Bret and Heather 16th DarkHorse Podcast Livestream\_ Meaning,...

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people, hypothesis, theorist, theory, science, test, true, field, study, point, men, darwinism, understand, conjecture, chimps, women, gatekeeping, questions, term, idea

**SPEAKERS**

Bret, Heather

**Bret** 00:08

Hey folks, welcome to the Dark Horse podcast live stream our 16th. We have heard you internet loud and clear and we promise you more cat Bell is coming not only more frequency of the rings, but higher amplitude. So stay tuned for that I am sitting with Dr. Heather Hyang. We have many things planned for today we are going to have a discussion that will last for whatever period of time it lasts. And then we will switch we'll take a break. And then we will switch to another link which will be find in the description to this video at which we will take your super chat questions so you can file those questions during our discussion here. And then we will take as many of those as possible, and then switch to Super Chat questions filed in the q&a. All right. I thought we would start today by talking about the catastrophic meaning making crisis that we are facing and what we might do to bootstrap our way out of it. Let's do it. All right. So the place I want to start is this. As many of our longtime listeners and followers will know, I am an evolutionary theorist. Now, people do not generally have a good grasp, though, on what theorists actually do. And I must say there's something about the term theorists that when I hear somebody describe themselves as a theorist, I roll my eyes just like everybody else. But nonetheless, theorist is how I understand my my scientific role. And what it means is that there are some tools in the theorists toolkit, which I believe are not well understood by most people that I think are actually vital to the crisis that we find ourselves in. Now.

**Heather** 01:59

Let me just say that although this isn't the report that we might be going, that when I hear theorist and you are indeed an evolutionary theorist, and I don't, I'm not really, I can I can play along, but it's not really what I do. I'm more of an empiricist. And I think of those two things as counterpoint to one another, and both as necessary. And I don't know if you see these two approaches as compatible with one another, but very much describing different parts of the process. Is that Yeah, what do you what do you say so

**Bret** 02:33

100% each necessary to the other. In fact, you will remember many years ago as I was engaging the questions surrounding telomere senescence and cancer, in a fit of frustration, I wrote a mad poem, and this very point was made in the center of that poem about that. These two things are they are hands that he loads best together was I think the phrase, but in any case, can

**Heather** 03:00

do I wish we had that poem right. Now we could read that poem. That would be perfect.

**Bret** 03:03

It would be so much I didn't think to Yeah, so I think we just need to

**Heather** 03:07

define the terms. And let me just let me start with empiricists. It's easier, it's more straightforward. It's it is a in closer alignment to what people imagine if they have an accurate view of what scientists tend to do. And most people don't think of theorist is even in the realm of possibility, right? And there's a lot we've talked a little bit in past live streams about the difference between hypothesis driven science, which is also known as hypothetical deductive ism, versus data driven science, I tend to use the square quotes versus, you know, conclusion driven conjecture, which is being passed off as data driven science a lot these days. Both of these theorists and empiricists both ought to be if they're actually doing science driven by hypothesis in trying to get driven to either generate or generate hypothesis most fundamentally as what they're doing, as opposed to most fundamentally be testing hypotheses. And so an empiricist, often, maybe synonymized, mostly at the with experimentalist is someone who makes an observation generates as many possible hypotheses that there might be to explain that observation, generates predictions, which would inherently follow from each of those hypotheses, and then begins to try to test those hypotheses specifically, I hope, hopefully, in the preparing universe, trying to falsify those hypotheses. And so it is that act of testing via either carefully controlled observation or experiment. That is the empirical part of that process. It doesn't in that that description I just gave doesn't include the analysis, which is generally data analysis, which is generally statistical analysis, and it doesn't put as much of a focus on how How was it that you generate your hypotheses in the first place? And are you outside of the scope of what other people have even considered? And so, you know, I found, for instance, that I had particular skill that I never knew before I started spending time in the field alone at Yes, making observations and generating hypotheses and predictions, but specifically in figuring out what experiments would accurately test for distinctions between hypotheses. And so that's what the empiricism is that what experimental design, and then follow up data analysis would allow you to distinguish between hypotheses that sort of more the realm of empiricists, whereas theorists spend more time earlier in the process and often are doing not through brick in the wall type science. But parent would seek to do paradigm shifting science.

**Bret** 05:51

Well, there are two things in here. One is, what exactly does a theorist do? And then the other is, what is their objective? Okay. And so let's just say I think that there's actually a confusion in the public's imagination about theory that arises from the expectation that a theorist generates theories, which is not true, a theorist cannot generate theories. So let us step back into a dialogue that we've all heard many, many times that will begin to unearth the question. So we've all heard at some point, some person advocating for the teaching of some creation theory alongside Darwinism in school or something. And inevitably, in making the argument that there should be done, they will make the claim that Darwinism is just a theory, right? And so why shouldn't other competing theories be taught right alongside it? Now this is actually a non sequitur, right? It's, it always reminds me of, I don't think that the word means what do you think it means, right? It's, the word theory has a very precise meaning. And if it is understood precisely, then the claim that Darwinism is just a theory, of course, doesn't make any sense. And this is always what you hear the scientific establishment responding to these claims that these creationist theories should be taught alongside Darwinism is that the word theory is as close to a fact as scientists ever get. But then when we travel around in other disciplines, we find that this isn't true that terms theory is invoked all the time for things that are not as close to effect as we ever get in science. And in fact, sometimes it's used for things that aren't even remotely fact like, and

**Heather** 07:34

we don't, when we it would be easy pickings to go after grievant studies fields here, right? And you know, and even legitimate humanities and social science fields, which tend to use theory or literary theory and, and such really broadly and too liberally and frankly, inaccurately, but we don't even have to go there we can we can stick to talking about science, and the misuse of the term within science,

**Bret** 07:56

right? So theory is actually the top of a hierarchy of concepts. And the reason that we're raising this, and the connection to the meaning crisis is that if one understands how elegantly these different kinds of ideas fit together and lead to each other, then one discovers that the tools for fixing the meaning making apparatus already exist. They are well understood at a philosophical level. But they are not widely understood. Even people who study science for a living are often quite vague on these things. So for example, we frequently see in the major journals, papers that have no relationship, they report data of some kind, but have no relationship to any hypothesis that is described anywhere. And what you and I have generated over years of teaching is the idea that every paper that reports data ought to be doing one of two things and it ought to say which it is, it is either data leading to a hypothesis or data that tests a hypothesis. data should never be collected in isolation of those two things. Either. You're looking to unearth a pattern that needs an explanation, which would be a hypothesis, or you're testing an explanation that has been provided either by you or someone else in order to see whether or not it stands up to, to that attempt to falsify

**Heather** 09:20

it. And this is, in fact one way to make the distinction between data driven and hypothesis driven science, the data that were collected, and I don't even love to use the term data here. But we'll we'll do it data that were collected absent a hypothesis in which the researchers were letting the data reveal patterns that the humans behind it didn't actually have any idea about what might be true, have not tested anything. They what they have done is the first step in the usual scientific process, which is in fact a cycle. That such that they have now generated a hypothesis but the results of those papers that use data to prove Do some hypotheses, even though that's not what they say they're doing, compared to papers that actually test the hypothesis by having hypothesis generating data, and then figuring out if the hypothesis is borne out or falsified. The results of those two types of papers are often are often, boy, you just can't even tell the difference by the way that people talk about them or respond to what it is that they're claiming. And in fact, they're very, they're very different in terms of the standards of proof that they are then letting loose on the world.

**Bret** 10:33

Yeah, in fact, there's a kind of rarely spoken, but widely detectable sense that hypothesis testing is almost an archaic mode that we've gotten past it because things have gotten more complex or our technology has allowed us to see into a level of detail where that doesn't work. And of course, it's nonsense.

**Heather** 10:54

I'm reminded of the faculty member I taught with once at evergreen, who revealed in front of the class, and this is a direct quote, I used to think hypothesis was important. Now I know better.

**Bret** 11:05

So again, I want to, I want to step back, because a lot of things that need to be sort of in the mix here in order to ultimately get to the power tools. And really, from the point of view of those of you listening or watching at home, the real point here is if you understand how these tools work, and it isn't all that complex, your thinking will without knowing anything new become that much more powerful. These things enhance the power of what you already know, to an immense degree. So hang in there, if this is seeming far afield. Where was I headed? I was headed

**Heather** 11:40

somewhere. You were going to explain what a theorist is?

**Bret** 11:43

Well, oh, yeah, that's that's one thing.

**Heather** 11:45

You're backing up to a larger view? I think.

**Bret** 11:47

So a theorists I know what it is. There's a question I've said elsewhere. And actually, it's gotten quite a lot of positive reaction, that every great idea starts with a minority of one, right? If you're going to change the way a field sees something, then it's first going to occur to you. And you'll be the only person who believes that until you come up with something that might demonstrate to others the need for them to pay attention to it, which frankly, sometimes takes decades, right. So it starts out as minority of one. But in a world where what you have is endless appeals to authority. What that person says makes sense, because of the credential they have, I'm going to believe it. That world in which ideas compete based on how appealing they are, or who's saying them is not a world in which the idea that occurs as a minority of one can ever win, because it will always be driven to extinction, by the majority who may have a vested interest in preventing the idea that up ends them from ever gaining currency. So how is it that these minority of one ideas ever take hold? And the answer is they take hold because of an elegant scientific philosophical system that says exactly what is necessary in order for your idea to replace the ones that preceded it. And it doesn't anywhere mentioned anything about authority, or credential or publication or any of those things, it has nothing to do with them. But it has to do with is whether your idea explains more and or assumes less than the ideas that it is replacing, if you come up with an explanation for a observable pattern. And your explanation assumes less than the preceding explanations, or explains more of what is observed, then it is taken to be correct. So

**Heather** 13:36

rephrase that slightly, which is the scientific method explicitly rejects any kind of gatekeeping, there is no stay in your lane admonition within the scientific method. And we have come in modern science to do a lot of gatekeeping. And a lot of a lot of finger wagging and stay in your lane. And oh, you don't have expertise in that, therefore, you can't speak to that, or you can't apply for grants in that. And some of that is maybe some of that some of that is maybe necessary in giant world with a lot of people vying for very limited resources, a little bit of how do we channel interest and funds and such, but the vast majority of it, if not, nearly all of it, is now being used as a way to keep out ideas that are, in fact, heterodox, that are more shamanistic that are more about consciousness as opposed to establish culture that might break the wall. That is the current paradigm and whatever scientific interpretation we're currently working under, as opposed to put in yet another brick in it. And another brick in the wall science is absolutely necessary, and is terrific, assuming the foundation on which you've built it and the wall itself is an accurate representation of reality.

**Bret** 14:50

So I'm going to take a little detour and steal man, the gatekeeping Okay, I hate to do it, but I think it's the right thing. So There is an argument that we need a kind of gatekeeping at the boundary where we take that which we think we know to be true, and we try to enact it as some kind of policy, obviously, we have to have somebody empowered to say that idea is not worth taking seriously, if we're figuring out how to allocate resources, or what medicines are safe, we have to have some kind of gatekeeping. The problem is, once you establish that, and it seems like gatekeeping is what keeps the world functional, then it gets transported into the philosophy of science where it doesn't belong, and it just kind of gets grafted onto it. And it gets used by people who have perverse incentives, to shut down their competition, which is both philosophically wrong, and very bad for the world, it results in us being farther behind in what we understand than we would otherwise be.

**Heather** 15:53

So I was just about to add on and say this is exactly what we see in peer review, which seems like a good a good proposal, but became so mired in its own internal perverse incentives that it is really hard to trust. But I was reminded before I began saying that, that you were trying to steal man, the idea of gatekeeping. And I'm not sure I totally heard the steel man,

**Bret** 16:17

though, that we need it when we get to what are we going to do? Okay, what is correct? We don't need it. And I would say, when

**Heather** 16:23

I hear you say that, again, be more.

**Bret** 16:27

There's a point at which you take what we think we understand. And you know, it's imperfect, but you have to translate it into policy. There's some kind of gatekeeping necessary there. And, you know, I do not like gatekeepers. And I think they've become so corrupt that I just, I'm not defending anybody who holds the position of gatekeeper. But I am saying, in principle, what I want is some standard by which we figure out how to translate what we think we understand into policy that eliminates some of the hazard that would otherwise accompany that step.

**Heather** 17:00

And is the idea there that the Abbess between the people who figured it out, and foofy about what is true, and the people who think they know what to do about that truth is typically so deep, such a big chasm, that there are a few people who can actually interpret in both worlds, like what why is that the moment that gatekeeping, you think, is maybe most easily defended as necessary, as opposed to the various other moments? Well,

**Bret** 17:27

I mean, you know, to take a trivial example, there is some hazard that comes from the update process. And us theorists must pay no attention to, right, it is a non factor, right? The objective of the exercise is to figure out what's right and how you're going to establish it. But that is not the same thing as trying to, you know, make a planet function and prevent harm to people and things like that. So you have to have some mechanism that isn't, you know, your policy isn't gonna change on a dime, the day you realize that something you thought was this way is actually that way, you have to have some coherent, practical policy. Now, again, I hear myself defending something I absolutely detest, right against the use of this process.

**Heather** 18:18

And you know, you are an extraordinary example of someone who does do both of these things. And, you know, perhaps that's the reason for some of the criticism that comes down the pike at you in particular, which is that no, you do this thing. But it's it's all very much of the tenor of stay in your lane, we know what you do, you know, get out of get out of our space. And you know, it's territorial, it's it's pissing on boundaries, all of this. So what, how do you maintain that gatekeeping, which is necessary, while still allowing those who can who have the chops to and who are willing to transgress boundaries that most people can't transgress?

**Bret** 19:00

Alright, two things, the answer to your question comes down to a principle that we've advocated to students for, you know, a decade and a half, which is it is natural for your science to affect your ideology, right? What you know to be true will certainly affect what you think ought to happen. It is completely unacceptable for your ideology to affect your science. That is to say your ideology doesn't change what is true at all, nor can it be allowed to so it's a one way relationship.

**Heather** 19:30

So asterisk. You had a second thing, but I have something to say in response to that.

**Bret** 19:34

Okay. The second thing I wanted to say is when I hear the word peer review now, I have the sense that I'm hearing somebody say something analogous to the Patriot Act, right? Patriot Act is a desperately unpatriotic document. But it's labeled in such a way that you'll think it's doing this job. Peer Review seems like well, you don't want your peers to evaluate your work can be very good. No I want my peers to evaluate my work I want them to do to do it in public, and I want them to show their work so that if they turn out to be wrong, then the credit flows the right direction if they turn out to be right, I'm also interested in the credit flow in the right direction, but it has to happen out in the open, because otherwise, what happens is people abuse this process to shut down their competitors. That's right. So that was the The second piece that we shouldn't be misled. It's just like, data driven, data driven sounds like a, it sounds like a defense of empiricism and who could possibly be against empiricism. But that's not what it is. It's data driven, right? data is driven is hidden behind the word data. So people will think that all you're doing is saying something obvious that every scientifically minded person would embrace when in fact, it's a coup against hypothetical deductive science by just this endless cycle of observation.

**Heather** 20:57

And it's, you know, you could without changing the meaning at all, and it wouldn't clue too many people off to what was going on. But you could instead of saying driven, say, first data first versus hypothesis first, do you want your science to engage hypothesis first, or data first. And if it's data, first, you've got a problem, because you have to go through many more iterative processes before you've actually tested a hypothesis. And since most of the science doesn't do that, you actually don't have a full cycle of the scientific method. With regard to your first point, you had said, it is unambiguously clear that humans being humans, as they do, science will find as they learn things through their science, that their worldview is affected by what they have learned. But what we cannot have is that that process going the other direction, which is to say we cannot have ideologies affecting science. And this This reminded me of the objection is this gets deeply moderately political very quickly. But the the admonitions from many of many people are emerging from grievance studies, but also many good faith academics and thinkers who are making cries for greater diversity in science, for instance, and you know, the easy one to go to, because we've both thought about a lot and talked about it a lot is we need more women in STEM, right? We need more women participating in science, technology, engineering, and math. And, you know, this is this is not the place to go into all of the ways that the the statistics that are usually trotted out here are often misleading. And the goals that people are advocating for are probably not the goals that we should be shooting for. But I remember saying to a number of Ernest smart, but frankly, confused young, mostly women, but some men at a conference that we were participating in, actually in the summer of 2017, after evergreen and blown up, but before we knew that we weren't going to be faculty there anymore. When when they were asking me when we had opportunity to get up and talk about what is the nature of sex and gender, the evolution of sex and gender, actually, and what does it mean, about proclivities and abilities and desires and all of this, I said, What, who you are, what your particular demographic is, should have absolutely no effect at all on the results that you get, if you are doing good science, it should have no effect at all. And therefore, in that regard with regard to if scientists are just being handed questions to address, then the particular answers, the answers that are coming out of those scientific questions should not vary based on where those people are from, what sex they are, what color they are, how old they are. But this is your economic background is any of that. And that's, of course, a perfect world. And it's not exactly totally true. But the fact is that the scientific process specifically is, you know, is about extracting the bias of the human doing the work such that you can get to a result that would be true no matter who you are. But what isn't the same is what questions you choose to ask. So the place where diversity, diversity to us, you know, it's super nuanced and politicized term now. But the place where we The reason that we actually do want a more diverse pool of people doing science and asking questions across all domains, is that your particular history, which includes your worldview, which includes whatever political views you have, because of the questions you've asked in the past, will affect the questions you ask. And the questions you ask are, of course, part of the purview of what you do as a scientist. So diversity doesn't matter at all for the results but it doesn't matter for the questions which of course affects the results

**Bret** 24:37

it it shouldn't matter for the results, but for the kinds of corruptions mental and otherwise that enter into the process. So we are going to have to get back to the basic structure here. No, no, we are some are so important though. And I will say I do think there are certain questions and this goes back to considerations of me empathy and who you will have an easier time understanding? Yeah, there are places where I do think our field has actually wildly fucked up not to put too fine a point on it. Because for historical reasons that have nothing to do with this field in particular, it was historically done by men. And so what it discovered the order of things that discovered had a lot to do with what males are more likely to see and what they're more likely to be unable to see. And so my favorite example of this is Jane Goodall, who a great hero of mine I know of yours as well saw her video this week actually was great to see she's usually travels all the time, but under lockdown, she had time to make a video. Sending bats Wonderful. Thank you, Jane. But anyway, I think Jane Goodall cracked the code of the great apes where men had failed. George Fowler in particular had failed with the great apes after he had succeeded with lions actually. But she cracked the code because a she was not over educated. So she didn't impose what she had learned from her elders on her chimps. But B she had the intuition to avoid the male bias against empathizing with her study organisms there was this sense that it would be a political a scientific corruption to, you know, to anthropomorphize your creatures, but of course, we're talking about

**Heather** 26:41

acts of grief for naming them right and for claiming that they were doing things like engaging in war or you know, friendship.

**Bret** 26:48

Well, and you know, the key thing that she did was ingratiate herself to her study organisms so that they would ignore her enough that she could understand what they were up to which, you know, Kim,

**Heather** 26:59

an absolutely necessary part of the study of social behavior of anything that is in any way conscious, you know, you don't I didn't I didn't particularly need to ingratiate myself with my frogs, they they would fall on me from trees no matter what. and ignore me mostly. But if you're studying, you know, dolphins or elephants, or chimps or any primates, really or crows or you know, a number, a number of organisms, and you would need to, and was it was it leaky? I can't remember now, which big name in anthropology tapped. Not just good all week. So it was just just to add a little bit more meat to the story. Yeah. Louis Leakey, who is this big old man in anthropology says, we really need in order to understand human origins and human behavior is a is a better grasp of what is going on with the at that point, we thought three extinct species of great apes, bonobos were classified as a small species of chimp. So he didn't have people going after the bonobos, but he said, I'm gonna find three people who I can send into the field for a long time, and see if they can't crack, you know, crack the code, so to speak of what it is that these that chimps, gorillas and orangutans are doing. And he was quite explicit about choosing three women. He chose Jane Goodall for the champs Dian Fossey for the gorillas and Britta galdikas for the ryan tans, girl. deca says, I believe still working in the field. And Fossey obviously was killed by poachers. And, and, and Goodall has become a massively important cultural figure and, and probably has helped save not just many chimps, but many other organisms throughout her work. And his league. His position was not just okay, but the men have been trying and they're not getting anywhere. But I Leakey actually think that there is a, there is a chance that women actually have more empathy, and are going to be better able to put themselves to basically do the theory of mind trick and imagine what it is like to be a chimp, a gorilla or an orangutan, and therefore get somewhere it would be studies and of course, all three of those women were trailblazing and we really we know, much more than we would have. Had there been had there been any other individuals, including most women. Right, but that there is some kind of work that the particular propensities and proclivities on average of men versus women may make one or the other, more suited to that work.

**Bret** 29:31

Yeah. So and, you know, it's interesting that the story is that, you know, the Grand Old Man of paleontology sent these women to do this work because he understood that they would get it better and I think history bore out his suspicions. So anyway, it's a complex story. I would say there's one other place that I think our field has screwed up as a result of a kind of male cognitive bias that blinded us. And it has to do with our misunderstanding of male sexual displays and lacking species. And that there is a way in which men who don't entirely get women have looked at the fact that females in many species require males to do these elaborate, seemingly senseless things. And they were, you know, they had kind of a, you know, females who get a reaction and anyway, I think, had the field in corporated. Women more quickly, we might have fixed this one sooner.

**Heather** 30:34

So one more anecdote here. Before you get back,

**Bret** 30:36

let me say, I do think we have the answer to that puzzle. And at some point here, it's going to emerge and I think it's a fully satisfying, very interesting answer. But what about anyway? Yeah. What? Why? Why does the peacock have such a fancy tail? Well, we know why he has it. But why should females require it? But why do the females require it? That's the tough part. Yeah.

**Heather** 30:57

So the anecdote is, you know, animal behavior, and especially the study of social behavior was, of course biased towards mostly males doing it for a very long time, just because of the history of science and how and how work of any sort really, outside of the home has been done humans. And there's a book by Sarah Blaffer hurty who is I don't know she are academic. Yeah, so she was a student, she was an early student of tic Alexander's, right. Right. She was, Oh, yeah, she was. She was when she was an undergrad when he was a graduate student. Okay, so serve love for her. It is an extraordinary researchers report on origin India on langers. And has written a number of excellent books, including Mother Nature, which has different subtitles, depending on when and where it was published. But it is such an excellent investigation of the basis of social behavior in mostly primates, including humans, that it was an eye You know, we've talked before about, you know, neither of us really ever liked to use textbooks. So this was one of the key books that I would use in my own behavior programs. And it is mostly an investigation of social behavior through a female lens. It's about mothers and daughters, and how fathers come into the picture and a pair bonded species, how important they are, and a non pair bonded species, how the females have to defend against, you know, putative fathers, and would be, would be intruders and all of this. And at the end of I think it was the first time I typed in on behavior using this as one of my books that we seminar it on every week. I remember hearing some It was good hearted it was it wasn't it wasn't deep criticism, but some sort of grumbling on a field trip from some of my male students, that they hadn't had any idea that the field of animal behavior and the study of sexual selection was such a female biased view, oh, my God, I had no idea that that could be interpretation. But I feel like inadvertently, I just, I just flipped the expectations on their head because no one I don't think in the history of the study of animal behavior had ever before voiced the concern that it was to female bias. And it's really just, you know, which which stories and written by home, do you run into first? And yes, if you're studying social behavior, you really do need both men and women doing it. If you're studying quirks, it's not clear to me that you do and if you're studying, you know, medical procedures, it's not clear to me that you do although medical procedures need to be done on both men and women, because men and women have fundamentally different anatomy and physiology isn't everything else.

**Bret** 33:32

And it's also worth pointing out that our era, the era in which we studied in graduate school, the our mentors were all of a generation that they could be forgiven for a certain view of women, you know, a throwback view, but none of the people who mentored US had that view of they were all very farsighted like the dad was and had excellent female students that they produced because they had no such bias. So anyway, kudos to to Arno cluey and Nick Alexander and Bob trivers. All of these men were ahead of their time with respect to understanding how broken that particular chauvinism was

**Heather** 34:18

and just just not caring they didn't didn't have privilege female students didn't seek out female students they just didn't give you that the topic right you got you know, can you can you talk science can you know, can you generate hypotheses and experiments and all of these things? And if you can't, I really don't have the time for you and I'm not going to be gentle on you because you're female and I'm afraid you might cry or something, you know? No, that's that's chauvinism too, and none of them engaged in that either.

**Bret** 34:40

Not in the slightest. Alright, so let us return to the meat of the map. Yeah, theorists do not create theories. They cannot. What theorists do is they advance hypotheses and those hypotheses, if they survive, test and ultimately go on to be The default assumption of the field that is the moment at which they become theories. So I think the important thing, the reason that this is so deeply connected to the meaning making crisis and the possible route out of it, is that that process whereby you take a minority perspective, you demonstrate its importance, and it replaces the dominant paradigm. This is a rigorous mechanism whereby heterodoxy becomes the new orthodoxy. And orthodoxy has this bad connotation. But in this case, what I simply mean is, it is the standing of what we commonly believe to be true, you know, that the earth goes around the Sun is now orthodoxy, as it should be, it's almost certainly correct. How did it get there? Well, it started as a minority perspective that had to win the day through this process. So to make the process a little clearer, just realize that mathematics has an analogue of this whole thing, and the terms are different. But the logic is very similar. It's not identical, but it's very similar. So in mathematics, you can offer a conjecture, that's a proposal, that's the equivalent of a hypothesis, you can offer a proof of the conjecture, a proof is analogous to a hypothesis test. And if a conjecture is proven, then it becomes an axiom. And what an axiom is, is the default assumption for what is true, it has become axiomatic. So in science, instead of doing those things, again, it's not exactly the same, but it's close. You observe a pattern, you hypothesize an explanation for the pattern, the hypothesis is effectively a conjecture that comes along with predictions. And then those predictions allow you to test the hypothesis and see whether, in fact, it stands up to that rigorous challenge, at the point that something has stood up to enough challenge, that the default assumption of the field is that it is true, then it is a theory. And so this explains the mysterious conversation that we hear so many times where people allege that Darwinism is just a theory. And that that means that other theories should be taught alongside it. That is, in fact, a non sequitur. because there aren't other theories. There's only one theory of how life became complex on earth, and it is Darwinian, in one form or another.

**Heather** 37:29

So let me just reiterate what you just said in a slightly different order. Because I think it's important and it bears repeating a few times. Scientists to hypothesis as math is to conjecture. So hypothesis conjecture, the same thing in science and math, space, sciences to test as math is to proof. Right? testing in science is like the proofs in in math and sciences to theory, as math is to axiom. And I think you've also said, or postulate or theorem in math, right? So science has hypothesis and test some theory and math has conjecture proof. And axiom also postulates and theorems. And that those are more or less analogous points, with one important caveat distinction between theory and science and axiom and math, which, so to get to,

**Bret** 38:19

I'm a little out of my depth here. I'm really not a mathematician, although obviously, there's math in my family very close by. But the difference I think, is that when a conjecture has been has a proof has been delivered, that has withstood scrutiny, I believe it is accurate to say that the axiom that arises is simply true. And we don't have to worry about it being falsified, because the nature of proof is such that proof isn't like a big stack of evidence that something is right. It's an ironclad demonstration that it is right. And so once something has reached the status of axiom, is it beyond disproof, I suspect it is. So that's different than in science where a theory Darwinism could be false. Let's say for example, we are living in a simulation and Darwinism was hard coded into it or the appearance of Darwinism was hard coded into it in order to figure out, you know, what we humans would think in response to it, then it's not real. And the appearance that it is real is explainable by a larger hypothesis, which could be potentially demonstrated, but nonetheless, could be false. And we could discover it, but at the moment, we have no reason to think that's coming any more than we have reason to think that we're going to discover that the earth doesn't orbit around the sun.

**Heather** 39:45

One of the distinctions, at least in the realm of science that we often engage in is also the test is, as you said, basically based on a stack of evidence that then endures basically a probabilistic assessment statistic. is a probabilistic assessment. And because of probabilistic the theory that may result after many, many, many tests in the end, the test of time as it were, is still based on probabilistic analysis. Where as a proof is not generally probabilistic. It is it is yes or no, in each of the

**Bret** 40:20

either accurate or a proof from each of the

**Heather** 40:22

steps. It's been binary. And so there it's it is not a probabilistic situation.

**Bret** 40:27

Right. So one of the outgrowth of this that I think people who use the term of theory casually don't understand is that there should really only be one theory for a given observation at a time, the theory is that which is so likely to be right that it is taken as the assumption and it can be displaced by some other theory, but then it's no longer a theory, it gets demoted to the status of hypothesis. And in fact, it's a falsified hypothesis at that point. So that is an important fact theory is not some infinitely large space, it is not something you yourself, produce, it is the result of a combination of things. Actually, it's a result of the exact combination of the teamwork that you were describing before. Right, you generate a hypothesis, the empiricists tested sometimes the empiricist is also the theorist, but it doesn't matter. But the end product of the cycle is theory. So why are we so confused about this? This is the this is the problem. And this is a this is a difficult one to deal with, because what we have just described is the way it is supposed to function. It very frequently doesn't function inside, even inside of fields where we wield the term theory as a defense of, for example, Darwinism, where we swear that the creationists don't know what they're talking about, because they say Darwinism is only a theory. And we say you don't get what that term means, right? Even inside of a field where we need that defense. We're not consistent about the use of the term. But there are other fields in which a much worse job is done. And I think that this is the problem, part of the crisis and meaning making has to do with the fact that there's not even a standard between disciplines about how to use these terms. So I would say the worst offenders in my opinion, outside of maybe the the humanities who abuse the term theory, like nobody's business, and maybe we'll return to that. But the worst offenders inside science, I would say, are the physicists, who very frequently, when they talk, talk as if they are advancing theories, which doesn't make any sense if you use the proper definition. And this results in an immense amount of confusion that, frankly, I think is hiding in broads in plain sight. Right? I think anybody can see it. So there's a hierarchy, you have something that isn't a hypothesis. It's an idea. It could be true, but you don't know how to test it. It doesn't make any obvious predictions. Okay? That's a notion or interpretation. Okay? It's not necessarily wrong. But it's below a hypothesis, a hypothesis is an idea of why something might be the way it is, that comes with a prediction that would tell you if it was false, right? So it has a higher status, because it comes along with something that gives it the potential for being eliminated. If it isn't true, a conjecture doesn't have to be, you know, we can conjecture that this is one of them, you know, a billion universes, and that would have no implication for us here in the universe. So, you know, I can't say it's true or false, but it's not as good as a hypothesis. And then you've got, you know, a hypothesis that is withstood test. And if it was standard enough test that it becomes the default assumption that becomes a theory, right? So that's the hierarchy you've got. You've got notions, you've got hypotheses, you've got theories, which are hypotheses that have become the default, basically, they have, in a legal sense, you might say they have the presumption of being accurate, and they are capable of being removed, but until they are we just treat them effectively as axiomatic. But what do we do with something like string theory? Why do we even call it string theory, if I'm to understand string theory has yet to deliver a testable prediction. Now, that doesn't mean it's wrong, but it does mean it's a notion or an interpretation. It's not even a hypothesis. And if we discussed string theory, as string notion, or, you know, then

**Heather** 44:46

it loses a little bit of its cachet. It loses

**Bret** 44:48

a bit of its cache as it should. And, you know, again, that doesn't make it wrong, but it doesn't deserve the status of theory, the top level right, the default assumption Now what happened in physics, if I'm to understand, again, I'm not a physicist, what I'm what I understand is that effectively, string theory socially won the day, people were so excited by the idea that it effectively killed off all of its competitors. And it took over the field, despite the fact that it had yet to rise to even the first level of scientific rigor, which we would be to deliver a prediction that could, in principle, allow it to be tested. So until we realize that, that there are things out there masquerading as theories that aren't anything more than a notion, we have a real problem. And I think that this is actually corrupting field after field. So in our field, Pan psychism, Pan psychism, the idea that consciousness is written into the very particles of the universe. That's a nifty notion. But that's about all it is, doesn't make any prediction that I'm aware of about nature, it's the it is actually a response to the difficulty of the study of consciousness. And that's it, it's some idea that would just simply render it outside of our purview, and therefore not our problem. And so I don't take it seriously at all. I don't see any reason anyone should. But nonetheless, it is talked about in serious circles as if it were something scientific, when in fact, it hasn't. It hasn't even risen to the bottom rung of the ladder.

**Heather** 46:27

So you've got a category notions into which you've currently put string theory and pan psychism. And I think I think it's a great bend to start filling with things that have been given probably more press and more importance than they would seem. If for if only for the fact that no one pointed out not testable, therefore, couldn't possibly be a theory, because not testable means not knowable, and can't even be a hypothesis.

**Bret** 46:57

Yeah. And I should say, I'm violating one of my own rules here. I know, I'm kind of being a dick by common notions. That's really just designed to annoy people. If you need a new name for the band. Well, the the bin has in its interpretation, right? So it right is it? Yeah, I mean, it is in physics. So the Copenhagen interpretation Oh, so this, again, points to another one of these things that's artificially been boosted because it's a cool idea. But it still hasn't reached the bottom rung, which is the many worlds interpretation, right? The many worlds interpretation is consistent with, you know, events happening the way they seemed to seem to

**Heather** 47:42

this is a merging 100 ish years ago, maybe this is mechanics, this

**Bret** 47:46

is in response to, you know, the double slit experiment and the Schrodinger experiment, or thought experiment. But anyway, the point is, yes, you can solve the puzzle by imagining an infinite number of universes springing off of each other. I think it's the worst idea I've ever heard. But, but nonetheless, I get that, technically, it's consistent with what we see. But that doesn't, that isn't even the first level of saying, okay, it's consistent with what we see. But you want to make it a hypothesis, tell us what it predicts that we don't yet know to be true. Yeah, right. I would say Likewise, the interpretation that this is a deterministic universe or could potentially be a deterministic universe. If the point is in a deterministic universe, you wouldn't know because all of this was predestined from the very first particle interactions. Yep, then, you know, Okay, I get it. But what does it predict? So, the bottom line here, we have a rigorous set of tools, it involves using terms that people have butchered by misusing them. And if we can resurrect those tools and just use them consistently. And well, I believe we are halfway out of the meaning making crisis, because we will at least know what the hierarchy of ideas is, you know, are you offering a hypothesis? Is it a theory? Is it just a notion, you know, knowing where things fit, I believe will be very helpful. And I probably should not point out that one place where this is very important is hypotheses of collusion, which get dismissed by boosting them to the level of theory which they don't deserve. Not until they've been demonstrated. So you know,

**Heather** 49:35

Watergate to call them collusion hypotheses now doing well, I'm

**Bret** 49:38

using the word collusion because conspiracy has become so tightly associated with the word theory that it's like an instant grounds for dismissal. And so my point would be Watergate is a conspiracy theory. Right? We all assume it happened. Right? lizard people is a falsified hypothesis. We can falsify it on the basis of phylogeny headaches. Right? 911 was an inside job. That's a hypothesis. Right? It's not the theory. Right and hasn't been falsified as far far as I'm concerned. But it fits in with a bunch of other theories, including the the 911 Commission's theory of what happened or hypothesis of what happens hard to keep those hard to keep them straight. Yeah. So anyway, I don't know. Let's try to be consistent with the terminology. I'll try to do a better job than I just did there in that last sentence, but Watergate. Now that's a conspiracy theory. Yeah.

**Heather** 50:36

Good. All right, we're not too far from an hour. Do we want to just touch on a couple of addendums and corrections from previous shows? And then take a break? Okay, I think we've got three of them here. Let's see in the Super Chat. Last time someone asked about a paper that's on a preprint a psycho psycho, psychology preprint server that asks, Does this pandemic make people more conservative regarding gender roles, and a quote from it is, in times of threat to people can embrace traditional ideologies to cultivate meaning and purpose, environmental uncertainty, that is can promote desires to preserve the status quo. This effect is, is observed historically, in US presidential elections throughout which times of greatest Seidel threat to the established order have pursued the increases in preferences for political conservatism. reference, specific evidence for use and colleagues. 2003 motivated social cognition model of conservatism also comes from findings that people in the US reported more conservative attitudes after the terrorist attacks of 911 than before, regardless of whether they personally self identified as liberal versus conservative. Similarly, increased salience for the Ebola epidemic in 2014, predicted preferences for more conservative political candidates. So all of those are referenced in this paper, and the author's go in with the hypothesis that we'll actually a few hypotheses that people will actually shift to the right to politically during a pandemic, which they find no evidence for, incidentally. And then two other hypotheses if memory serves, if I can find it here. Pi, there's a lot of sort of jargony gobbledygook in here, epistemic, existential motivational processes. Yeah, yeah. Does a pandemic render people more strongly conforming to traditional gender roles, and believing more strongly in traditional gender stereotypes, both of which they claim to find evidence for, which is interesting, If true, and raises a number of questions that we might just talk for a couple of minutes about, start us off.

**Bret** 52:46

Yeah, I'm having trouble remaining objective about this claim. Because, you know, I'm, I'm watching the pandemic, as, as a scientist, and in general, I'm pretty good at keeping things straight. And on the other hand, and I'm watching it as a father, and I'm having the sense of everything that makes life work, is coming apart, without, clearly without anybody having an understanding of what replaces it. And, you know, we're not going to be locked down forever, no matter what happens, even if we just end up facing the virus and, you know, 10s of 1000s die needlessly, which is not something I'm advocating, and I know you're not advocating, but even if that's what we end up doing, we will escape lockdown soon enough, and things will go sort of back to some kind of normalcy. I don't think they go back to normal, but they'll go back to something. But I do you think we've lost our innocence? And I wonder, I really wonder about how how romantic love emerges from this for people who are in the early phase of their life where they're still trying to figure out who they are and who they're going to be with and how they're going to find them and how they're going to court and woo and do all sorts of things that they're going to need to do whatever the modern terms for those things are. So anyway, I guess I guess the point is, there's you know, if I hear that people return to traditional gender roles, in part that goes very much against what you and I have been advocating, which is that it's time for a renegotiation of those roles, because so much is different about males and females in the world we live in, on the other hand, you know, at least there's some pattern there. There's something that people could depend on. And and this

**Heather** 54:55

is I mean, I think, I think the argument which is that, in times of deep, uncertain In t, where maybe what you need is a totally new approach. But knowing that totally new approaches are very likely to be flawed, the shaman is more likely to be wrong than right. Even though you need the exactly right shamanistic approach, people are more likely to retreat to the noun, comfortable the understood, even if it's patterns that they themselves were fighting against before.

**Bret** 55:20

Yeah. So yeah, I mean, that does feel a little bit right. That we do need until the new way has been plausibly spelled out. And you know, the way this is done in the context of modern markets is nothing like a viable new way. But until some new way has been spelled out until somebody has proposed the renegotiated arrangement between man and woman. I get why people would retreat.

**Heather** 55:55

So let me just say one more thing about this paper, which I read it just quickly before this, and you haven't had a chance to yet so you don't, you have not looked at their methods. With regard to testing whether or not people were endorsing gender stereotypes at higher rates after the pandemic or during the pandemic versus before for which they found statistical evidence. Their methods I find really weak and a little strange and that's not I think, just because I find the gender stereotypes themselves. Not not particularly comforting at all. But am I likely to put you on the spot and say what you'll come up with some gender stereotypes here, but I think all of us just listening and so as such, imagine what it is that you might think, you know, what is what would it be like to be more masculine or manly? You know, think of some things and now would it be like to be more feminine or womanly? Think of a few things for a moment. And now let me share with you the words that they used. Which is that you know, they treat these as they say endorsement of traditional gender stereotypes was assessed by eight items. Of these eight items, four items, assessed attitudes towards men and four towards women. So we got eight words for which are supposed to be more masculine, and four of which are supposed to be for feminine. For the masculine ones, we have risk taking, brave, courageous and adventurous. That doesn't strike me as for things, that's one thing I don't like, I love them all. But that doesn't strike me as for independent things. And for attitudes towards women, the four things that they supposedly did were clean, hygienic, sanitary, and pristine, which kind of problem with the category, but it's only one category, right? Like they have basically brave versus clean. And like I could, I could tear apart the like, women are clean thing, but you know, probably most people watching or listening came up with some version of courageous or risk taking or adventurous as being a typically more masculine trait. But and you know, that which many women would like to, you know, are also engaged in a lot. But this isn't eight. This is an eight things at most, it's two, and one of those two, which is represented by four words here is questionable in and of itself. So I'm not compelled by at least that part of this research.

**Bret** 58:14

I ain't seen the methods, but that sounds like a weird kind of pseudo replication. Exactly. Yeah,

**Heather** 58:20

exactly. Okay, so there's a lot more we could do on that paper. But let's, since I think we're coming to an hour, let's just quickly talk about two more things that have come up in the past. Oh, I don't remember which livestream it was we were talking about that Contra Costa study, that that presumed to show that invited people via Facebook, and it turns out the wife of the principal investigator was specifically promising people that they would be able to get tested, if they came up positive, they might be more likely to go back to work. in Contra Costa County, which is the county in California that has San Jose Silicon Valley, etc. We talked a lot about the various reasons that we didn't trust the results. Well, there's a there's another thing now that I only find it on BuzzFeed news, which is obviously a questionable source, but they find that they a whistleblower complaint has been lodged at Stanford, claiming that jet blues founder helped fund the study. And that that which is potentially a pretty big conflict of interest in the financing, the study was not disclosed in the publishing of the study. So one more thing to make a suspect that that whole, that whole study was politically motivated at best, and potentially, you know, potentially quite skewed. I don't know if we have anything well, kids.

**Bret** 59:36

If you're going to go with corrupt study design, go big or go home. The lesson here,

**Heather** 59:43

there you go. Okay, and finally, I think it was last time or the time before you were talking about the aircraft carrier. That Okay, so fill us in here.

**Bret** 59:58

Yeah, there was an alarming report. ordnance is one of the things I fear most in this crisis and alarming report of people who had recovered from COVID-19, who were showing signs of a new infection. And this would be disastrous, it's still possible off of

**Heather** 1:00:16

the I can just can't think of the name of the Roosevelt.

**Bret** 1:00:20

So this would be a terrible thing, if you if it turned out that having had it once didn't mean that you were immune, not even for a short period of time that you could get it again, almost immediately. So what we have now begun to see, and I put

**Heather** 1:00:33

the screen back,

**Bret** 1:00:35

South Korea is evidence that the second wave of positive tests on these people is not the result of new infection, but it is, in fact, the result of them shedding. Forgive the term here for a second, but dead virus, people will complain about that. And they'll say viruses are not alive to begin with, we don't need to fight about it. The point is, you've got viruses that are capable of inducing an infection, these are complete viruses. And then you've got fragments. And these tests are such that they don't detect an entire virus, they detect a particle that is recognizably viral in origin. But that does not mean that you have active virus in your system. So I think in this case, they were actually shedding dead cells from their lungs that had been infected. And it's not surprising that those would have molecules that would trigger these tests. Yeah,

**Heather** 1:01:28

I don't know if it was lungs, because the one last thing I want to say about this, that you would you would found this on the Bloomberg site. And strangely, they Yeah, I guess you can put that appsec, you would found that on the Bloomberg site. And they didn't link to what should have been a preprint. You know, we don't expect it to be a peer reviewed article at this point, but a preprint. And so I went looking and I found Stars and Stripes, I found Mother Jones, I found Forbes here. And all of them are telling the same story, but none of them have links to the preprint. And you look, the only thing that I see to indicate Why is the top of this Forbes story, which says South Korea's Health Agency announced Monday, which sounds like it was a press conference, which is really even such a lower bar than anything else that we have yet seen. This means that I really, really hope this is true. Like this, this flips the script again, back to Okay, hopefully, if you've had it, and you've got antibodies, you will now have some level of immunity and you cannot get it again or have it reemerge. But this it's 200. I think they looked at 400 people, maybe 285 of which had it tested negative and tested positive again, and they go and find these dead in quotes, virus viruses that are causing the antibody test to test positive again. But all of that all of that, that I just said, is hearsay, because it's from a press conference we aren't we haven't been allowed into the scientific paper. And of course, scientific papers almost never have links to the actual databases. And you know, most people can't do the appropriate analysis on someone else's data set, especially if they're outside of their own field. But you can do what we did for instance, on you know, this Rosenfeld and tomiyama paper on whether or not open a pandemic can make people more socially conservative for what we did specifically with that Contra Costa study paper went through looked at the methods, what methods are not going to be reliable here, therefore, we at the very least can't say that they, they think that they found what they think they found, they found what they say they found, in this case, we can't do that. And that means, you know, I really hope it's true. But where's the preprint? If they did this work, like it needs to be out there on the far have a paper and the preprints allow multiple revisions up until up until it's accepted somewhere and published. So it should be out there. And I really I can't see what the excuses for it not being available for people to look at. So this is

**Bret** 1:03:56

a particular thing. It's rare in my experience, but it's not unheard of. And it is a terrible corruption of the method. This is the opposite of doing your peer review out in the open this is Yeah, nobody's even able to access it. Now here presumably, this is not intentional. But I recall in my own past, in my paper on telomeres senescence in cancer, I had a prediction about cloned mammals and in particular Dolly, that she would die. She of Dolly, the first cloned mammal, the sheep, and she would die of pathologies that were beyond what her age would predict she would have. And at the point that she died,

**Heather** 1:04:42

we have pathologies beyond the age at which she was

**Bret** 1:04:45

we don't know, because they didn't publish it. They told us that it wasn't the case. They told us that they had put her to sleep to put her out of her misery because they couldn't stand to see her suffer from the pathologies that she had that they swore

**Heather** 1:04:57

but but she died far. Earlier that most cheap a first species,

**Bret** 1:05:03

well, they the specifics, but we don't know because they euthanized her, but she didn't know how old she was Yes, right. They euthanized her claimed it had nothing to do with age related pathologies. She did have early arthritis. But in any case, it made it impossible to evaluate. So there was a hypothesis test that had been run effectively, but we weren't allowed to see the result of it. So anyway, this is something it's something that happens and it is. It is really problematic when it does. Alright.

**Heather** 1:05:37

I think we're good. We are going to Yep. Do we want to say something about what we're going to do next time or we want to leave that on say, I think we can say something okay. So I we don't we don't really know yet. But we noticed that Saturday when we are scheduled to do our next live stream is may 23, which makes it the third anniversary of Brett having 50 or so students and we had never met before show up at his classroom and chat for his immediately immediate firing a resignation. And the rest is history and largely televised as well. We have not talked much publicly just the two of us. Benjamin Boyce did a very nice interview with us that summer. I think. And we've both talked, you've talked a lot, you know with with Joe Rogan and Dave Rubin and Sam Harris and such publicly, but and

**Bret** 1:06:29

we talked to Mike Naina Oh yeah, Mike

**Heather** 1:06:32

has done an extraordinary, extraordinary job. But we were thinking of spending the next livestream talking a bit about evergreen and maybe going over some things that haven't been public so far. Maybe.

**Bret** 1:06:47

Yeah, so we'll talk about what it looks like. Three years out. Yeah. Okay. So we will be back in 15 minutes, we will do q&a with your super chat questions. If you are not subscribed to the channel, why don't you subscribe and hit like hit the notify Bell and set it to all so you don't miss future live streams and other content and we will see you very shortly.