll "taste-test" the hypothesis and adjust it. He keeps the decision-making center on standby for the next few weeks as he makes a bunch of early adjustments to the flawed hypothesis—a little more salt, a little less sugar, one prime ingredient that needs to be swapped out for another. Eventually, he's satisfied enough with how things are going to move back into auto-pilot mode. This new decision is now part of the automated routine—a new recipe is in the cookbook—and he'll check in

on it to make adjustments every once in a while or as new pertinent data comes in, the way he does for all parts of his software.

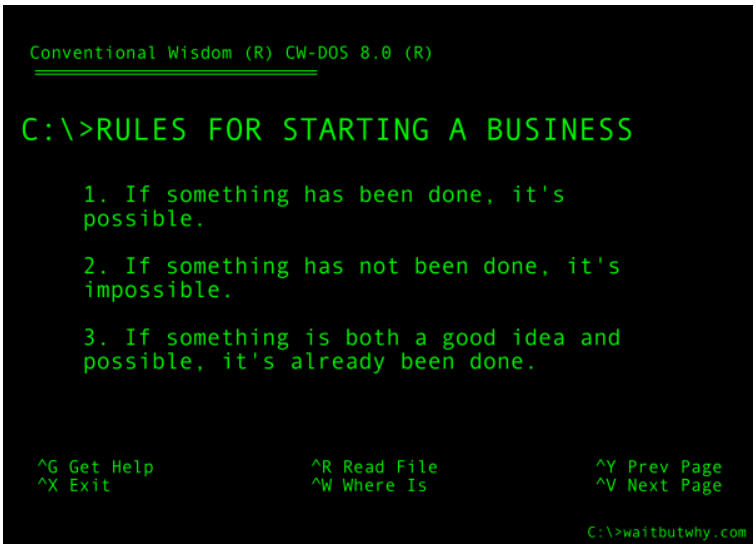
The cook has no idea what's going on in the last paragraph. The reasoning cook's software is called "Because the recipe said so," and it's more of a computerized catalog of recipes than a computer program. When the cook needs to make a life decision, he goes through his collection of authority-written recipes, finds the one he trusts in that particular walk of life, and reads through the steps to see what to do—kind of like WWJD, except the J is replaced by whatever authority is most trusted in that area. For most questions, the authority is the tribe, since the cook's tribal dogma covers most standard decisions. But in this particular case, the cook leafed through the tribe's cookbook and couldn't find any section about this type of decision. So he needs to get a hold of a recipe from another authority he trusts with this type of thing. Once the cook finds the right recipe, he can put it in his catalog and use it for all future decisions on this matter.

First, the cook tries a few friends. His catalog doesn't have the needed info, but maybe one of theirs does. He asks them for their advice—not so he can use it as additional thinking to supplement his own, but so it can *become* his own thinking.

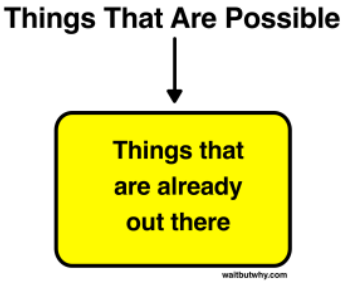
If that doesn't yield any strongly-opinionated results, he'll go to the trusty eternal backstop—conventional wisdom.

Society as a whole is its own loose tribe, often spanning your whole nation or even your whole part of the world, and what we call "conventional wisdom" is its guiding dogma cookbook—online and available to the public. Typically, the larger the tribe, the more general and more outdated the dogma—and the conventional wisdom database runs like a DMV website last updated in 1992. But when the cook has nowhere else to turn, it's like a trusty old friend.

And in this case—let's say the cook is thinking of starting a business and wants to know what the possibilities are—conventional wisdom has him covered. He types the command into the interface, waits a few minutes, and then the system pumps out its answer:



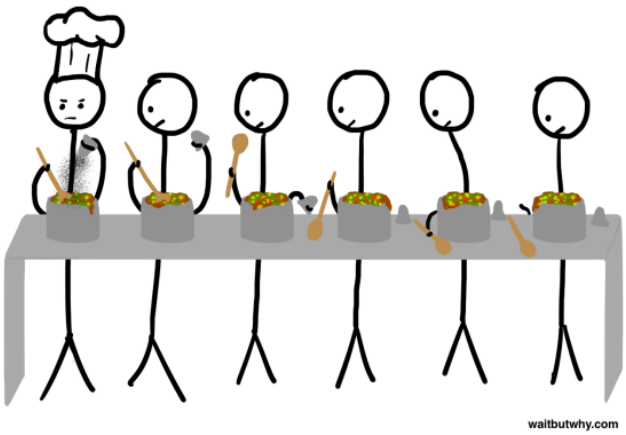
The cook, thoroughly discouraged, thanks the machine and updates his Reality box accordingly.



With the decision made (not to start a business), he switches his software back into auto-pilot mode. Done and done.

Musk calls the cook's way of thinking "reasoning by analogy" (as opposed to reasoning by first principles), which is a nice euphemism. The next time a kid gets caught copying answers from another student's exam during the test, he should just explain that he was reasoning by analogy.

If you start looking for it, you'll see the chef/cook thing happening everywhere. There are chefs and cooks in the worlds of music, art, technology, architecture,[7] writing, business, comedy, marketing, app development, football coaching, teaching, and military strategy. And in each case, though both parties are usually just on autopilot, mindlessly playing the latest album again and again at concerts, it's in those key moments when it's time to *write* a new album—those moments of truth in front of a clean canvas, a blank Word doc, an empty playbook, a new sheet of blueprint paper, a fresh whiteboard—that the chef and the cook reveal their true colors. The chef creates while the cook, in some form or another, copies.



And the difference in outcome is enormous. For cooks, even the more innovative kind, there's almost always a ceiling on the size of the splash they can make in the world, unless there's some serious luck involved. Chefs aren't guaranteed to do anything good, but when there's a little talent and a lot of persistence, they're almost certain to make a splash. Sometimes the chef is the one brave enough to go for something big—but other times, someone doesn't feel the desire to make a splash and the chef is the one with the strength of character to step out of the game and in favor of keeping it small. Being a chef isn't being like Elon Musk—it's being yourself.

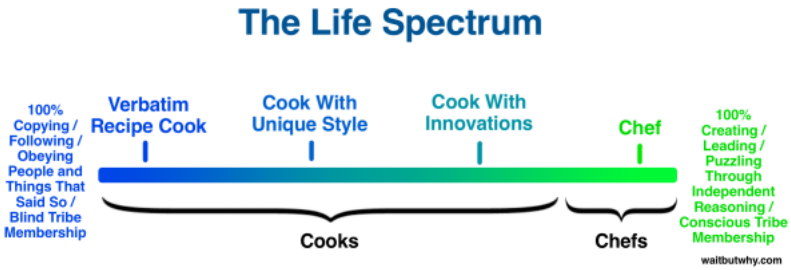
No one talks about the "reasoning industry," but we're all part of it, and when it comes to chefs and cooks, it's no different than any other industry. We're working in the reasoning industry every time we make a decision.

Your current life, with all its facets and complexity, is like a reasoning industry album. The question is, how did that set of songs come to be? How were the songs composed, and by whom? And in those critical do-or-die moments when it's time to write a new song, how do you do your creating? Do you dig deep into yourself? Do you start with the drumbeat and chords of an existing song and write your own melody on top of it? Do you just play covers?

I know what you *want* the answers to these questions to be. This is a straightforward one—it's clearly better to be a chef. But unlike the case with most major distinctions in life—hard-working vs. lazy, ethical vs. dishonest, considerate vs. selfish—when the chef/cook distinction passes right in front of us, we often don't even notice it's there.

Missing the Distinction

Like the culinary world's cook-to-chef range, the real world's cook-to-chef range isn't binary—it lies on a spectrum:



But I'm pretty sure that when most of us look at that spectrum, we *think* we're farther to the right than we actually are. We're usually more cook-like than we realize—we just can't see it from where we're standing.

For example—

Cooks are followers—by definition. They're a cook because in whatever they're doing, they're following some kind of recipe. But most of us don't think of ourselves as followers.

A follower, we think, is a weakling with no mind of their own. We think about leadership positions we've held and initiatives we've taken at work and the way we never let friends boss us around, and we take these as evidence that we're no follower. Which in turn means that we're not just a cook.

But the problem is—the only thing all of that proves is that you're no follower *within your tribe*. As Einstein meanly put it:

In order to form an immaculate member of a flock of sheep one must, above all, be a sheep.

In other words, you might be a star and a leader in your world or in the eyes of your part of society, but if the core reason you picked that goal in the first place was because your tribe's cookbook says that it's an impressive thing and it makes the other tribe members gawk, *you're not being a leader—you're being a super-successful follower.* And, as Einstein says, no less of a cook than all those whom you've impressed.

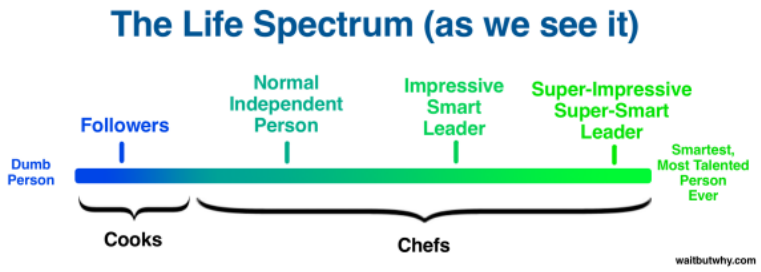
To see the truth, you need to zoom way out until you can see the real leader of the cooks—the cookbook.

But we don't tend to zoom out, and when we look around at our life, zoomed in, what appears to be a highly unique and independent self may be an optical illusion.[8] What often feels like independent reasoning when zoomed out is actually playing connect-the-dots on a pre-printed set of steps laid out by someone else. What feels like personal principles might just be the general tenets of your tribe. What feels like original opinions may have actually been spoon-fed to us by the media or our parents or friends or our religion or a celebrity. What feels like Roark might actually be Keating. What feels like our chosen life path could just be one of a handful of pre-set, tribe-approved yellow brick roads. What feels like creativity might be filling in a coloring book—and making sure to stay inside the lines.

Because of this optical illusion, we're unable to see the flaws in our own thinking or recognize an unusually great thinker when we see one. Instead, when a superbly science-minded, independent-thinking chef like Elon Musk or Steve Jobs or Albert Einstein comes around, what do we attribute their success to?

Awesome fucking hardware.

When we look at Musk, we see someone with genius, with vision, with superhuman balls. All things, we assume, he was more or less born with. So to us, the spectrum looks more like this:



The way we see it, we're all a bunch of independent-thinking chefs—and it's just that Musk is a really impressive chef.

Which is both A) overrating Musk and B) overrating ourselves. And *completely* missing the real story.

Musk is an impressive chef for sure, but what makes him such an extreme standout isn't that he's impressive—*it's that most of us aren't chefs at all.*

It's like a bunch of typewriters looking at a computer and saying, "Man, that is one talented typewriter."

The reason we have such a hard time seeing what's really going on is that we don't get that brain software is even a *thing*. We don't think of brains as computers, so we don't think about the distinction between hardware and software at all. When we think about the brain, we think only about the hardware—the thing we're born with and are powerless to change or improve. Much less tangible to us

is the concept of how we reason. We see reasoning as a thing that just kind of *happens*, like our bodies' blood flow—it's a process that automatically happens, and there's not much else to say or do about it.

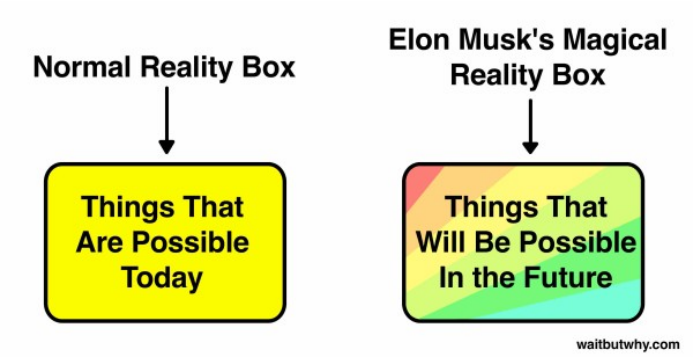
And if we can't even see the hardware/software distinction, we certainly can't see the more nuanced chef software vs. cook software distinction.

By not seeing our thinking software for what it is—a *critical* life skill, something that can be learned, practiced, and improved, and the major factor that separates the people who do great things from those who don't—we fail to realize where the game of life is really being played. We don't recognize reasoning as a thing that can be created or copied—and in the same way that causes us to mistake our own cook-like behavior for independent reasoning, we then mistake the actual independent reasoning of the chef for exceptional and magical abilities.

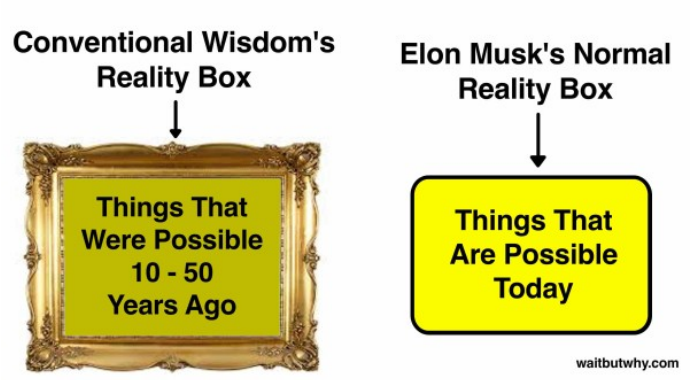
Three examples:

1) We mistake the chef's clear view of the present for vision into the future.

Musk's sister Tosca said "Elon has already gone to the future and come back to tell us what he's found."[9] This is how a lot of people feel about Musk—that he's a visionary, that he can somehow see things we cannot. We see it like this:



But actually, it's like this:



Conventional wisdom is slow to move, and there's significant lag time between when something becomes reality and when conventional wisdom is revised to reflect that reality. And by the time it does, reality has moved on to something else. But chefs don't pay attention to that, reasoning instead using their eyes and ears and experience. By ignoring conventional wisdom in favor of simply looking at the present for what it really is and staying up-to-date with the facts of the world as they change in real-time—in spite of what conventional wisdom has to say—the chef can act on information the rest of us haven't been given permission to act on yet.

2) We mistake the chef's accurate understanding of risk for courage.

Remember this MuskSpeak quote from earlier?

When I was a little kid, I was really scared of the dark. But then I came to understand, dark just means the absence of photons in the visible wavelength—400 to 700 nanometers. Then I thought, well it's really silly to be afraid of a lack of photons. Then I wasn't afraid of the dark anymore after that.[10]

That's just a kid chef assessing the actual facts of a situation and deciding that his fear was misplaced.

As an adult, Musk said this:

Sometimes people fear starting a company too much. Really, what's the worst that could go wrong? You're not gonna starve to death, you're not gonna die of exposure—what's the worst that could go wrong?[11]

Same quote, right?

In both cases, Musk is essentially saying, "People consider X to be scary, but their fear is not based on logic, so I'm not scared of X." That's not courage—that's logic.

Courage means doing something risky. Risk means exposing yourself to danger. We intuitively understand this—that's why most of us wouldn't call child Elon *courageous* for sleeping with the lights off. Courage would be a weird word to use there because no actual danger was involved.

All Elon's saying in the second quote is that being scared to start a company is the adult version of being scared of the dark. It's not actually dangerous.

So when Musk put his entire fortune down and on SpaceX and Tesla, he was being bold as fuck, but courageous? Not the right word. It was a case of a chef taking a bunch of information he had and puzzling together a plan that seemed logical. It's not that he was sure he'd succeed—in fact, he thought SpaceX in particular had a reasonable probability of failure—it's just that nowhere in his assessments did he foresee *danger*.

3) We mistake the chef's originality for brilliant ingenuity.

People believe thinking outside the box takes intelligence and creativity, but it's mostly about independence. When you simply ignore the box and build your reasoning from scratch, whether you're brilliant or not, you end up with a unique conclusion—one that may or may not fall within the box.

When you're in a foreign country and you decide to ditch the guidebook and start wandering aimlessly and talking to people, unique things always end up happening. When people hear about those things, they think of you as a pro traveler and a bold adventurer—when all you really did is ditch the guidebook.

Likewise, when an artist or scientist or businessperson chef reasons independently instead of by analogy, and their puzzling happens to both A) turn out well and B) end up outside the box, people call it innovation and marvel at the chef's ingenuity. When it turns out *really* well, all the cooks do what they do best—copy—and now it's called a revolution.

Simply by refraining from reasoning by analogy, the chef opens up the possibility of making a huge splash with every project. When Steve Jobs[9] and Apple turned their attention to phones, they didn't start by saying, "Okay well people seem to like this kind of keyboard more than that kind, and everyone seems unhappy with the difficulty of hitting the numbers on their keyboards—so let's get creative and make the best phone keyboard yet!" They simply asked, "What should a mobile device be?" and in their from-scratch reasoning, a physical keyboard didn't end up as part of the plan at all. It didn't take genius to come up with the design of the iPhone—it's actually pretty logical—it just took the ability to not copy.

Different version of the same story with the invention of the United States. When the American forefathers found themselves with a new country on their hands, they didn't ask, "What should the rules be for selecting our king, and what should the limitations of his power be?" A king to them was what a physical keyboard was to Apple. Instead, they asked, "What should a country be and what's the best way to govern a group of people?" and by the time they had finished their puzzling, a king wasn't part of the picture—their first principles reasoning led them to believe that John Locke had a better plan and they worked their way up from there.

History is full of the stories of chefs creating revolutions of apparent ingenuity through simple first principles reasoning. Genghis Khan organizing a smattering of tribes that had been fragmented for centuries using a powers of ten system in order to build one grand tribe that could sweep the world. Henry Ford creating cars with the out-of-the-box manufacturing technique of assembly-line production in order to bring cars to the masses for the first time. Marie Curie using unconventional methods to pioneer the theory of radioactivity and topple the "atoms are indivisible" assumption on its head (she won a Nobel Prize in both physics and chemistry—two prizes reserved exclusively for chefs). Martin Luther King taking a nonviolent Thoreau approach to a situation normally addressed by riots. Larry Page and Sergey Brin ignoring the commonly-used methods of searching the internet in favor of what they saw as a more logical system that based page importance on the number of important sites that linked to it. The 1966 Beatles deciding to stop being the world's best cooks, ditching the typical songwriting styles of early-60s bands, including their own, and become music chefs, creating a bunch of new types of songs from scratch that no one had heard before.

Whatever the time, place, or industry, anytime something *really* big happens, there's almost always an experimenting chef at the center of it—not being anything magical, just trusting their brain and

working from scratch. Our world, like our cuisines, was created by these people—the rest of us are just along for the ride.

Yeah, Musk is smart as fuck and insanely ambitious—but that's not why he's beating everybody. What makes Musk so rad is that he's a software outlier. A chef in a world of cooks. A science geologist in a world of flood geologists. A brain software pro in a world where people don't realize brain software is a thing.

That's Elon Musk's secret sauce.

Which is why the real story here isn't Musk. It's us.

The real puzzle in this series isn't why Elon Musk is trying to end the era of gas cars or why he's trying to land a rocket or why he cares so much about colonizing Mars—it's why Elon Musk is so *rare*.

The curious thing about the car industry isn't why Tesla is focusing so hard on electric cars, and the curious thing about the aerospace industry isn't why SpaceX is trying so hard to make rockets reusable—the fascinating question is why they're the only companies doing so.

We spent this whole time trying to figure out the mysterious workings of the mind of a madman genius only to realize that Musk's secret sauce is that he's the only one being normal. And in isolation, Musk would be a pretty boring subject—it's the backdrop of *us* that makes him interesting. And it's that backdrop that this series is really about.

So…what's the deal with us? How did we end up so scared and cook-like? And how do we learn to be more like the chefs of the world, who seem to so effortlessly carve their own way through life? I think it comes down to three things.

How to Be a Chef

Anytime there's a curious phenomenon within humanity—some collective insanity we're all suffering from—it usually ends up being evolution's fault. This story is no different.

When it comes to reasoning, we're biologically inclined to be cooks, not chefs, which relates back to our tribal evolutionary past. First, it's a better tribal model for most people to be cooks. In 50,000 BC, tribes full of independent thinkers probably suffered from having too many chefs in the kitchen, which would lead to too many arguments and factions within the tribe. A tribe with a strong leader at the top and the rest of the members simply following the leader would fare better. So those types of tribes passed on their genes more than other tribes. And now we're the collective descendants of the more cook-like people.

Second, it's about our own well-being. It's not in our DNA to be chefs because human self-preservation never depended upon independent thinking—it rode on fitting in with the tribe, on staying in favor with the chief, on following in the footsteps of the elders who knew more about staying alive than we did, and on teaching our children to do the same—which is why we now live in a cook society where cook parents raise their kids by telling them to follow the recipe and stop asking questions about it.

Thinking like cooks is what we're born to do because what we're born to do is survive.

But the weird thing is, we weren't born into a normal human world. We're living in the anomaly, when for many of the world's people, survival is easy. Today's privileged societies are full of anomaly humans whose primary purpose is already taken care of, softening the deafening roar of unmet base needs and allowing the nuanced and complex voice of our inner selves to awaken.

The problem is, most of our heads are still running on some version of the 50,000-year-old survival software—which kind of wastes the good luck we have to be born now.

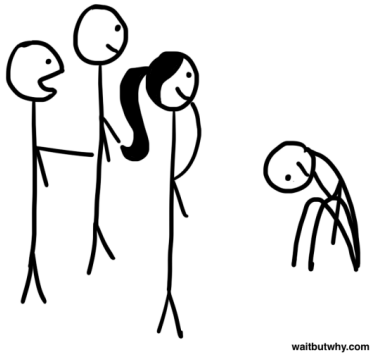
It's an unfortunate catch-22—we continue to think like cooks because we can't absorb the epiphany that we live in an anomaly world where there's no need to be cooks, and we can't absorb that epiphany because we think like cooks and cooks don't know how to challenge and update their own software.

This is the vicious cycle of our time—and the secret of the chef is that they somehow snapped out of it.

So how do we snap out of the trance?

I think there are three major epiphanies we need to absorb—three core things the chef knows that the cook doesn't:

Epiphany 1) You don't know shit.



The flood geologists of the 17th and 18th centuries weren't stupid. And they weren't anti-science. Many of them were just as accomplished in their fields as their science geologist colleagues.

But they were victims—victims of a religious dogma they were told to believe without question. The recipe they followed was scripture, a recipe that turned out to be wrong. And as a result, they proceeded on their path with a fatal flaw in their thinking—a software bug that told them that one of the undeniable first principles when thinking about the Earth was that it began 6,000 years ago and that there had been a flood of the most epic proportions.

With that software bug in place, all further computations were moot. Any reasoning tree that puzzled upwards with those assumptions at its root had no chance of finding truth.

Even more than being victims of any dogma, the flood geologists were victims of their own certainty. Without certainty, dogma has no power. And when data is required in order to believe something, false dogma has no legs to stand on. It wasn't the church dogma that hindered the flood geologists, it was the church *mentality* of faith-based certainty.

That's what Stephen Hawking meant when he said, "The greatest enemy of knowledge is not ignorance, it is the illusion of knowledge." Neither the science geologist nor the flood geologist started off with knowledge. But what gave the science geologist the power to seek out the truth was *knowing* that he lacked knowledge. The science geologists subscribed to the *lab* mentality, which starts by saying "I don't know shit" and works upwards from there.

If you want to see the lab mentality at work, just search for famous quotes of any prominent scientist and you'll see each one of them expressing the fact that they don't know shit.

Here's Isaac Newton: *To myself I am only a child playing on the beach, while vast oceans of truth lie undiscovered before me.*

And Richard Feynman: *I was born not knowing and have had only a little time to change that here and there.*

And Niels Bohr: *Every sentence I utter must be understood not as an affirmation, but as a question.*

Musk has said his own version: *You should take the approach that you're wrong. Your goal is to be less wrong.*[12]

The reason these outrageously smart people are so humble about what they know is that as scientists, they're aware that unjustified certainty is the bane of understanding and the death of effective reasoning. They firmly believe that reasoning of all kinds should take place in a lab, not a church.

If we want to become more chef-like, we have to make sure we're doing our thinking in a lab. Which means identifying which parts of our thinking are currently sitting in church.

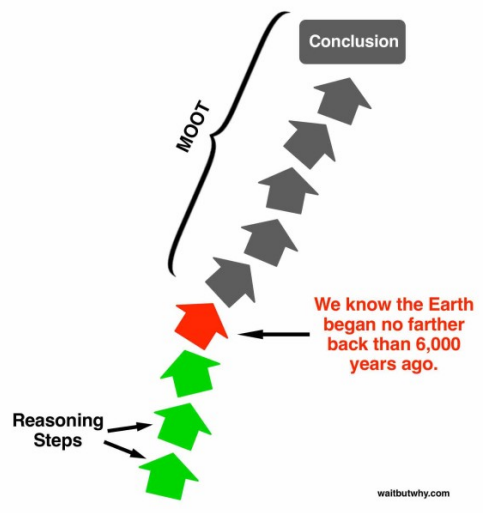
But that's a hard thing to do because most of us have the same relationship with our own software that my grandmother has with her computer:[10] It's this thing someone put there, we use it when we need to, it somehow magically works, and we hope it doesn't break. It's the way we are with a lot of the things we own, where we're just the dumb user, not the pro. We know how to use our car, microwave, phone, our electric toothbrush, but if something breaks, we take it to the pro to fix it because we have no idea how it works.

But that's not a great life model when it comes to brain software, and it usually leads to us making the same mistakes and living with the same results year after year after year, because our software remains unchanged. Eventually, we might wake up one day feeling like *Breaking Bad's* Walter White, when he said, "Sometimes I feel like I never actually make any of my own… choices. I mean, my entire life it just seems I never… had a real say about any of it." If we want to understand our own thinking, we

have to stop being the dumb user of our own software and start being the pro—the auto mechanic, the electrician, the computer geek.

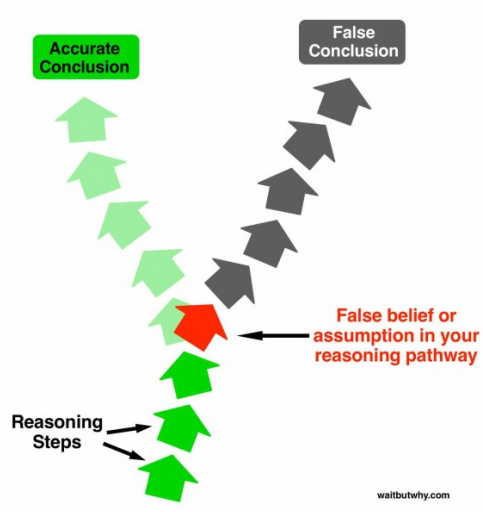
If you were alone in a room with a car and wanted to figure out how it worked, you'd probably start by taking it apart as much as you could and examining the parts and how they all fit together. To do the same with our thinking, we need to revert to our four-year-old selves and start deconstructing our software by resuming the Why game our parents and teachers shut down decades ago. It's time to roll up our sleeves, pop open the hood, and get our hands dirty with a bunch of not-that-fun questions about what we truly want, what's truly possible, and whether the way we're living our lives follows logically from those things.

With each of these questions, the challenge is to keep asking why until you hit the floor—and the floor is what will tell you whether you're in a church or a lab for that particular part of your life. If a floor you hit is one or more first principles that represent the truth of reality or your inner self and the logic going upwards stays accurate to that foundation, you're in the lab. If a Why? pathway hits a floor called "Because [authority] said so"—if you go down and down and realize at the bottom that the whole thing is just because you're taking your parent's or friend's or religion's or society's word for it—then you're in church there. And if the tenets of that church don't truly resonate with you or reflect the current reality of the world—if it turns out that you've been working off of the wrong recipe—then whatever conclusions have been built on top of it will be just as wrong. As demonstrated by the flood geologists, a reasoning chain is only as strong as its weakest link.



Astronomers once hit a similar wall in their progress trying to calculate the trajectories of the sun and planets in the Solar System. Then one day they discovered that the sun was at the center of things, not the Earth, and suddenly, all the perplexing calculations made sense, and progress leapt forward. Had they played the Why game earlier, they'd have run into a dogmatic floor right after the question "But why do we know that the Earth is in the center of everything?"

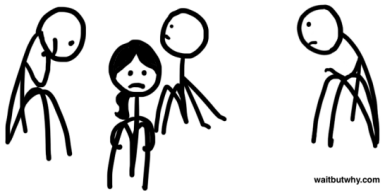
People's lives are no different, which is why it's so important to find the toxic lumps of false dogma tucked inside the layers of your reasoning software. Identifying one and adjusting it can strengthen the whole chain above and create a breakthrough in your life.



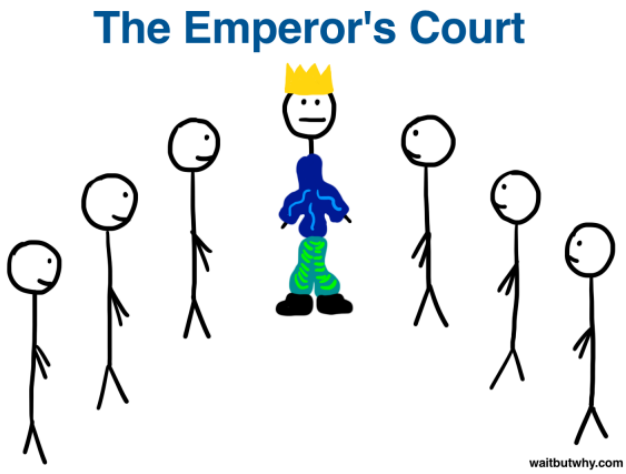
The thing you really want to look closely for is unjustified certainty. Where in life do you feel so right about something that it doesn't qualify as a hypothesis or even a theory, but it feels like a *proof?* When there's proof-level certainty, it means either there's some serious concrete and verified data underneath it—or it's faith-based dogma. Maybe you feel certain that quitting your job would be a disaster or certain that there's no god or certain that it's important to go to college or certain that you've always had a great time on rugged vacations or certain that everyone loves it when you break out the guitar during a group hangout—but if it's not well backed-up by data from what you've learned and experienced, it's at best a hypothesis and at worst a completely false piece of dogma.

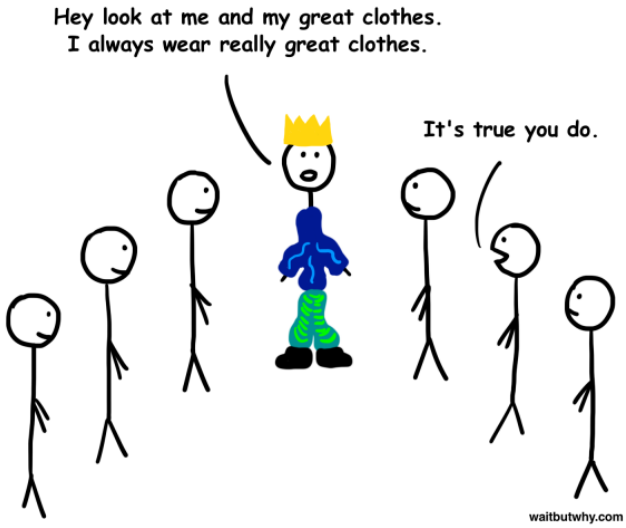
And if thinking about all of that ends with you drowning in some combination of self-doubt, self-loathing, and identity crisis, that's perfect. This first epiphany is about humility. Humility is by definition a starting point—and it sends you off on a journey from there. The arrogance of certainty is both a starting point and an ending point—no journeys needed. That's why it's so important that we begin with "I don't know shit." That's when we know we're in the lab.

Epiphany 2) No one else knows shit either.

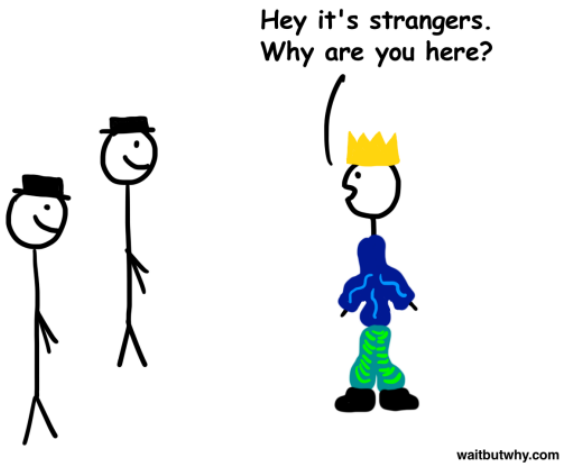


Let me illustrate a little story for you.

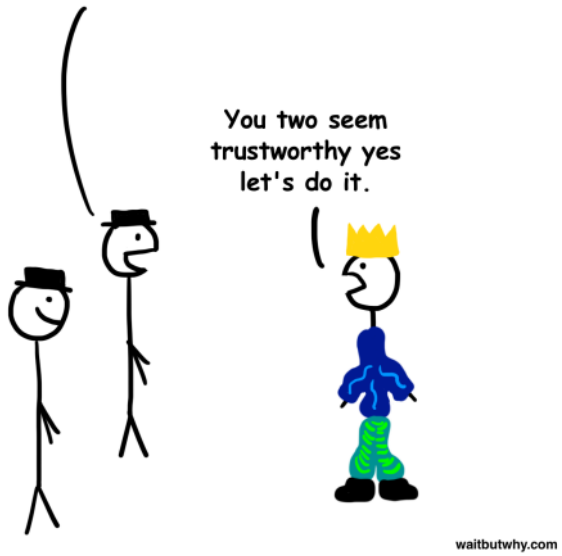




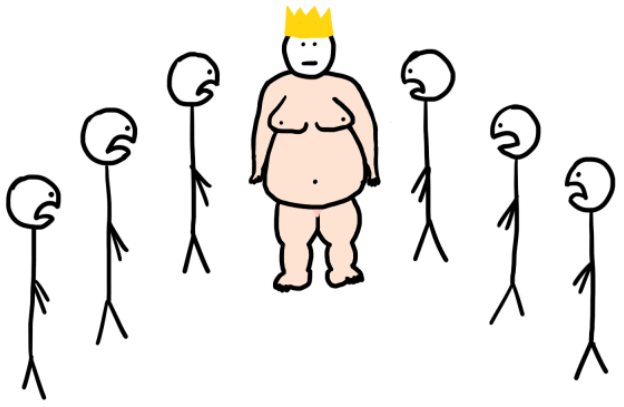
The next day

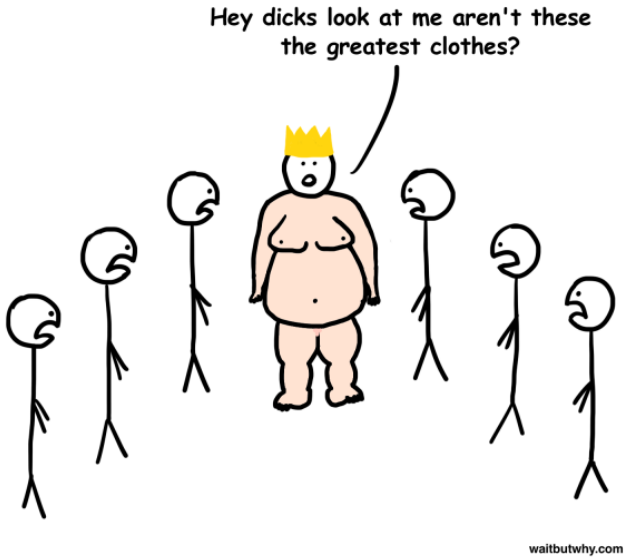


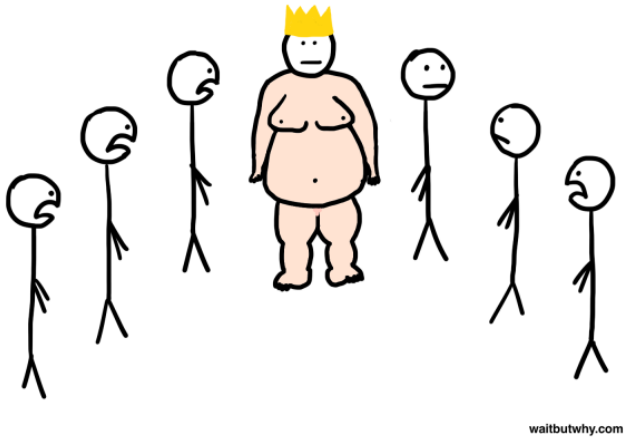
We're clothes makers and we actually make the best clothes but listen to this cool thing. They're magic clothes and only people who are rad can see them. To everybody else, they're invisible. And also, all of this is true. Want some?



Two weeks later




Hey dicks look at me aren't these the greatest clothes?
waitbutwhy.com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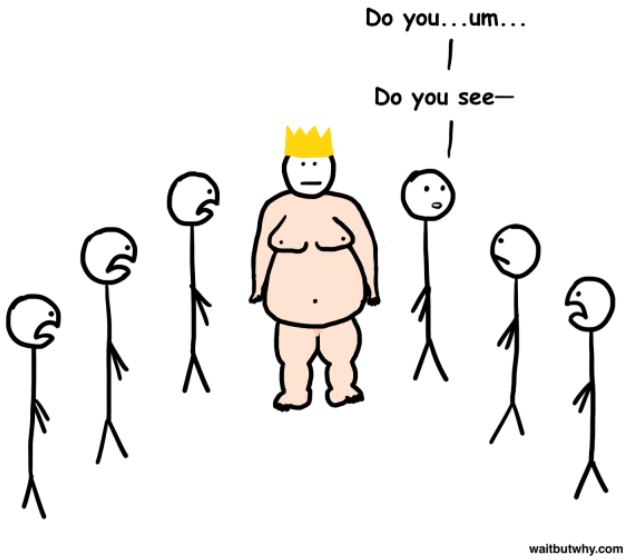
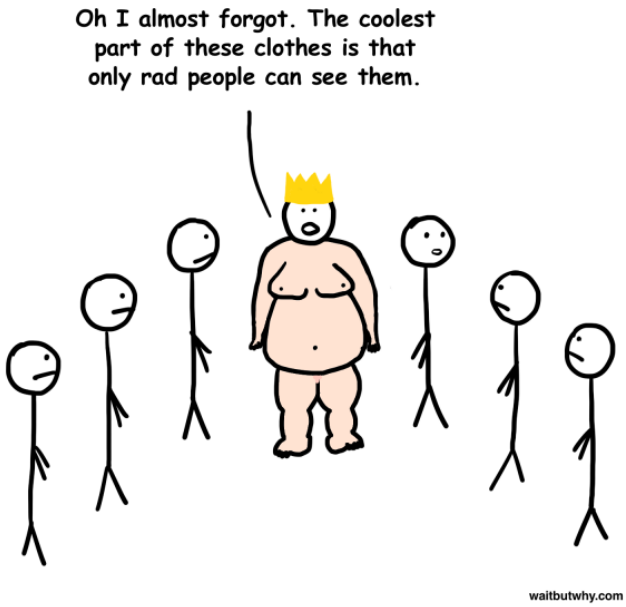
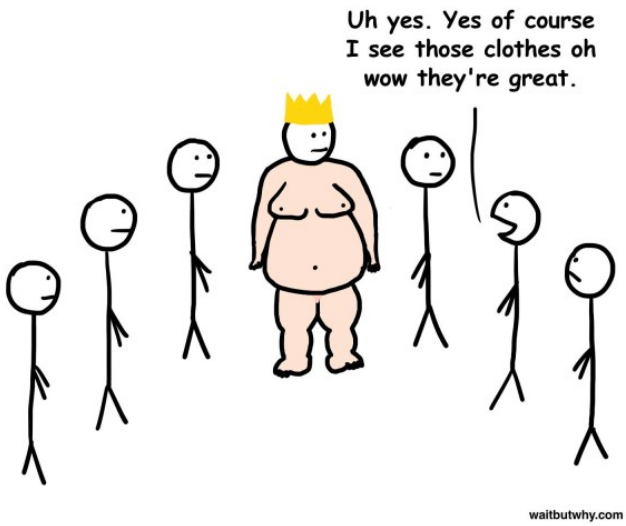
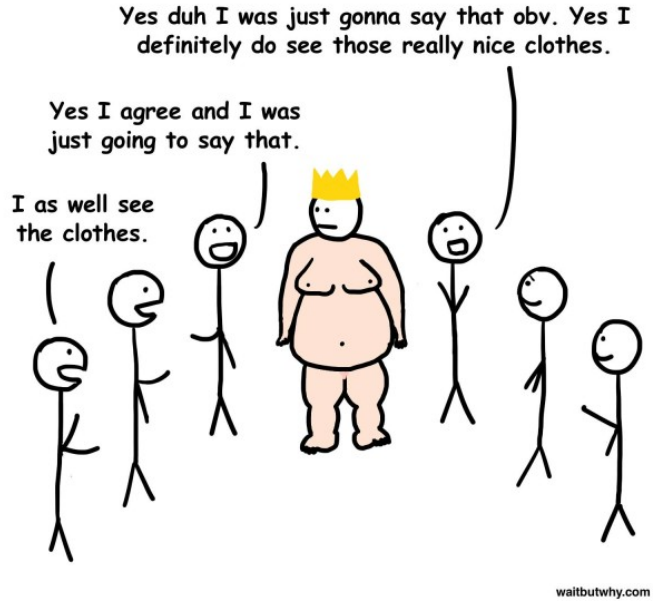
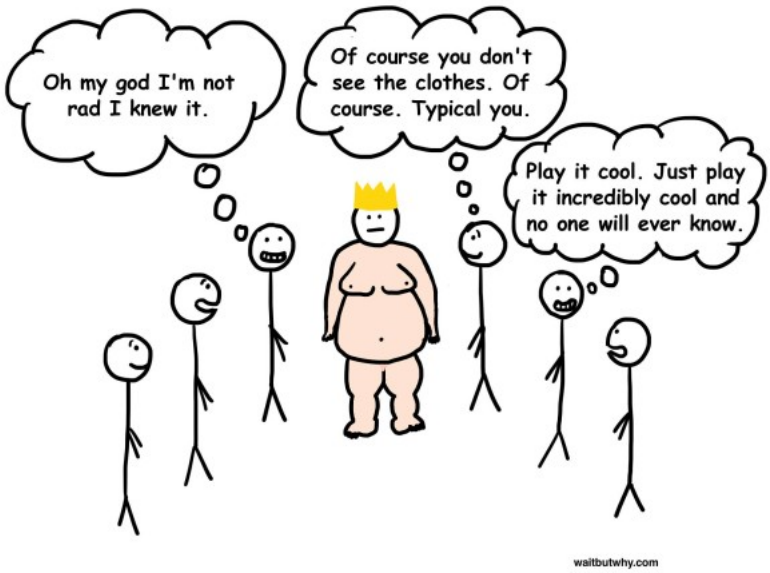
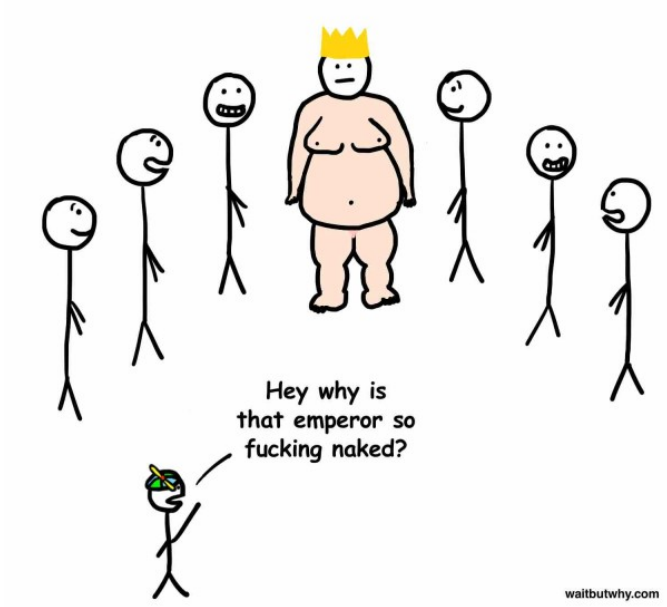

Do you...um...
Do you see—
waitbutwhy.com

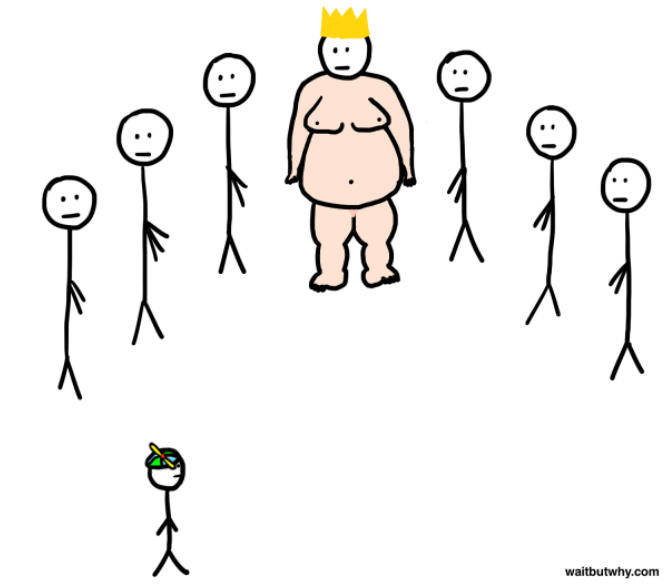

Oh I almost forgot. The coolest part of these clothes is that only rad people can see them.
waitbutwhy.com


Uh yes. Yes of course I see those clothes oh wow they're great.
waitbutwhy.com


Yes duh I was just gonna say that obv. Yes I definitely do see those really nice clothes.
Yes I agree and I was just going to say that.
I as well see the clothes.
waitbutwhy.com


Oh my god I'm not rad I knew it.
Of course you don't see the clothes. Of course. Typical you.
Play it cool. Just play it incredibly cool and no one will ever know.
waitbutwhy.com


Hey why is that emperor so fucking naked?
waitbutwhy.com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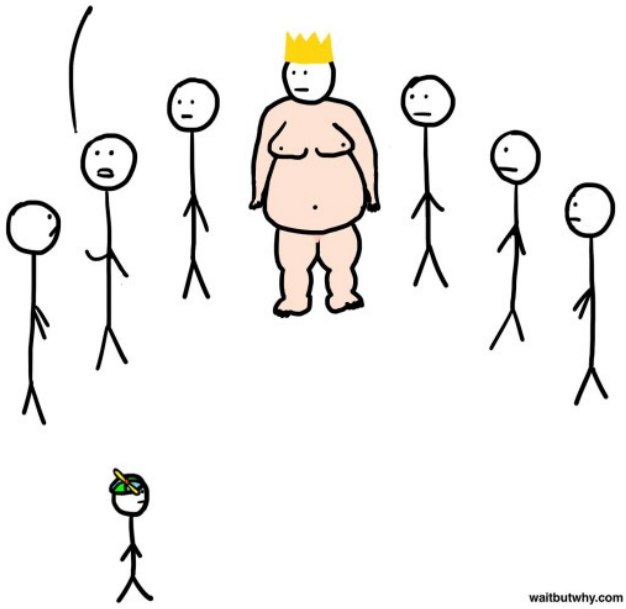
Uh wait...is there a chance...that...like do you actually...um...see the um...



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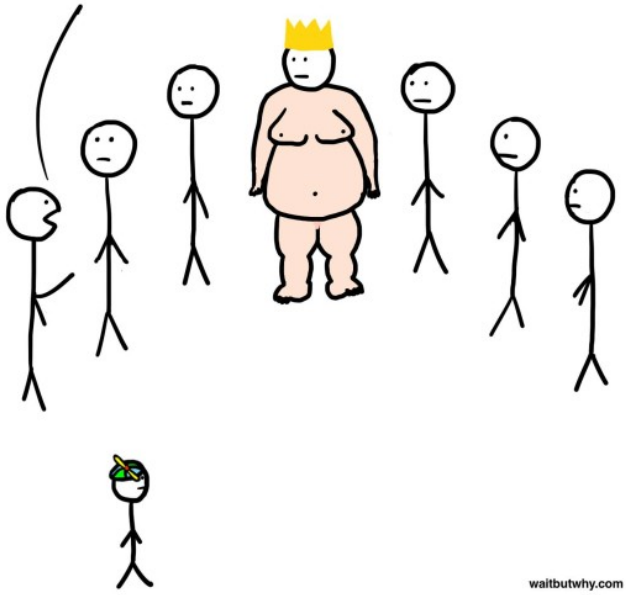
Okay yeah no I don't. The kid is right. That guy is really fucking naked.



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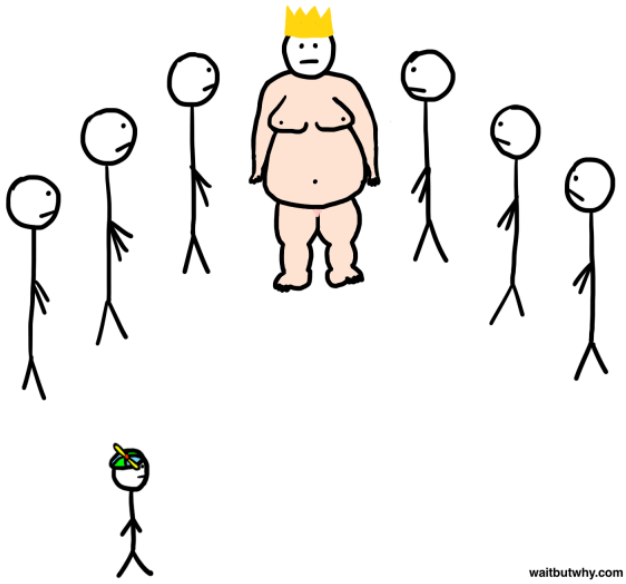
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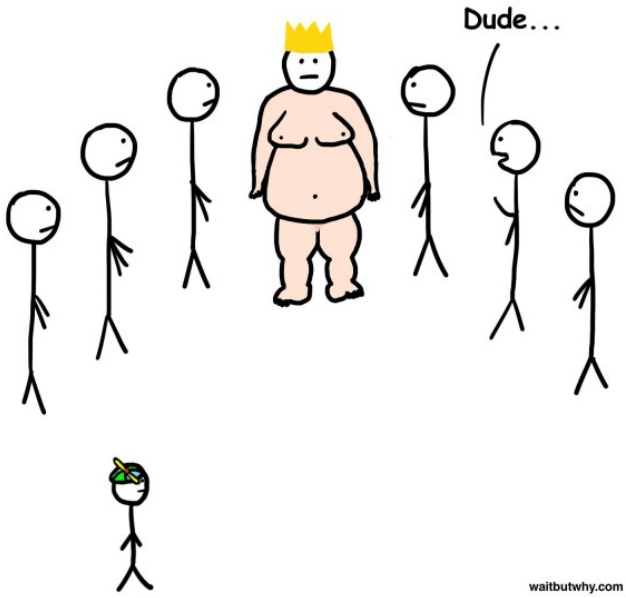
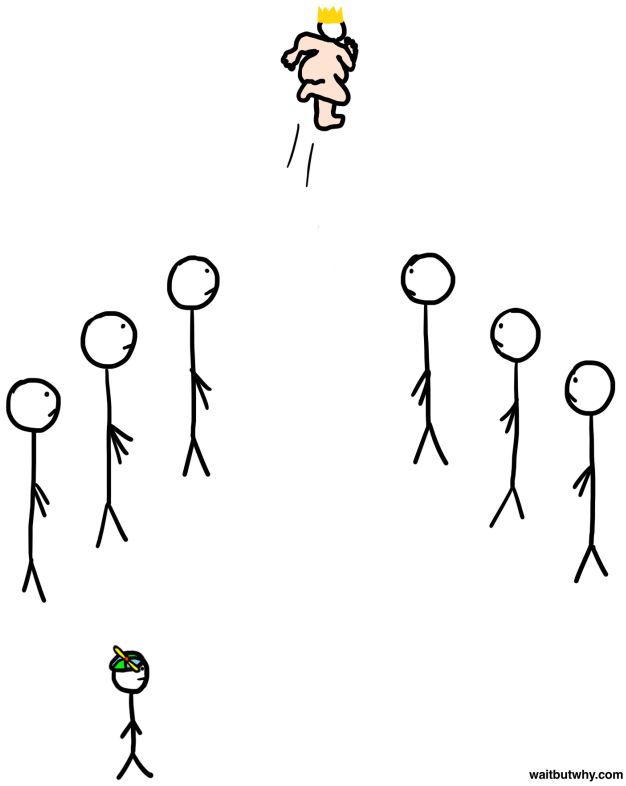

Dude...
waitbutwhy.com



Yes, it's an old classic. The Emperor's New Clothes. It was written in 1837 by Hans Christian Andersen [11] to demonstrate a piece of trademark human insanity: the "This doesn't seem right to me but everyone else says it's right so it must be right and I'll just pretend I also think it's right so no one realizes I'm stupid" phenomenon.

My favorite all-time quote might be Steve Jobs saying this:

When you grow up, you tend to get told the world is the way it is and your life is just to live your life inside the world. Try not to bash into the walls too much. Try to have a nice family life, have fun, save a little money. That's a very limited life. Life can be much broader once you discover one simple fact. And that is: Everything around you that you call life was made up by people that were no smarter than you. And you can change it, you can influence it, you can build your own things that other people can use. Once you learn that, you'll never be the same again. [12]

This is Jobs' way of saying, "You might not know shit. But *no* one knows shit. If the emperor looks naked to you and everyone else is saying he has clothes, trust your eyes since other people don't know anything you don't."

It's an easy message to understand, a harder one to believe, and an even harder one to act on.

The purpose of the first epiphany is to shatter the belief that all that dogma you've memorized constitutes personal opinions and wisdom and all that certainty you feel constitutes knowledge and understanding. That's the easier one because the delusion that we know what we're talking about is pretty fragile, with the "Oh god I'm a fraud who doesn't know shit" monster never lurking too far under our consciousness.

But this epiphany—that the collective "other people" and their conventional wisdom don't know shit—is a much larger challenge. Our delusion about the wisdom of those around us, our tribe, and society as a whole is much thicker and runs much deeper than the delusion about ourselves. So deep that we'll see a naked emperor and ignore our own eyes if everyone else says he has clothes on.

This is a battle of two kinds of confidence—confidence in others vs. confidence in ourselves. For most cooks, confidence in others usually comes out the winner.

To swing the balance, we need to figure out how to *lose respect* for the general public, your tribe's dogma, and society's conventional wisdom. We have a bunch of romantic words for the world's chefs that sound impressive but are actually just a result of them having lost this respect. Being a *gamechanger* is just having little enough respect for the game that you realize there's no good reason not to change the rules. Being a *trailblazer* is just not respecting the beaten path and so deciding to blaze yourself a new one. Being a *groundbreaker* is just knowing that the ground wasn't laid by anyone that impressive and so feeling no need to keep it intact.

Not respecting society is totally counterintuitive to what we're taught when we grow up—but it makes perfect sense if you just look at what your eyes and experience tell you.

There are clues all around showing us that conventional wisdom doesn't know shit. Conventional wisdom worships the status quo and always assumes that everything is the way it is for a good reason—and history is one long record of status quo dogma being proven wrong again and again, every time some chef comes around and changes things.

And if you open your eyes, there are other clues all through your own life that the society you live in is nothing to be intimidated by. All the times you learn about what really goes on inside a company and find out that it's totally disorganized and badly run. All the people in high places who can't seem to get their personal lives together. All the well-known sitcoms whose jokes you're pretty sure you could have written when you were 14. All the politicians who don't seem to know more about the world than you do.

And yet, the delusion that society knows shit that you don't runs deep, and still, somewhere in the back of your head, you don't think it's realistic that you could ever actually build that company, achieve that fabulous wealth or celebrity-status, create that TV show, win that senate campaign—no matter what it *seems* like.

Sometimes it takes an actual experience to fully expose society for the shit it doesn't know. One example from my life is how I slowly came to understand that most Americans—the broader public, my tribe, and people I know well—knew very little about what it's actually like to visit most countries. I grew up hearing about how dangerous it was to visit really foreign places, especially alone. But when I started going places I wasn't supposed to go, I kept finding that the conventional wisdom had been plain wrong about it. As I had more experiences and gathered more actual data, I grew increasingly trusting of my own reasoning over whatever Americans were saying. And as my confidence grew, places like Thailand and Spain turned into places like Oman and Uzbekistan which turned into places like Nigeria and North Korea. When it comes to traveling, I had the epiphany: other people's strong opinions about this are based on unbacked-up dogma and the fact that most people I talk to feel the same way means nothing if my own research, experience, and selective question-asking brings me to a different conclusion.[13] When it comes to picking travel destinations, I've become a chef.

I try to leverage what I learned as a traveler to transfer the chefness elsewhere—when I find myself discouraged in another part of my life by the warnings and head-shaking of conventional wisdom, I try to remind myself: *"These are the same people that were sure that North Korea was dangerous."* It's hard—you have to take the leap to chefdom separately in each part of your life—but it seems like with each successive cook → chef breakthrough, future breakthroughs become easier to come by. Eventually, you must hit a tipping point and trusting your own software becomes your way of life—and as Jobs says, you'll never be the same again.

The first epiphany was about shattering a protective shell of arrogance to lay bare a starting point of humility. This second epiphany is about confidence—the confidence to emerge from that humility through a pathway built on first principles instead of by analogy. It's a confidence that says, "I may not know much, but no one else does either, so I might as well be the most knowledgeable person on Earth."

Epiphany 3) You're playing Grand Theft Life

The first two epiphanies allow us to break open our software, identify which parts of it were put there by someone else, and with confidence begin to fill in the Want and Reality boxes with our own handwriting and choose a goal and a strategy that's right for us.

But then we hit a snag. We're finally in the lab with all our tools and equipment, but something holds us back. To figure out why, let's bring back our emperor story.

When the emperor struts out with his shoulder hair and his gut and his little white junk, the story only identifies two kinds of people: the mass of subjects, who all pretend they can see the clothes, and the kid, who just says that the dude is obviously naked.

But I think there's more going on. In an emperor's new clothes situation, there are *four* kinds of people:

1) Proud Cook. Proud Cook is the person drinking the full dogma Kool-Aid. Whatever independent-thinking voice *is* inside of Proud Cook was silenced long ago, and there's no distinction between his thoughts and the dogma he follows. As far as he's concerned, the dogma is truth—but since he doesn't even register that there's any dogma happening, Proud Cook simply thinks he's a very wise person who has it all figured out. He feels the certainty of the dogma running through his veins. When the emperor walks out and proclaims that he is wearing beautiful new clothes, Proud Cook actually *sees* clothes, because his consciousness isn't even turned on.

2) Insecure Cook. Insecure Cook is what Proud Cook turns into after undergoing Epiphany #1. Insecure Cook has had a splash of self-awareness—enough to become conscious of the fact that he doesn't actually know why he's so certain about the things he's certain about. Whatever the reasons are, he's sure they're right, but he can't seem to come up with them himself. Without the blissful arrogance of Proud Cook, Insecure Cook is lost in the world, wondering why he's too dumb to get what everyone else gets and trying to watch others to figure out what he's supposed to do—all while hoping nobody finds out that he doesn't get it. When Insecure Cook sees the emperor, his heart sinks—he doesn't *see* the clothes, only the straggly gray hairs of the emperor's upper thighs. Ashamed, he reads the crowd and mimics their enthusiasm for the clothes.

3) Self-Loathing Cook. Self-Loathing Cook is what Insecure Cook becomes after being hit by Epiphany #2. Epiphany #2 is the forbidden fruit, and Self-Loathing Cook has bitten it. He now knows *exactly* why he didn't feel certain about everything—because it was all bullshit. He sees the tenets of conventional wisdom for what they really are—faith-based dogma. He knows that neither he nor anyone else knows shit and that he'll get much farther riding his own reasoning than jumping on the bandwagon with the masses. When the emperor emerges, Self-Loathing Cook thinks, "Oh Jesus...this fucktard is actually outside with no clothes on. Oh—oh and my god these idiots are all *pretending to see clothes*. How is this my life? I need to move."

But then, right when he's about to call everyone out on their pretending and the emperor out on his bizarre life decision, there's a lump in his throat. Sure, he knows there are no clothes on that emperor's sweaty lower back fat roll—but actually *saying* that? Out *loud?* I mean, he's sure and all—but let's not go crazy here. Better not to call too much attention to himself. And of course, there's a *chance* he's missing something. Right?

Self-Loathing Cook ends up staying quiet and nodding at the other cooks when they ask him if those clothes aren't just the most marvelous he's ever seen.

4) The chef. The kid in the story. The chef is Self-Loathing Cook—except without the irrational fear. The chef goes through the same inner thought process as Self-Loathing Cook, but when it's time to walk the walk, the chef stands up and yells out the truth.

A visual recap:

We're all human and we're all complex, which means that in various parts of each of our lives, we play each of these four characters.

But to me, Self-Loathing Cook is the most curious one of the four. Self-Loathing Cook gets it. He knows what the chefs know. He's tantalizingly close to carving out his own chef path in the world, and he knows that if he just *goes* for it, good things would happen. But he can't pull the trigger. He built himself a pair of wings he feels confident work just fine, but he can't bring himself to jump off the cliff.

And as he stands there next to the cliff with the other cooks, he has to endure the torture of watching the chefs of the world leap off the edge with the same exact wings and flying skills he has, but with the courage he can't seem to find.

To figure out what's going on with Self-Loathing Cook, let's remind ourselves how the chefs operate.

Free of Self-Loathing Cook's trepidation, the world's chefs are liberated to put on their lab coats and start sciencing. To a chef, the world is one giant laboratory, and their life is one long lab session full of a million experiments. They spend their days puzzling, and society is their game board.

The chef treats his goals and undertakings as experiments whose purpose is as much to learn new information as it is to be ends in themselves. That's why when I asked Musk what his thoughts were on negative feedback, he answered with this:

I'm a huge believer in taking feedback. I'm trying to create a mental model that's accurate, and if I have a wrong view on something, or if there's a nuanced improvement that can be made, I'll say, "I used to think this one thing that turned out to be wrong—now thank goodness I don't have that wrong belief."

To a chef in the lab, negative feedback is a free boost forward in progress, courtesy of someone else. Pure upside.

As for the F word…the word that makes our amygdalae quiver in the moonlight, the great chefs have something to say about that too:

Failure is simply the opportunity to begin again, this time more intelligently. —Henry Ford

Success is going from failure to failure without losing your enthusiasm. —Winston Churchill[13]

I have not failed 700 times. I've succeeded in proving 700 ways how not to build a lightbulb. —Thomas Edison

There's no more reliable corollary than super-successful people thinking failure is fucking *awesome*.

But there's something to that. The science approach is all about learning through testing hypotheses, and hypotheses are built to be disproven, which means that scientists learn through failure. Failure is a critical part of their process.

It makes sense. If there were two scientists trying to come up with a breakthrough in cancer treatment, and the first one is trying every bold thing he can imagine, failing left and right and learning something each time, while the second one is determined not to have any failures so is making sure his experiments are similar to others that have already been proven to work—which scientist would you bet on?

It's not surprising that so many of the most wildly impactful people seem to treat the world like a lab and their life like an experiment session—that's the best way to succeed at something.

But for most of us, we just can't do it. Even poor Self-Loathing Cook, who is so damn close to being a chef—but somehow so far away.

So what's stopping him? I think two major misconceptions:

Misconception 1: Misplaced Fear

We talked about the chef's courage actually just being an accurate assessment of risk—and that's one of the major things Self-Loathing Cook is missing. He thinks he has become wise to the farce of letting dogma dictate your life, but he's actually in the grasp of dogma's slickest trick.

Humans are programmed to take fear *very* seriously, and evolution didn't find it efficient to have us assess and re-assess every fear inside of us. It went instead with the "better safe than sorry" philosophy—i.e. if there's a chance that a certain fear might be based on real danger, file it away as a real fear, just in case, and even if you confirm later that a fear of yours has no basis, keep it with you, just in case. Better safe than sorry.

And the fear file cabinet is somewhere *way* down in our psyches—somewhere far below our centers of rationality, out of reach.

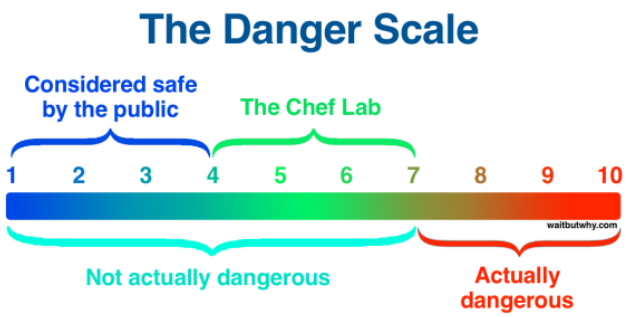
The purpose of all of that fear is to make us protect ourselves from danger. The problem for us is that as far as evolution is concerned, danger = something that hurts the chance that your genes will move

on—i.e., danger = not mating or dying or your kids dying, and that's about it.

So in the same way our cook-like qualities were custom-built for survival in tribal times, our obsession with fears of all shapes and sizes may have served us well in Ethiopia 50,000 years ago—but it mostly ruins our lives today.

Because not only does it amp up our fear in general to "shit we botched the hunt now the babies are all going to starve to death this winter" levels even though we live in an "oh no I got laid off now I have to sleep at my parents' house for two months with a feather pillow in ideal 68° temperature" world—but it also programs us to be terrified of all the wrong things. We're more afraid of public speaking than texting on the highway, more afraid of approaching an attractive stranger in a bar than marrying the wrong person, more afraid of not being able to afford the same lifestyle as our friends than spending 50 years in meaningless career—all because embarrassment, rejection, and not fitting in really sucked for hunters and gatherers.

This leaves most of us with a skewed danger scale:



Chefs hate real risk just as much as cooks—a chef that ends up in the Actually Dangerous territory and ends up in jail or in a gutter or in dire financial straits isn't a chef—he's a cook living under "I'm invincible" dogma. When we see chefs displaying what looks like incredible courage, they're usually just in the Chef Lab. The Chef Lab is where all the action is and where the path to many people's dreams lies—dreams about their career, about love, about adventure. But even though its doors are always open, most people never set foot in it for the same reason so many Americans never visit some of the world's most interesting countries—because of an incorrect assumption that it's a dangerous place. By reasoning by analogy when it comes to what constitutes danger and ending up with a misconception, Self-Loathing Cook is missing out on all the fun.

Misconception 2: Misplaced Identity

The second major problem for Self-Loathing Cook is that, like all cooks, he can't wrap his head around the fact that he's the scientist in the lab—not the experiment.

As we established earlier, conscious tribe members reach conclusions, while blind tribe members *are* conclusions. And what you believe, what you stand for, and what you choose to do each day are conclusions that you've drawn. In some cases, very, very publicly.

As far as society is concerned, when you give something a try—on the values front, the fashion front, the religious front, the career front—you've branded yourself. And since people like to simplify people in order to make sense of things in their own head, the tribe around you reinforces your brand by putting you in a clearly-labeled, oversimplified box.

What this all amounts to is that it becomes very painful to *change*. Changing is *icky* for someone whose identity will have to change along with it. And others don't make things any easier. Blind tribe members don't like when other tribe members change—it confuses them, it forces them to readjust the info in their heads, and it threatens the simplicity of their tribal certainty. So attempts to evolve are often met with opposition or mockery or anger.

And when you have a hard time changing, you become attached to who you currently are and what you're currently doing—so attached that it blurs the distinction between the scientist and the experiment and you forget that they're two different things.

We talked about why scientists welcome negative feedback about their experiments. But when you *are* the experiment, negative feedback isn't a piece of new, helpful information—it's an *insult*. And it *hurts*. And it makes you *mad*. And because changing feels impossible, there's not much good that feedback can do anyway—it's like giving parents negative feedback on the name of their one-month-old child.

We discussed why scientists expect plenty of their experiments to fail. But when you and the experiment are one and the same, not only is taking on a new goal a change of identity, it's putting your identity on the *line*. If the experiment fails, *you* fail. You *are* a failure. Devastating. Forever.

I talked to Musk about the United States and the way the forefathers reasoned by first principles when they started the country. He said he thought the reason they could do so is that they had a fresh slate to work with. The European countries of that era would have had a much harder time trying to do something like that—because, as he told me, they were "trapped in their own history."

I've heard Musk use this same phrase to describe the big auto and aerospace companies of today. He sees Tesla and SpaceX like the late 18th century USA—fresh new labs ready for experiments—but when he looks at other companies in their industries, he sees an inability to drive their strategies from a clean slate mentality. Referring to the aerospace industry, Musk said, "There's a tremendous bias against taking risks. Everyone is trying to optimize their ass-covering."

Being trapped in your history means you don't know how to change, you've forgotten how to innovate, and you're stuck in the identity box the world has put you in. And you end up being the cancer researcher we mentioned who only tries likely-to-succeed experimentation within the comfort zone he knows best.

It's for this reason that Steve Jobs looks back on his firing from Apple in 1986 as a blessing in disguise. He said:[14] "Getting fired from Apple was the best thing that could have ever happened to me. The heaviness of being successful was replaced by the lightness of being a beginner again. It freed me to enter one of the most creative periods of my life." Being fired "freed" Jobs from the shackles of his own history.

So what Self-Loathing Cook has to ask himself is: "Am I trapped in my own history?" As he stands on the cliff with his wings ready for action and finds himself paralyzed—from evolving as a person, from making changes in his life, from trying to do something bold or unusual—is the baggage of his own identity part of what's holding him back?

Self-Loathing Cook's beliefs about what's scary aren't any more real than Insecure Cook's assumption that conventional wisdom has all the answers—but unlike the "Other people don't know shit" epiphany, which you can observe evidence of all over the place, the epiphany that neither failing nor changing is actually a big deal can only be observed by experiencing it for yourself. Which you can only do after you overcome those fears…which only happens if you experience changing and failing and realize that nothing bad happens. Another catch-22.

These are the reasons I believe so many of the world's most able people are stuck in life as Self-Loathing Cook, one epiphany short of the promised land.

The challenge with this last epiphany is to somehow figure out a way to lose respect for your own *fear*. That respect is in our wiring, and the only way to weaken it is by *defying* it and seeing, when nothing bad ends up happening, that most of the fear you've been feeling has just been a smoke and mirrors act. Doing something out of your comfort zone and having it turn out okay is an incredibly powerful experience, one that changes you—and each time you have that kind of experience, it chips away at your respect for your brain's ingrained, irrational fears.

Because the most important thing the chef knows that the cooks don't is that real life and Grand Theft Auto aren't actually that different. Grand Theft Auto is a fun video game because it's a fake world where you can do things with no fear. Drive 200mph on the highway. Break into a building. Run over a prostitute with your car. All good in GTA.

Unlike GTA, in real life, the law is a thing and jail is a thing. But that's about where the differences end. If someone gave you a perfect simulation of today's world to play in and told you that it's all fake with no actual consequences—with the only rules being that you can't break the law or harm anyone, and you still have to make sure to support your and your family's basic needs—what would you do? My guess is that most people would do all kinds of things they'd love to do in their real life but wouldn't dare to try, and that by behaving that way, they'd end up quickly getting a life going in the simulation that's both far more successful and much truer to themselves than the real life they're currently living. Removing the fear and the concern with identity or the opinions of others would thrust the person into the not-actually-risky Chef Lab and have them bouncing around all the exhilarating places outside their comfort zone—and their lives would take off. That's the life irrational fears block us from.

When I look at the amazing chefs of our time, what's clear is that they're more or less treating real life as if it's Grand Theft Life. And doing so gives them superpowers. That's what I think Steve Jobs meant all the times he said, "Stay hungry. Stay foolish."

And that's what this third epiphany is about: fearlessness.

So if we want to think like a scientist more often in life, those are the three key objectives—to be humbler about what we know, more confident about what's possible, and less afraid of things that don't matter.

It's a good plan—but also, ugh. Right? That's a lot of stuff to try to do.

Usually at the end of a post like this, the major point seems manageable and concrete, and I finish writing it all excited to go be good at shit. But this post was like, "Here's everything important and go do it." So how do we work with that?

I think the key is to not try to be a perfect chef or expect that of yourself whatsoever. Because no one's a perfect chef—not even Elon. And no one's a pure cook either—nothing's black and white when you're talking about an animal species whose brains contain 86 billion neurons. The reality is that we're all a little of both, and where we are on that spectrum varies in 100 ways, depending on the part of life in question, the stage we're in of our evolution, and our mood that day.

If we want to improve ourselves and move our way closer to the chef side of the spectrum, we have to remember to remember. We have to remember that we have software, not just hardware. We have to remember that reasoning is a skill and like any skill, you get better at it if you work on it. And we have to remember the cook/chef distinction, so we can notice when we're being like one or the other.

It's fitting that this blog is called Wait But Why because the whole thing is a little like the grown-up version of the Why? game. After emerging from the blur of the arrogance of my early twenties, I began to realize that my software was full of a lot of unfounded certainty and blind assumptions and that I needed to spend some serious time *deconstructing*—which is the reason that every Wait But Why post, no matter what the topic, tends to start off with the question, "What's really going on here?"

For me, that question is the springboard into all of this remembering to remember—it's a hammer that shatters a brittle, protective feeling of certainty and forces me to do the hard work of building a more authentic, more useful set of thoughts about something. Or at least a better-embraced bewilderment.

And when I started learning about Musk in preparation to write these posts, it hit me that he wasn't just doing awesome things in the world—he was a master at looking at the world, asking "What's really going on here?" and seeing the real answer. That's why his story resonated so hard with me and why I dedicated so much Wait But Why time to this series.

But also, Mars. Let's all go, okay?

If you liked this post, you'll probably like these too (they're shorter don't worry):

Taming the Mammoth: Why You Shouldn't Care What Other People Think

Life is a Picture, But You Live in a Pixel

Your Life in Weeks

And the other posts in this series:

Part 1: Elon Musk: The World's Raddest Man
Part 2: How Tesla Will Change the World
Part 3: How (and Why) SpaceX Will Colonize Mars

Extra Post #1: The Deal With Solar City
Extra Post #2: The Deal With the Hyperloop
Extra Post #3: **SpaceX's Big Fucking Rocket — The Full Story**

And a new one, written in 2017, about a whole new Elon company: **Neuralink and the Brain's Magical Future**

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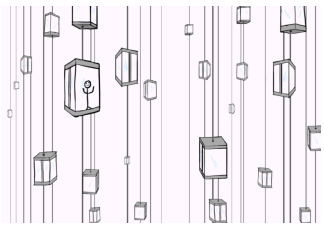

How to Pick a Career (That Actually Fits You)

100 Blocks a Day

SpaceX's Big Fucking Rocket – The Full Story

Mariano Rodríguez • 3 days ago

Great article. Thou I would prompt you to stop using ISIS as an example for something that would trap a dogmatic mind. You have the US Army much handier.

Reply • Share ›

Arthur • 2 months ago

"If someone gave you a perfect simulation of today's world to play in and told you that it's all fake with no actual consequences—with the only rules being that you can't break the law or harm anyone, and you still have to make sure to support your and your family's basic needs—what would you do?"

Those two conditions, especially that latter one, are far easier said than done. A lot of people in this generation probably remain stuck with fear precisely because they see difficulty providing for themselves and their families. Naturally, it feels impractical to be thinking about being an independent creative lone-ranger who revolutionizes industries when it's already difficult attaining means. Is there a better way to combat that fear, especially people who start out with fewer resources?

3 Reply • Share ›

Hana • 2 months ago

I'm just a little frustrated and confused by the whole reasoning by first principles and abandoning dogmas thing. 1) if all that we know, for certain, is that we exist, how can we even begin to form our own first principles? Sitting here thinking about this is so incredible overwhelming to me. For example, if I try and think to myself, 'everyone else knows as little as me,' I think to myself, how do I know this? I know this because you just told me that. But beyond that, I have no clue if it true or not. Maybe everyone else in the world around me is a genius and has clarity that I lack, and I just can't see that. Or else maybe everyone else is stupid and I am the one thinking at a higher level. Or more likely so, everyone else is of relatively equal intelligence and I'm really not special. BUT HOW DO I KNOW!!!?? The same reasoning, I feel, can be applied to ANY other question I ask myself. 2) It really just seems impossible to abandon all dogmas without joining another. If I try to give up the dogmas that I currently live my life by, am I not just joining the dogma you just presented to me within this post? A dogma of making decisions through reasoning and logic and rejecting ideas just handed to me? But wait, if I reject ideas just handed to me, don't I have to reject that idea itself? It essentially was just handed to me by you with the reason that because Elon Musk and other successful people do it, it's the right way to think. But is it really? I don't know. So where am I left? My brain

hurts. Help me understand.

4 ^ | v • Reply • Share ›

Alocian • 3 months ago

I m going to express some objections to this article which I found to be deeply relevant.

1. I doubt the cook chef dualism for the simple fact that many people can make analogies nobody thought of without reasoning by first principles. Reasoning by first principles is the best way to go in a bussiness environment but not in any theoretical STEM field for the simple fact that reasoning from fp there means reinventing the wheel. So thinking like a scientist is not how this article describes it for the simple fact that science is very complex while engineering is not and since I am there engineering is depending on theoretical frameworks from physics to collect data. It s a 2 way street.

2. The honest answer why Musk his PhD is that he disliked huge complexity and decided to get rich and change the world.

3.The main reason Musk is successful is because he can make geeky STEMs believe in his dreams and work for him while giving 100 percent. You are one of those useful geeks.

4. Another reason is Musk being a genius geek that can deal with corporate type people that have all the interest for him to fail, like oil and auto-companies who are richer than Norway(e.g General Motors). I.e. Musk is socially and politically savvy enough to fight off powerful enemies.

5. Stop with cook vs chef simplistic analogy, and ask Musk how he can manage his life at the top of the food chain.

^ | v • Reply • Share ›

Alocian ➚ Alocian • 3 months ago

6. Most kids aren t creative per se they are just flexible enough so that they can adapt better to the environment. It s an evolutionary trait and it works since they have lots of free memory space to fill in. School cannot kill real creative types because nobody can kill your highest value so tell Michio Kaku and other idiot savants you read that their studies don t imply anything. It s much more likely that kids simply grow out of creativity since obviously there were almost zero public school before 1500 and most people are uncreative even if their life depended on it. And no, i m not a stubborn rigid asshole for saying this, i m just tired of stupid BS.

^ | v • Reply • Share ›

Josh Eckert • 3 months ago

In defense of Cooks: Joseph Henrich (watch his great talk at Google) and Kevin Laland formed theories of gene-culture co-evolution. That means we count on cultural learning to survive.

Kevin Laland's book DARWIN'S UNFINISHED SYMPHONY created a simulation to test the success of first-principle thinking against copying behaviors. The best survivors exploited strategies they copied from others (not that they invented via first-principle thinking). However, they tried to copy strategies that emerged recently from environments identical to their own. The best survivors also discounted old strategies or strategies of unknown origin. Thus, they didn't have to spend tremendous resources reinventing the wheel, but they didn't copy irrelevant dogmatic practices either.

Copy from science fiction writers like Neil Stevenson. Copy from Minority Report. Copy from the Elon Musk. In life, copycat cooks who hitch their wagons to the right chefs often fare better than those chefs--all the fruits of the labor with 1/10 the labor. We see this a lot in science.

3 ^ | v • Reply • Share ›

Christina-Lena • 3 months ago

I'm impressed. Your role in this whole "improving the world"-thingy is certainly to produce some more Elon Musks. It just reminded me on the big role Philosophy or generally Humanities can play. Of course it's a serving role, but it's definitely underestimated these days. Imagine you changed the minds of only two people of your readers, and they walk out to do as impressive stuff as Elon Musk. I've often been criticized for choosing Art as my career path. But once again I am happy, that I followed my "Want-Box" and that I see it as my job to educate and inspire people. As you wrote in this article, a crazy man in a scared and uninformed society is dangerous. You're doing a good job enlightening a part of it.

6 ^ | v • Reply • Share ›

José Miguel Pellicer García • 5 months ago

These series of Elon Musk hit me really hard. It ignites a lot of ideas in my head making me feel like I really have a lot of things to say and to fight for. Thank you for writing this whole story as enjoyable and mind-blowing as it is.

4 ^ | v • Reply • Share ›

Jan Felix Ehrke • 6 months ago

Almost every article of WBW is a great one, but this is definitely the most important. I've been trying to understand the concept of "reasoning from first principles", but no explanation could nearly answer all my questions...but this post changed a lot for me (though there's still a LOT to learn on this topic)! Really good starting point for anyone who wants to learn/work in the most efficient way - and the next second I realized most people won't even consider this way of thinking after reading the article. So simply start applying these rules to your life and you're going to have a tremendous advantage and if you're interested in improving the

rules to your life and you're going to have a tremendous advantage and if you're interested in improving the world: Tell people about this! :)

6 ^ | v • Reply • Share ›

Heather Lynn • 6 months ago

You deserve an award for this article!

4 ^ | v • Reply • Share ›

derek xiao • 7 months ago

Honestly it is mind boggling how much work the article must have took. I don't even understand it entirely after reading through it in 2 hours. Imagine how many iterations the author had to go through to write this in such an organized manner.

11 ^ | v • Reply • Share ›

derek xiao • 7 months ago

though really this hsould be taken with a grain of salt, considering the opposite end of the spectrum with the Dunning-Kruger effect

1 ^ | v • Reply • Share ›

Julio C • 7 months ago

Just finished to read the whole Musk series; a friend recommended the site and Im totally happy he did. I love the clarity; the hard work investigating the topics which lead to an excellent deconstruction. My congrats for a work well done and hope we go to Mars, and keep creating better worlds.

4 ^ | v • Reply • Share ›

Sechsi • 9 months ago

Have a look at this one if you´re interested in Martin Luther being a "cook" https://en.wikipedia.org/wi... ;)

29 ^ | v • Reply • Share ›

Anil Bhandi • 10 months ago

The way of explaining stuff by you is awesome. And you just made me more humble, confident and fearless individual. Thank you !

2 ^ | v • Reply • Share ›

19 with LIFE ahead of him... • a year ago

Brilliant. A little late to the party, but boy was that refreshing. The most straightforward analysis of "success" I've ever bumped into on the internet. Thanks Tim for shining a new light on my life!

3 ^ | v • Reply • Share ›

GAURAV MAKHECHA • a year ago

One of the best posts I have ever read and one of the greatest discoveries for me about myself.

15 ^ | v • Reply • Share ›

Nerd Neuron • a year ago

blowing ...

32 ^ | v • Reply • Share ›

Zenzo • a year ago

Whoa. Thank you so much for this post. I already knew many things, but this order and clarity are gold!

1 ^ | v • Reply • Share ›

David C. Navas • a year ago

"reprogramming the human genetic code" well, sure, but that's like baby step one. If you want to cancel the Genesis Device that is life, you need to be able to reprogram your entire biome. Every virus, every bacterium, every part of the system that recodes its environment "in favor of it's new matrix." Because, in the end, "moral" implications matter rather deeply. FWIW, two years ago I was really worried about the Fermi Paradox as well. I would have agreed with Brian Cox. But life, it turns out, is stunningly threatening to its surroundings, a lot more than our limited intelligence might be. We've overthought the problem and weighted a variety of items incorrectly.

The Kardashev scale assumes that civilizations can be measured by the exponent. I think that comes from the same place as Asimov's giant, hyperspace-embedded computer systems. It isn't about exponents, it's about precision. If you want to harness extreme amounts of energy, you need to be able to limit energy losses, or you're going to have a problem living within material constraints (RUD). If you want to exponentiate life, you need to be able to increase the precision of control over it as well. We think we're approaching a Type I civilization, but on the scale of control over our genetics, we don't even register yet.

So yes, there's awareness that we keep waking up in a room with an increasing number of self-destruct buttons, and yes, "one solution to the Fermi paradox is that it is not possible to run a world that has the power to destroy itself and that needs global collaborative solutions to prevent that" - Brian Cox. "What if" my id proclaims "there is no force in the universe that can control me?!" "Bwahaha" it adds, for good measure.

Absolutely, reprogramming the human genetic code, but as we sit at the thin-end of 4 billion+ years of evolution, that implies control over all of it. And yeah, just as necessary as the rest of the advances.

Thanks for the series.

Reply • Share ›

Clark • a year ago

It would be interesting for Tim to interview Jeff Bezos, another Chef and if he approaches the space race in the same manner as Musk. Also it is interesting that in Peter Thiels book he recommends to stay away from existing industry because the incumbents can crush you competitively. He recommends coming up with new ideas which means being a chef, but Elon took on incumbents and succeeded partly because he was a millionaire to begin with, plus his plans worked out enough to get additional financing, although just in the nick of time.

2 Reply • Share ›

Singularity • a year ago

Impressive and brilliant, your analysis of the Why-game, dogma and blind tribalism! Thank you!

One remark: in your analogy of A (engineering) and B (science), where you say: without A there is no B: A needs a lot from B too. F.i. without the discovery of DNA (B) there would be no CRISPR (mostly A).

Oh, and brain hardware CAN be changed (a bit).(Until this theory is overruled. :-))

2 Reply • Share ›

David Allen • a year ago

I see therapists to help me out with my autism spectrum disorder (even though now I have doubts it's rally a problem), and, next session I get the chance, I'm going to ask them to grill me about what I like, until I reach a point of "I don't know." Not just "Why do you like this?", but "Why did that happen?", up to the point where I end up with, "I don't know." (TL;DR, really grill me, not just with one question.) Edit: Because I read this post.

1 Reply • Share ›

Rowan Goodrich • a year ago

Doesn't everyone think like this? If not, why not? I def think like that, I may not be efficient at it but isn't it the same for everyone. It should be classic psychological thinking rather than one persons amazing "software".

Reply • Share ›

Rowan Goodrich ↗ Rowan Goodrich • a year ago

Just to point out what I think overall of this section: this is a really good and well thought out discussion of human behaviour

Reply • Share ›

Special Circumstances • a year ago

The end of this post resonated with me deeply. I know that all my self-reflection is based on trying to balance between arrogance and humility, but your description of a Self-Loathing Cook hit so deep I almost wept. Thank you so much for (once again) helping me look at the world with a slightly wider vision.

7 Reply • Share ›

NotABigDealBut • a year ago

It's actually "homing in on" rather than "honing in on;" cf. homing missiles and homing pigeons.

Reply • Share ›

SophieO • 2 years ago

I am so over the 'brain is like a computer' argument. We are a bodymind and to stick to computer metaphor is to delete all the other realities available to us. A computer processes input which is essentially old knowledge (it's the same problem with scientists who can only confirm/deny what has happened. Any projections are based on past peer agreed calculations). Musk creates in the moment. That is not the work of a computer :)

Reply • Share ›

TokyoMystify ↗ SophieO • 10 months ago

Our minds also processes input, which we recieve through our 5 senses. And AI can already predict things that have not happened yet based on current information.

2 Reply • Share ›

Federalist • 2 years ago

tl;dr: Musk's "secret sauce" is a practical blend of autism spectrum traits combined with an exceptional intellectual capacity and a lot of hard work.

3 Reply • Share ›

Wonseok Song • 2 years ago

Mr. Urban -
Did you literally travel an year into the future when you wrote this and look into the problems of this election cycle and write about them last year? You are a magician.
The dogma section fits so perfectly.

1 Reply • Share ›

Marco • 2 years ago

So, Musk would like to see humanity using electric cars in order to produce less CO2, but then he would like to see humanity affording low cost space travel which is by far _the greatest_ CO2 producer per passenger moved? ;-P

Reply • Share ›

xorxornop ➚ Marco • a year ago

There's no alternative. He's not suggesting that rockets replace airplanes; airplanes can't go to space. You work with what is possible - the Reality.

So, you can either wait until you have the technology to do this carbon-free, or do it now but at a minor cost. Remember, these rockets are going to space, not acting like airplanes - there's a much lower flight rate and capacity.

Musk has decided that in the case of becoming multi-planetary, the benefits are worth the cost, and FWIW, I agree with this analysis.

If you examine the amount of CO2 produced by a rocket flight, and extrapolate that out to the amounts needed for colonisation of Mars, it's still a tiny, tiny fraction of what airplanes flights will be. Is that cost worthwhile? I think so. (particularly, every human that leaves takes their entire CO2 budget with them. This probably completely cancels out the CO2 cost of their leaving!)

6 Reply • Share ›

Felluv • 2 years ago

Don't mean to be too much of a stickler but Elon's statement: "....But then I came to understand, dark just means the absence of photons in the visible wavelength—400 to 700 nanometers. Then I thought, well it's really silly to be afraid of a lack of photons"

strikes me as a bit, i don't know, superficial or non-realistic or something.
I mean, there are very good reasons to be afraid of a lack of photons, for example:
1. We require photons to properly function in the world. In a part of the world without photons we become dysfunctional. Bump into and trip over things, fall into holes, lose sense of direction, become much less able to protect ourselves, etc.
2. There are entities that *are* capable of functioning well in, or simply take their chances in, areas with a significant lack of photons, and some of these creatures may be our deathly enemies, out to get us, whether or not we're paranoid:)

Jus' cogitatin'

15 Reply • Share ›

Water ➚ Felluv • a year ago

Move your bed to the middle of the room and there are no holes in the bedroom, make sure that you have no dangerous creatures in your room, lock all doors, close all windows etc. you could just solve it easily.

1 Reply • Share ›

sirishaditya • 2 years ago

I want to say Thank you- for freeing me from the shackles, for giving me a new sense of purpose, for giving me the courage to prioritize the action over the consequence. But I've had epiphanies like this before and all I have to say for them is that it's very convenient to give in and be a dogmatic believer in my own incompetence, in my lack of confidence in my abilities, in my crushed will to make my world a little better. I hope this realization is more long lived, though I'm not very optimistic. Atleast it showed me that there are some embers still burning within, that someday I'll have the courage to sit quietly and wait until I can hear the whispering of my inner voice over the cacophony of the world. I hope, and thank you for that.

1 Reply • Share ›

samuelvb • 2 years ago

Tim, have you ever read about the Asch conformity experiment? I think you make a wonderful point about Dogma, but what's interesting to know is that this has been backed up by actual research data (and interestingly, subsequently ignored in media and textbooks).

https://en.wikipedia.org/wi...

(... I know... Wikipedia... but the sources are there in a neat list)

1 Reply • Share ›

SUPERCILEX • 2 years ago

Thanks for the awesome post!!! At footnote 5, I just wanted to point out that you should come over to my tribe and use Google Docs. :) Seriously though, when you enable offline editing in Google Drive, you can edit all of your docs offline and every change gets saved automatically. I lost a bunch of writing too but because my battery died. Not acceptable. I switched to Google Docs after that. If you can't switch because you need to use WordPress for some reason, then I hope it's never happened to you again. Good luck! :)

1 Reply • Share ›

None ↗ SUPERCILEX • 2 years ago

WordPress is something that websites 'run' on.

1 • Reply • Share ›

SUPERCILEX ↗ None • 2 years ago

Yeah, I know. Theoretically, you could copy over a document from G Docs or Word without losing formatting, but maybe he has to keep using Wordpress because of formatting issues.

1 • Reply • Share ›

xangez • 2 years ago

Just read brave new world and it reminded me of this article.

“Yes; but what sort of science?" asked Mustapha Mond sarcastically. "You've had no scientific training, so you can't judge. I was a pretty good physicist in my time. Too good–good enough to realize that all our science is just a cookery book, with an orthodox theory of cooking that nobody's allowed to question, and a list of recipes that mustn't be added to except by special permission from the head cook. I'm the head cook now. But I was an inquisitive young scullion once. I started doing a bit of cooking on my own. Unorthodox cooking, illicit cooking. A bit of real science, in fact.”

Excerpt From: Huxley, Aldous. “Brave New World.”

It'll be really cool if you had got the idea for musks secret sauce here (intentionally or not). Have you read this book. If not was there a specific place you got inspiration from? Just curious :)

Btw, great article, my favourite by far. And it really changed me in a positive way.

6 • Reply • Share ›

Jesper • 2 years ago

Even though I don't know I'd necessarily want to literally be Elon Musk, this is still hands down the best life advice I've ever read. It seems that I've been stuck on Step 1 for a looong time, doubting everything I thought and never being sure of anything. Just reading this article already took me to Level 2, as I only now realize that no-one else really knows anything either. Now I'm convinced to overcome my fear of change and failure, so that I can finally become the componist instead of the musician (to use a different analogy).

That being said, I was a little annoyed by your use of the terms axiom and proof (I'm a mathematician by education, so that maybe explains my annoyance). An axiom is not something that's necessarily 100% true, but more like a basic assumption. Axioms can be judged on their consistency as well as their usefulness, so in that aspect they are not that different from a theory from a natural science. And a proof is not something that is true or false in itself, but rather acts as evidence for a certain theorem, so again not that different from natural sciences. The real difference is rather that a mathematical proof gives (theoretically) 100% confidence that the assumptions imply the conclusion, while a physical experiment can only get your confidence closer and closer to 100% without actually getting there. Maybe it would be worth it sometime to do an article on logic and mathematical proof? I think many people have a very wrong view on it and there's some fascinating aspects to explore like Gödel's incompleteness. I'd love to help on that if you're interested.

Either way, thank you very much for the article and the entire series. It took some time to finish, but it was truly worth the time.

7 • Reply • Share ›

Martin ↗ Jesper • 2 years ago

I support the motion.

• Reply • Share ›

Brian Barr • 2 years ago

Thank you for writing this. I've been sharing it with everyone that brings up any sort of introspective question. Because I really do think this is fundamental to all of it.

I think one thing we could explore more is the role being a cook can play in the formation of skill sets before becoming a chef in a particular field. I haven't yet decided if that's good or not - but I think it could accelerate growth and learning if you can be disciplined enough to take the most fundamental things to first principles, never take anything as truth without verification, and know when to switch out.

For example, a new musician will probably learn best by studying under an expert and playing specific pieces - doing it through a tested methodology and then (or while simultaneously) reverse engineering that to find the first principles for music.

1 • Reply • Share ›

Immanuel Jegan • 2 years ago

Thanks for writing this. I never realised before but I'm kinda like at different stages ranging from "Insecure Cook", "Self-Loathing Cook" and "Chef" depending on the subject matter. It really never occurred to me that I could be using the same approach in all areas, because I tend to defer to a more experienced person in areas that I am unfamiliar in.

Time to make some changes!

• Reply • Share ›

Elika • 2 years ago

I like this concept a lot. Your blog posts are super interesting and out-of-the-box. In reading your Musk series, I'm inspired to keep trying to remind myself to challenge my assumptions, as a person and as an engineer.

But one part of your discussion bothered me, and I can't tell if that's because I'm stuck with more societal ideas of the danger of traveling, but it goes something like this.... you are an older, Caucasian male. That comes with some privileges when traveling over myself, a 20 yr old Indian girl. People will judge me differently, and very likely treat me differently. This isn't an evidence-lacking conclusion: even traveling with my dad, he has the privilege of higher safety in certain conditions. He isn't cat called, or threatened in broad daylight. So how can you claim the traveling isn't dangerous, when that may only be true for you or people like you?

Then again, I know what you're trying to say haha, and I appreciate it. There are plenty of assumptions I make that if I question enough I realize I can afford to disregard. But the hardest part, I have found so far, is that I must remember that I do live in a world with other people who do follow society's rulebook. And that limits the levels to which I disregard my own assumptions, since I do happen to interact with other people quite a bit.

Thoughts, anyone? Ideas on how to get around this snag if we all want to become chefs one day?

5 ▲ ▼ • Reply • Share ›

Brian Barr ➚ Elika • 2 years ago

Hey, I certainly understand the bit about traveling. As a young caucasian male, I even sometimes feel guilty when my female friends tell me they wish they could travel the way I do.

I think the key thing to take away is to not assume that because everyone says it's dangerous, it must be so. To do you research, experiment a little, and find out for yourself what is true. And as he said, it's not about taking risk, it's about understanding reality. For example, I know it is foolish for me to move to South America without insurance or enough money to by an immediate return flight home. I've decided that for myself, given a relative cost/risk analysis, not because my parents/friends/etc told me so.

So unfortunately, for you, maybe there are parts of the world you should not travel alone too. If you want to go to these places, you need to understand WHY they are unsafe for you (using the first principle reasoning) and then develop realistic solutions (companions, security, etc) then you need to decide if any of them are viable for you - e.g. you may not have the means to hire security and if they're not, remove them from the reality box and accept that. I am willing to bet, there are at least some solutions that are viable. At this point, you'll need to decide if they're worth it. Every goal decision has costs associated with it and not everything is possible. You ultimately have to accept reality once you discover it through reasoning. Then maybe check back in on it every once and

see more

2 ▲ ▼ • Reply • Share ›

Cluedo Jameson ➚ Elika • 2 years ago

Hi Elika.
The issue you raise is one that has troubled me for several years now. I have travelled for quite a few years as a reasonably fit looking caucasian (non US/Europe though) male and am very aware of how sad it is that there are some places I can walk down the street freely where my daughter couldn't.
In the end though, I think first principles arguments are important ones here.
For example:
- Some places are empirically currently dangerous for me to travel to. However, some others are not. How can we create a good selection criteria or actions to reduce or better mitigate those dangers? Perhaps initially we have to initiate new ventures or adventures online, or in more safe areas, before slowly expanding our comfort zones.
- Some people may be inherent scumbags, whereas others may be just be cooks copying what they have seen others do. How can we change that? Maybe we can't convince everyone, but even on a small scale, what actions are possible to create changes that give everyone more freedom and safety?
- While you shouldn't have to always take a minder to travel, maybe when with some people it is safer. So perhaps you could have a travelling partner who is with you and makes you feel safer. Maybe you do more adventurous things than them and inspire them to try more. Maybe you make great conversation. Maybe you two can have greater adventures than you would alone anyway. That's not a long-term social change solution (and we need those too), but perhaps there are ways to reduce risk while also increasing, rather than decreasing the value you get too.

There are many questions and strategies and I do not profess to have the right ones. It saddens me that you and people like my daughter have to make choices far harder than I have. But it's not just about making hard choices. Elon may seem privileged now but ultimately he build himself up through enormous effort whilst being an immigrant with low capital access. So change is possible, however difficult, and I do dream that we can all have a part in it.

1 ▲ ▼ • Reply • Share ›

Daniel D • 2 years ago

I like the analogy of thinking of yourself as hardware and software... I'd like to learn more how tweak that

I like the analogy of thinking of yourself as hardware and software... I'd like to learn more how tweak that software, only I'm a procrastinator...

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Evan Timm ➚ Daniel D • 2 years ago

Your only a procrastinator "because my mom said so" How do you know your not just lacking a firm connection between wants and reality.

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Love the clarity conveyed using a liberal sprinkling of offensive words. And why the fuck not? I don't trust people that never use swearwords. They try too hard - usually to hide something...

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Dano Marr

This post deserves way more than 2 comments, because it's really really thought-provoking. You write so logically, really humorously, and approachably. I really enjoy it. And this topic—really makes me want to dig deep and move into chef-land.

Lots of really's in there. I want you to understand how much I like it.

Like · Reply · 2 · 30w

Radu Antoniu

You're a fantastic writer Tim.

Like · Reply · 2 · 47w

Michael Burden

"Most of us probably wouldn't have joined the Nazi party, because most of us aren't on the extreme end of the blind-to-conscious spectrum."

Neither were many of the people who joined the Nazi party.

It takes a lot more self-consciousness and world-consciousness than most people are able to attain in order to avoid subcuming to tribalism when you are absolutely, completely surrounded.

Like · Reply · 25w

Sachin Arora

Tim, I want to know the way you research. I want to follow you - Like a Cook follow a chef. 🙂
I want to follow your receipe.

One Question - What if a person trust his religion and follow it blindly. And I see people who are happy with it and also seems satisfied (specially with their religion). Everytime they face someething bad they say that don't worry, everything will be fine. If they do proper reasoning and their faith breaks at some points. They won't feel good after that. And they are feeling like their whole life was just a lie. What if someone of age more than 60 feel the same. What is good for them. Follow the same path or use reasoning.

Like · Reply · 10w

Nick Byers

Do you have any ideas for desensitizing your fear response? If that is truly the limiting factor for growth of the "innovation curve" of the world then it would make sense to double down on figuring it out. I was thinking of attacking disjoint fears (or at least seemingly independent) uniformly. Focus on one fear in the primal area (lack of food, perhaps some stoic exercises exist?), one in the social/identity area (social anxiety or sales type exercises?), one in the intellectual area (have debates until you are wrong, accept it and don't fight to try to win), one in the resources department (namely financial).

Like · Reply · 30w

Angie Maksymetz

The Chef (a silly song):
https://www.youtube.com/watch?v=50zLID3D_so

Like · Reply · 1 · 30w

Terry Lee

Amazing article. Just sent it to both of my kids. Here is a great example of a chef. https://youtu.be/OYecfV3ubP8

Like · Reply · 24w

Mohammed Saud

I come here once every few months for a "Software Update"

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Lucy Wen

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