Rationally Speaking #238: Razib Khan on “Stuff I’ve been wrong about”

Julia Galef: Welcome to Rationally Speaking, the podcast where we explore the borderlands between reason and nonsense. I'm your host, Julia Galef, and my guest today is Razib Khan.

Razib is a geneticist for Insitome, and he has three blogs and two podcasts of his own. He blogs for Insitome, and then also blogs at Gene Expression and Brown Pundits. And then he hosts the Insitome podcast and hosts the Brown Pundits podcast. So he's a busy guy.

But this episode with Razib was inspired by a conversation on Facebook recently in which I was complaining about public intellectuals not changing their mind very often... and Razib said, "Oh, interesting, this makes me want to write a list of things that I've chan ged my mind about – or, things that I've been wrong about."

And he did. He wrote a blog post with this fascinating list of like 30 things that he's changed his mind about in the last decade or so, in his field of genetics, but also in other fields of science, politics, economics, religion.

And I was reading through it and I just kept wanting to ask him to elaborate more on why he changed his mind and what his new view is. So, that's what we're going to do in this episode. Razib, welcome to Rationally Speaking.

Razib Khan: Great to be here.

Julia Galef: I liked that your mind changes in your list are more complex than just the sort of archetypal, "I used to think X, and now I think the opposite of X," which I think is actually a very unrepresentative type of mind change, but it's like the archetype that people think of when they think of changing your mind.

And yours are ... Well, I mean yours are all different, but a lot of yours are like, "Well, I was pretty confident that X and now I'm confused," which is how most of my mind changes go, honestly.

Razib Khan: Yeah. So, I think you hit the nail on the head there. A lot of it has to do with my stronger skepticism of very bold and strident claims, as I've gotten older and I have more experience with how those work out.

Julia Galef: I feel like that is a pattern, and it makes sense. I wonder if there's anyone whose evolution of their thinking over time has gone in the opposite direction, and they're now less agnostic and they think things are simpler and clearer than they used to, when they were younger. That would be an interesting episode.

Razib Khan: Well, I would say that I think if you are in a very technical field and you have a specialty, you can develop an intuitive feel for things sometimes. Where I feel like there are certain questions, certain types of things related to genetics where I have a stronger opinion than I would have 20 years ago because I have more experience.

Julia Galef: Let's jump in with something you wrote about religion. So I'm just going to ... When I go through this list, I'm going to read what you wrote and then we can have you elaborate.

So you wrote, "My views in relation to religion were close to what was for a while termed the 'new atheism.' I don't hold that view anymore. Around 2004, I moved away from this position and came to believe that the roots of religion were cognitive and the social and cultural complexity required deeper analysis rather than plain dismissal."

So I assume by the new atheism view of religion, you don't just mean the view that it's false. You mean something about how new atheists explained the roots of religion or the role of religion in society? How would you describe the new atheist view of religion?

Razib Khan: I think the new atheist view of religion is kind of like a complicated version, or a educated version, of the village atheist view of religion. Where-

Julia Galef: Did you say "village atheist"?

Razib Khan: Yeah, I mean, a village atheist was just like the guy in the medieval village who just didn't believe the orthodoxy. And was just really just obstinate, like medieval Richard Dawkins. Imagine Richard Dawkins in a cape.

Razib Khan: Yeah. So basically what I mean by new atheist is the idea that religion is a set of propositions, just like a formal set of propositions. And that's how I viewed religion. So you could just refute it.

And I don't think it's that way. I think for most people it's a set of intuitions. They don't have a really strong rational view of it.

Razib Khan: Does that make sense?

Julia Galef: Yeah, I certainly share that view. I guess I would have thought the standard atheist model of what's happening for religious people is they... there's this thing that people around them believe, that they've grown up thinking is the good and virtuous thing to believe. And it's also comforting. And so it's the standard kind of motivated cognition model. Where they have various motives for believing it, and so that causes confirmation bias and denialism and things like that.

Is that not what you're saying?

Razib Khan: So that's a layer on top of it. The social aspect is a layer on top of it, but I'm pretty sure that most people, just from what I've done reading in the psychology, they have strong supernatural intuitions due to like agency detection and stuff like that-

Julia Galef: What do you mean by agency detection?

Razib Khan: And it's just really overwhelmed. It's like if you're walking through a cemetery, you're creeped out because you think someone might be there. I don't actually have that feeling very strongly at all, but I know many people that do. When I have a discussion with someone who actually believes in ghosts, it's really difficult for me to overcome their strong intuition that there are ghosts.

I don't have that strong intention. I never have. And a lot of people who I know who are atheists like me have never had that strong intuition.

Julia Galef: Interesting.

Razib Khan: So I think we start out with a deck of cards that make us much more amenable to the idea that there are no supernatural agents in the universe, because we don't have that strong intuition.

Julia Galef: Interesting. But religion... There's a super strong correlation with whether you're religious and whether your family and society or subculture are religious. So does that suggest that the predisposition to have this kind of agency detection trait is genetic?

Razib Khan: I think agency detection is basically an outgrowth of theory of mind. So yeah, it is genetic. It is heritable. There's some variation within the population. There's a disposition.

But I mean, the way I would think about it is if you think of the constant rate of acceleration of a ball as it drops, we have intuitions of how that ball should actually move, and that's at variance with reality.

But we can show people what the constant rate of acceleration is, like an iron ball or something like that. So I mean you can obviously convince people out of these views. It's just some intuitions are stronger and more culturally embedded than others.

Razib Khan: So it's like if, I used to think, if you refute the ontological argument for the existence of God and then you refute the teleological argument for the existence of God, et cetera, et cetera, you could refute the existence. I think this is very irrelevant to most people.

Julia Galef: Okay. So your model, it's kind of a two prong model, or multi-factor model of who becomes religious. Some people have stronger innate intuitions that make them feel like there should be a supernatural explanation for things, and other people have less of those intuitions.

But then the degree to which you are amenable to overriding or changing your intuitions depends a lot on cultural factors and your family and the society you live in.

Razib Khan: Exactly. So it's a phenomenon with multiple structural layers. And so the bottom-most layer is just -- when I say cognitive, it's what's your intuition is about plausibility. And that's the foundation.

It doesn't have to be organized religion. It's not necessarily -- so, that's why I gave you the example of people who believe in ghosts. It's not because they've seen a ghost. It's just they feel that they're there. I've never felt that they were there, but that's just me.

Julia Galef: Got it. And what changed your mind about this? Was it just talking to people, and discovering that they have these really strong intuitions that you just never had experienced?

Razib Khan: No, it was reading research. Because that's the way I roll.

Julia Galef: Well, that's very in keeping with the topic.

Razib Khan: It's just showing you how I'm not a normal person. I had to read replicable research, and I was like, oh these intuitions are really strong. They're not just lying to me.

Julia Galef: Cool. Let's talk about some of the items on your list that were about genetics.

I don't know enough about the field to understand why the questions that you listed that you changed your mind about are significant. Like, why the answer to those questions matters. So I just wanted to go through a few of them and find out why they matter.

One is, you said, “I underestimated how complex complex traits were. I wasn't totally wrong, but the factor was off.”

So why does it matter how complex complex traits are, and how did you learn the factor was off?

Razib Khan: Yeah, I mean why would it matter... if we're doing genetic engineering and there's, I don't know, a thousand genes that affect a characteristic, you're not going to be able to engineer it very easily, because there's so many moving parts. If there's one or two genes, obviously it'll be easy to quote unquote fix or change the characteristic, right? So when you translate science into engineering, the complexity is going to have an effect in terms of how easy it'll be to engineer.

And more broadly why it matters... if you're talking about prediction algorithms, they're generally just going to be easier when there's fewer genes that you can have in your model to make the prediction. Everything becomes more tractable when you have fewer genetic positions.

So think about something like height... Actually, I'll give you a concrete example. Skin color turns out to be mostly due to about 10 genes. That means that for forensics you can do really good predictions on pigmentation, relatively good prediction on the pigmentation of samples. So for crimes or stuff in the past.

When it comes to height, it's more like a thousand genes, a hundred to a thousand genes, depending on how you want to do the distribution of effect sizes. That's a lot of genes. So it's much more difficult to predict someone's height than it is to predict their complexion. Right?

And so, I mean that matters for forensics, and matters for a bunch of things. It will matter if you want to do genetic engineering. And then obviously beyond height, there are psychological traits which are super controversial and super important and super interesting

to everybody. Intelligence, personality, even religiosity, all of these things.

Everything is somewhat heritable to various degrees. Something like schizophrenia is 80% heritable, right? So, I mean that's really important for genetic prediction. So how complex the trait is depends... affects how good your predictions are going to be.

Julia Galef: Is there a kind of direct relationship between how complex something is, and how heritable it is? Like the more complex, the less heritable?

Razib Khan: In general, no. Actually, it's the more complex, the more heritable, because often it's not strongly selected. Like height.

Julia Galef: Oh I see. It would be kind of coincidental if all the pieces --

Razib Khan: It's kind of a subtle thing.

Julia Galef: Yeah, go on.

Razib Khan: Yeah. Well I mean it's just, there's a lot of variation. If it's complex, there's a lot of variation in your genome. So if it was strongly selected, the variation would be gone.

And so actually it tends to be the opposite way. Really complex traits tend to be more heritable then you would expect. That's not always true, but intelligence, 50% heritable, 50% of the variations in the population. Height's 60 to 80%, Schizophrenia's 80%.

Julia Galef: I'm just surprised, because you said that skin color was simple, or simpler than height. But obviously skin color is more heritable than height. It would be, right?

Razib Khan: Yeah, yeah. So I mean this is, it's a generality. But a lot of times let’s take something like, number of digits you have on your hand. They're usually due to new mutations. So they're not actually that heritable. They're new mutations, these are technical issues.

But generally, really simple characteristics often have strong fitness consequences. If there are strong fitness consequences, selection often tends to get rid of the variation quickly, so a lot of the variation is random.

Does that make sense? If the fitness consequences aren't strong, if it doesn't matter if you're tall or short, selections not going to get rid

of the variation. And so more of it will be preserved that's heritable across the generation.

Julia Galef: Yeah. Interesting. So why did you use to think traits in general were simpler than they actually are?

Razib Khan: Partly because I wanted it to be. I mean you want it... You know what I'm saying? If you're doing a science, you kind of want it to be tractable. That's why you're doing it.

Julia Galef: Is it like... you started with simple traits because that's just what we as a scientific community first discovered, and people focused on those, and just kind of wishfully assumed they could extrapolate to most other traits?

Razib Khan: So when I first started thinking about this, say 20 years ago, we didn't know how many genes there were in the human genome. Now we know there are 19,000. So we didn't know a lot of the map.

And so if you told me that intelligence was 100 genetic positions, I'd be like, okay, that sounds plausible. It turns out it's closer to a thousand, okay. So I knew it was complex, but I didn't have a good sense of order of magnitude, because we have a good sense of order of magnitude in the whole genome.

Julia Galef: Right. You didn't have a clear prior of what --

Razib Khan: It's like I didn't have a scaling [factor] --

Julia Galef: Yeah. Got it. Okay, another item on your list in the genetics category is:

"I no longer believe in a 'cognitive great leap forward' 50,000 years ago in human evolution. I don't know what I believe, but I think gradual and cumulative processes are probably more important, and the roots of human uniqueness as quite ancient. My views began to change around 2010 with evidence for archaic introgression."

So why does it matter whether there was a cognitive great leap -- okay, let's back up. What is a cognitive great leap forward?

Razib Khan: Yeah, so it basically means that there's a mutation or a change, and we go from becoming non sentient to sentient. From non cultural creatures, to cultural creatures.

Julia Galef: Actually discrete?

Razib Khan: Does that make sense?

Julia Galef: I mean, it can't be really discrete. There's not like a gene for sentience, right?

Razib Khan: Yeah. I mean there was... Richard Klein is a paleo anthropologist who wrote a book in 2005 which basically argues that there was a macro mutation. So it was like a saltation event. That's the most extreme case. So it's an event where there's a single mutation and he's positing that it was due to random genetic drift and allowed for development of language. Someone with a more psycholinguistic viewpoint would say like recursive language.

Julia Galef: So discrete, like evolving lactose tolerance or something?

Razib Khan: Yeah, I mean that would be... that's actually an example of a mutation like that, where it's a single change and it changes the whole characteristic.

So I mean the idea is, quite rapidly we became a cultural creature about 50,000 years ago, when we spread across the world and we replaced everybody else. Right? So stuff like religion, language, symbolic manipulation and thought, all of these things that are characteristic of our species, if not exclusive to. We always have developed it pretty extensively.

The idea was that emerged really rapidly, and it explains the rapid expansion of humans outside of Africa. Because we know from the archeology that there was a massive pulse between, say 40 to 60,000 years ago. Let's center it around 50,000 years ago.

Razib Khan: And our ancestors, our relatives, our ancestors were the first to make it to Australasia, the first to make it to the new world. They push North into Siberia and areas that hadn't been occupied before. So hominins, our lineage, has been around for a few million years. And they'd been gradually increasing in brain size for a few million years.

But then around 50,000 years ago, there was kind of a revolutionary switch in terms of what we could do. So, we know for a fact that modern humans did not make it beyond the Wallace line. Well at least... They made it a little beyond the Wallace line, I think the hobbits and Flores are a little beyond. But anyways, they didn't make it really to Australia. They did make it to Papua.

That happened about 45, 50,000 years ago. And so it seems like really, really sudden.

And that's also when Neanderthals were replaced in Europe. So the hypothesis was something special happened. We don't know what happened.

Julia Galef: Just looking at that pattern naively and trying to guess about how sentience evolved... I would have assumed that the evolution of intelligence was gradual and not sudden, like lactose tolerance, where there's a mutation and people are sentient.

So the evolution of intelligence was gradual -- but there was some threshold above which you're intelligent enough to transmit culture, and kind of store it. So, the actual functional intelligence of a community or a civilization looks like it just was this huge discrete change where suddenly you have this rapid expansion of culture -- because you've just passed the threshold of raw intelligence that you can start doing that.

Was that not the prior that people had?

Razib Khan: I don't know what people... It was just kind of, we just knew there was an out of Africa expansion, and I don't think it was really well modeled. Partly because as you were implying, we know from the skulls that the brain size gradually... Like, the biggest brain hominins are Neanderthals. Okay. So I mean there was a lot of confusion on what intelligence meant and was it related to like how the brain was organized as opposed to size. There was a lot of lack of clarity. All we knew was some incredibly effective cultural creature emerged around 50,000 years ago and replaced everyone else.

Julia Galef: Okay. So you say around 2010 you started getting evidence for something called archaic introgression, which changed your view of that. What is archaic introgression and why did it change your view?

Razib Khan: I mean basically you got sequences of Neanderthals, and you saw that it was in a lot of modern humans. So we obviously intermixed with them. And there's various technical reasons.

We know that it happened about 50,000 years ago in primarily a singular event. So perhaps it was a fusion of a small Neanderthal tribe with a greater group of humans that happened in the near East. But I mean, humans will have relations... Will copulate with lots of organisms.

So I'm not saying we're necessarily picky, but to me it was suggested like, okay, we obviously perceived them as human. Most people

outside of Africa are 2% Neanderthal and they don't seem that strange.

And so there were already... I was already having skepticism of some of the extreme “out of Africa” views before 2010, but that's direct evidence, right? We interbred with them, we mated with them and there were hybrid offspring.

Razib Khan: We've now discovered individuals that are an eighth Neanderthal, so they had a great grandparent that was Neanderthal. I mean that’s strongly suggestive that they were just human like us, just different.

But anyway, so with the Neanderthals, basically they seem way more human looking at their genome than we were expecting. So if there was a big genetic difference, it's not there in the genome. Does that make sense?

We have the genome, we can actually see their sequence. Their sequence is not that different in all but quote special areas, like the language areas and all these other areas. There

If we had heard about the language gene in the early 2000s, called foxp2... It was reported extensively. We don't find really strong differences between Neanderthals and modern humans. We know this from the genes now. We have the Neanderthal genome, right? So if there was a prediction of a single gene that was different between the two lineages, it's really hard to find that, that has anything that's related to cognitive development.

Julia Galef: Wait, was the original idea of the cognitive leap forward, was that the same as moved from Neanderthal to human? No?

Razib Khan: That's the best case because Neanderthals were so successful and we replaced them in Europe. Our modern human ancestors seem to replace them in a very, very clearly documented way. Right? Europe has a lot of archeology because of its historical background and so we know a lot about it. So, it's the best case scenario. It's the best test of the hypothesis. Does that make sense?

Julia Galef: Okay. Just one more time. What should we expect to see in Neanderthal genetics if the great cognitive leap forward hypothesis were true?

Razib Khan: I mean, I think one of that predictions would have been that all of these like bio-behavioral loci, related to language and psychological development, should be very, very strikingly different. And there

have been geneticists that have looked for the gene that makes us human as we understand it. They haven't really found it.

Julia Galef: Got it. Okay, great. Let's move on to... you had several mind changes in other scientific fields besides genetics. One was about evolutionary psychology.

You wrote, “I accepted evolutionary psychology in a classical sense, massive modularity, et cetera, in the early 2000s. Not sure that the full package is necessary.”

What do you mean by modularity? Is it the modular mind thesis, that we have different parts of the mind that have evolved to do different things?

Razib Khan: Yeah, I mean, so Tooby and Cosmides, when they kind of promoted the field and developed it in the 80s, they came out of psychology. And they have this idea of the Swiss Army knife model of the mind, and that we have competencies that were very specialized. So, there's like a language module and ... theory of mind, and there was stuff in the 90s and 2000s about localizing using cognitive neuroscience to particular regions of the brain.

And the main reason that I changed my view, it was looking at the cognitive neuroscience, it looks like a lot of this stuff is relatively more plastic, even though there are regions of the mind. But, I mean if you have damage to one area of the brain that's normally localized for, say language, sometimes another area of the brain could actually come on as a backup, and do it even if it's not at 100%.

Or there was a book by Stanislas Dehaene on reading. And it showed how when we recognize letters, it localizes to a region of the brain that's normally associated in hunter gatherers with looking at like shapes in nature. Right? And so, there's obviously some localization, but there's just so much co-option and repackaging, that this sort of like specialized domain competencies, I don't know if that's really necessary to understand what's going on.

Julia Galef: Interesting. Is that really central to evo psych, though? When I think of archetypal evolutionary psychology hypotheses, like, I don't know, men being attracted to women with markers of fertility, or women being attracted to men with, I don't know, markers of status or strength or whatever. I don't see how that relates... Hypotheses like that don't seem to relate to the modularity of mind thesis.

Razib Khan: Yeah, I mean, so I'm not a psychologist myself... But I mean, in the original formulation, there's basically a core group of Evolutionary Psychologists that adhere to all these general propositions.

And then there's like the broader field of just evolutionary psychology without the capital letters. Right? And so I think the modularity of the mind comes out of this theory that okay, adaptation is very strong and our brain is adapted to these specialized tasks. And it just makes sense to think that there was like special regions of the brain, that were targeted by adaptation.

Julia Galef: Got it. So, do you have a model of why you disagree, or what you disagree about, with current evolutionary psychologists? I had Diana Fleischman on the show last year, what would you disagree with her about, regarding just the general priors or method in the field?

Razib Khan: Yeah, I mean, I don't know. I know Diana and I respect her work. I don't know what her theoretical commitments are. So, we're talking mostly about theoretical commitments. I think evolutionary psychologists... I think they're a little bit more adaptationist than I am at this point.

And also, they focus more on individual level gains a lot. And so, I think they think ... I think Diana would probably favor more individual optimization of fitness. And I think it's a lot noisier than that at this point. So, a lot of the stuff is not a signal of adaptation. It could just be... I mean, I'll call it noise, but I think it's embedded in a broader cultural matrix and I think it's more important to look at it that way now.

So, it's evolutionary psychology versus behavioral ecology. They're not that different, but their cultures and science are different in what they focus on. And so, I'm more in between than I used to be.

Julia Galef: You mentioned cognitive neuroscience a couple of minutes ago...

One of the other items on your list was, “Like many people, I put too much credence in fMRI based cognitive neuroscience. Should have ignored it.”

So, I think I know roughly what you're referring to, but for the sake of our listeners, can you give the nutshell summary of why credence in fMRI based neuroscience has gone down?

Razib Khan: Yeah, I think a lot of it, it's just like... that was one of the first cases of the replication crisis. Although I think it was even before the primary replication crisis.

Julia Galef: Yeah, I think it was.

Razib Khan: Yeah, it was these small sample sizes of brain imaging. And they had to be small sample sizes, because if you know people who do fMRI, I mean, how many people are you going to get to sit in that little chamber to get scanned?

And, the images were really, really captivating. And you would see the associations of images to particular regions and particular stimuli. And it was just... everything fit together in terms of what you would think. Because you know that this is in the brain somewhere and they're actually showing you where it is. Right? And so it was very attractive, in terms of being able to see the physical location of some sort of psychological phenomenon.

But I mean, I think a lot of it has turned out to be just like small sample sizes, and spurious associations because of the small sample sizes using the traditional P values. They would try to make some functional sense – like, "This is in a region of the brain associated with this, that, and this" -- but obviously, there was a lot of data dredging, lack of multiple hypothesis testing going on there.

And so, I just don't know ... I assume some of it is still valid, but a lot of it was obviously just wishful thinking. And, the sexiness of the technology really sold it for a lot of people, including me.

Julia Galef: In the sense of, having pictures of brain scans makes a claim seem 50% more credible?

Razib Khan: Exactly. Because stuff's happening in the brain, you know that.

Julia Galef: Oh, like discovering that a specific part of the brain lights up when you look at a picture of an attractive person of the opposite sex or something, that fact should not be surprising. Of course, some part of the brain is going to light up. We didn't actually learn anything.

Razib Khan: Exactly. Yeah. But the whole causal sequence of connections that people were making and the theories that were spun out of that, obviously a lot of that is just not, it's probably not going to be replicated.

I mean, they've tried, I think. Some people have.

Julia Galef: Do you think that you should have known better at the time? That if you were thinking more carefully or rigorously, it would have been clear to you that you should have ignored the fMRI-based studies?

Or do you think it's just like, “Well, we didn't know, because we hadn't tried to replicate it?”

Razib Khan: I think a lot of it has to do with, I thought that there were other priors, in terms of what we knew about the brain.

So, maybe we didn't know as much about the brain, in terms of the functional localizations, as we thought. Because it wasn't just the sample size of like 20. There was also like, “Oh, well we know functionally in aphasiacs, this part of the brain is associated with this.”

And so I thought... I think there were a lot of moderate confidence things that were going through my brain. I think it turns out maybe we don't know the brain's structural localization as well as we thought we did.

And as I admitted, I think just looking at the pictures. I'm a materialist, basically. Looking at the pictures was very, very attractive to me. Because now it's not some abstraction.

Some of it has to do with the fact that data dredging and low, bad P-value-oriented science was common in than 2000s. So, that's some of it. But, I think for me a lot of it had to do with the fact that I thought, again going back to modularity, I thought we understood other priors a lot more than we did.

Julia Galef: Yeah. I was thinking about a version of this with respect to social science. My credence in it has gone down a lot in the last 10 years, as you alluded to.

I was recently reading some old blog posts on Overcoming Bias from I think around 2007, 2008. And it was crazy to see people, friends of mine, in the comments talking very credulously about various social science studies that we all now know are terrible.

And I was wondering, should we have known at the time not to trust those studies? And I kind of think that yes, we should have. Because even though the replication crisis hadn't --

Razib Khan: Some people did.

Julia Galef: Some people did. Did you know about social science, and just not neuroscience, or --

Razib Khan: I didn't know what to think about it. But I had a friend who was a graduate student in 2006 who would tell me “All the social psychology's crap.” Everything he said was totally right.

He literally exactly predicted it.

Julia Galef: So, the thing that I ... Well, I guess if I'd been paying more attention to the stats, which -- is your friend like statistically savvy?

Razib Khan: He did statistical analysis in a social psychology lab.

So, he totally ... I mean, he and one other person in the field told me a lot of this stuff is not going to pan out. It's crap. People just need lines on their CV.

And my thought, honestly, was like, “Could that actually be true? Could this all be just some weird conspiracy?” Not conspiracy, but ...

Julia Galef: Yeah, yeah.

Razib Khan: Just like, could this all be statistically invalid? This whole field with all these people? Chris Chabris also kind of was suggesting things to me.

And I was just like, whoa. When the replication crisis happened, I'm like, well, they were right. They told me, I didn't know what to think. I was agnostic, I wasn't in the field. How do you judge? But they knew.

Julia Galef: I think the part that I don't really blame most people for is the data mining. Have you read Andy Gelman's Garden of Forking Paths metaphor?

Razib Khan: Yeah, I have. I'm a big fan of his blog. Yeah.

Julia Galef: Yeah, so there are statistical problems with the research that means a lot of it is worthless. But I actually think, looking back at some of the papers that even friends of mine were talking about credulously 10 years ago, if you just read the methodology it should be clear to you that it doesn't actually test the thing you care about.

Like, the papers where the headline is, “Looks like humans learn to trust each other more when you wear green or something.” And

then the experiment is -- well, actually just in a recent episode, my guest was talking about measures of whether video games cause violent behavior. And the thing they did to measure violent behavior was to measure how much hot sauce people put on a plate of food for someone else. Which is so tangentially related to violent behavior, that just reading that you should go, “Oh, I should not update much at all from this study, even if it were perfectly conducted, about the actual question I care about, which is video games and violent behavior.”

And I think that a lot of studies were like that. Maybe not quite as performatively silly as the hot sauce one, but just like -- no external validity, basically. So, I do in retrospect blame us for not reading the methodology and going, "What? We shouldn't update from this.”

Razib Khan: Well, I mean, if it's out of field, I feel like... I think one of my assumptions is, How am I going to figure out the methodology? When it's in my field it's pretty easy. Because I know all the methods and I've done them. Although, these are like general statistical ones. So, I guess that's a stupid argument. But I mean... I think that was part of my logic.

Julia Galef: At the end of your list, you say, “If there's an overall theme” – like, to the items on your list – “I think I was more optimistic about the future in 2002 than how the future has actually turned out. And I'm more pessimistic about the future in 2019 than I was in 2002, by a long shot.”

Does that mean you disagree with the Steven Pinker, Enlightenment Now, “world is getting better” thesis?

Razib Khan: I think his facts are right. But humans care about positional status a lot. And that's I guess my key. And maybe it's because I'm older, I see that more.

Obviously, the development of China has been great. On the other hand, you have Uyghurs being put into camps. So I mean, from a Pinkerian perspective, China is like one of the greatest successes of the last generation.

But you have issues where it's also gotten to be a much more effective totalitarian state, in a way, because of technology. And also its forced projection has caused issues across the world. Because the United States is no longer the hyperpower, and that's going to cause instability.

In terms of my pessimism, I'm just reflecting it against Fukuyama's ... Whether Fukuyama himself believed this or not, because his views are more subtle, but the “Last Man,” “The End of History.” There was going to be some great neoliberal global paradise of free markets and free capital, and every president was going to be Bill Clinton in 1999, and the dot-com bubble was going to go on forever. I mean, this is a caricature, but the world from 1999 to like 2019... 2019 seems a lot more like 1914 than I thought it would've been.

Julia Galef: Does that relate to what you were saying about “humans care a lot more about positional status than...”

Razib Khan: Yeah, because we are way more... The average American middle class person has a Star Trek computer in their pocket. Actually, most Americans. The smartphone, right? And yet we are getting stressed out about the fact that manufacturing is declining. But a lot of it is other nations are catching up and that's stressing us out because we don't feel as rich.

Julia Galef: But that doesn't sound like a reason to say that you're more pessimistic about the... Oh, do you mean you're more pessimistic about the future in the sense that as nations catch up, people in the richer nations will be less happy because their positional status is lower?

Razib Khan: That's one of the things on the individual level. But I also think something like Trump's trade war, it's not really rational, but it makes sense if you're thinking of it as a zero sum game. And I think that's what people are doing. I mean, we're probably going into global recession soon.

And it's definitely being exacerbated by the volatility, due to Trump's trade issue, but actually most Americans support, even on the left, they support an anti-free trade position. It's strongly intuitively favored, right?

Julia Galef: I feel like the disagreements between the Pinkerites and the anti ... Well, it's not like there's one camp of anti-Pinkerites. I wouldn't put you in -- you know, you’re critiquing Pinker but you're not in the same camp as the Vox critics of Pinker.

But anyway, the people who don't fully buy the Pinker thesis, I think one thing that tends to happen is: Pinker's thesis, although he doesn't always make this clear, I think it mostly rests on the progress of the third world. Like people in China are... Child mortality is going way down and, people are getting more education and so on and so forth. And so, his case mostly rests on that. And

then the people who don't buy it point to conditions in the developed world, that aren't getting as much better, or have the other problems you were pointing to.

Razib Khan: Exactly. I totally agree.

Julia Galef: Which, maybe that's what you meant by, you don't disagree about the facts.

Razib Khan: Yeah, really, the global ... Infant mortality, something like that. You can't disagree with that fact. It's a great fact in terms of, the direction is going well. I have relatives in Asia and I can tell you they're very optimistic. They have a totally different mindset. But they have like 6 to 8% growth per year. Their lives are changing, in their generation, in a very concrete way that we can't even understand. They're going from not having a toilet, to having a smartphone.

So, I mean, they're obviously going to be very optimistic. We're not, we're not there. A lot of people trying to figure out what they want to do with their lives. That's a weird question to ask, but it's a legitimate question, you know?

And I think ... I mean, I think you're old enough to remember when people were really optimistic about the internet and what it could unleash. And now I think we're a little bit more cautious. Because it turns out that what the internet unleashes are social mobs and memes and a lot of porn.

Julia Galef: So when you say you're more pessimistic about the future now than you were in 2002, I guess it just means that you were optimistic about progress in society and people's happiness and so on in the west, like in the US and western Europe. And now you're less optimistic about that.

Razib Khan: Yes, that's for sure. And I also think though that unfortunately what happens in the west is going to matter in someways because the world is interconnected.

And I'm not excited about the US being the world policeman, but when you have one cop, that really simplifies things a lot. And that's fading away. We are going to have a multi-polar world, and that adds complexity.

And so your expected value can be, “Okay everything's going to be fine, people aren't going to go crazy,” but I think the variance of outcomes is going to start to increase. Because as you saw during

World War I, World War II, humans are really good at taking a good thing and destroying it.

Julia Galef: Do you think that in retrospect you should have known in 2002 that you were being overly optimistic? Is your change a matter of getting new information or paying more attention?

Razib Khan: Yeah I think it's honestly, I wonder if a lot of it is getting older and getting to understand human psychology better. I don't know that much more history than I did then, but I thought this time it was different. And maybe that's just the psychology of when you're 22. "This time it's different," you know?

Julia Galef: Yeah, when I see older people in Silicon Valley who've been through a bunch of cycles of hype and excitement over something like, I don't know, virtual reality, they definitely have a more, like, "Okay, we've been through this before, maybe this next hyped thing will pan out, but I'm not holding my breath." And then the younger people who haven't lived through the bursting of the hype bubbles are just like, "No, this time it will be different! This one's going to work!"

Sorry to interrupt you, go on.

Razib Khan: Yeah. No that's exactly... some of this is not me being smarter, it's just being older, and having more input, having more data. But the data is visceral.

Julia Galef: Exactly.

Razib Khan: A lot of the data, yeah. I didn't know that World War I -- and I'm using that as an extreme case, I'm not saying that's going to happen -- but I'm saying, I knew what World War I is. And I knew what led up to it, and how there were all these individual choices and blah blah blah... but I just thought, "Look, this is 1999. And we have email, and everyone can email everyone else, and that's great! And so all the information can be there, they would never coordinate to do something that insane."

And now we're seeing Facebook being used to enable genocide in Myanmar, you know? So I mean, okay, having more information is not always good.

Or like the social media mobs that are running around. Okay, with hindsight, it totally makes sense what's happening there. But that wasn't something that we talked about in 1999, we talked about the upside.

It's just like when people predict their future income they underestimate volatility, and so they just assume it's going to be smooth. We underestimated the downside risks of a lot of this information technology, and the tracking and all the other things that we're doing. We kind of had it in a vague idea, but now that it's concrete we see what people are using it for and it's pretty disturbing.

So you know there's that. And I think that I definitely didn't understand it. Partly because the technology wasn't there yet, but partly because I was definitely doing glass-half-full assessments.

Because yeah, social media mobs totally makes sense. Because mobs have always been around. What happened when we had the printing press? We had a bunch of revolutions. A lot of of Catholic relics were destroyed, there was wars in Germany. I mean all this stuff got unleashed very soon after information got way cheaper and it wasn't just like letters, like wood blocks. Visual representations became way cheaper and spread across the population so it allowed people to mobilize for good or ill.

And whether it's good or ill probably depends a lot on where you stand as well. Maybe some people think social mobs are great. Some people probably do.

Julia Galef: When you look back at the things on your list, what kind of patterns jump out at you? Or not even patterns, as much as lessons? What kind of general updates do you think you should make, about how to model the world going forward?

You've talked about a couple of them, like you've talked about just generally paying more attention to the glass-half-empty side of new technology. Also earlier in the episode you were talking about updating to be cautious about extrapolating from your own psychology to other people's.

Are there any other general updates that you think you can make?

Razib Khan: Yeah. I don't frankly update as quickly any more, because I'm suspicious of new information. Especially with what's sexy and salient. If it's too counterintuitive I'm like, "Okay, I need to check this out," you know?

And so what I routinely do -- and I don't even read the sexy social science stuff now. I do a lot of my own data analysis if I really want to check to make sure... and I've done things where I've checked and I'm like, "Okay if you change the parameters or you reanalyze the

variables, this doesn't hold out at all. This is ridiculous." You know? But I definitely make sure to look at the original study. I'm really skeptical of stuff that's counterintuitive now, that's too sexy.

I'm also skeptical of stuff that increases the confidence of my beliefs a lot. There have been multiple times where I'm like, "I believe this is true, but I don't think this [new evidence] actually should make me more confident…"

Julia Galef: Yeah, that's happened to me a lot in doing research on bias, and motivated reasoning. There are a lot of studies that confirm my intuitive, anecdotal impressions of, in what situations people are biased, and how bias works and everything. But then I read the methodology of the study and I'm like, "Oh, I should not update at all, based on this." I still think it's true, but not because of any research. Any of this research, anyway.

Razib Khan: Yeah, and I mean I also think the best way to have a really strong opinion on something is to reanalyze the data and look at it yourself. And to develop it into --

Julia Galef: And by strong opinion, do you mean reliable, or do you mean confident?

Razib Khan: Yeah, I would say confident.

Julia Galef: Oh, you mean the best way to have a *justified* confidence.

Razib Khan: Yeah, justified confidence. Because unless you're generating your data, you don't know other things that are going on. There's been so many times that I've seen, where the data analysis is manifestly... it's like the forking paths. You know what I'm saying? They made a bunch of choices, and they came to this conclusion. And you reanalyze, and you're like, "Oh, you can come to a different conclusion." It doesn't necessarily mean your conclusion's right, it just means, how was this done, what does this mean.

Julia Galef: Normally at the end of the episode I ask my guest about a book that influenced them or changed their mind. That fits very nicely and naturally into this particular episode. Razib, you actually discussed in your list a book that changed your mind. Although it wasn't like a core piece of your worldview, I don't think. It was the book The Fall of Rome, which you said transformed your views on the question of whether Rome fell in a consequential and disruptive manner.

Julia Galef: So tell me a little bit about what you previously thought about Rome, and why the book changed your mind?

Razib Khan: Yes. When you read a lot of history, it's textual analysis, and it's very high level. It's kind of the view of some Roman senator.

And so when you talk about the decline of Rome, there's been a revisionist argument that Rome didn't actually decline, and it persisted. Look at the Catholic Church... through the Dark Ages, it maintained Roman institutions.

And on the surface of it that's not a totally implausible assertion. Like you could say, "Oh they became really creative in theology, and all these arguments, so Rome was still very active as an intellectual center."

What The Fall of Rome shows is if you look at material remains -- if you look at coin hoards, if you look at architecture, if you just look at the archeology -- it's pretty obvious. You can look at the material remains as a proxy for economic surplus. And so you can see the decline in the tax base. You can see the increase in coin hoards, which means people have a certain perception of what the future is going to be like, spiking up in the fourth and fifth centuries, right when classically we did say Rome fell, right?

So whatever you think about the intellectual environment, the reality is the material environment was far poorer after Rome fell than before Rome fell. And so if the... if a Pinkerite view is what you hold, then you would have to say that Rome did fall in some consequential way.

Julia Galef: What do you mean by consequential here? I originally thought you just meant it had a significant impact or something. But it sounds like you mean something else?

Razib Khan: No, consequential would be like... a Roman proletariat in the say, second century would have access to a range of pottery. If they were wealthy enough to pay taxes, they would pay taxes. And they could pay in specie. They would have access to bunch of services like baths. Basically consumer goods and services. Like classical economics. They would be wealthier than some one that lived in the sixth century, when the population was actually lower. For a reason, because the primary productivity was being utilized less. A lot of the services were gone, and specialization and interconnected trade had declined a lot. So that everything had gone back to a village economy. So say the pottery was not nearly as nice because there wasn't specialization.

And so you could say that "Well this isn't really a fall, they had the Christian religion which was far superior to anything they had 400

years ago." That's fine if that's the criteria you want to use; I still think whether you have enough food, and the variety of food you have, and your goods and services -- that should be the primary thing you evaluate.

Julia Galef: Got it. Consequential in terms of material well being.

Razib Khan: Yeah, like look at the people's teeth. If their teeth are rotting from too much sugar, well, is that really bad?

Julia Galef: You also had another item on your list about Rome. I don't know if it relates to this particular book, but you said you now believe that some sort of complex ethical religious system was going to become dominant in the Roman empire at some point Why did you come to believe that?

Razib Khan: Well, I came to believe it because if you look cross culturally, other societies have also gone through the same transition around the same time.

So you know in Tibet, I gave an example in the blog post, there was multiple introductions of Buddhism in Tibet. And there was a traditionalist reaction against this, because it overturned certain power structures, right?

What ends up happening in all these circumstances is these complex ethical systems, these religions, higher religions is what we call them, they always come back. And they always eventually conquer in these societies.

So I think basically when a society reaches a certain level of complexity, it needs a certain ideological framework that is provided by something that transcends ethnicity, provides some sort of future afterlife, and gives like these moral calculuses. These supernatural agents, whether it's Karma or gods. Whether it was Christianity or not, something would have emerged like that.

I'm not necessarily saying it would have to be Christianity, I don't know it could be some form of Mithraism, who knows you know? But the old pagan religion of the late Roman Republic, that was not going to persist indefinitely. And so Christianity stepped into that functional role at that stage in society. Other societies had other religions that stepped into that functional role.

Julia Galef: When you look at the Greek empire, do you feel like the Greek religion was playing those roles that you described? I'm not an expert in it but from the books that I've read, it just sounds like this

kind of colorful cast of characters. And not... it doesn't have this deep morality, and punitive rules, and everything.

Razib Khan: Yeah, and I think that causes a problem. Because the elite in the Hellenistic Empires tended to be ethnically Greek, and identifying only with Greek culture. And so you could assimilate to that, which happened periodically, but that's a big ask to transition your whole ethnicity.

On the other hand, religion is a more discrete package, and you can still retain your ethnicity while switching your religions. So basically what I'm getting at is it allows, in an imperial system, multi-ethnic societies to bind themselves together, and have a common currency of communication, of ethical moral communication.

Julia Galef: Got it. “It” being a complex, ethical religious system.

Razib Khan: Yeah. So I think the religion is always there. It's what's put on top of that. So Christianity is a "higher" religion. You know, you can say higher or not, but obviously it's something different than what you were talking about with the Greek religions, right?

But you know, China had the same thing. Where it had its local household cults and all these things, but eventually Buddhism, Daoism, and Confucianism became way more elaborated. And they served as the ideological binding for this whole empire -- because that's what you kind of need for people in different parts of the empire to communicate in a comprehensible way.

Julia Galef: Great, well Razib, that’s probably a good place to end. Thank you so much for coming on the show, it's been a pleasure having you. And thank you for writing up this list of ways that you've changed your mind, and setting an example -- hopefully, hint hint -- for other public intellectuals out there.

Razib Khan: For sure. It was great talking to you Julia.

Julia Galef: This concludes another episode of Rationally Speaking. Join us next time for more explorations on the borderlands between reason and nonsense.