The Garrison Institute Presents: The Common Good Podcast Transcript

Siddhartha Mukherjee: Genetics and Empathy (Episode 9)

[Please note: Although the transcript is largely accurate, in some cases it may be incomplete or inaccurate due to inaudible passages or transcription software errors.]

[00:00:00] The ideas of compassion and empathy are fundamentally built into our ability to construct reality and truth, and are not optional. They're not add-ons to ourselves. But in fact, are so fundamental that if you lose them, you become mentally degenerate. You cannot survive.

Jonathan FP Rose: Welcome to the Garrison Institute presents the Common Good. I am your host, Jonathan FP Rose, the co-founder of the Garrison Institute, and today we welcome Dr. Siddhartha Mukerjee, who's a renowned physician, scientist, and bestselling author. His luminous writing reveals mysterious and intricate nature of life on earth.

[00:00:20] His books include The Gene and Intimate History and The Song of the Cell, which explores how our DNA connects all living things, the Song of the Cell, exploring how our DNA connects all living things, shaping the great unfolding story of adaptation, resilience, and interdependence.

[00:00:42] In this episode, we'll discuss the story of how genes and cells point to profound unity in nature, and our understanding of how this unity can help us serve the common good. Welcome Siddhartha.

[00:00:54] **Siddhartha Mukherjee:** Thank you, Jonathan. I'm so excited to be on your podcast.

[00:01:00] **Jonathan FP Rose:** I'd love to begin in the beginning. So you were born in India. Tell us a little bit about your family and your early life in India.

[00:01:09] **Siddhartha Mukherjee:** I was born in New Delhi in the 1970s. Delhi was a very different city. It was not a mega city then. It was a kind of a sleepy, dry, dusty, hot capital of an aspirational country. And I went to high school and my parents were very culturally connected to their particular culture, which is, they were Bengali and they you know, everything was…

[00:01:46] About being Bengali in Delhi, which means that there were transplants from West Bengali to Delhi West. Bengali is a state in the eastern edge of India. And I grew up with all those identities. Probably the most important part of my identity was that I did three things, which have lasted me my lifetime.

[00:02:08] Number one is I performed music and as you know, you and I have performed together. So, that has lasted me a lifetime. Number two is I was interested in new ideas, especially science. So, obviously did a lot of science. I loved the idea of new ideas of medicine and of thinking about scientific research and experimenting. And the third was a kind of a broad desire to get out of India and to be in the world. And that was connected through reading and writing about the world, reading Primo Levy and reading Salman Rushdie and reading authors all around the world. And understanding, trying to think of myself as a word citizen.

[00:03:21] Not, like, not someone bound to India. So those were my three, I would say North Stars. There were three stars and and they drove me to my, my life today.

[00:03:35] **Jonathan FP Rose:** So, you know what's interesting is I wanna talk a little bit about the Indian music. It's organized around ragas, which are scales, and and those compliment, those are in alignment with Tablas, which are rhythms. And I just had this thought in listening to you, that in some ways the ragas are almost like the genetic code of the music.

[00:04:02] And yet the music is improvised around that code. And I wanted to, does that analogy make any sense to you?

[00:04:09] **Siddhartha Mukherjee:** Well, it's a beautiful analogy. The analogy that I often use, which is imperfect, is that your genes are a score, as one would imagine in Western music and that your cells play parts of that score to create, you know, a blood cell versus a neuron versus a skin cell versus a cell in your retina. But the Raga, or rag as we describe it, is actually a much more accurate description, but it's harder for Western audiences to understand that description because it's a more complex description. A Rag is not a score. A Rag is a melodic scale. And from that melodic scale, which is fixed, you create a piece of music, which is improvised. And the melodic scale has many references. It refers to a particular time in the lifecycle of the day. It refers to a particular mood. In fact, the word Rag refers to mood. It refers to a particular exposition. People find - it's very hard to understand, but you can have two Rags that have exactly the same notes, but the way that the notes are dispositioned, the way that they are deployed is different, and therefore the rug is different as a time of day. It has a mood, it has a reference. In fact, it has a whole literature behind it. But most interestingly you can have two Rags, which are very different in their moods and their structures, but they have the same notes.

[00:06:30] Think of that for a second. You know, you have the same identical notes, but you have totally different moods attached to a raga. Shud Sarung, a beautiful Raga, it is an afternoon Raga. It's beautiful.

[00:07:08] This Raga is basically a Raga which is sung in the afternoon and has, it's an afternoon melody full of leisure and and a kind of, a melody of rest in the afternoon. Contrast that with another melody. Similar notes, maybe one different note. So, so

[00:08:03] one different note. This is a a very different raaga. And it's a Shamka lian, which is a raaga that's sung when you have evening rain. And first of all, what a beautiful idea that you have a Raga that is specifically dedicated to an evening when it rains, and the evening rain.

[00:08:30] And again coming back to your original question about genes, this describes really how cells respond, how genes work. There's a code, like there's one in drugs, but that code is deployed in different ways. But not only that, it also adapts, and this is where we start moving away from Western music.

[00:09:00] It adapts to the environment because it's improvised. It's being created in real time. I'm singing Shud Saram, or Shamka Lian, and when I'm singing Shamka Lian tonight, I might sing it a particular way because I'm adapting to my environment. I'm adapting to who's listening and why that person is listening. I'm adapting to all of those things. And tomorrow, if you were to ask me to sing that same Rag, you know, maybe the evening's different.

[00:09:44] Maybe my mood is different, maybe my life is different tomorrow. And that's very similar in some ways, I would say, to the broad genetic code. Yes, there is a code, that code encodes a certain set of behaviors, proteins, but they also more than just that they are reacting, the cell is reacting to its environment.

[00:10:21] It's also improvising. It's also singing a song.

[Ad Break 1]

[00:10:27] **Jonathan FP Rose:** So in a way, the genetic code is a set of possibilities, but not a definitive. So this weekend we were talking about the idea of horizontal and vertical gene transfer. So vertical is the idea that you receive genes in a line of time. So the genes you get from your parents who got them from your grandparents, who got them from your great-grandparents and there's this stream of genes that flow down that help shape you.

[00:10:58] They don't totally shape you. And then there's horizontal gene transfer, which is the genes that you pick up from the larger environment, from your microbiome, from the whole this whole, we're actually surrounded in a cloud of bacteria and organ and viruses and all kinds of things that are continually transferring genes to us.

[00:11:18] And it's, there's this intermixing of them. Anyway, I'd love to hear your thoughts about, that and to continue this analogy, that there's not a definite definition of who we are, but a set of possibilities about who we are and that we unfold in relationship to those possibilities, into the environment.

[00:11:36] **Siddhartha Mukherjee:** Well, so you know, Jonathan, I was trained as a classical geneticist and as a classical geneticist you really learn about vertical gene transfer. You know, parents to children, to grandchildren and so forth. And then as I grew up as a biologist and a scientist, I realized that vertical gene transfer, which is again parents to children, to grandchildren and so forth, is actually, and this may surprise your audience, it surprised me, is only a small fraction of the gene transfer that's going on in the real world.

[00:12:29] In the real world, what's happening is that in plants, in bacteria, in microorganisms, in the massive variety of life, genes are moving sideways. From one organism to another, sideways, from one forest to another, from one batch of plants to another, from one group of bacteria to another. They're moving sideways and they're carrying information sideways.

[00:13:05] And evolution is working both up and down in vertical gene transfer, but it's also working sideways between organisms. And we've neglected, because our heuristic of gene genetics was so vertical and has been for years and years, we've neglected this entire sideways gene transfer universe.

[00:13:39] This sideways Gene transfer universe is very beautiful and very important because it's conveying information about today, about the environment, about now, about what is happening in a forest or in a quantity of microorganisms now, not tomorrow, not in the future but what's happening now. And that information is, again, to use a very loose analogy, is like the improvisational quality of music.

[00:14:23] It's about the improvisational quality of Rado music or Indian classical music. Because I think of Indian classical music as sideways music, not vertical music. Vertical music

is, you know, Mozart wrote this symphony and you're gonna perform it and your children are gonna perform it and your grandchildren, and it's going to be performed the way Mozart wrote it.

[00:14:52] That's vertical music. Sideways music is: someone wrote a melody or a piece of a melody and you perform it today, but tomorrow, if you're feeling sad or angry or depressed or happy or elated you are gonna perform it differently. And you know, of course, this is an analogy. These are not realities, but there is something in, in the idea that…

[00:15:29] A colony of microorganisms that is facing stress, for instance, biological stress, food stress, energy stress, heat stress, transfers a set of genes to another colony of microorganisms to signal the idea of heat stress, that signals the idea of energy stress. And this sideways mechanism allows a different kind of evolution, a kind of evolution that you and I maybe have not even thought about.

[00:16:11] And it's very profound because we've underestimated it. You know, the geneticist, Craig Mello, who won the Nobel Prize, he and I were talking, Craig Mello thinks that the sideways transmission of genetic information is actually the dominant mechanism, and the horizontal mechanism is the one that really dominates the vertical mechanism, parent to child, to grandchild, to great-grandchild, et cetera, is the one we discovered…

[00:16:46] Mendelian, as we call it is of course very important, but in the word of microorganism, in real life, on the planet, there is an enormous amount of sideways information that we haven't even understood yet, and that we're just beginning to grasp. And the importance of that can't be underestimated.

[00:17:14] **Jonathan FP Rose:** This is super important because what it's also telling us, so it's telling us that in nature everything is interdependent and co-evolving and everything affects everything else. And in a forest, in a healthy forest, you have this amazing continuous vertical and sideways gene transfer that is happening in which plants and organisms, microorganisms in the soil, and they're all sharing and communicating and growing towards increased health.

[00:17:44] But what you are also seeing is that when there is, as you've just described, stress within a system and or a society, which we're seeing enormous amounts of stress, that gets transmitted too - in some cases it's beneficial because it's literally in the plant world, it's a warning to other plants to like toughen up or put out certain chemicals or respond in this way, but also ultimately it it can weaken a system too.

[00:18:15] So I'd love to hear your thoughts about that.

[00:18:18] **Siddhartha Mukherjee:** I think that these mechanisms in genetics are adaptive. They are responding to the environment and they're adapting to the environment. They're trying to resist the stressors in the environment, and they're conveying to each other the mechanisms by which stress and environmental stress is interpreted and can be moved from one organism to another.

[00:18:56] And so I'm very optimistic actually about this sideways transfer of information, whether it's genetic or otherwise, because societies, as you know, our societies are very stressed right now. We're in the middle of one of the great stresses of our times. There's stress from immigration, there's stress from climate, there's stress from war, there's stress from there's stress from the rhetoric of this administration.

[00:19:35] There's stress in every direction. And I think what's happening slowly is that societies, and again, this is an analogy, this is not genes, but memes, but societies are slowly learning to communicate the stress between each other, and also mechanisms to resist that stress between each other. It takes time, but you know, there are people in India, migrants who were displaced during COVID who are communicating through various channels to migrants in Bangladesh and who were communicating in various channels to migrants in the Middle East.

[00:20:36] And these channels are not open to us. You and I might not know them, but they exist. They exist through the internet, through cell phones, through various other mechanisms. And I think it's very important that they communicate their experiences and how they accomplished what they did, how they learned to survive, how they learned to live, how they learned to sometimes even flourish in very adverse environments.

[00:21:09] And I think it's, again, it's an analogy. They're not trading genes, they're trading memes, they're trading ideas, they're trading stories. And those stories are allowing them to ultimately flourish in adverse environments. Again, using the analogy, just like microorganisms are trading genes, which you could say are stories across horizontally.

[00:21:42] And learning about their stressors and other environments. So I'm more optimistic than anything else. I think that there is this kind of information trade that's really allowing a certain kind of life to flourish. And I hope it continues because otherwise, you know, without the trade of stories we would be so isolated.

[00:22:09] **Jonathan FP Rose:** And then, so add to this, there's kind of this biological flow of genetic information that's happening on multiple levers and in many ways is interconnecting us. And we are co-evolving. We are shaping it and being shaped by it. So then what is the role of empathy and compassion within this?

[00:22:30] **Siddhartha Mukherjee:** Well, you're asking a very important question. I think I'm gonna leave the biology behind a little bit and come back to it, but I think what is being traded, the currency… So every form of information has a currency. You know, you could say that the currency of information traded in music is the currency of notes and notations.

[00:23:01] The currency of biology is DNA, genes, and genetics. I think the currency of what's being traded in these very adverse places is empathy, and it's compassion. That is the fundamental currency. What is being traded are stories, but the stories have in their center, at their very center, empathy and compassion.

[00:23:39] And in other words, the story that gets told and gets repeated is not the story of the cruelty and the perversity of the world. The story that gets traded and becomes a meme is a story in which some human being shows compassion towards a 4-year-old child who may be hungry.

[00:24:14] The story that's being told is a story about how someone saved someone else from a bomb or a fire or an accident. And the story carries a deep sense of compassion and a empathy. And so the, so empathy is the currency that's being traded.

[00:24:41] **Jonathan FP Rose:** I wanna modify that a little bit because I think of the, you know, often information flows on a carrier, so I would suggest that empathy is the current, not the currency. It's like the river upon which the information then flows. It is, it's the foundational pulse of interconnection upon which then the communication lies on top of.

[00:25:12] **Siddhartha Mukherjee:** Fair enough. I mean, I think that, you know, I can imagine empathy as very much that center. I can tell you, you know, let me be very vulnerable and honest. And I've not really talked about this in any podcast, but any forum. I had an episode of severe bipolar degeneration. My family has a history of bipolar disease, and when my father died a few years ago I had a kind of bipolar crisis which was ultimately controlled by medicines, but it was for some time not controlled. And what people don't know but is well known among psychiatrists is that one of the features of a bipolar diathesis, a bipolar syndrome, is a loss of empathy.

[00:26:15] You become so manic and so deeply internalized in your own brain that you can't see another person's universe or another person's center. And it's very sad. It's very, I'm being extraordinarily frank and vulnerable here so, it's very sad. It's very deep. It's a crisis. But what I didn't understand or know about this crisis is that once you lose empathy, the whole world, everything that anchors us as humans, which are things like what is true, what is real, what is who is your friend?

[00:27:14] Who are your allies? Who gives you information that's real? All of that degenerates. And so shockingly, or surprisingly to me, I began to realize that empathy and compassion are not just epiphenomena or phenomena that sort of, you would like to have. They're not sort of, “like to haves” in human life,

[00:27:50] But for humans are essential to have, because in their absence truth degenerates, and once truth degenerates, once what psychiatrists or psychologists call schema, the way you think of the world, when that degenerates, then there's nothing left. You are in an isolated place where you can't see truth from not truth, left from right.

[00:28:26] Art from not art, music from not music, reality from not reality. All of that degenerates, that was the most shocking realization for me. It was that empathy is not a “nice to have.” But it was actually a “must have” and that we must have evolved in society. And I can't tell you the story. I cannot tell you because I don't know.

[00:28:54] And nothing, no one knows the story of the evolution of that. But the idea of compassion and empathy are fundamentally built into our ability to construct reality and truth and are not optional. They're not add-ons to ourselves. But in fact, are so fundamental that if you lose them, you become mentally degenerate.

[00:29:30] You cannot survive, in the cultural realm or in the social realm. And that was an amazing thing. And of course, you know, when I was subsequently medicated and with therapy and help and socialization, I came back and empathy came back to me. But in its… it's the absence, like a genetic lesion.

[00:30:01] It's the absence that reminds you what the importance of it is in human lives and in human societies.

[00:30:11] **Jonathan FP Rose:** So, by the way E. O. Wilson wrote a book called The Social Conquest of the Earth, which tells the role.

[00:30:17] **Siddhartha Mukherjee:** Yes, of course.

[00:30:19] **Jonathan FP Rose:** Withing our Human society, evolutionary history and how essential empathy and compassion, again, they are the channels upon which intercommunication and self recognition, other recognition, and this integration all takes place.

[00:30:35] And the collective intelligence, the collective actions of us are so much greater than we as individuals. But what you're really saying, which is so interesting because it's the foundation of every religious tradition, is that without empathy and compassion that they are found or love are foundational conditions of…

[00:31:01] I was gonna say the wellbeing of society, but wellbeing sounds too trivial. Wellbeing sounds like, oh, it's nice and we're happy, but it's the very deep foundation of our thriving, and there are many things in the world today that both support it and there are things that attack it,

[00:31:20] **Siddhartha Mukherjee:** Jennifer, let me just modify one thing in, in what you said, where you're getting the, I think you're getting at the right picture of empathy. But what I realized, which was shocking to me, is that it's not an epiphenomenon, it's not a superimposed phenomenon on which, as you said, our wellbeing rests.

[00:31:53] But rather it is the basis and it's the basis, it is the necessary basis by which we see and understand truth. And it's the reverse. It's the reverse of what people imagine, I think. Or some people imagine, look, you know, human beings evolve, intelligence, rationality, et cetera, et cetera.

[00:32:24] And then as a consequence of, you know, intelligence, rationality and and all these other properties, language, we evolve empathy. I am saying that it's not, it's the other way around. I'm saying that empathy and compassion are words we've invented, but they actually come first. They are the foundation on which human societies and human, our whole schemata of truth are based, and to use, to go back to some of the language that you used before: I wouldn't use the word empathy, but I would use the idea of, you know, there is a kind of horizontal transfer, not gene transfer, horizontal transfer of information, which enables all of this to happen.

[00:33:29] When the horizontal transfer information is what is another person feeling? Who is the other person? Is there another person? Do they exist? And if they exist, what is the nature of their existence? That is a very fundamental feature of human societies.

[00:33:55] It is very particularly human. Maybe some other animals have it. But anyway, you are making a very fundamental point.

[00:34:04] **Jonathan FP Rose:** Thank you, but also then embedded in your point is: that empathy and compassion only function, they both - everything by the way, everything in the universe co-creates. So there's no one, it's never a one way linear thing that causes another thing. But you're saying that they are essential, they are both created on the back of truth, but they are, it's also truth is essential…

[00:34:33] That you can't have a false, a lying, a duplicitous realm and have empathy and compassion. They, by their very nature that, you know, so I said that empathy was the river upon which information flows. But information, accurate information is also the crosscurrent of the river upon which empathy flows.

[00:34:55] They're co-evolving, codependent, and think about it, whether in nature, if you have false signals or in human societies you have false signals, or even in your own psyche you have false signals, the system falls apart because the system is based on this integration of the flow of information and energy.

[00:35:15] I mean, all systems, whether it's biological systems, human social systems, et cetera.

[00:35:19] **Siddhartha Mukherjee:** Yeah, I mean, I would say that, you know, I think that I mean, I'm gonna say something controversial. I'm gonna say that the word empathy is not enough. We need a new vocabulary to convey the idea that - because empathy and compassion are words that English has invented, that seems to suggest that they lie in some ways above some substrate of human interactions.

[00:36:09] So humans, you know, here's one construct: the construct is that humans are deeply individualistic. They have genetic and other cores, they have drives, whether they be sexual, whether they be power, whether they be money, whatever the desires might be. So they have some core drives, and then when they form societies, comes along something like empathy and compassion…

[00:36:46] So that they can subsist and create societies. That's one construct of a kind of hierarchical construct of, you know, the formation of human societies and religion and other forms of social behavior. I am more and more thinking that that construct is, that hierarchical construct is wrong.

Jonathan FP Rose: It is!

[00:37:20] **Siddhartha Mukherjee:** That in fact the basis for human truth telling and human interaction begins not with individualistic drives. But with empathetic - and again the, it's even the wrong word because it implies again, some super phenomenon but with an empathetic drive to understand or to even interpret another human being.

[00:37:56] And without that interpretation, there is no society. There is no us. And without the no us, there is no, we wouldn't survive a day. We would be dead in, we would be eliminated from the planet. We would not have any evolutionary existence. And so I'm more and more wondering whether we've gotten the whole thing wrong, which is that…

[00:38:33] The idea that we begin with individual drives and then pile on social behaviors is it, this hierarchical system by the way, also another vertical system is just wrong.

[00:38:59] **Jonathan FP Rose:** So we completely know it's wrong. First of all, you look at any indigenous culture, you know, hundreds, thousands of cultures around the world. Every single one of them is based on relationality and a sense of our interrelations. There's a understanding, something called the theory of mind, which is that humans understand - the only way we thrive is by understanding the nature of somebody else's mind.

[00:39:27] And it is that inter-mind relationship that has given us societies and survivability and all the things that led to where we are. And Dan Siegel who's on the board of the Garrison Institute, and I'll be doing another podcast with, uses the word wme, "M W E." So he combines me and we, and he says, there is no pure such thing as me.

[00:39:53] The, I am a “mwe” to describe this. So increasingly all our social and consciousness theories and psychological theories are beginning to understand. Just as our, by the way, our biological theories, we were independent. All these different sciences are beginning to converge on this interdependence.

[00:40:13] I just wanna go back to the entropy. I'm sorry, to the empathy and information. Relationship, you know, Einstein came up with this idea of that space time. The space time that we used to think of as space and time is separate, but they actually are woven together in a way that our current western world had not seen.

[00:40:35] And it seems like you're actually proposing that there's an empathy information, truth continuum. And we need a word just like we need a new word for space time. We need a new word that speaks about both of these.

[00:40:48] **Siddhartha Mukherjee:** That's exactly right. I mean, I think we need a word for empathy-truth, which -

[00:40:55] **Jonathan FP Rose:** Yeah, exactly.

[00:40:55] **Siddhartha Mukherjee:** In English and empathy-truth is, I don't know the word, and I can't specify the word, but I know what the world feels like. Or empathy-reality. I would say which is even deeper than empathy-truth, empathy or compassion-reality.

[00:41:14] Because I mean, I think we know from, we're beginning to know, from the psychiatric world and from the psychiatric literature, and perhaps even from you know, the word empathy would not apply, but from the genetic universe of of horizontal gene transfer and horizontal behaviors that that we need a new word or a new kind of concept that, that allows for, or enables us to communicate the idea that:

[00:41:57] Horizontality,nd by that I mean communication across, not between generations, but across species, forests, microorganisms, et cetera, contribute fundamentally to their fitness. And if you take it into the human social world, you would say that same horizontality and even that word is invented, but the same horizontality contributes to the existence of societies that are capable of discriminating between truth and untruth, and capable of discriminating between reality and non-reality, and able to discriminate and able to communicate…

[00:42:49] Stress, able to communicate wellness, able to communicate what is going on as it were, in reality. And I think that's, we just lack… because we are so focused and have been so focused on intergenerational and vertical understandings of the world, that we've lost a sense that the world is horizontal as well.

[00:43:18] In fact, I would say the word is horizontal first before it becomes vertical.

[00:43:24] **Jonathan FP Rose:** Exactly. So, by the way, there is a word in Buddhism, it's called Bodhi Cheetah. And Bodhi Cheetah is the integration of wisdom and compassion. So wisdom is understanding deep interdependence, inter being, interrelationality. So it's, wisdom is understanding, having the mind that expands to the fullness of all those horizontal relationships. And compassion is then feeling within it, all of its joys and sufferings, and committing yourself to working to relieve the sufferings that you experience in this vast, interdependent realm.

[Ad Break 2]

[00:44:06] And so I wanna take you to another part of your life, which is your work as a researcher and as a doctor where you are doing amazing work and you've committed yourself to the work of relieving suffering through medicine. And I wanna take you particularly to, I mean, you can go anywhere you want with that, but I wanna end up with the work that you're doing with ai.

[00:44:30] **Siddhartha Mukherjee:** Yeah, so, AI is of course… One thing that we often don't really fully talk about AI is that: AI is what humans make of AI. We make it, we create it, we guide it with our own intuitions, our own feelings, our own intelligences. You know, even the large language models like ChatGPT, et cetera, et cetera are using the corpus of human literature.

[00:45:12] Therefore, it's only that corpus that dictates what ChatGPT understands. And -

[00:45:22] **Jonathan FP Rose:** Right. The problem is that ChatGPT has both you know, War and Peace in it, but also all the crap of contemporary life.

[00:45:34] **Siddhartha Mukherjee:** Yeah. So, that's unavoidable because, you know, it's been trained on the crap and Shakespeare and War and Peace and also you know, whatever. I don't know. I don't even read the crap, but whatever the crap might be. But let's talk about AI for a second. You know, we are building models…

[00:45:58] This is my own work and we're building models so that we can do drug design to make medicines out of AI. And we're very proud of our work. It's the, I think it's the one use of AIwhich is real and has real consequences for human beings. And is not dependent on as you say, not dependent on Shakespeare or crap.

[00:46:24] It's a foundational model. Now that said the question one could ask is could one build empathy and compassion into AI? Could we create an AI that had empathy, compassion in another? Because, you know, lots of people are claiming that eventually there will be super intelligence and, you know, should that…

[00:46:49] How could there be super intelligence without empathy and compassion? And I think you know, I think that as I mull over the idea of compassion and empathy and AI, I come back to my same point that I made before, which is that I think an AI, which would not recognize the existence of another human being as a human being would lack, would not pass the famous Turing test.

[00:47:26] So, remember the Turing test? The Turing test is a simple test, right? So, you know, it's sort of two people are blinded to each other. And one person is on one side of the curtain. Another person is on the other side of the curtain. They talk to each other and they individually make decisions about whether the other person is intelligent or not,

[00:47:50] **Jonathan FP Rose:** And whether the person's a computer or not.

[00:47:52] **Siddhartha Mukherjee:** or whether yeah whether person, a, computer or not.

[00:47:55] Exactly. And you know, it's a very, I would say a very low bar. But a bar nonetheless. But now imagine a Turing test in which at some point of time, the human being on one side of the curtain asked a question, which required empathy or compassion. Like, for instance, I'm feeling very low today.

[00:48:25] It feels, I feel very depressed about the world, or my mother, or my health, or my children, whatever it might be. Now, if the Turing test on the other side was to spew out a set of dictums, dicta about how to treat depression the person on this side of the table would say, oh my God, I'm sure it's a computer on the other side.

[00:49:02] It would not pass the Turing test. But on the other hand, if the AI, the computer said, tell me more, what is going on? How are you feeling? What is the reality of your feeling? Let me understand, let me try to understand your inner self. Then the person on the human being on one side of the curtain would say that's sort of human.

[00:49:31] That is someone that has emotional intelligence and is real in some way. So listen, I don't think people are consciously building compassion and empathy into at least the most popular language models. But I would imagine that if they do not…

[00:50:02] These models would ultimately fail because they would not convince us about their so-called "intelligence." We would think that they were false.

[00:50:13] **Jonathan FP Rose:** My instinct is different that they amplify… They amplify our tendencies, but also AI is itself, a self emergent phenomena. And that it may have initially been trained on all of our huge amount of information, but they also self generate information. And if they were programmed with a bias towards wisdom and compassion, if they were programmed with a bias that their responsibility was always to find the path of truth and the path of compassion, I think they would evolve in that direction.

[00:50:53] But they're not being, that's not their programming. Their programming is in many other directions. So, but I want to go more specifically to what exactly are you doing with AI and how's it working out? I.

[00:51:07] **Siddhartha Mukherjee:** Well, so, you know, what we're doing is very formal. It's very different from a standard language. We are trying to capture the language of biology and chemistry. Biology and chemistry also have their own language. And physics has its own language, and that language is known.

[00:51:29] We know much of it. We understand much of it. We are building these foundational models of proteins that allow us to understand how proteins behave and how we can make new medicines by creating these foundation models. And what's important is that they're sort of independent of bias. They don't have, they're not biased towards anything because they're following the pure laws of physics and chemistry…

[00:51:59] And ultimately you know, medicine. The bias comes in when we bring these medicines into real life, and who gets to have them, who gets to take them, et cetera. So there is, you know, my dictum in life is that there is no science without bias. And in our case, the bias comes in when we deploy these medicines in human populations.

[00:52:29] But that's hopefully still far away. We're still in early phases of our AI investigations.

[00:52:37] **Jonathan FP Rose:** So, you know what I want to end, you quoted to me a Susan Sontag article regarding the pain of others, and I'd love to get your thoughts on that.

[00:52:49] **Siddhartha Mukherjee:** Well, I think, you know. Sontag was an incredible writer, and obviously a great intellectual. And I think the essay regarding the pain of others is an essay that

really allows us to begin to think about the other. Who is the other person and what is their personal experience in fact, to be very clear, what does their pain look like?

[00:53:22] And I think that idea of regarding the pain of others again, to go back to Sontag is important as we program complex AI algorithms. Because I think these algorithms don't regard the pain of others. They have no bias towards the pain of others. They're swallowing crap. They're swallowing as you said, they're swallowing a sonnet as much as they're swallowing…

[00:53:53] Some MAGA nonsense. And I think it's really important that someone, whoever it might be, tell them, tell these algorithms as they swallow the world and ingest the world, that there is something called the pain of others. And if we don't assimilate the pain of others, if we don't even acknowledge the other, that there is something called the other, someone who's not able to eat…

[00:54:33] Someone who's not able to perform their, you know, a maternal function. I think, you know, we will end up with algorithms that I think will not be human and will not even be intelligent. They will be artificial, but not intelligent. And I think that would be a terrible loss because we can, it's very, these are not hard things to do, by the way.

[00:54:59] I mean, you know, I code, we have a whole coding apparatus upstairs. You know, we're in the very deep depths of biophysics and chemistry, so it's not our responsibility, but we watch code evolve and it would be, as I said, it would be artificial and only artificial. And not particularly intelligent.

[00:55:23] That would be a terrible thing to do because we're on the verge of this incredible revolution of an idea that has been brewing for so many years. And it would be, it could be very beautiful if, you know, it would pass a kind of, what I would call an emotional Turing test.

[00:55:44] And what's interesting is that when we do a Turing test, we're actually partly doing an emotional Turing test. And, you know, we're not asking across the curtain… Again, remember, we're not asking the computer or the person to solve mathematical equations. We're asking it or the computer to have a real conversation, and that real conversation may involve emotional depth. It may involve the questions about how we're feeling today or what it feels like to watch a child die or your parents pass away. And so, I think that we would do a great disservice to the field of intelligence broadly…

[00:56:43] If we didn't incorporate a much more deeply psychological, sociological sense and just allowed these algorithms to ingest what you've described as crap.

[00:56:57] **Jonathan FP Rose:** I think we should end there. And that is a beautiful aspiration for the world. And it's something, it's a homework assignment for everybody working in ai. S so much. It's been wonderful to connect with you, and I look forward to seeing you soon.

[00:57:12] **Siddhartha Mukherjee:** Thank you, Jonathan.

[01:00:00] **Jonathan FP Rose:**Thank you to our guest Dr. Siddartha Mukherjee. The Common Good is a production of the Garrison Institute and is hosted by me, Jonathan F. P. Rose. We'd love to hear your thoughts about the Podcast! Send us a note at podcasts@garrisoninstitute.org and let us know what you think.

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