Book Review: The Secret Of Our Success

Posted on June 4, 2019 by Scott Alexander

***Previously in sequence:** Epistemic Learned Helplessness.*

I

"Culture is the secret of humanity's success" sounds like the most vapid possible thesis. *The Secret Of Our Success* by anthropologist Joseph Henrich manages to be an amazing book anyway.

Henrich wants to debunk (or at least clarify) a popular view where humans succeeded because of our raw intelligence. In this view, we are smart enough to invent neat tools that help us survive and adapt to unfamiliar environments.

Against such theories: we cannot actually do this. Henrich walks the reader through many stories about European explorers marooned in unfamiliar environments. These explorers usually starved to death. They starved to death in the middle of endless plenty. Some of them were in Arctic lands that the Inuit considered among their richest hunting grounds. Others were in jungles, surrounded by edible plants and animals. One particularly unfortunate group was in Alabama, and would have perished entirely if they hadn't been captured and enslaved by local Indians first.

These explorers had many advantages over our hominid ancestors. For one thing, their exploration parties were made up entirely of strong young men in their prime, with no need to support women, children, or the elderly. They were often selected for their education and intelligence. Many of them were from Victorian Britain, one of the most successful civilizations in history, full of geniuses like Darwin and Galton. Most of them had some past experience with wilderness craft and survival. But despite their big brains, when faced with the task our big brains supposedly evolved for – figuring out how to do hunting and gathering in a wilderness environment – they failed pathetically.

Nor is it surprising that they failed. Hunting and gathering is actually really hard. Here's Henrich's description of how the Inuit hunt seals:

> You first have to find their breathing holes in the ice. It's important that the area around the hole be snow-covered—otherwise the seals will hear you and vanish. You then open the hole, smell it to verify it's still in use (what do seals smell like?), and then assess the shape of the hole using a special curved piece of caribou antler. The hole is then covered with snow, save for a small gap at the top that is capped with a down indicator. If the seal enters the hole, the indicator moves, and you must blindly plunge your harpoon into

the hole using all your weight. Your harpoon should be about 1.5 meters (5ft) long, with a detachable tip that is tethered with a heavy braid of sinew line. You can get the antler from the previously noted caribou, which you brought down with your driftwood bow.

The rear spike of the harpoon is made of extra-hard polar bear bone (yes, you also need to know how to kill polar bears; best to catch them napping in their dens). Once you've plunged your harpoon's head into the seal, you're then in a wrestling match as you reel him in, onto the ice, where you can finish him off with the aforementioned bear-bone spike.

Now you have a seal, but you have to cook it. However, there are no trees at this latitude for wood, and driftwood is too sparse and valuable to use routinely for fires. To have a reliable fire, you'll need to carve a lamp from soapstone (you know what soapstone looks like, right?), render some oil for the lamp from blubber, and make a wick out of a particular species of moss. You will also need water. The pack ice is frozen salt water, so using it for drinking will just make you dehydrate faster. However, old sea ice has lost most of its salt, so it can be melted to make potable water. Of course, you need to be able to locate and identify old sea ice by color and texture. To melt it, make sure you have enough oil for your soapstone lamp.

No surprise that stranded explorers couldn't figure all this out. It's more surprising that the Inuit *did*. And although the Arctic is an unusually hostile place for humans, Henrich makes it clear that hunting-gathering techniques of this level of complexity are standard everywhere. Here's how the Indians of Tierra del Fuego make arrows:

> Among the Fuegians, making an arrow requires a 14-step procedure that involves using seven different tools to work six different materials. Here are some of the steps:
>
> - The process begins by selecting the wood for the shaft, which preferably comes from chaura, a bushy, evergreen shrub. Though strong and light, this wood is a non-intuitive choice since the gnarled branches require extensive straightening (why not start with straighter branches?).
> - The wood is heated, straightened with the craftsman's teeth, and eventually finished with a scraper. Then, using a pre-heated and grooved stone, the shaft is pressed into the grooves and rubbed back and forth, pressing it down with a piece of fox skin. The fox skin becomes impregnated with the dust, which prepares it for the polishing stage (Does it have to be fox skin?).
> - Bits of pitch, gathered from the beach, are chewed and mixed with ash (What if you don't include the ash?).

> - The mixture is then applied to both ends of a heated shaft, which must then be coated with white clay (what about red clay? Do you have to heat it?). This prepares the ends for the fletching and arrowhead.
>
> - Two feathers are used for the fletching, preferably from upland geese (why not chicken feathers?).
>
> - Right-handed bowman must use feathers from the left wing of the bird, and vice versa for lefties (Does this really matter?).
>
> - The feathers are lashed to the shaft using sinews from the back of the guanaco, after they are smoothed and thinned with water and saliva (why not sinews from the fox that I had to kill for the aforementioned skin?).
>
> Next is the arrowhead, which must be crafted and then attached to the shaft, and of course there is also the bow, quiver and archery skills. But, I'll leave it there, since I think you get the idea.

How do hunter-gatherers know how to do all this? We usually summarize it as "culture". How did it form? Not through some smart Inuit or Fuegian person reasoning it out; if that had been it, smart European explorers should have been able to reason it out too.

The obvious answer is "cultural evolution", but Henrich isn't much better than anyone else at taking the mystery out of this phrase.

Trial and error must have been involved, and less successful groups/people imitating the techniques of more successful ones. But is that really a satisfying explanation?

I found the chapter on language a helpful reminder that we already basically accept something like this is true. How did language get invented? I'm especially interested in this question because of my brief interactions with conlanging communities – people who try to construct their own languages as a hobby or as part of a fantasy universe, like Tolkien did with Elvish. Most people are *terrible* at this; their languages are either unusable, or exact clones of English. Only people who (like Tolkien) already have years of formal training in linguistics can do a remotely passable job. And you're telling me the original languages were invented by cavemen? Surely there was no committee of Proto-Indo-European nomads that voted on whether to have an inflecting or agglutinating tongue? Surely nobody ran out of their cave shouting "Eureka!" after having discovered the interjection? We just kind of accept that after cavemen working really hard to communicate with each other, eventually language – still one of the most complicated and impressive productions of the human race – just sort of happened.

(this is how I feel about biological evolution too – how do you evolve an eye by trial and error? I've read papers speculating on the exact process, and they make lots of good points, but I still don't feel *happy* about it, like "Oh, of course this would happen!" At some point you just have to accept evolution is smarter than you are and smarter than you would expect to be possible.)

Taking the generation of culture as secondary to this kind of mysterious process, Henrich turns to its transmission. If cultural generation happens at a certain rate, then the fidelity of transmission determines whether a given society advances, stagnates, or declines.

For Henrich, humans started becoming more than just another species of monkey when we started transmitting culture with high fidelity. Some anthropologists talk about the Machiavellian Intelligence Hypothesis – the theory that humans evolved big brains in order to succeed at social maneuvering and climbing dominance hierarchies. Henrich counters with his own Cultural Intelligence Hypothesis – humans evolved big brains in order to be able to maintain things like Inuit seal hunting techniques. Everything that separates us from the apes is part of an evolutionary package designed to help us maintain this kind of culture, exploit this kind of culture, or adjust to the new abilities that this kind of culture gave us.

II

Secret gives many examples of many culture-related adaptations, and not all are in the brain.

Our digestive tracts evolved alongside our cultures. Specifically, they evolved to be unusually puny:

> Our mouths are the size of the squirrel monkey's, a species that weighs less than three pounds. Chimpanzees can open

> their mouths twice as ide as we can and hold substantial amounts of food compressed between their lips and large teeth. We also have puny jaw muscles that reach up only to just below our ears. Other primates' jaw muscles stretch to the top of their heads, where they sometimes even latch onto a central bony ridge. Our stomachs are small, having only a third of the surface area that we'd expect for a primate of our size, and our colons are too short, being only 60% of their expected mass.

Compared to other animals, we have such atrophied digestive tracts that we shouldn't be able to live. What saves us? All of our food processing techniques, especially cooking, but also chopping, rinsing, boiling, and soaking. We've done much of the work of digestion before food even enters our mouths. Our culture teaches us how to do this, both in broad terms like "hold things over fire to cook them" and in specific terms like "this plant needs to be soaked in water for 24 hours to leach out the toxins". Each culture has its own cooking knowledge related to the local plants and animals; a frequent cause of death among European explorers was cooking things in ways that didn't unlock any of the nutrients, and so starving while apparently well-fed.

Fire is an especially important food processing innovation, and it is entirely culturally transmitted. Henrich is kind of cruel in his insistence on this. He recommends readers go outside and try to start a fire. He even gives some helpful hints – flint is involved, rubbing two sticks together works for some people, etc. He predicts – and stories I've heard from unfortunate campers confirm – that you will not be able to do this, despite an IQ far beyond that of most of our hominid ancestors. In fact, some groups (most notably the aboriginal Tasmanians) seem to have lost the ability to make fire, and never rediscovered it. Fire-making was discovered a small number of times, maybe once, and has been culturally transmitted since then.

But it's not just about chopping things up or roasting them. Traditional food processing techniques can get arbitrarily complicated. Nixtamalization of corn, necessary to prevent vitamin deficiencies, involves soaking the corn in a solution containing ground-up burnt seashells. The ancient Mexicans discovered this and lived off corn just fine for millennia. When the conquistadors took over, they ignored it and ate corn straight. For four hundred years, Europeans and Americans ate unnixtamalized corn. By official statistics, three million Americans came down with corn-related vitamin deficiencies during this time, and up to a hundred thousand died. It wasn't until 1937 that Western scientists discovered which vitamins were involved and developed an industrial version of nixtamalization that made corn safe. Early 1900s Americans were very smart and had lots of advantages over ancient Mexicans. But the ancient Mexicans' culture got this one right in a way it took Westerners centuries to match.

Our hands and limbs also evolved alongside our cultures. We improved dramatically in some areas: after eons of tool use, our hands outclass those of any other ape in terms of finesse. In other cases, we devolved systems that were no longer necessary; we are much weaker than any other ape. Henrich describes a circus act of the 1940s where the ringmaster would challenge strong men in the audience to wrestle a juvenile chimpanzee. The chimpanzee was tied up, dressed in a mask that prevented it from biting, and wearing soft gloves that prevented it from scratching. No human ever lasted more than five seconds. Our common ancestor with other apes grew weaker and weaker as we became more and more reliant on artificial weapons to give us an advantage.

Even our sweat glands evolved alongside culture. Humans are persistence hunters: they cannot run as fast as gazelles, but they can keep running for longer than gazelles (or almost anything else). Why did we evolve into that niche? The secret is our ability to carry water. Every hunter-gatherer culture has invented its own water-carrying techniques, usually some kind of waterskin. This allowed humans to switch to perspiration-based cooling systems, which allowed them to run as long as they want.

III

But most of our differences from other apes are indeed in the brain. They're just not where you'd expect.

Tomasello et al tested human toddlers vs. apes on a series of traditional IQ type questions. The match-up was surprisingly fair; in areas like memory, logic, and spatial reasoning, the three species did about the same. But in ability to learn from another person, humans wiped the floor with the other two ape species:

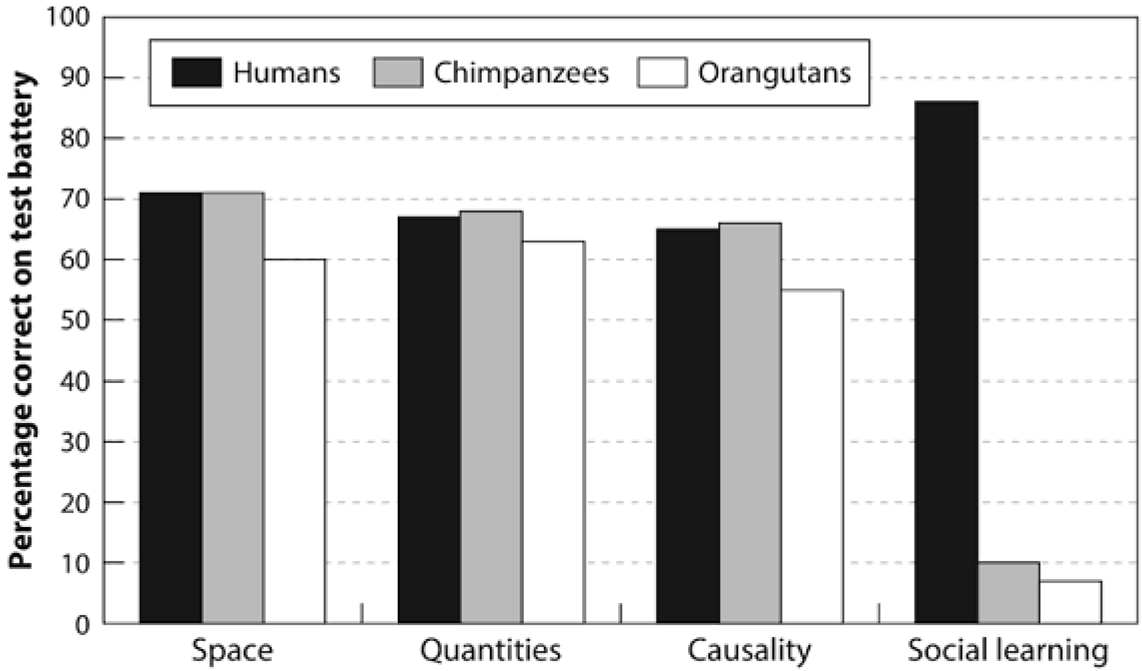

Figure 2.2. Average performance on four sets of cognitive tests with chimpanzees, orangutans, and toddlers.

Remember, Henrich thinks culture accumulates through random mutation. Humans don't have control over how culture gets generated. They have more control over how much of it gets transmitted to the next generation. If 100% gets transmitted, then as more and more mutations accumulate, the culture becomes better and better. If less than 100% gets transmitted, then at some point new culture gained and old culture lost fall into equilibrium, and your society stabilizes at some higher or lower technological level. This means that transmitting culture to the next generation is maybe the core human skill. The human brain is optimized to make this work as well as possible.

Human children are obsessed with learning things. And they don't learn things randomly. There seem to be "biases in cultural learning", ie slots in an infant's mind that they know need to be filled with knowledge, and which they preferentially seek out the knowledge necessary to fill.

One slot is for language. Human children naturally listen to speech (as early as in the womb). They naturally prune the phonemes they are able to produce and distinguish to the ones in the local language. And they naturally figure out how to speak and understand what people are saying, even though learning a language is hard even for smart adults.

Another slot is for animals. In a world where megafauna has been relegated to zoos, we *still* teach children their ABCs with "L is for lion" and "B is for bear", and children *still* read picture books about Mr. Frog and Mrs. Snake holding tea parties. Henrich suggests that just as the young brain is hard-coded to want to learn language, so it is hard-coded to want to learn the local animal life (maybe little boys' vehicle obsession is an outgrowth of this – buses and trains are the closest thing to local megafauna that most of them will encounter!)

Another slot is for plants:

> To see this system in operation, let's consider how infants respond to unfamiliar plants. Plants are loaded with prickly thorns, noxious oils, stinging nettles and dangerous toxins, all genetically evolved to prevent animals like us from mess-

ing with them. Given our species wide geographic range and diverse use of plants as foods, medicines and construction materials, we ought to be primed to both learn about plants and avoid their dangers. To explore this idea in the lab, the psychologists Annie Wertz and Karen Wynn first gave infants, who ranged in age from eight to eighteen months, an opportunity to touch novel plants (basil and parsley) and artifacts, including both novel objects and common ones, like wooden spoons and small lamps.

The results were striking. Regardless of age, many infants flatly refused to touch the plants at all. When they did touch them, they waited substantially longer than they did with the artifacts. By contrast, even with the novel objects, infants showed none of this reluctance. This suggests that well before one year of age infants can readily distinguish plants from other things, and are primed for caution with plants. But, how do they get past this conservative predisposition?

The answer is that infants keenly watch what other people do with plants, and are only inclined to touch or eat the plants that other people have touched or eaten. In fact, once they get the ‘go ahead’ via cultural learning, they are suddenly interested in eating plants. To explore this, Annie and Karen exposed infants to models who both picked fruit from plants and also picked fruit-like things from an artifact of similar size and shape to the plant. The models put both the fruit and the fruit-like things in their mouths. Next, the infants were given a choice to go for the fruit (picked from the plant) or the fruit-like things picked from the object. Over 75% of the time the infants went for the fruit, not the fruit-like things, since they'd gotten the 'go ahead' via cultural learning.

As a check, the infants were also exposed to models putting the fruit or fruit-like things behind their ears(not in their mouths). In this case, the infants went for the fruit or fruit-like things in equal measure. It seems that plants are most interesting if you can eat them, but only if you have some cultural learning cues that they aren't toxic.

After Annie first told me about her work while I was visiting Yale in 2013, I went home to test it on my 6-month-old son, Josh. Josh seemed very likely to overturn Annie's hard empirical work, since he immediately grasped anything you gave him and put it rapidly in his mouth. Comfortable in his mom's arms, I first offered Josh a novel plastic cube. He delighted in grapping it and shoving it directly into his mouth, without any hesitation. Then, I offered him a sprig of arugula. He quickly grabbed it, but then paused, looked with curious uncertainty at it, and then slowly let it fall from his hand while turning to hug his mom.

It's worth pointing out how rich the psychology is here. Not only do infants have to recognize that plants are different from objects of similar size, shape and color, but they need to create categories for types of plants, like basil and parsley, and distinguish 'eating' from just 'touching'. It does

> them little good to code their observation of someone eating basil as 'plants are good to eat' since that might cause them to eat poisonous plants as well as basil. But, it also does them little good to narrowly code the observation as 'that particular sprig of basil is good to eat' since that particular sprig has just been eaten by the person they are watching. This another content bias in cultural learning.

This ties into the more general phenomenon of figuring out what's edible. Most Westerners learn insects aren't edible; some Asians learn that they are. This feels deeper than just someone telling you insects aren't edible and you believing them. When I was in Thailand, my guide offered me a giant cricket, telling me it was delicious. I believed him when he said it was safe to eat, I even believed him when he said it tasted good to him, but my conditioning won out – I didn't eat the cricket. There seems to be some process where a child's brain learns what is and isn't locally edible, then hard-codes it against future change.

(Or so they say; I've never been able to eat shrimp either.)

Another slot is for gender roles. By now we've all heard the stories of progressives who try to raise their children without any exposure to gender. Their failure has sometimes been taken as evidence that gender is hard-coded. But it can't be quite that simple: some modern gender roles, like girls = pink, are far from obvious or universal. Instead, it looks like children have a hard-coded slot that gender roles go into, work hard to figure out what the local gender roles are (even if their parents are trying to confuse them), then latch onto them and don't let go.

In the Cultural Intelligence Hypothesis, humans live in obligate symbiosis with a culture. A brain without an associated culture is incomplete and not very useful. So the infant brain is adapted to seek out the important aspects of its local culture almost from birth and fill them into the appropriate slots in order to become whole.

IV

The next part of the book discusses post-childhood learning. This plays an important role in hunter-gatherer tribes:

> While hunters reach their peak strength and speed in their twenties, individual hunting success does not peak until around age 30, because success depends more on know-how and refined skills than on physical prowess.

This part of the book made most sense in the context of examples like the Inuit seal-hunting strategy which drove home just how complicated and difficult hunting-gathering was. Think less "Boy Scouts" and more "PhD"; a primitive tribesperson's life requires mastery of various complicated technologies and skills. And the difference between "mediocre hunter" and "great hunter" can be the difference between high status (and good mating opportunities) and low status, or even between life and death. Hunter-gatherers really want to learn the essentials of their hunter-gatherer lifestyle, and learning it is really hard. Their heuristics are:

Learn from people who are good at things and/or widely-respected. If you haven't already read about the difference between dominance and prestige hierarchies, check out Kevin Simler's blog post on the topic. People will fear and obey authority figures like kings and chieftains, but they give a different kind of respect ("prestige") to people who seem good at things. And since it's hard to figure out who's good at things (can a non-musician who wants to start learning music tell the difference between a merely good performer and one of the world's best?) most people use the heuristic of respecting the people who other people respect. Once you identify someone as respect-worthy, you strongly consider copying them in, well, everything:

> To understand prestige as a social phenomenon, it's crucial to realize that it's often difficult to figure out what precisely makes someone successful. In modern societies, the success of a star NBA basketball player might arise from his:
>
> 1. intensive practice in the offseason
> 2. sneaker preference
> 3. sleep schedule
> 4. pre-game prayer

5. special vitamins

6. taste for carrots

Any or all of these might increase his success. A naïve learner can't tell all the causal links between an individual's practices and his success. As a consequence, learners often copy their chosen models broadly across many domains. Of course, learners may place more weight on domains that for one reason or other seem more causally relevant to the model's success. This copying often includes the model's personal habits or styles as well as their goals and motivations, since these may be linked to their success. This "if in doubt, copy it" heuristic is one of the reasons why success in one domain converts to influence across a broad range of domains.

The immense range of celebrity endorsements in modern societies shows the power of prestige. For example, NBA star Lebron James, who went directly from High School to the pros, gets paid millions to endorse State Farm Insurance. Though a stunning basketball talent, it's unclear why Mr. James is qualified to recommend insurance companies. Similarly, Michael Jordan famously wore Hanes underwear and apparently Tiger Woods drove Buicks. Beyonce' drinks Pepsi (at least in commercials). What's the connection between musical talent and sugary cola beverages?

Finally, while new medical findings and public educational campaigns only gradually influence women's approach to

> preventive medicine, Angelina Jolie's single OP-ED in the New York Times, describing her decision to get a preventive double mastectomy after learning she had the 'faulty' BR-CA1 gene, flooded clinics from the U.K. to New Zealand with women seeking genetic screenings for breast cancer. Thus, an unwanted evolutionary side effect, prestige turns out to be worth millions, and represents a powerful and underutilized public health tool.

Of course, this creates the risk of prestige cascades, where some irrelevant factor (Henrich mentions being a reality show star) catapults someone to fame, everyone talks about them, and you end up with Muggeridge's definition of a celebrity: someone famous for being famous.

Some of this makes more sense if you go back to the evolutionary roots, and imagine watching the best hunter in your tribe to see what his secret is, or being nice to him in the hopes that he'll take you under his wing and teach you stuff.

(but if all this is true, shouldn't public awareness campaigns that hire celebrity spokespeople be wild successes? Don't they just as often fail, regardless of how famous a basketball player they can convince to lecture schoolchildren about how Winners Don't Do Drugs?)

Learn from people who are like you. If you are a man, it is probably a bad idea to learn fashion by observing women. If you are a servant, it is probably a bad idea to learn the rules of etiquette by observing how the king behaves. People are naturally inclined to learn from people more similar to themselves.

Henrich ties this in to various studies showing that black students learn best from a black teacher, female students from a female teacher, et cetera.

Learn from old people. Humans are almost unique in having menopause; most animals keep reproducing until they die in late middle-age. Why does evolution want humans to stick around without reproducing?

Because old people have already learned the local culture and can teach it to others. Henrich asks us to throw out any personal experience we have of elders; we live in a rapidly-changing world where an old person is probably "behind the times". But for most of history, change happened glacially slowly, and old people would have spent their entire lives accumulating relevant knowledge. Imagine a Silicon Valley programmer stumped by a particularly tough bug in his code calling up his grandfather, who has seventy years' experience in the relevant programming language.

Sometimes important events only happen once in a generation. Henrich tells the story of an Australian aboriginal tribe facing a massive drought. Nobody knew what to do except Paralji, the tribe's oldest man, who had lived through the last massive drought and remembered where his own elders had told him to find the last-resort waterholes.

This same dynamic seems to play out even in other species:

> In 1993, a severe drought hit Tanzania, resulting in the death of 20% of the African elephant calves in a population of about 200. This population contained 21 different families, each of which was led by a single matriarch. The 21 elephant families were divided into 3 clans, and each clan shared the same territory during the wet season (so, they knew each other). Researchers studying these elephants have analyzed the survival of the calves and found that families led by older matriarchs suffered fewer deaths of their calves during this drought.
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> Moreover, two of the three elephant clans unexpectedly left the park during the drought, presumably in search of water, and both had much higher survival rates than the one clan that stayed behind. It happens that these severe droughts only hit about once every four to five decades, and the last one hit about 1960. After that, sadly, elephant poaching in the 1970's killed off many of the elephants who would have been old enough in 1993 to recall the 1960 drought. However, it turns out that exactly one member of each of the two clans who left the park, and survived more effectively, were old enough to recall life in 1960. This suggests, that like Paralji in the Australian desert, they may have remembered what to do during a severe drought, and led their groups to the last water refuges. In the clan who stayed behind, the oldest member was born in 1960, and so was too young to have recalled the last major drought.

> More generally, aging elephant matriarchs have a big impact on their families, as those led by older matriarchs do better at identifying and avoiding predators (lions and humans), avoiding internal conflicts and identifying the calls of their fellow elephants. For example, in one set of field experiments, researchers played lion roars from both male and female lions, and from either a single lion or a trio of lions. For elephants, male lions are much more dangerous than females, and of course, three lions are always worse than only one lion. All the elephants generally responded with more defensive preparations when they heard three lions vs. one. However, only the older matriarchs keenly recognized the increased dangers of male lions over female lions, and responded to the increased threat with elephant defensive maneuvers.

V

I was inspired to read *Secret* by [Scholar's Stage's review](). I hate to be unoriginal, but after reading the whole book, I agree that the three sections Tanner cites – on divination, on manioc, and on shark taboos – are by far the best and most fascinating.

On divination:

> When hunting caribou, Naskapi foragers in Labrador, Canada, had to decide where to go. Common sense might lead

> one to go where one had success before or to where friends or neighbors recently spotted caribou.
>
> However, this situation is like [the Matching Pennies game]. The caribou are mismatchers and the hunters are matchers. That is, hunters want to match the locations of caribou while caribou want to mismatch the hunters, to avoid being shot and eaten. If a hunter shows any bias to return to previous spots, where he or others have seen caribou, then the caribou can benefit (survive better) by avoiding those locations (where they have previously seen humans). Thus, the best hunting strategy requires randomizing.
>
> Can cultural evolution compensate for our cognitive inadequacies? Traditionally, Naskapi hunters decided where to go to hunt using divination and believed that the shoulder bones of caribou could point the way to success. To start the ritual, the shoulder blade was heated over hot coals in a way that caused patterns of cracks and burnt spots to form. This patterning was then read as a kind of map, which was held in a pre-specified orientation. The cracking patterns were (probably) essentially random from the point of view of hunting locations, since the outcomes depended on myriad details about the bone, fire, ambient temperature, and heating process. Thus, these divination rituals may have provided a crude randomizing device that helped hunters avoid their own decision-making biases.

This is not some obscure, isolated practice, and other cases of divination provide more evidence. In Indonesia, the Kantus of Kalimantan use bird augury to select locations for their agricultural plots. Geographer Michael Dove argues that two factors will cause farmers to make plot placements that are too risky. First, Kantu ecological models contain the Gambler's Fallacy, and lead them to expect floods to be less likely to occur in a specific location after a big flood in that location (which is not true). Second… Kantus pay attention to others' success and copy the choices of successful households, meaning that if one of their neighbors has a good yield in an area one year, many other people will want to plant there in the next year. To reduce the risks posed by these cognitive and decision-making biases, Kantu rely on a system of bird augury that effectively randomizes their choices for locating garden plots, which helps them avoid catastrophic crop failures. Divination results depend not only on seeing a particular bird species in a particular location, but also on what type of call the bird makes (one type of call may be favorable, and another unfavorable).

The patterning of bird augury supports the view that this is a cultural adaptation. The system seems to have evolved and spread throughout this region since the 17th century when rice cultivation was introduced. This makes sense, since it is rice cultivation that is most positively influenced by randomizing garden locations. It's possible that, with the introduction of rice, a few farmers began to use bird sightings as an indication of favorable garden sites. On-average, over a life-

> time, these farmers would do better – be more successful – than farmers who relied on the Gambler's Fallacy or on copying others' immediate behavior. Whatever the process, within 400 years, the bird augury system spread throughout the agricultural populations of this Borneo region. Yet, it remains conspicuously missing or underdeveloped among local foraging groups and recent adopters of rice agriculture, as well as among populations in northern Borneo who rely on irrigation. So, bird augury has been systematically spreading in those regions where it's most adaptive.

Scott Aaronson has written about how easy it is to predict people trying to "be random":

> In a class I taught at Berkeley, I did an experiment where I wrote a simple little program that would let people type either "f" or "d" and would predict which key they were going to push next. It's actually very easy to write a program that will make the right prediction about 70% of the time. Most people don't really know how to type randomly. They'll have too many alternations and so on. There will be all sorts of patterns, so you just have to build some sort of probabilistic model. Even a very crude one will do well. I couldn't even beat my own program, knowing exactly how it worked. I challenged people to try this and the program was getting between 70% and 80% prediction rates. Then, we found one student that the program predicted exactly 50% of the time. We asked him what his secret was and he responded that he "just used his free will."

But being genuinely random is important in pursuing mixed game theoretic strategies. Henrich's view is that divination solved this problem effectively.

I'm reminded of the Romans using augury to decide when and where to attack. This always struck me as crazy; generals are going to risk the lives of thousands of soldiers because they saw a weird bird earlier that morning? But war is a classic example of when a random strategy can be useful. If you're deciding whether to attack the enemy's right vs. left flank, it's important that the enemy can't predict your decision and send his best defenders there. If you're generally predictable – and Scott Aaronson says you are – then outsourcing your decision to weird birds might be the best way to go.

And then there's manioc. This is a tuber native to the Americas. It contains cyanide, and if you eat too much of it, you get cyanide poisoning. From Henrich:

> In the Americas, where manioc was first domesticated, societies who have relied on bitter varieties for thousands of years show no evidence of chronic cyanide poisoning. In the Colombian Amazon, for example, indigenous Tukanoans use a multistep, multiday processing technique that involves scraping, grating, and finally washing the roots in order to separate the fiber, starch, and liquid. Once separated, the liquid is boiled into a beverage, but the fiber and starch must then sit for two more days, when they can then be baked and eaten. Figure 7.1 shows the percentage of

cyanogenic content in the liquid, fiber, and starch remaining through each major step in this processing.

Such processing techniques are crucial for living in many parts of Amazonia, where other crops are difficult to cultivate and often unproductive. However, despite their utility, one person would have a difficult time figuring out the detoxification technique. Consider the situation from the point of view of the children and adolescents who are learning the techniques. They would have rarely, if ever, seen anyone get cyanide poisoning, because the techniques work. And even if the processing was ineffective, such that cases of goiter (swollen necks) or neurological problems were common, it would still be hard to recognize the link between these chronic health issues and eating manioc. Most people would have eaten manioc for years with no apparent effects. Low cyanogenic varieties are typically boiled, but boiling alone is insufficient to prevent the chronic conditions for bitter varieties. Boiling does, however, remove or reduce the bitter taste and prevent the acute symptoms (e.g., diarrhea, stomach troubles, and vomiting).

So, if one did the common-sense thing and just boiled the high-cyanogenic manioc, everything would seem fine. Since the multistep task of processing manioc is long, arduous, and boring, sticking with it is certainly non-intuitive. Tukanoan women spend about a quarter of their day detoxifying manioc, so this is a costly technique in the short term. Now consider what might result if a self-reliant Tukanoan mother decided to drop any seemingly unnecessary steps from the processing of her bitter manioc. She might critically examine the procedure handed down to her from earlier generations and conclude that the goal of the procedure is to remove the bitter taste. She might then experiment with alternative procedures by dropping some of the more labor-intensive or time-consuming steps. She'd find that with a shorter and much less labor-intensive process, she could remove the bitter taste. Adopting this easier protocol, she would have more time for other activities, like caring for her children. Of course, years or decades later her family would begin to develop the symptoms of chronic cyanide poisoning.

Thus, the unwillingness of this mother to take on faith the practices handed down to her from earlier generations would result in sickness and early death for members of her family. Individual learning does not pay here, and intuitions are misleading. The problem is that the steps in this procedure are causally opaque—an individual cannot readily infer their functions, interrelationships, or importance. The causal opacity of many cultural adaptations had a big impact on our psychology.

Wait. Maybe I'm wrong about manioc processing. Perhaps it's actually rather easy to individually figure out the detoxification steps for manioc? Fortunately, history has provided a test case. At the beginning of the seventeenth century, the Portuguese transported manioc from South America to West Africa for the first time. They did not, however, transport the

> age-old indigenous processing protocols or the underlying commitment to using those techniques. Because it is easy to plant and provides high yields in infertile or drought-prone areas, manioc spread rapidly across Africa and became a staple food for many populations. The processing techniques, however, were not readily or consistently regenerated. Even after hundreds of years, chronic cyanide poisoning remains a serious health problem in Africa. Detailed studies of local preparation techniques show that high levels of cyanide often remain and that many individuals carry low levels of cyanide in their blood or urine, which haven't yet manifested in symptoms. In some places, there's no processing at all, or sometimes the processing actually increases the cyanogenic content. On the positive side, some African groups have in fact culturally evolved effective processing techniques, but these techniques are spreading only slowly.

Rationalists always wonder: how come people aren't more rational? How come you can prove a thousand times, using Facts and Logic, that something is stupid, and yet people will still keep doing it?

Henrich hints at an answer: for basically all of history, using reason would get you killed.

A reasonable person would have figured out there was no way for oracle-bones to accurately predict the future. They would have abandoned divination, failed at hunting, and maybe died of starvation.

A reasonable person would have asked why everyone was wasting so much time preparing manioc. When told "Because that's how we've always done it", they would have been unsatisfied with that answer. They would have done some experiments, and found that a simpler process of boiling it worked just as well. They would have saved lots of time, maybe converted all their friends to the new and easier method. Twenty years later, they would have gotten sick and died, in a way so causally distant from their decision to change manioc processing methods that nobody would ever have been able to link the two together.

Henrich discusses pregnancy taboos in Fiji; pregnant women are banned from eating sharks. Sure enough, these sharks contain chemicals that can cause birth defects. The women didn't really know why they weren't eating the sharks, but when anthropologists demanded a reason, they eventually decided it was because their babies would be born with shark skin rather than human skin. As explanations go, this leaves a lot to be desired. How come you can still eat other fish? Aren't you worried your kids will have scales? Doesn't the slightest familiarity with biology prove this mechanism is garbage? But if some smart independent-minded iconoclastic Fijian girl figured any of this out, she would break the taboo and her child would have birth defects.

In giving humans reason at all, evolution took a huge risk. Surely it must have wished there was some other way, some path that made us big-brained enough to understand tradition, but not big-brained enough to question it. Maybe it searched for a mind design like that and couldn't find one. So it was left with this ticking timebomb, this ape that was constantly going to be able to convince itself of hare-brained and probably-fatal ideas.

Here, too, culture came to the rescue. One of the most important parts of any culture – more important than the techniques for hunting seals, more important than the techniques for processing tubers – is techniques for making sure nobody ever questions tradition. Like the belief that anyone who doesn't conform is probably a witch who should be cast out lest they bring destruction upon everybody. Or the belief in a God who has commanded certain specific weird dietary restrictions, and will torture you forever if you disagree. Or the fairy tales where the prince asks a wizard for help, and the wizard says "You may have everything you wish forever, but you must never nod your head at a badger", and then one day the prince nods his head at a badger, and his whole empire collapses into dust, and the moral of the story is that you should always obey weird advice you don't understand.

There's a monster at the end of this book. Humans evolved to transmit culture with high fidelity. And one of the biggest threats to transmitting culture with high fidelity was Reason. Our ancestors lived in Epistemic Hell, where they had to constantly rely on causally opaque processes with justifications that couldn't possibly be true, and if they ever questioned them then they might die. Historically, Reason has been the villain of the human narrative, a corrosive force that tempts people away from adaptive behavior towards choices that "sounded good at the time".

Why are people so bad at reasoning? For the same reason they're so bad at letting poisonous spiders walk all over their face without freaking out. Both "skills" are really bad ideas, most of the people who tried them died in the process, so evolution removed those genes from the population, and successful cultures stigmatized them enough to give people an internalized fear of even trying.

VI

This book belongs alongside *Seeing Like A State* and the works of G.K. Chesterton as attempts to justify tradition, and to argue for organically-evolved institutions over top-down planning. What unique contribution does it make to this canon?

First, a lot more specifically anthropological / paleoanthropological rigor than the other two.

Second, a much crisper focus: Chesterton had only the fuzziest idea that he was writing about cultural evolution, and Scott was only a little clearer. I think Henrich is the only one of the three to use the term, and once you hear it, it's obviously the right framing.

Third, a sense of how traditions contain the meta-tradition of defending themselves against Reason, and a sense for why this is necessary.

And fourth, maybe we're not at the point where we really want unique contributions yet. Maybe we're still at the point where we have to have this hammered in by more and more examples. The temptation is always to say “Ah, yes, a few simple things like taboos against eating poisonous plants may be relics of cultural evolution, but obviously by now we’re at the point where we know which traditions are important vs. random looniness, and we can rationally stick to the important ones while throwing out the garbage.” And then somebody points out to you that *actually* divination using oracle bones was one of the important traditions, and if you thought you knew better than that and tried to throw it out, your civilization would falter.

Maybe we just need to keep reading more similarly-themed books until this point really sinks in, and we get properly worried.