

Frank Keil Wonder

Frank Keil: [00:00:00] wonder is free and engaging wonder is free.

It's one of the few things that no one can take away. If you want, you got to get. I think it's, it's an amazing combination of humility because you're confessing, you don't know something, but sort of audaciousness because you can, you can propose, I wonder if it's this or this incident really way radical,

That was Frank Kyle on psychologists off the clock.

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Debbie Sorensen: I'm Dr. Debbie [00:01:00] Sorensen, practicing in mile high, Denver, Colorado, and coauthor of ACT Daily Journal.

Yael Schonbrun: I'm Dr. Yael Schonbrun, a Boston based clinical psychologist, assistant professor at Brown University, and author of the upcoming book Work, Parent, Thrive.

Jill Stoddard: And from sunny San Diego, I'm Dr. Jill Stoddard author of be mighty and the big book of act metaphors.

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Jill Stoddard: I'm here with you El to introduce today's episode with Dr. Frank Kyle about his book wonder, and I just thought that this was such an interesting conversation and yell. I'm curious what your thoughts about the episode.

Yael Schonbrun: I have many thoughts. I think this concept of wonder is so cool. And one thing that I just wanted to say. Our conversation Jill off is asking you to go a little bit deeper about the difference between wonder and curiosity, because here in this podcast, you know, I think we're all very curious and exploring lots of different ideas.

So, and you asked, , Frank Kyle, this question, but I wonder if you could say a little bit more about how to differentiate between wonder and curiosity.

Jill Stoddard: Yeah, I think I, hopefully this is the right way to [00:04:00] think about it, but I would say that curiosity is always a part of wonder, but wonder isn't always a part of curiosity. So he gives an example in the book, like you might be curious about. Which state has the largest number of automobiles and the answer is California and the conversation just stops there.

It's a fact, whereas wonder has more of this wanting to know how and why about something, you know, how does, I think he uses the example, you know, how does a sunflower move, , you know, the, these kinds of things that have a little bit more depth to them, I guess I would say.

Yael Schonbrun: Yeah, And I think wonder is such a, there's sort of this cognitive piece. And then there's this emotional piece, this sort of. Excitement over learning. And one thing that you guys talked a bit about that I reflected on a lot myself is the need to be okay. Be comfortable, not knowing the need [00:05:00] to sort of be comfortable, not being the expert in the room.

That part of why kids are so good at being curious and full of one. Both, , is because it's okay for them not to know because they're kids and that once you get to have a PhD in clinical psychology, for example, it feels a little bit less safe to be the one who doesn't know. And yet I think when you sort of go deeper in to the value of having wonder, it becomes a little bit easier to connect to.

To not know. And I think that that comes up all the time for me on this podcast. You know, when we're interviewing guests who have expertise in this or that area, and I have this sense of, I should know, but I don't. And here I have this opportunity to ask these questions and be the one who doesn't yet know in this conversation, but it can be uncomfortable.

Jill Stoddard: Yeah, I totally agree with. And I think it depends a lot on the context, if were expected to be the expert in the room. There's a little bit more of that pressure [00:06:00] may be that it's not okay to say. I don't know. And I think that's one of the, I took so much out of this interview, , and I've noticed it's really changed my behavior with my own kids and the way that I interact with him.

, and specifically in the way that you're talking about where I think in the past, I felt more of a pressure to always be able to answer their questions. Whereas now I kind of look at it more as an opportunity for us to. Kind of go on an adventure and try to discover the answer together, you know, to say, gosh, I don't know, how can we figure that out?

You know, let's go hunting for an answer to that. And it has really made our interactions so much richer. And, you know, you'll hear in this episode, Frank talking about his relationship with. Granddaughter's three-year-old granddaughter and some, some just really interesting examples of how wonder has really opened up his [00:07:00] experience in his life.

And I think listeners will we'll learn some really cool tactics for doing the same in their own.

Yael Schonbrun: Yeah, and it was, as I was listening, I was thinking that wonder Frank Kyle's book wonder and Adam Grant's book. Think again are a nice combination because Adam Grant really encourages. To think like scientists to sort of have curiosity and be willing to test their hypothesis and be wrong and go on a journey of exploration and be willing to be, have your original assumptions proven wrong.

To the point that you're making about joining your kids in this journey? I recently had an experience , my son turned 12 years old and got a video game from my mother in law for his birthday. And they do a zoom once a week. And. I came downstairs to their zoom. They were talking with one another and the computer, , that they usually talk on was face to the computer screen.

And my son was playing the video game. And then I heard my mother-in-law's voice coming out of the computer and I was like, what's [00:08:00] going on? And she said, I just was dying to know how this video game worked. It was like a basketball video game. She's in her seventies. She doesn't regularly play video games, but there she was engaging with wonder and curiosity with my 12 year old son on a computer together with him.

Such a strange and adorable sweet scene of them journeying together in this area that she probably wouldn't on her own have had any interest, but because he was so excited and she was willing to have that on curiosity and wonder together with him, it became such a connecting experience for them.

Jill Stoddard: I love that so much. And it's something that is fairly simple, you know, it doesn't, you don't have to drive an hour to the botanical garden to go learn about Venus fly traps. You know, it can be something that they live far away from one another, but can still find a way to engage that sense of wonder even using technology and, and.

In a pretty simple way. That's such [00:09:00] a cool story. Well, I hope everyone enjoys this interview with Frank Kyle.

Hi everybody. It's Jill here and I'm thrilled to introduce today's guest. Dr. Frank Kyle Frank Kyle is the Dilley professor of psychology, linguistics and cognitive science at Yale university.

Much of his research involves asking how intuitive explanations and understandings emerge in development and how they function in adults. These topics are linked to broader questions of what concepts and explanations are, how they change with increasing expertise, how people understand the limits of their own knowledge and how they navigate the division of cognitive.

Dr. Kyle received a PhD in psychology from the university of Pennsylvania, a master's in psychology from Stanford and a bachelor's in biology from MIT. He is the author of hundreds of articles and several books, including developmental psychology, the growth of mind and behavior, and most recently

wonder [00:10:00] childhood and the lifelong love of science, which is here to talk with us about today. Frank, welcome to psychologists off the clock. Thank you so much for being here.

Frank Keil: Well, thank you for having me. I'm looking forward to this.

Jill Stoddard: You bet me too. Well, I just, I love this topic of wonder. I find it fascinating. And of course I've noticed in my own kids who are eight and 10, , you know, noticed it a lot when they were little and how it seems to change over time.

So we will get to that. I think in a lot of detail, but I think the natural place to start first is how we define wonder and how it's different from things like curiosity or.

Frank Keil: That's very important. Thank you. , it's had different meanings over the centuries, and so I do take a lot of character make clear. The sense I made is one that you see Rachel Carson, the naturalist talking about, or the astronaut Mae Jemison, or the physicist Richard Fineman. And now. The idea that we want a hunger to understand how the world works.

We are really [00:11:00] obsessed with why and how questions we want to know how things work. So this is more than just saying, wow, that's amazing what could be off. And it's more than simply being curious in an open-ended way. Like how many of windows does the white house have or.

how many trees that are on the lawn?

And it's not a yes, no kind of exploration. It's a wine house. It's hunting for deeper mechanisms. The causal structure lies beneath the surface. And the surprising thing is that very young children are just wired to do this. They're incredibly precocious this way and up till about age five, they're just rocketing ahead and another building.

Jill Stoddard: Yeah, it's really interesting. I love in your book, ,, you start out by talking about this idea that, that how naturally curious children are and how we see this in the types of children's books that appear on shelves, that all these kids' books answer, how and why questions, but those types of. Essentially just disappear from the adult reading shelves because of this decline in wonder.

So I'm curious if you can talk a little bit about your research and other people's research, what the research says about why we seem to lose [00:12:00] this natural sense of wonder over time.

Frank Keil: We're still trying to puzzle it out, but it's really quite astonishing how much it does seem to decline. This was first noticed almost 50 years ago, , in a study in Britain, , and a very careful analysis and they found surprisingly, , this is Barbara Tizard and Martin Hughes. It happens at all social classes.

They thought they'd be big SES differences, but it happened wealthy, poor, rural, urban, and, ,

these children were at age four. The why questions and how questions just took off some children by the end of their fourth year, asking a hundred why and how questions a day. Then they enter the schools and some are going down to two, one or zero.

Why question today? So I don't want to blame it on the schools. It's a very complicated convergence. If you're a teacher in an average school, you have a very large classroom. You've got to get through a curriculum. You may well have to teach to a standardized test. You don't have time to entertain why and how questions and go back and forth and go into a deep dive, but that's what kids want.[00:13:00]

And so, , when they find out that they can't do. And the teacher feels constrained and keeps on how to answer facts because that's what the test we're going to be on. Virtually no assessment instruments asked them to offer explanations. They offering to get facts cause they're used to degrade. So there's that there's also adult misconstrues of what children's minds are capable of.

We tend to think of children at age five or six as being concrete in their thought. And that's just not true. There's decades of research. Last couple of decades showing that it can have quite abstract concepts. And so because of that misconception, that reinforces that we should treat them in a certain way.

That's inappropriate. And those are two sort of major themes. , there's more, we may enforce them the wrong way. We often think we should have possibly an extrinsically reinforced children, which can undermine wonder because spontaneous plan exploration is the best way to do it. So all those things come to.

And I'm not blaming anybody. I think it's a really hard nut to crack. We have some reasonably optimistic because we see individuals who survive the wonder, we see [00:14:00] places where that happens. , Finland's a very interesting example. They have revamped their education system dramatically, and it seems to have resulted in a lot more people living engaged in loving to ask wonder, , it's much more play oriented kind of curriculum.

It's a long story,

Jill Stoddard: yeah, that's interesting. I remember there was something you wrote about it that had to do with schooling and how, you know, going back to this idea that there's a classroom full of 30 kids. And that one of the things that changes is that the teacher starts being the one to ask the questions and the students are the ones expected to answer.

Frank Keil: It's Right,

And of course, teacher has not much choice. And the questions that teachers asking are usually not and why and how questions, like they're more like how, what, and what is and stuff. And the other thing that happens, and this society, teachers get the impression that they shouldn't confess what they don't know.

So they, they feel like they should be the phones of authority and they should just give out information to kids absorb, but really. Wondering is a coat process. It's a partnership. [00:15:00] And I think th th th the thing we have to all learn is it's wonderful to find out what you don't know, because I knew I have a sort, an opportunity to learn so that I could see the world more clearly,

Jill Stoddard: So it's sort of like saying, I don't know why don't we figure this out together and turn it into a process of wondering,

Frank Keil: and engagement.

Jill Stoddard: and engaging. Yeah.

Frank Keil: Well, how do you do that with the class of 30 kids?

Jill Stoddard: Right.

Frank Keil: And so that's, that's sort of the, the challenge. , and I think you can master it, but it it's very difficult

Jill Stoddard: do you know if, ha has any research ever looked at homeschooling or Waldorf or Montessori or some of these different sorts of models to see if this is different, even as kids get older?

Frank Keil: Yeah, it, it's not clear that any one kind of SchoolWorks, it is clear that some kind of faculty or teachers work, some people have this, a gift to engage children all at the same time, keep track of them. I describe in detail, a teacher I had in elementary school who was [00:16:00] miraculous. ,

and, and I think he taught me 80% of the science I knew before I got there.

My teeth, , they're just astonishing. And he would wonder all the time it confesses. Yeah.

Also taught all of science, the history, which was very interesting was something that he had learned when he was a Harvard and a Akuna the president of Harvard who tried to volition science instruction that way.

And what that meant was it was cross-cultural because he described the origins of internal combustion engines by starting with gunpowder and China, as a way of storing crumble. And I went to the quest different individuals. There's lots of discussion of failure, but we did it all in a way that was deficient.

I don't know how he did it in retrospect, but it was an astonishing individual. I talk about another person who teaches now we'll call her high school. Outside of Milwaukee, Wisconsin, sister Gertrude, who did the same thing, but these were extraordinary people, both of them have graduate degrees, one in math and one in philosophy.

And they had a passion for wonder that was infectious. And so I think that's, my future would be there on weekends all weekend, wanting to go and just play [00:17:00] with him, you know, and do stuff, all sorts of gear set up. So those things do happen, but it requires an incredible person with. Do.

Jill Stoddard: Right. And, and with external pressures for standardized testing and specific curriculum, it, it may be impossible in terms of the systemic issues in schools. But I wonder if there are things that may be, people can learn as parents, even, you know, if, if I just want to promote wonder in my two kids or our listeners, you know, in their kids or nephews or other young people that they interact with, I wonder do you, are there.

To be learned from those two teachers you talked about in your book, you know, things we can do to kind of promote that sticking around.

Frank Keil: There's a lot to do. And, and, I go through a lot of studies that reveal what they are. You'd learned. Talk to your children differently. You don't ask them what we call closed in questions. I think I hear do therapy. You don't the same thing. You want to get them to roll out what they think. So.[00:18:00] , did he go to the zoo?

You say, what did you do at this? Or, you know, and if they don't say it, I don't know if they may say, well, did you see an interesting animals? What kind, where they, you draw them out. You make them realize that this is an exploration. You're not just asking us no answers or facts. And so that's one thing the other is to immediately get excited about things that you don't know and join the expedition was done that can be Googling or exploring something internet.

It can be anything. So it's taking the time to sit down and figure out what they want to know. There are studies showing the court amazing with kids as young as three, that if you could ask a why question and the adult just repeats it back or paraphrases it, or there something circular, the kids will ask it again and again, until they get some kind of mechanistic answer.

They're not happy when you just try to put them off and. And if you don't know that it's fine with them, you're not diminishing your, their view their back to you. I think you're doing the opposite because you're willing to, you have the ability to say you don't know, that's a big thing. You know, the best scientists are often the ones who are most [00:19:00] confessed, what they don't know.

And this is the very famous soccer to school with that, the more I know, the less I know.

Jill Stoddard: Right. Well, anybody who has parented or, or dealt with young young kids knows the, the phase of the incessant. Why question that starts out very cute, but then can start to feel a bit like a burden after awhile. But it sounds like what you're saying is to really embrace that phase and respond in a different way and to continue to do so to even maybe encourage.

Those why questions to stick around longer so that we're not inadvertently squashing that wonder.

Frank Keil: And you know, some people think, oh, they're asking why question just to annoy me or to remain socially engaged. I don't really care. And a few kids do that, but the literature says that's not true. 95% of the time. They really do want to know. , and you don't have to. The whole thing at once. If you happen to be a real expert on something, you don't give them the entire graduate thesis on it, because I'm a little bit of slice.

It's like really rich dessert. I wouldn't digest it and then come back a little more and [00:20:00] see what they care about. So none of us can know everything about a topic. I should just get deeper and deeper and more branching, but you can give them a little glimpse enough tools to go further.

Jill Stoddard: How do you think we should respond? I'm just thinking about, I'm trying to think of examples of these kinds of questions I've gotten from my own kids and what they're doing lately at eight and 10 is not why questions as much as let me did, you know, and then they'll tell me something that I'm almost positive is patently wrong.

Like totally untrue, but I don't want. Are you with them? What would be a way to respond to that? That would prompt more of this wondering

exploration

Frank Keil: That's a great question. I haven't had that before and I love it. , and it's a big issue because the misinformation wars are getting worse and worse. so there's an awful lot of stuff out there that we have to think about. What I would do. And I think we did with our kids, , would be saying, well, I'm not sure that tried, can we look into that further?

What's the evidence, what supports? And so you might have to [00:21:00] Google or talk to somebody, you know, who's an expert and unexplored. The other thing to tell the child is I want to have this. I want to disagree to it and play around with this, but you have to convey to them that disagreeing and having an argument is something you do to learn not to win.

So I have a section of book about arguing to when we're starting. It's so important to learn that all human interactions aren't win, lose, or actually they can be win-wins and that's good. I, was, we've been arguing, but I, think it's such an important lesson in life. And wondering if a beautiful example, you can be in a debate, a vigorous one, but you're smiling.

You're enjoying it. You're learning. That's what you want. My best loud names of my grad students are ones where we're arguing, but joyously.

Jill Stoddard: Yeah. Yeah. Well, and I think if I'm remembering correctly, I think you said that one of the things that leads to this loss of sense of wonder is as we start to develop more distrust and denial, and I could see if you're kind of arguing the wrong way. Like if I'm just shutting my kids down and saying, no, that's not true.

That's not how that works. That could breed some distressed or deny, you know, these things that would really shut

Frank Keil: all the bad, [00:22:00] the bad DS disengagement. , yeah. What happens is, , or worse yet? I got a sibling sort of shuts him down says, oh, that's stupid. You don't know anything. And then it can take, so I feel I'm not going to engage this area. So I think the dinner table is a fascinating place to try to develop this skill.

People don't get together enough. You know, there's all these books and articles about how you should get together and stuff. Well, when you do, you shouldn't be doing quizzes. You're having discussions and exploring things together. , and I think we all have to practice that it's so much fun. I mean, I'll give you an analogy.

, I had, , bill cataracts about a year ago. I, the world was really getting blurry and I had them able to remove your foot. Everything was brighter. Incredibly clear was amazing. I said again, that's like no wondering, because it gives you more insight to what's going on in the world, around you. I teach a course on wonder. I just started doing a seminar senior seminar and every, every week student taught to present something. They knew nothing about that. They

learned about, I have learned so much about the world around me, through the seminar for them. I [00:23:00] do it myself anyway, but I learned about how. Parakeets seeing, which is astonishing, how they, how they mimic our voices.

I learned how early flowers sprout and the first ones in the spring and how they have special adaptations to break to the frosty soil. And every time I go aside, the world is richer and deeper and it's like the cataracts, the wonder clears up your, it adds a new lens.

Jill Stoddard: I love that. And what a brilliant idea to get to now get adults to get re-engaged with wonder.

Frank Keil: They love it. They tell me it's astonishing, how much is changing their experience. And, and I, I, as a matter, the book has changed me. I spend a lot more time interrogating myself and thinking, what, what don't. I understand that well, and almost anything I look at closely, I realize I have all sorts of holes and so I devour stuff.

And then it's just incredibly rewarding.

Jill Stoddard: Yeah, so that, you know, I can certainly see, but you know, it feels good. I mean, I like I think of myself as a lifelong learner and I love it when I have a question and I can [00:24:00] find the answer and it surprises me. , but what are like, why do we need wonder, you know, if we talk about. The loss of wonder is a negative thing and wanting to promote it more and adults, like, why do we need it?

And what are some of the negative consequences of losing our sense of wonder?

Frank Keil: if we don't wonder?

we have very few ways of learning what really works in the world and be able to have a deep discussion where much more vulnerable to misinformation, disinformation. We, we can't have the ability to ask. And track down things. We don't even know how to approach the right experts.

If you don't know anything about an area, what do You know, even to who to approach, to ask for opinions? , so those are a lot of big reasons. I think it's important for sort of social policy reasons. I think it takes a little practice, but it's pretty quick to realize how much better you feel when you do it.

It's been like exercise at first. You have to kind of work at it, but it's not that hard. And when you remind yourself that a three or four year old can do it [00:25:00] effortlessly, The embers there. So you shouldn't be intimidated to start simple. I mean, that's another thing I try to tell people is don't start with an incredibly complicated exposition of it.

Start by simple. If you want to understand quantum mechanics, don't start with the math. Read a simple description of it. I have a section on math in the book. I think math is great. But there's lots of ways to qualitatively entering into the system. And it's slowly slotted into math if they want to.

There's nothing we can't learn about really. I mean, there's always somebody who really brilliant who has made it clear for us and we can

Insight.

Jill Stoddard: I I'm smiling as you're talking about quantum mechanics, because I learned recently that there's an entire series of books for babies. That's like quantum mechanics for babies and their literal board books that are written at such a simple level that even a baby can get a general understanding.

So this would be kind of a cute natural place to start with wonder, even if it

Frank Keil: Google for yourself. My, my four year old granddaughter husband's books.

Jill Stoddard: Oh, she

does. [00:26:00]

Frank Keil: and she's, she's ferocious reading them. She corrects me the other day. She said, I'm really interested in Venus evil twin planet earth. And I say, what do you mean evil twin? You said, well, it's the hottest point in the solar system?

I said, no, mercury is the hottest. It's the closest to the sun. She said, no, no, no, no, no, that's not right. And I said why? And she said, because there's so much more atmosphere. So I said, oh, but she's totally right. Venus has this incredibly thick atmosphere that cause a super greenhouse effect. You though it's much farther away from the sun.

It's 860 degrees Fahrenheit on a surface all the time. And. And the science fiction of Ray Bradbury, which thought it was like a tropical jungler. So I learned from her all the time.

Jill Stoddard: You got schooled by a three-year-old. Now this is Francis. Was she named after you?

Frank Keil: she was, yes.

Jill Stoddard: She was,

Frank Keil: That's nice of you to pick up on that. It was,

Jill Stoddard: yeah, that's really

Frank Keil: and, and she's, and she's a wonder machine. I mean, she's amazing.

She had, she asked me why Cardinals don't migrate in the winter. , she's pretty precocious. And I [00:27:00] said, I have no idea. I didn't even know they didn't migrate. And that made a whole bunch of different excursions about why they're red. They have to eat red things to be red. It's very interesting. And the males do it when they want to mate, they get really red and it's a whole, I see now Cardinals in a wholly different way.

So just listening to your own children and kind of getting into it. You start really expanding your own insights. So I'm very glad I feel mama much more, more to her than she does to me and information. Okay.

Jill Stoddard: That is so cute. I mean, it's, it's really cool. It's a way for you to learn from each other, but there's also like a bonding that's happening when you're experiencing wonder together. And, you know, you, you even talk about at one point the importance of other people and helping us gain more powerful ways of speculating and exploring and discovering.

You know, I think I was thinking of that as sort of like adults to children, but the way you're describing it is almost the opposite.

Frank Keil: It is not always, but It certainly can be. I do have a section. I called the didactic [00:28:00] predators, which is sometimes an academic parents are often guilty of those are professional parents. We start lecturing our kids. So we say, and we start saying, and I've seen myself do this. And that turns them off right away.

You start being very didactic and you're not partners anymore. You're saying I'm the authority. And I'm going to tell you all about, , the evolution of plants, or I will tell you all about whatever. And then it turned right off. , they want to be paced. They want to be partners. They want to ask questions.

I mean, there's so many studies and many, many labs. Present a total with a puzzle and they want to unpack it. , Francis again, I just, my granddaughter's story. When she started learning about the piano, she was fast, knew that her fingerprints could get this discrete sound and she tried to crawl inside the piano.

She would have figured it out so badly. , so I, you know, I want to, I hope we can keep us alive. We'll do everything we can in her pants when she hits school, to keep that going.

Jill Stoddard: Well, and the other thing I'm thinking is kids love to teach. They love to have knowledge and share knowledge. And I'm thinking about, you know, the [00:29:00] worksheets that come home from school, where my kids have learned something like the cycle of a seed, you know, they always learn that the seed to the plant and the photosynthesis and all of that.

, And that in even just asking the question, tell me about that. It, it gives them the opportunity to demonstrate something they've learned, but it's also a way that an adult can access their own sense of wonder. Assuming it's coming from like an authentic place, not as a, not as just a strategy. Do you know what I mean?

Frank Keil: Yeah.

it's a strategy. It can't be an authentic, it can't be just trying to show off or whatever, and you have to be careful. You have to make sure you don't embarrass the child. So if they come home and learn how the water cycle or whatever, and then you can't push them too hard, like you said, , you know, if I can an example, I know I told somebody today more about how courage is working in and they should get, but do you know the CarNow cycle?

We said, no, no, we're not going that of depth at this point. So you can make someone feel bad and inadvertently do that. So you have to be thoughtful about. Embracing what [00:30:00] they've done, making it clear that you're doing great things. If you're disagreeing thing, they have a misunderstanding, don't completely ignore it.

But that's really interesting, but let's think about if there's any other ways. So I it's obvious how to do it if you're not pressed, but problem is if you have two jobs and three kids and you're trying to cook dinner and everything else, and this kid asks you a question, you have to sit down and think about it.

And another thing that comes up. Because people say, why do I need to do all this? It's all Google. Why should we wonder at all? We can just look. And I think there's a very strong answer against that. And that is you shouldn't use Google and other resources all the time, but you can't outsource everything because you don't even know where to look and you can't have a conversation.

I can't have a conversation with you in real time. If I have to turn to my cell phone or tablet every two minutes and Google, the next question, we need a mental tool. That's okay. So schema is about how the world works, abstract skeletal ones to engage, and that's what we're missing. And I think it's getting worse.

I have a section in the book where I talk [00:31:00] about the mechanism. Does. and I good example of my college, Carlos is a 63 triumph Spitfire. There was not a single transistor in the entire car. It didn't have a radio by a Mazda Miata today, which is a comparable car and has three or 4 billion transistors.

And everything's encased in silicone. Nobody might see her yell. Students not even change a tire, a little hunches oil. And in my generation, almost everybody could take apart cars down to the last night before. And that's true for toasters. It's true for almost everything they see, they're just in indecipherable and they say, oh, we're the digital generation.

We have that instead. But they know more about how you use the cell phones, not how they actually work.

Jill Stoddard: Right. That's such an interesting point.

Frank Keil: And I'm not trying to diss them. I think they have a lot to do, but I think we give up a lot because then we surrender our agency. , if, if you read someone, tell you about the COVID epidemic is, is a fabulous example.

How are you to evaluate claims that the vaccine is dangerous, how you're at evaluate claims that you shouldn't take it. If you're pregnant, [00:32:00] all of which I think are wrong, but you have to understand something about viruses and bacteria and the immune system and everything else. Not a lot, but enough to know what to read.

Okay. No, listen to arguments that, that aren't Conklin confrontation.

Jill Stoddard: It's such, it's such a good point. And the other thing I'm thinking about is just like, Quality is quality of life. The word I'm looking for that, you know, when I think about a construct like mindfulness, you know, similar to wonder kids are born mindful, like you're only present and in the moment, and there's no judgment yet, and you're not worrying about the future and you're not ruminating about the past.

And this is something that shifts over the course of time. And then we have to be more effortful at trying to practice. Present and mindful, but when you are mindful, you know, you eat out so much more from your experience and when there's not judgment, It reduces suffering. So even though you still [00:33:00] experienced the pain of painful moments, there's not the suffering that comes with, you know, the judgment on top of it or that I shouldn't be feeling this way.

And you know, the wonder sort of reminds me of that, that, yeah, we can certainly just rely on Google and Alexa and, you know, Else, and we'll get an answer and we'll get it quickly and we can move on about, you know, our business and the 50,000 things that we have to do in the day. But when you think about what you want, the quality of your day-to-day existence to look like, I mean, isn't it just a much better space to exist in when you try to engage your natural sense of wonder and, and, and move through the world in that way.

Frank Keil: and so it's, so yeah, it's so rewarding. I mean,

take a bit. I imagine that you had a choice between wearing fuzzy, dirty glasses all day versus nice clear ones. What would you do it? There's no question about every time you understand a bit more about why things are there, are they hard to world? You see more, you [00:34:00] see more richer, causal color, there's a metaphor.

And I, and I totally see spring differently as a result of reading and learning about what happens all around me and the same thing for, for a car. One of the big challenges in developing. Was vibration. I had never realized that these things used to come vibrating apart. So when I see a car doing it, doing it on the road, but a new car being perfectly quiet, a safe, what a marble of vibration happening.

That's something that's that you can think about, but you have to realize all that's going on is that the car whizzes by, especially these electronic cars, we can hear

them. , they're amazing. Masterpieces of engineering and appreciating that makes it a richer experience. It's like seeing much more.

Jill Stoddard: Does anyone ever argue. That like it's beneficial to leave something to the imagination or I'm, I'm thinking of a, a colleague of mine who talks about appreciating a sunset, just speak just because it's beautiful versus trying to understand it like a math problem

that there can be drawbacks basically.

Frank Keil: I don't think that I'll go into this in some detail, because it's a

great [00:35:00] Richard Dawkins wrote a book where he talks about this issue in particular, because there's a. Bye Keats and where he talks about, , how, , Newton destroyed the beauty of color in the rainbow by showing how it decomposes the person.

And mark Twain actually has a rumination about this. And I argue actually, it's not a good art card was actually Keats, who was a medical student. Science and digging deeper, so circle, and he has a wonderful other poem about exploration and discovery. , what I think the answer is is that the mystery gets deeper and more amazing and more, you know, it doesn't, you don't solve it.

And what you learn when you start getting into it is, oh my God, this branches, and there's more and more and more to know. So it's not like you close it all out and there's no mystery. It's just much more interesting. I've been reading about the planets. I discovered astonishing things. I didn't know.

There's a conjecture. That's fairly well. Called the tack of Jupiter, where Jupiter at one point billions years ago came roaring in from where it is now to near Mars, stripped away the atmosphere of Mars, Trump, Mars, and created the [00:36:00] asteroid belt and then went running back to be on Saturday. , and how I did this and why the solar system is highly dynamic.

So I'm looking up there as you start thinking, these guys are not just start a Google kind of things. Rotating in stationary orbit. They're much more dynamic and that didn't stop me.

Jill Stoddard: Right that you didn't, you don't go up. I know everything about space now. Nothing

Frank Keil: I really don't know anything now I think, oh my God. And so that's what my, my experience, again, the guy who said no, if you want to be impressed by the beauty of the world, you, it unfolds its tapestry, all the richer.

Every time you do this. So, , I just disagree and I've never seen anybody who wants to experience it said, oh, genomics. You

Jill Stoddard: Right.

Frank Keil: and I think there's also a compound. Sometimes people turn, play into work. So twine talks about how a physician might lose interest in biology because they spend so much time fixing bodies that's because it gets diversive to be doing it all the time.

And you just have to learn.

how to separate that. And all our jobs are to be very careful not to get so [00:37:00] obsessed with a work product that we

Jill Stoddard: Right. And, and maybe if you maintain your sense of wonder about biology, because even if you're a medical doctor, there's still more to learn, maybe it sort of prevents that, that burnout

, but you know, another benefit that just occurred to me just because of talking to you is. When you're engaging in wonder so that you're gathering this information or, you know, the things that Francis has taught you that you're now saying to me, this is a really interesting conversation.

So the more you wonder, the more you learn and then the more you have to share with other people, and the more vibrant a conversation can then

become

Frank Keil: exactly

right. I, it does make me a boar at some cocktail parties because there's a script you should pay. Carpet barn is where you say, oh, our property taxes are too high. What's a good restaurant. What trips have you taken lightly? And then move on to the next person. But someone who comes to me and says, oh, our property taxes are too high.

I say, yeah. I wonder why that is. What is it about the, you know, I just want to dive into exploring. They don't want to do that. They just want to make a comment and move on. So there are [00:38:00] certain scenarios where there's a scripted, shallow interaction or diving, but that's rare. I think most of the time we really love it.

Jill Stoddard: Well, and how often do people say they hate small talk? I mean, I think that a lot of times we really crave these kinds of conversations that are deeper or more. Interesting.

Frank Keil: Yeah. that's a great point, but we have to learn how to do it in a way that's not threatening. I'm not going to get you in deep to show how smart I am.

Jill Stoddard: You don't sound like a no at all.

Frank Keil: You're not trying to Trump. The other person who show that you're the master,

Jill Stoddard: yeah, yeah.

Frank Keil: wonder is free and engaging wonder is free.

It's one of the few things that no one can take away. If you want, you got to get. I think it's, it's an amazing combination of humility because you're confessing, you don't know something, but sort of audaciousness because you can, you can propose, I wonder if it's this or this incident really way radical, you know, it's the kind of thing that despots fear, because we really wonder about the system or about, you know, I have a section of the book about Lysenko whose crazy views about her.

But one argument killed more people than any other person in history because he [00:39:00] had these views and how to, where we resulted in massive famines all across the Soviet union, including the Ukrainian was one of the worst workplace heads. And then, , China adopted similar to, and it's because no one dare challenge him.

No wonder. I wonder how could that work? It doesn't he had this Lamarckian view of a breeding. That was crazy. And so that's very important, I think, , and a number of go Britain on this. In some ways, quite a disruptive, almost revolutionary kind of thing, but it's also a tumble. You're not being arrogant at all.

You can just help us.

Jill Stoddard: Right, right. Well, while we're talking about, you know, the relationship between wonder and other people, I was curious about this concept of over imitation, because I think I misunderstood it, maybe when I was reading it, because to me. It seems like over imitate. So, you know, when you're basically just blindly doing what someone else does, it seems like it's the opposite of wonder where we're just doing or copying rather than exploring.

And it made me think of the funniest story. That's one of these stories that has been [00:40:00] passed down through my family. Although now I can't remember if it was my grandmother and her mother or my mother and my grandmother, her mother. But that, they would always cut a ham in half and put it in the pot and cook it that way.

And I think it was my great grandmother who did this. So that's what my grandmother did. So that's what my mother did. And nobody ever thought to ask why,

how does this work? Why do you need to do this?

Frank Keil: Mister make it fit. I presume, but when it got

Jill Stoddard: Yes, that's it. The great grandmother only had a small pot, but then when my grandmother and my mom had perfectly large pots, they still always cut the ham in half and never thought to ask why.

So to me, that seemed like it was an example of over invitation and the opposite of wonder.

Frank Keil: What orientations? I introduce it. We were some of the people in our lab. coined the name , it is an important part of going up because very early on, you'll have to take some things on face. If someone teaches you how to operate the , ,

I always use the visa, but they don't exist anymore, but operate, , your cell phone or some other new modern device. You can't really [00:41:00] ask why all. Yeah, I have to take on faith. And especially when you're young, when the people around you, you can trust like your parents. It's a way to kind of catch up. You can later than dive in, ask why you did that and then start tripping away. Why are we cutting this roast every time? What's the point of this? And sometimes we forget too.

It's also a way to enter rituals that are important in cultures. And so those are really vigorous literature on us. There's no question, kids do this when they're young and they do it as a way of thinking, becoming socially. So, you can't ask why you do everything, driving a car. There are things you do, or, you know, when you installed software, run a new program where they say do it this way, you don't ask why, why, why, why you just do it.

But later you do want to start, we the luxury of time, start to unpack it because you don't want to always just do it. Maybe it isn't efficient. Maybe it's silly, or your hands are drying out because you're not thinking you're just cutting in half. I don't like that

Jill Stoddard: Right. It's not funny. So I, the, the, the, uh, the pattern has been broken. I do not cut hands in half to,

Frank Keil: Because [00:42:00] you wondered because you said,

Jill Stoddard: because I w yeah, well, I think it was, I probably have to give my mom credit for that one. I think she was the one who wondered and then was able to tell me the story so that

Frank Keil: I

mean, so I think it's good to adopt what people do around you, who you trust at first, when you're young, but then always start asking why at some point, and no one should be offended. And then obviously when it gets to religion, it gets more tricky because some things are rituals that you do. So you have to.

know the boundaries and That's not always.

But I think, you know, I see in my own children, they, they do something we did in Africa, as I say, why do you always back in the car when it does that? Why don't you do it this way? And I realized you're right. This is a silly habit I've got, which would cause me to pick up habits sometimes that are not productive.

And it's, it's great. It's great. When an outside observer can say, is there a reason you're doing this?

Jill Stoddard: Yeah. What, you know, this just made me think, because you said religion, this has come up a lot recently in my house where my daughter will say. Why do people believe in God? So she's, she's 10 she's decided she

doesn't believe in [00:43:00] God, which she has been raised in a, in a, a house that doesn't have religion as part of her upbringing.

And so she doesn't understand. She's wondering why do people believe in God? And she says like, if science can't prove that God exists, why do people believe in it? And I've asked her, you know, well, I'm not sure. What do you think? And I can't think of what she said. I think she just says, I don't know. And I tried to talk to her a little bit about.

Faith and it's not clicking. So she keeps asking and I'm wondering, is, is there like, cause that's not a question you can really Google, is there a way to, to, to promote her, to continue to ask and not shut that down, but I don't know.

Frank Keil: I mean, it's a very difficult question.

One day you could say might be well. , why do we have moral rules where. , you know. and that they're not obviously proven by science, there's no science of, of, , the golden world. You just have. I noticed, right.

A lot of people think that's connected to religion that may not be true, but there are other things we believe in now that are not related to [00:44:00] scientific discoveries or we want to believe.

And so there's some things like that and how they happen is kind of a mystery, but it gives a lot of. A good feeling, a good direction in life. So, you know, this has a bit of a tangent, but I'll bring it back to wonder. I'm always telling my students and it really shocks me that they cannot write off 70 million Americans as being nuts.

So after the elections, when the incredible country gets a beautiful country gets so polarized, I have neighbors who will not have people with the opposite political party, to their house for dinner, for social contract. And I think that's just horrific. And so when someone is religious and you're not, that's a talk or it's an opportunity for conversation to engage and say, what are you getting out of this?

And then you might find a parallel, get it. Maybe not be maybe your daughter's not religious, but really she believes in something else you can't justify. She Bluestone river.

Jill Stoddard: so, and I could even encourage her to ask her friends, not in a, an attacking or defensive way, but in a [00:45:00] curious

open

way, tell me why you believe in

Frank Keil: Oh, no, maybe I will generally say so why is this feel good to you? Why, why do you enjoy it? And, and, and, and, you know, she might learn something interesting. I mean, I tell all three of our. To go across drive across the United States and go to the Iowa state. Fair. It sounds silly, but these bi-coastal kind of experiences.

They forgot about this whole middle part of the country life transforming for everything, every one of them. , and many of the kids at Yale have been to all the continents sometimes even Antarctica, but haven't been to, , Nebraska and that's insane. So I think wondering does help being openness open to have discussions and explore things.

We don't do enough of that. So when we get to the religion case or anything else, that's kind of, there shouldn't be topic topics. I think, I think things are uncomfortable, but it's very hard. Why undergraduates tell me they don't like talking about difficult issues. You need to worry about offending people.

I used to be a residential college head. My wife. [00:46:00] So we've lived with this 400 students for 11 years and we, one time started difficult issues to have a one night a week. We talk about too touchy issues that they don't want to discuss without some kind of moderation. No one would have. They were too uncomfortable.

They were too worried about offending somebody and I got it, but that just tells you, and that's too bad. I think we've gotten more that way in the last few decades. And I don't want like a, just a wondering, but I think there is this welcoming of discourse, you know, in my generation, you could have discussions with people from opposite ends of the spectrum without feeling like you are going to be assaulted morally.

Jill Stoddard: Yeah, and I think it all speaks to how desperately. We want and need to connect. I mean, we're hard wired evolutionarily to connect with other human beings. And there was a time where having hard conversations, maybe facilitated that, but with everything that's gone on over the last six plus years, that feels so threatening that it feels safer to, to avoid these conversations.

It's it's, [00:47:00] it's not just, I don't want to offend people for the sake of not offending it's I don't want to have a rupture. In a relationship I want to connect.

And the way I feel like I can connect is to just have safe conversations with people who are like me. And then, and then we, we, we lose opportunities to connect with a lot more

Frank Keil: And you lose steps, you'll lose kind of deeper

insights. It's a huge issue as I'm sure you know, much better than I do. There's been a kind of sea change on college campuses with anxiety, rising people.

worried about offending each other. And I don't, again, I don't want to tie this all at one concept, but I think We do have to learn to embrace it.

To embrace the joy of learning about each other about issues and realize we have much more common, common humanity than we sometimes, uh,

Jill Stoddard: We are more alike than we are doing.

Frank Keil: way more.

Jill Stoddard: Yeah, that's so true. Well, tell me, do you have we're we're getting close to the end of our time. So I'm curious if you have a favorite or most surprising or most interesting study or finding,

Frank Keil: [00:48:00] I'll tell you one that we didn't have a lot of years ago. It's still done. It staggers me. We had children as young as 11 months, watch a simple array of objects, which are all disorderly.

Imagine this is a metaphor to do exactly how we did it with more control, but imagine you go into a room and all the toys are scattered about now, a screen comes up and either a person goes behind the screen or a ball rows behind. Screen comes down and all that order disorders neatly ordered. They're very surprised they can't even speak, but they show great surprise if the ball did it, but they think it's fine for the person to have done it.

Now show the opposite where it goes from order to disorder. And I think either one could easily have done it. So they know at some level before they can even. The only intentional agents can create order of disorder or basically reverse engineered machines. Now you can ask adults to explain what's going on.

Cause they have the same reaction and I got a bit tongue tied and older children can explain it all, but they know it. It's some people [00:49:00] that learning about the causal structure world at a very abstract level, not concrete. It's

incredibly powerful. Recognizing that intentional agents have a kind of power and agency that nothing can get in the wheel house.

And there's just dozens, even hundreds of studies now demonstrating aspects of that. It's very hard to do in for a study. So it's not what I do most of my time on it. But once in a while, I can really reveal stuff. So that's one example, another one, which actually we just finished, which was really fun was people underestimate how much children might complain.

So we took an adult vo-tech, , engine training video from mechanics about how the internal combustion engine works. It's about an eight minute video. It's really complicated. There's every gear, every cog, every valve, and it had a kind of boring narration. And all we did is change the narration and make it more friendly and make some of the wonky terms sound more.

COVID. We showed it to five-year olds who were absolutely totally fascinated. All the adults we asked, would they be interested in no way? There'll be totally. [00:50:00] No. And they learned all these obstructions. They don't remember all the details, but the world is messy and complicated and children we've evolved to deal with that.

So they came away knowing stuff because they watched a video like the one part speeds up other parts of the speed up to it's not a trade-off opera. People think maybe one part speeds up on the part of the slow down. That's not true for engines. And they learned that abstract principle and could articulate it back to us in.

And they learned three or four other principles. That's fascinating that they can do this they're equipped. And so don't try to always over simplify, let kids see the glory and just the world. Give them a little help in terms of understanding how to get insight. They don't realize how much they meet out.

It's not to, but you don't want to, you don't want to broadcast it. We've also done studies showing that there, they can only succeed in tasks when you're helping them. What's called scaffolding, but you don't have to tell them they should do it Right.

away. Give them some feeling of success in the Congress.

You know, this whole scaffolding, what picture you want to teach a kid, how to make her bed? , you might sort of cheat by laying out all the materials of the [00:51:00] sequence and they'll make a bit of light and they'll come and say, I

don't have any good, bad. You give them a laundry basket. They can't do it at all, but that's okay because they start to get a foot on how to do it.

So those are the kinds of studies that I just, I just love to read about are doing our own lab.

Jill Stoddard: Well, and, and there, there are so many of them are so surprising. I mean, especially as a psychologist, obviously I was trained about Piaget and you know, this from concrete to abstract developmental changes and that persists today. I mean, I think that's, I still was shocked when I read that.

Like, wait, that's, that's not accurate. I had no idea.

Frank Keil: there's a lot of stuff on it. It's a fascinating question. Why persist? , and part of that is because, and I talked about this at length with west coast, Maria Montessori, Montessori schools often almost repeat this like a mantra. It may be sometimes not always a good instructional techniques.

Sometimes you start with concrete materials and go to more abstract representations. But what you're teaching may be obstruct. You know, it's the materials you used may be concrete, but the concept was well, Montessori knew that when Maria Montessori wrote [00:52:00] about, she said, often the math is latent within them and we have to use materials to get it across to them.

So that's part of the problem. There are other reasons too. Um, I mean, in praise of Piaget, he made us think about all this much more seriously. He, he raised the issues. He did incredibly interesting studies, but Yeah.

we've moved on a bit bit for now. We've learned a lot more.

Jill Stoddard: Yeah. It was really interesting. And, you know, I learned a lot from reading this book and things that I had no idea that were not accurate. So my sense of wonder was high as I was reading the book and I appreciated, you know, learning so many new things, , So where we're about at the end here.

Let me ask you one last question. Knowing that adults tend to sort of lose this childhood sense of wonder over time. What can we do specifically to reconnect with that now?

Frank Keil: There are a bunch of things you can do in my last chapter book, I run too. So you can try to monitor a bit what you do, make a checklist. How many times in the last week I did I ask why or how versus what is, or what

[00:53:00] that you might look at your Google search. Go on your browser and see what questions you talked to.

Did you say who won a Grammy's in 63, or did you ask, why did the such and such a musical genre, DK? What kind of questions are you asking? If you're not asking enough? Why and how questions think about maybe why you should, how much more they give you an insight. The other thing to do is sometimes think about something you think, you know, really well. And go through it step by step, and you'll usually find these holes and that shouldn't just comfort you. That should be wonderful. It's a good kind of discomfort. It's the kind of comfort you want. It was exciting. , and, and, and realize that that's what you want. You want to learn discovering a whole, and your knowledge should be a joyous experience because it's an opportunity to expand your toolkit. ,

And I tried it. I tried to change my mind. It was something significant once a month. If I go back over my karma and say, I haven't learned anything new or different, I've not been working hard workers, I've been playing hard enough. , and, and so, and the more you do it, the more [00:54:00] it, because I have a large section on, , people who are calling mass people who knew something about everything and the constant theme that runs through.

Is this incredible joy and insatiable pleasure of business. And it becomes almost like an addiction, but it's a healthy one because it's social, as we talked about, it's rewarding, it's free and it makes everything you do more, more rich.

Jill Stoddard: I think it probably helps the self-esteem too. I know, you know, my husband is kind of what, you know, he's really good at jeopardy. He knows a little bit about a lot of things and he's a guy he's a tech guy. And so he goes into these internet holes where he's asking these how and why questions and know so much.

And then I, and I think it's something he's really proud of and gives them some confidence. It makes them feel smart, you know?

Frank Keil: It feels good and, and, you know, and He shares it with others. I'm sure. I mean, you should always have. Be the happy to start small. So when we talked about, he starting with kid videos or Eleanor wonders, why this new, very good new TV search, you can read something. That's a very easy way. I like reading the history of science because if you go back far [00:55:00] enough, they had no idea.

And so you can stumble around with them. I mean, a really interesting example is electricity and magnetism, Michael Faraday, who did more revolutionary things. Or did electricity and magnetism anybody? No, no math. He was a blacksmith son. He hardly educated, but he had these gorgeous diagrams and the success of how to experiments and then Maxwell who made the very complex knuckles equation, which unified electricity.

So unfair. That was the whole reason he can cut there. So you can be 30 if you're committed and start with his heated, what do you do now? And get into it and you can do that for almost every science. It can be manual. You can go back and find the early pioneers. So that's one way to enter if you're worried about it and reading the history of these people's lives is so fascinating.

I do a lot more of that than I used to, and it never fails. I mean, these people are so interesting. Mary Somerville, this amazing polymath in her own, right. Who one of the Oxford colleges is named after. [00:56:00] Jennifer don't note that the crisper and vendor who lives in San Francisco, her life is astonishing as a recent biography by Walter Isaacson.

So reading about them and what they were like as children and how they learned that Mueller,

Jill Stoddard: Yeah, that's great. I love it. Those are great suggestions. We'll encourage our listeners to go out and start asking some hi, how and why questions.

Maybe you can, or, yeah, just to read about, spread about folks around. Early lives or whatever it is that they're interested in. And maybe you can put your wonder class online so that it can, you know, there's that happiness class.

I can't remember where it

is, but you know, now like tens of thousands of people have taken it. Maybe your wonder class is next.

Frank Keil: is my colleague, Laura Santos. I don't have her skillset

Jill Stoddard: that's right. She is there. Yeah,

that's

Frank Keil: a wonderful, it's a terrific class.

Jill Stoddard: This has been so great. Thank you so much for joining me. I think this has just been such an interesting conversation. We appreciate your time.

Frank Keil: No, I appreciate it too. And I appreciate your you're starting to work.

[00:57:00]

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Jill Stoddard: We'd like to thank our strategic consultant, Michael Harold, our dissemination coordinator, Katy Rothfelder, and our editorial coordinator, Melissa Miller.

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