On Being with Krista Tippett

Adele Diamond

The Science of Attention

Last Updated

August 7, 2014

Original Air Date

November 19, 2009

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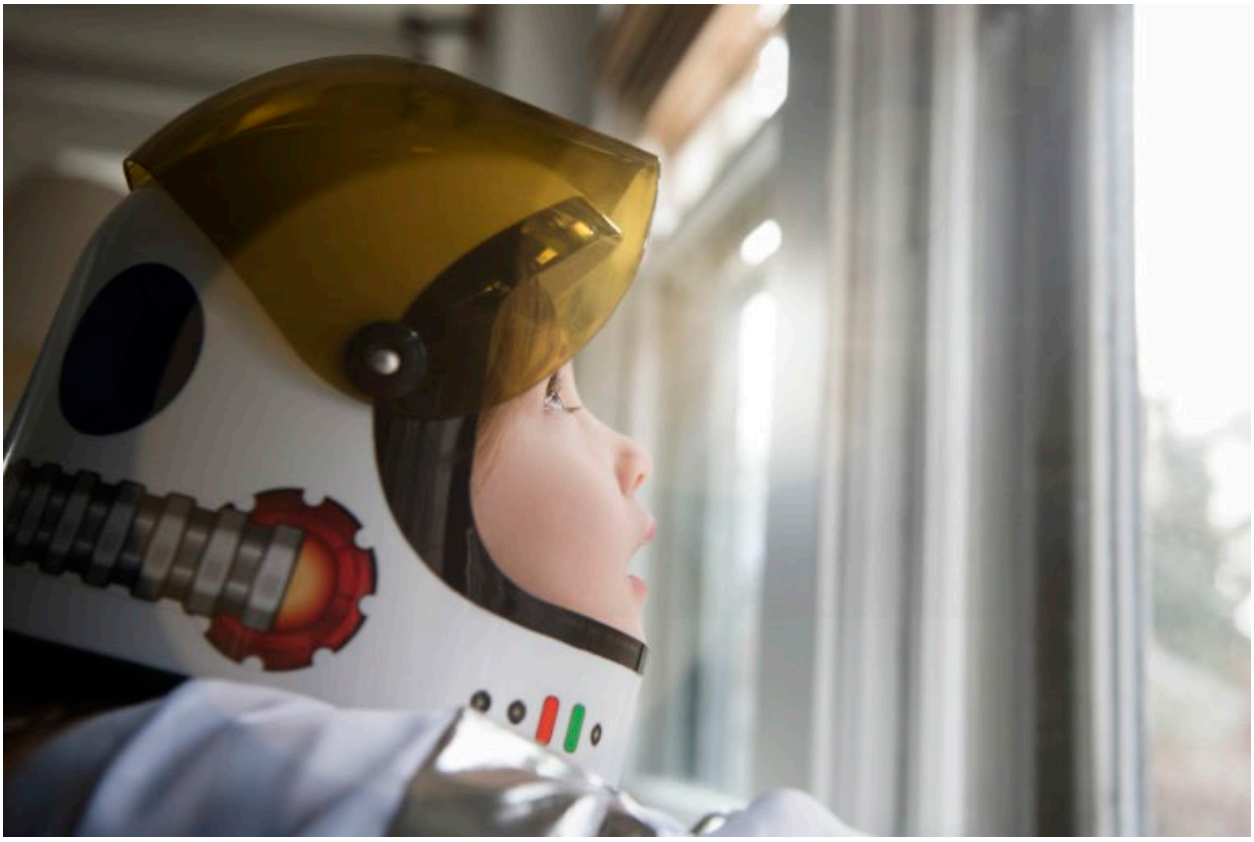
What Adele Diamond is learning about the brain challenges basic assumptions in modern education. Her work is scientifically illustrating the educational power of things like play, sports, music, memorization, and reflection. What nourishes the human spirit, the whole person, it turns out, also hones our minds.



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Guest

Adele Diamond is a professor of developmental cognitive neuroscience at the University of British Columbia.

Transcript

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ADELE DIAMOND: A lot of my perspective is based on Abraham Heschel. And one of the things he wrote is, I think, very applicable to child development because he said the act teaches you the meaning of the act. He said, "I don't care why you're doing the good deed. Do the good deed." And that's a wonderful lesson for children. Say, "I want you to do this." And you say, "Well, you know, I'm only doing it for you. How's that going to be any good?" And you say, "Just do it. Just do it fully and do it and you'll get something out of the doing. The act, the doing, is absolutely critical and will transform you."

[*Music: "Seven League Boots" by Zoe Keating*]

KRISTA TIPPETT, HOST: My thinking about the education I received, about school testing, and about what I want for my children will never be the same after this conversation I had with the neuroscientist Adele Diamond. What Adele Diamond is learning about the brain is turning some of our most modern ideas about education on their heads. What nourishes the human spirit, the whole person, also hones our minds.

I'm Krista Tippett, and this is *On Being*.

[*Music: "Seven League Boots" by Zoe Keating*]

MS. TIPPETT: American born and Harvard trained, Adele Diamond is a professor of developmental cognitive neuroscience at the University of British Columbia. She's a formative figure in innovative networks in British Columbia and beyond that are bringing the fruits of unfolding science into classrooms and educational systems — informing environments where children learn how to pay attention, to problem solve, to collaborate, and to work creatively with what they know across the life span. Facility in these skills, research is showing, is a stronger predictor of success — even academic success — than IQ.

Adele Diamond's thinking has been influenced by her participation in the "Mind and Life Institute" — the Dalai Lama's ongoing dialogue with scientists from diverse fields. And I spoke with her there in 2009.

MS. TIPPETT: I've read in other interviews you've given or things that you've written that you didn't aspire to be a scientist in your early life but that you did love — you always loved learning. Is that right?

DR. DIAMOND: That's right.

MS. TIPPETT: What did you study when you went to college?

DR. DIAMOND: When I went to college, I studied mostly anthropology. A little bit of philosophy. So my majors were sociology/anthropology — which was one department — and also psychology. But I spent more time in sociology/anthropology than psychology. And wanted to continue studying in those three fields. Didn't want to do anything that sounded like hard science or lab science.

MS. TIPPETT: So, how would you answer the question of how you went from there to becoming a founder of this field called development cognitive neuroscience? How did that happen?

DR. DIAMOND: It happened because my original thesis topic didn't work out. A lot of the sociology, psychology, philosophy I've read said that people needed to feel like they were masters of their fate. If you don't feel like you're in control of what's going to happen to you, you feel helpless, you feel depressed, you feel suicidal. But it seemed to me that everybody I read was Western. And it didn't seem to me to be necessarily intrinsically human like everybody was saying.

So I was going to go study in the South Pacific, which seemed to me the most idyllic place I could think of, and see if it was true in the culture there. But I didn't think I was coming up with a good way to study this, and I didn't think any of the famous people at Harvard advising me were coming up with a good way to study it either. They said, "You'll go and you'll do great work and it'll be wonderful." And I'm thinking, "You guys are crazy." So I gave the money back.

And my first year in graduate school, Jerry Kagan was jumping up and down, literally jumping out of his seat, about all the changes we see in babies' behavior in the first year of life. So in 1980, I started my dissertation following up on this idea that the changes we see in babies, in cognitive abilities, can't be all maturation because their minds change all over the world in similar ways at the same time, but they're living in totally different circumstances. How can it just be experience and learning? There has to also be a maturational component. So that was the original spark that started my dissertation.

MS. TIPPETT: So there's a lot of talk now from many different corners that our entire concept of education needs to change, needs to move out of in the Industrial Age, into the 21st century. And you and I are talking as part of a conference where there are a lot of very creative people, including the Dalai Lama but also educators and scientists talking about this. So when I look at what you're doing, it's also suggesting a change in education and from a very specific vantage point, informed by science. So let me just say it this way and ask you if this is right. One of the things you're saying is that education is also not just about what we teach and what kind of information we put into the brain but understanding what's happening in the prefrontal cortex and working with that knowledge to help children develop and learn to learn better.

DR. DIAMOND: I think a lot of what you need in school is to learn skills because the content you'll forget. A lot of the content you're going to forget, and the content you can always look up anyway.

MS. TIPPETT: But we pretend like we're learning that content and we're supposed to remember it.

DR. DIAMOND: Yes. And, you know, educators are worried that you need that content for the exams that you're going to take, but what's more important is that you should want to learn. What's more important is for you to know how to find that information if you need it. What's more important is for you to learn how to problem solve and use that information.

But I agree that education needs to change. But the way your question started, which is move beyond the Industrial Age, suggested that we move forward, and a lot of what I see is that we need to look back because I think there was a lot of wisdom of previous generations of the evolutionary past of our species that we're ignoring because we tend to think that we're going to be modern and we can do better than our parents and grandparents did. But there are certain things that have been part of the human condition for thousands of years, and I think that they've probably been part of the human condition for a good reason.

MS. TIPPETT: Okay.

DR. DIAMOND: Otherwise they would've been weeded out. Music has always been part. Dance has been part. Storytelling's been part. The play of children's been part. And there are good reasons why these have been part. And the schools are tending to think, "Oh, my god. We don't have time for play. And we don't have time for the arts because we…"

MS. TIPPETT: And we don't have a budget for music.

DR. DIAMOND: That's right. "And we have to focus on the academic content, because you're going to get tested at the end of the year and we have to make sure they do well on these tests." But our research and others' is showing that if the children have more time to play, they do better on these academic outcome measures than if they spend more time in direct academic instruction. And things like the arts or sports or any of these other things, they develop your cognitive skills dependent on prefrontal cortex. Like sustaining attention, like being able to hold information in mind. They speak to your social aspect because you're part of a group.

MS. TIPPETT: Right.

DR. DIAMOND: Which is terribly important to doing well. They also use your body, and we know if you're physically healthy, your prefrontal cortex and brain work better, specifically your prefrontal cortex. And leading a sedentary life is terrible for your brain health or your cognitive health.

MS. TIPPETT: Right.

DR. DIAMOND: So the arts and sports and play tend to incorporate all these things in an organic way.

MS. TIPPETT: So an implication of that that's really interesting is that previous ways of not just educating but living — the whole context for education — was in fact more responsive to what science is now learning about the prefrontal cortex than what we developed especially in the 20th century.

DR. DIAMOND: Yes.

MS. TIPPETT: Huh.

DR. DIAMOND: Yes. A lot of the old practices had an awful lot of wisdom in them. One of the sessions with the Dalai Lama yesterday, Stephen Covey talked about the talking stick, which is tradition among many of the indigenous people of North America.

MS. TIPPETT: Right.

DR. DIAMOND: And with the talking stick only the person who has the stick can talk, and he's supposed to keep that stick until he feels understood. Now, the program I've studied in the schools is a little bit of a 20th-century version of this, though the developers didn't know that.

They have all of the four-year-olds and five-year-olds in the class, everybody get into pairs, and each gets a picture book. And they're to tell the story that goes with the pictures in their book to the other child, like "The Ugly Duckling" or something. And they're all excited. They want to tell their stories. Nobody wants to listen. Everybody wants to tell their story. And if you ask a four-year-old or a five-year-old to wait, it's pretty worthless. So they give one child a picture of a mouth, and they give the other child a picture of an ear. And they explain that ears don't talk; ears listen. And with that concrete reminder the child actually listens.

MS. TIPPETT: So the concept of the talking stick is, in fact, not cultivating talking; it's cultivating listening. Right?

DR. DIAMOND: Yes. Yes. Absolutely. At two levels. One, it's the simple level of not interrupting the other person and letting the other person finish and we take the turns. The norm of role taking that young children need to learn. But at a more deep level, it's also to really listen, to really listen and hear so that the person who's talking feels understood. And that's so important.

[*Music: "Gogol" by Chilly Gonzales*]

MS. TIPPETT: I'm Krista Tippett and this is *On Being*. Today with neuroscientist Adele Diamond.

The early childhood educational method that Adele Diamond has evaluated is called "Tools of the Mind." It incorporates the kind of role-playing mouth-ear exercise she just described, as well as structured or formal dramatic play. This approach is based on new understandings of what is called "executive function."

It describes the brain's capacity to coordinate the many kinds of mental activity involved in any human experience and certainly in learning — from how we focus to how we feel. Executive function is in part about what Adele Diamond describes as "inhibitory control."

DR. DIAMOND: You need inhibitory control to stay on task when you're bored or when you meet initial failure. You need inhibitory control to focus in on something in the environment so that you're not overwhelmed by all the other things around. You need inhibitory control — for example, let's say you see an old friend that you haven't seen in years. And your first reaction on seeing your old friend is, "My god, how much weight you've gained!" But you don't say that. Instead you exercise inhibitory control and you instead say something to make your friend feel good.

And if you think about it more in terms of the things the Dalai Lama talks about, the Dalai Lama talks about how easy it is when you get hurt to react by hurting the next person. But if you exercise inhibitory control, you can say, "Wait a minute."

Another aspect of executive function is working memory. It's holding information in mind and playing with it, and you need working memory for anything that unfolds over time. You also need working memory for creativity because the essence of creativity is holding things in mind and disassembling them and putting them together in new ways. That's where you need working memory.

And the last executive function is cognitive flexibility. It's being able to switch your perspective or switching the way you're thinking about things, being able to think outside the box. And of course, that's also an aspect of creativity.

So those are the basic aspects of executive function, and out of that, more sophisticated executive functions like planning and problem solving get built up.

MS. TIPPETT: Mm-hmm. And negatively, poor executive function in pathology is associated with mental illness, right?

DR. DIAMOND: Yes. You see poor executive function in a lot of mental illnesses like ADHD, depression, schizophrenia, autism. Prefrontal cortex is the latest region of the brain to develop over evolution and the latest to develop within a lifespan. So it's the new kid on the block and it's the most fragile. It's in the right place to get hurt if you ever fall. It's the earliest to go in aging, the latest to develop. So often when anything goes wrong with the brain you'll see some aspect of prefrontal function impaired.

MS. TIPPETT: So something…

DR. DIAMOND: Not always, but often.

MS. TIPPETT: Right. I mean, so something that really strikes me, just looking at the language around this, like this term executive function is very dry and then the program that you work in is "Tools of the Mind," which sounds very serious also. But, intriguingly, a real centerpiece of

actually cultivating this in children is dramatic play. Talk to me about the — there are some founding figures in this connection between executive function and dramatic play. Lev Vygotsky, a name that most of us haven't heard but I'm suspecting that as this field grows may be a name that's more commonly known.

DR. DIAMOND: Vygotsky and Luria were giants in Russia in psychology and in neuroscience. And Vygotsky emphasized that social development and cognitive development were intimately integrated, and if you want to develop one you need to develop the other. So we develop cognitively by interacting and being in a social world. And if you think about social dramatic play and the three executive functions I mentioned, first of all, let's say you're playing Cops and Robbers. You have to use working memory to remember what role you picked and what role your friends picked, right? Because if you want to go to the cop, you don't want to accidentally go to the robber. That could be disastrous. And you have to inhibit acting out of character. Let's say you're playing Mommy and Baby. You may know exactly what Mommy should do, and she's not doing it, and you want to terribly go in there and correct the situation but you're the baby. You can't. You have to stay in character. And then your friends may take that scenario in new ways that you never expected. So on the fly in real time, you have to flexibly adjust. So in this play, you're exercising working memory, you're exercising inhibition, and you're exercising cognitive flexibility. And you're doing it in a natural situation.

MS. TIPPETT: I think, was it Vygotsky who maintained that a child's ability to play creatively with other children is a better indicator of future academic success than IQ? I think you've also said that discipline is a better indicator than IQ.

DR. DIAMOND: Yes.

MS. TIPPETT: Which, when I was growing up in the 1960s, '70s, you know, everybody got IQ tests, but I remember being aware even then that they didn't know what to do with it. Right? And that they would…

DR. DIAMOND: Oh, you see, when I was growing up in the 1970s, they segregated us by IQ. So they had the intellectually gifted classes whose children had scored higher in IQ. And if you got a super high IQ and you were a girl in New York City, you could go to Hunter High School.

MS. TIPPETT: Okay. [laughs]

DR. DIAMOND: So IQ meant a lot in terms of tracking back then. But it turns out, the work of Angela Duckworth and Marty Seligman shows that even in college discipline — being able to exercise discipline, and keep at it, and practice, and study, and finish your assignments, and start your assignments when you need to — is much more important than IQ. Which is kind of hopeful because then you don't have to worry, you know, gee, I wasn't born with this high IQ so I can't achieve. And the evidence is that that's not so.

So for example, in "Tools" they have the children write down a plan of what they want to do in their dramatic play. It may be pictures or just the first letter of the words of what they mean, but they write down something, which is their plan, and often, initially, in the beginning of the

school year, the children want to change it after a couple of minutes. “I’m tired of this. I want to go do something else.” And the teacher comes back and brings their plan and says, “Wait a minute. You committed to doing this. You need to continue to do it for another 10, 15 minutes,” and that’s really important because that’s really where the executive function comes in.

MS. TIPPETT: Right.

DR. DIAMOND: The having to do it when your first inclination isn’t to do it. An example in a math context is a lot of children will do mirror writing. Like, they’ll write a six reversed.

MS. TIPPETT: Right.

DR. DIAMOND: Now, that’s very normal, but a lot of teachers will pull their hair out about this, so they might have the child write 6 a thousand times. It doesn’t help, but they’ll try whatever they can to try to get the child not to do it. And Elena Bodrova has a very simple way, and after an afternoon or an evening, the mirror writing is gone. What she says is, when you go home tonight, and you do your math homework, every time you’re supposed to write a 6, put down your pencil and pick up a red pencil. That’s all she says. That’s the whole instruction. None of this “you’re a bad kid.” No. And the reason it works is because the child has an automaticity to do this mirror writing, and what the child really needs to do is take a moment and think and do what you really know you should do but is not your first inclination. But if you ask a child this young to wait it doesn’t help.

MS. TIPPETT: That is really interesting.

DR. DIAMOND: So it gives the child some way to wait, which is the time it takes to put down the pencil and pick up the red pencil.

MS. TIPPETT: So, you know what my inquiry and conversation is always driving towards is how does this expand our understanding of who we are, of what it means to be human, and what you just said about part of what this does is help children stop; that’s an important spiritual discipline. I mean, I had written in my notes when I was preparing that executive function is related to an ability to reflect which is also part of — we look at all the great spiritual traditions or even just what we know about being a whole human being, a very critical discipline not just to learning but to being. Do you think about things like that as you’re doing this work?

DR. DIAMOND: A little bit. It’s interesting that you talked about executive function as also disciplining attention or something like that because attention isn’t usually a word I use but I think the difference is just a matter of semantics. So you could call working memory holding information in mind and working with it, or you could call it keeping your attention focused on something and working with it.

MS. TIPPETT: Right.

DR. DIAMOND: So I think it’s just semantics, and in fact, the neural bases of working memory and attention are pretty identical. It’s very much concerned with also resisting ways that could be

hurtful to yourself or to another. So, for example, when you stop and reflect, you may realize that what's hurting you is the meaning that you've read into what somebody else did. Not actually the act of what they did but the attention you're impugning to it and that you might be wrong about the intention you're impugning.

MS. TIPPETT: Right.

DR. DIAMOND: It may have been done for a totally different reason.

MS. TIPPETT: So these are real moral and ethical impulses that are cultivated in this.

DR. DIAMOND: Yes. Yes. I think also that — I think you learn things by doing, which is one of the reasons I think "Tools of the Mind" is so good. You know, if I asked you who's going to learn more, the driver or the passenger, about the route, you'd say the driver without even thinking twice and you know why. The driver had to use it and the passenger's passively sitting there. But somehow when we make schools we forget about that and we have the children passively sitting there and the teacher's up in the front.

MS. TIPPETT: In really uncomfortable chairs.

DR. DIAMOND: Right. And the teacher's up there actively using it. And they're not going to learn as well if they're just listening. They need to actively use it. And I think the way to learn the disciplines like reflection or being able to stop is to keep trying it, is to keep exercising it. That's the way it develops, not to hear somebody tell you that you should do this or why it's so important to do this, but to actually experience it and keep experiencing it and keep trying.

MS. TIPPETT: Right.

DR. DIAMOND: And have people help you in ways that maybe would help you develop it more.

MS. TIPPETT: And, I mean, if you think about the whole lifespan, someone saying to you that you should listen? I mean, especially as you go through life there's lots of people you don't want to listen to.

DR. DIAMOND: That's right. That's right.

MS. TIPPETT: Or that you should have empathy. Those are easy words, very hard practices in so many real-life situations.

DR. DIAMOND: Yes. Yes. And it takes a long time. It's not like you can say I can sit back in my chair and say I've solved that problem. It's a lifetime of work.

[*Music: "Carol Kaye" by Laura Veirs*]

MS. TIPPETT: Something that interests me about you is you're also a dancer. I mean, it seems to me that this part of yourself, and I don't think you had any kind of scientific or academic motivation, but you've actually kept that part of yourself alive. And we did kind of touch on this. I mean, when I was looking at your dancing, I was wondering is it possible that at other times in history what we call formal play or structured play was actually part of regular human interaction. And, you know, a lot of the conversations I've had across the years, even, say, with the Pentecostals, a Pentecostal sociologist who talked about — and that's one of the fastest-growing forms of Christianity globally — and she really felt that one thing that is so appealing and important to people is that it's a full-body experience. It's cathartic. And she talked about how in our cultures, all kinds of religions used to play this role where people would sing and dance and cry and it would be physical and emotional and spiritual all at the same time. And now, say, in Western Christianity, you sit in pews and you sit up straight and you listen, right?

DR. DIAMOND: That's right.

MS. TIPPETT: And you listen to the monologue from up there. It's actually very much like what happens in a classroom.

DR. DIAMOND: Yes. Yes. And the more of you that gets involved — the body, the emotions, everything — the more you get out of it in many ways because it changes the brain, nurtures the brain. The social nurtures the brain. The joy nurtures the brain. The physical activity nurtures the brain.

MS. TIPPETT: Right.

DR. DIAMOND: And it also nurtures your physical health. You're going to be more physically healthy if you're socially connected, if you're physically fit, if you're active, if you're using your mind actively. And I love all kinds of partner dance.

MS. TIPPETT: Right. You've been in dance troupes, but it seems like you've always maintained this as part of your life.

DR. DIAMOND: Yes. But the dance that is my first love is American contra dance. And American contra dance was just what you're talking about. It was a part of the social fabric. When the settlers came over, it was a way for everybody to get together on a Saturday night. And it had to be easy because all these non-dancers had to be able to do it. And it was also socially leveling because the banker's wife might dance with the farmer because everybody got together for the dance. So it was very much a part of the social fabric of life. It wasn't a little side activity.

MS. TIPPETT: Mm-hmm. Have you consciously experienced that part of yourself to flow into what you've come to understand and appreciate as a scientist in this "Tools of the Mind" work?

DR. DIAMOND: I don't see "Tools of the Mind" connecting so much.

MS. TIPPETT: Okay.

DR. DIAMOND: But I see other things connecting. In my talks, I often end my talks by talking about or showing a video about two programs. One is called El Systema, the program of José Abreu, which is the Youth and Children's Orchestra of Venezuela. And it's been so successful in Venezuela that about 25 other Latin American countries have adopted it. And the National Dance Institute, NDI, which was founded by Jacques d'Amboise, a remarkable ballet dancer in New York. Both programs have been around since the mid-1970s. They've reached hundreds of thousands of children, mostly poor children. They take all comers. They don't charge anything. The orchestra program even includes children who are deaf. The dance program even includes children in wheelchairs. And both programs address all the parts of a human being. They both involve physical visual-motor coordination. They exercise executive functions. You have to sustain attention; you have to hold sequences in mind. They address your emotions. They give you joy. They give you self-confidence and pride. You feel like you're a member of a social group.

MS. TIPPETT: Right. Right.

DR. DIAMOND: Where everybody contributes and you're an important part of this group. And I would love to see research on these. You know, to the naked eye people give you testimonials all the time about how it's changed their lives and you can see how amazing it is when you look at the video. But we need research to show that it does this. So I keep trying to encourage people to go do the research about this.

MS. TIPPETT: Maybe you'll have to do it yourself one of these days.

[*Music: "Danzon No. 2" by Gustavo Dudamel (conductor) Simon Bolivar Youth Orchestra*]

MS. TIPPETT: Here's the Simón Bolívar Youth Orchestra of Venezuela performing Danzón No. 2 by the composer Arturo Marquez. The orchestra, led by the LA Philharmonic Orchestra's Gustavo Dudamel, features youth musicians from El Sistema, the program Adele Diamond just mentioned.

[*Music: "Danzon No. 2" by Gustavo Dudamel (conductor) Simon Bolivar Youth Orchestra*]

MS. TIPPETT: You can listen again and share this conversation with Adele Diamond through our website, onbeing.org.

[*Music: "Danzon No. 2" by Gustavo Dudamel (conductor) Simon Bolivar Youth Orchestra*]

MS. TIPPETT: Coming up, why our brains work better in joyful schools.

I'm Krista Tippett. *On Being* continues in a moment.

[*Music: "Danzon No. 2" by Gustavo Dudamel (conductor) Simon Bolivar Youth Orchestra*]

MS. TIPPETT: I'm Krista Tippett and this is *On Being*. Today with the neuroscientist Adele Diamond. She is a professor of developmental cognitive neuroscience at the University of British

Columbia. Her learnings are challenging basic assumptions about education that took hold in modernity. Her focus on the brain's capacity for executive function — also called "the science of attention" — has also shown promise for children with ADHD and autism, and for narrowing the achievement gap between children of differing socioeconomic backgrounds.

I spoke with Adele Diamond in Vancouver at a series of gatherings with the Dalai Lama in conversation with social activists, scientists, and educators. The government of British Columbia has changed its educational guidelines in response to research like that Adele Diamond is doing on the whole-body, whole-spirit nature of learning.

MS. TIPPETT: Did I hear in one of the sessions here at this conference in Vancouver that British Columbia has instituted a fourth "R" in its educational philosophy. So tell me about that? And is that connected to the work that you're doing? And does it create room for it?

DR. DIAMOND: Yes. So British Columbia has said that socioemotional development, developing good people who are good citizens, is a critical goal of our education system, as critical as any of the other goals. And it's something that parents and teachers and educational administrators take very seriously. And so they want very much to help develop children who are kind, who are caring, who are compassionate, who know that bullying is wrong, who know that helping another is right and who do it.

Also, one of the ways that British Columbia and I think Canada in general differs from the U.S. is that government officials are much more open to research evidence and to having that research evidence inform what's happening on the ground.

MS. TIPPETT: And we should say you're American and have spent more of your professional life in the United States, too, right?

DR. DIAMOND: Right. I'm American.

MS. TIPPETT: Yeah.

DR. DIAMOND: But I'm just amazed at how open the government of Canada is at all levels — the city level, the provincial level, and the national level, to hearing the research evidence and then modifying their policies in the light of evidence. They want to be evidence-based and they listen to the evidence. I was here only three days in this country and they invited me to be in a press conference with the prime minister. I've never met the U.S. president. I will probably never meet the U.S. president.

MS. TIPPETT: Right.

DR. DIAMOND: And that's a real difference, I think.

MS. TIPPETT: So the Dalai Lama came here a few years ago, and you've also been part of the — have you been part of the Mind Life?

DR. DIAMOND: Not for very long, but I was at the Mind Life meeting in Dharamsala in India in April.

MS. TIPPETT: Right. So I don't know if his visits here or the connections he's forged, how much they've had to do with that, but I sense that it's one factor, that it's created a certain energy and a feeling that something needs to be done rather than just talked about. And, obviously there are some really interesting, well, let's just say there are some really interesting parallels and overlap if you talk about attention, executive function, and then you think about the word "mindfulness."

DR. DIAMOND: That's right.

MS. TIPPETT: Clearly, those are kindred concepts.

DR. DIAMOND: That's right.

MS. TIPPETT: Tell me about your exposure, that encounter with this Buddhist-led dialogue between science and spiritual figures and how has that flowed in and formed, challenged you?

DR. DIAMOND: Well, the Dalai Lama is very concerned with taking nice-sounding statements and putting them into action. And so when I visited him in Dharamsala and talked about "Tools of the Mind" program, I asked how they help young children to develop their attention in Dharamsala, how the schools help the Tibetan children. And first of all, the Tibetan schools assume that very young children can't exercise executive function so they don't try.

MS. TIPPETT: Can't.

DR. DIAMOND: Right.

MS. TIPPETT: Okay.

DR. DIAMOND: But Jinpa, the Dalai Lama's interpreter, said that one thing that he thinks they do that helps is memorization. They emphasize memorization. So they might have a very long passage, and each day you'll get a small portion of it to memorize and you'll have to remember that and the portions you've gotten earlier, and eventually you've memorized the whole thing. And that sort of brought me back in my thinking to what we were talking about before, about our pushing aside the wisdom of the ages. I had to memorize stuff in school and I hated it, and we've advanced to the point where we now pooh-pooh memorization and that's old fashioned and there's no point.

MS. TIPPETT: We even pooh-pooh correct spelling, which drives me crazy.

DR. DIAMOND: Right. And it may be that while there's no necessary reason to memorize things, you can always look them up, that the discipline of being able to remember like that is a real important skill that helps the mind discipline itself. And there's some insights from the Dalai Lama that are so right on, that are so perfect. Like his insight that being compassionate to others

will also be what makes you happiest. So you can be compassionate to others because you want to be charitable and good to others, or you can be compassionate to others because you want something just for yourself. You're selfish. You can be compassionate for selfish reasons. And it works. You know, if you're nice to others you feel better. And it can be as simple as just saying hello to a stranger on the street. When that stranger reacts with a big smile, you feel good. Or, you know, you pay for the cup of coffee on the person in line behind you. You don't know that person but you feel good, especially when you see the surprise of the person when they come to the counter.

And also his insight about the stupidity of holding grudges. Right? Who gets hurt when you're holding a grudge? You get hurt. You stay in this locked angry place, whereas the person you're holding the grudge about is happily going on about their life. And there's a lot of wisdom there.

MS. TIPPETT: That's very pragmatic, too.

DR. DIAMOND: It's very pragmatic and if you try it, you see the wisdom of it. You know, if I say to you the best way to make yourself happy is to try to make others happy, you say, "Well, that sounds very nice but I don't believe it." But if you try it, then you see that it really does work.

And there's actually a lot of research on this now. They've looked into what are the happiest people in old age. And the happiest people are rarely the people who've accumulated the most possessions, who have risen to the highest heights in their career. It's the people who feel like they've had a fulfilling life in the sense of doing something they felt made a difference, of being part of something larger than themselves, some cause, some belief. It could be a religious belief, it could be Greenpeace, it could be almost anything. But something where they felt they were making a difference, regardless of whether they made much money or little money doing it. It's feeling like, "I mattered." And you could have a lot of money and feel like you never really mattered.

MS. TIPPETT: Something that intrigues me about some of the research I've heard about happiness is also that there's not necessarily a correlation between people who had happy childhoods and good parents, right? And functioning families. That it really is how you've lived your life, and the relationships you've formed.

DR. DIAMOND: Right. Yeah, it can go any way. It really does matter how you live your life and what you make of it. And it's really up to you what you make of it. Right? It's your attitude. You can feel sorry for yourself the whole time, or you can decide that I'm going to try to make lemonade out of lemons. But it is also true that people can get deeply hurt in childhood.

MS. TIPPETT: Right.

DR. DIAMOND: And have trouble ever being as happy as somebody else who hasn't been through that horrific experience.

MS. TIPPETT: Right. So how does all of this, the work you do, these experiences you've had out of that, knowing as you know from a very special vantage point that play is an essential part of us, as much as what we think of as intelligence or capability. You are a practicing Jew — you've said this is an important part of your identity. So how do you think differently? Does that have a theological implication for you? Do you think differently about the nature of God? Having this fuller sense of what we are as human beings and what makes us complete.

DR. DIAMOND: I don't think that my scientific work has particularly informed my religious perspective or my image or my understanding of God. A lot of my perspective is based on Abraham Heschel. And one of the things he wrote is, I think, very applicable to child development because he said the act teaches you the meaning of the act. He said, "I don't care why you're doing the good deed. Do the good deed." And the example he gives is a musician may be playing a concert to earn a lot of money. But if when he's playing the concert he's concentrating on all of the money he's going to make, he's going to play a lousy concert. While he's playing the concert, he has to be in the moment. He has to be concentrated on the music. And if he's concentrated on the music, he'll play well. So he talks about how the act can purify the motive if you really do the act fully.

And I don't know who he was talking to in this essay, but I imagine he was talking to super sincere Jewish theology students, who were very worried that they wanted to be good people, and do good deeds, but that doing the good deed made them feel good, and so were they doing it for selfish reasons or were they doing it for altruistic reasons? And I can imagine Rabbi Heschel telling them, "Don't worry about it, forget about it. I don't care why you're doing it. Just do it, it doesn't matter; if you do it with your whole heart, it will purify your motive."

And that's a wonderful lesson for children. Say, "I want you to do this." And you say, "Well, you know, I'm only doing it for you. How's that going to be any good?" And you say, "Just do it. Just do it fully and do it and you'll get something out of the doing. The act, the doing, is absolutely critical and will transform you."

[*Music: "Dustland" by Dekko*]

MS. TIPPETT: I'm Krista Tippett and this is *On Being*. Today: exploring what neuroscientist Adele Diamond knows about the brain that might change all of our imagination about education and life.

Before she went to Dharamsala for her first meeting of the "Mind and Life" conversations between Buddhist practitioners and scientists, Adele Diamond pulled together a book of readings to share with the Dalai Lama, writings of figures who formed her spiritually from her own Jewish tradition and others, including Rabbi Abraham Joshua Heschel as well as Isaac Bashevis Singer and Henri Nouwen.

MS. TIPPETT: I think of my own children, and I think my son is very resistant in a way that I wasn't — and I think my generation wasn't — to external expectations. You know, he doesn't have to prove anything to anyone. This is a little different from what you just said but, you know,

for me what's really effective with him is to say, "Do the right thing. You know what the right thing is." There's something inherent in his makeup that makes that a powerful suggestion.

DR. DIAMOND: Yeah.

MS. TIPPETT: And also something that I've thought a lot about — this is divergence but we have a few minutes — he still does a huge amount of dramatic play. I would say less with his friends now as he gets older, but I do find that quite mysterious and intriguing. But I love in this conversation with you and reading about your work, thinking about play as something that actually is educational in the best sense of the word.

DR. DIAMOND: Absolutely.

MS. TIPPETT: I mean, it's really wonderful. It's liberating to think we let our children play and that's great.

DR. DIAMOND: Right. And we also tend to have this terrible notion that anything that's important can't be fun.

MS. TIPPETT: Yeah. Right. Right.

DR. DIAMOND: You know, it's got to be torture if it's …

MS. TIPPETT: Right.

DR. DIAMOND: And that's such a shame. School should be joyful. Why not? Then the children will want to be there. You learn more. Your brain works better. Your prefrontal cortex goes offline if you're stressed, even mildly stressed. So the more you stress children in school the worse their executive function is going to be and the worse their higher cognitive functions are going to work. They work better if they're not stressed, if they're happy. And you can do things joyfully or you can do things making somebody miserable. Why not do it joyfully?

MS. TIPPETT: Right.

DR. DIAMOND: It can be fun. It's so much fun to learn.

MS. TIPPETT: You put together this beautiful packet for the Dalai Lama when you were going to Dharamsala, including Heschel. And you included these words of Rachel Naomi Remen: "All life has in it the dimension of the unknown. It is a thing forever unfolding. It seems important to consider the possibility that science may have defined life too small." And I just wondered, looking back on the trajectory of your work, you know, what have you learned in the course of your research, which really is very cutting edge, that you realized science had defined too small at the outset of your career?

DR. DIAMOND: Well, the little dedication at the beginning of my doctoral dissertation has the quote from someone else, I forget who right now, that no answer is a complete or final one. And

I think that there's so many times when we thought we understood something and then we realized we were totally wrong. I think that it's chutzpah to think that we know all the answers or that we've understood something perfectly. And I think it's wonderful that there's mystery out there, that there are surprises. I love being surprised. And actually, you learn much more from the surprises than you do from what you expected. Right? If what you expected happens, then you just have confirmation you were right. But if what you didn't expect happens, then it says, "Ah. This is an opportunity to learn because I was wrong. I expected something else and this happened."

So I think mysteries are just wonderful. It's very interesting because when I made this book for the Dalai Lama, I put a lot of love and time and effort into it. And my husband said — who came with me to Dharamsala said — "If you're going to give him a present, I want to give him a present too." So he wanted to give him a kite because he didn't think the Dalai Lama got to spend enough time playing.

MS. TIPPETT: Now your husband, is he a geneticist?

DR. DIAMOND: He was trained as a geneticist, yes.

MS. TIPPETT: Okay. And he's Mormon.

DR. DIAMOND: He's Mormon. Yes.

MS. TIPPETT: Okay. All right.

DR. DIAMOND: And his name is Don.

MS. TIPPETT: Okay.

DR. DIAMOND: I don't know if he would define himself in those terms, but he's my husband.

MS. TIPPETT: Okay.

DR. DIAMOND: And so then he found online that he could get a package of 10 plain undecorated kites very inexpensively. So he asked me if I could find classes of school children to decorate them. So I contacted a colleague, Kim Schonert-Reichl, and she helped me find a class of children with developmental disorders, many of them ADHD, who were either not on medication or on reduced medication because they were doing mindfulness. So they had heard of the Dalai Lama, and they were very excited to be decorating these kites. And there were two children per kite. So on one side, they did self portraits, so it looked like a Picasso because half of the kite is one child's face and half of the kite was the other child's face. Anyway, so my husband brings all these to Dharamsala and we get a private audience with His Holiness. And we had the wisdom not to bring all the kites with us to the audience because the Dalai Lama said thank you, but it was very clear he wasn't going to fly any kites; he's was going to put them in a drawer.

So after that we went to visit Matthieu Ricard at Kathmandu, where he has a Tibetan monastery. And he has many humanitarian projects in connection with that. And one of them are schools for poor children. Any background, doesn't matter, religious or ethnic. They call it bamboo schools because the buildings are all made out of bamboo. So we went to these bamboo schools and we brought the rest of the kites and we gave it to the children there. They had never flown kites before, and they were so happy to be flying these kites. And Matthieu was so happy to see the children so happy. And we took photos and videos and I brought them back to the class in Vancouver of the children who had been studying mindfulness and I showed them the pictures, and they were so happy to see how happy they had made the other children.

MS. TIPPETT: That's a great story.

DR. DIAMOND: And one of them said, "You know, they're on the other side of the world but we're all connected."

MS. TIPPETT: That's great. I think we should finish, but is there anything else you want to say? Anything this has sparked, or any place you want to go that we haven't gone?

DR. DIAMOND: No. Except that besides ignoring a lot of the wisdom of past generations, I think we also ignore the wisdom of people who don't have the fancy degrees and the fancy positions. And I think that's a shame. Because a lot of the people who are on the frontlines working with kids, struggling to make ends meet have a great deal of wisdom. And I think that we should be listening to that and honoring that more.

MS. TIPPETT: And is that something you think about as you do your work because it's actually the teachers who are going to be implementing these cutting-edge approaches based on science?

DR. DIAMOND: Right. You know, we go into daycares and preschools, and we work with children, and we see these amazing women. There's one woman who emigrated from Sierra Leone who wanted montessori manipulable material. And she couldn't afford it here. So she managed to get it from her country, and whenever a child in her class is having trouble at home, she takes the child into her own home. She's had several foster children from this school. These women go way beyond the minimal job requirements, and give of themselves and of their love. And they get so little recognition for it, and so little money for it. And it's such a shame. I'd love to see them get more recognition, and get more appreciated, and more recognized.

The summer before I started my dissertation, I worked as a hired hand on a cattle ranch in central Oregon. And I found the ranch because the wife of the ranch owner was a graduate of Radcliffe, so she was in the Radcliffe alumni directory. I shared the bunk house with two boys whose mother had never left the area. She had the first boy when she was 16; she'd never gone to college, I don't think she graduated high school. But she was a wise woman. She was much wiser than this Radcliffe graduate.

MS. TIPPETT: And if, as your work suggests or might continue to suggest, if as many people are thinking we may need a real, serious overhaul of the very idea of education in our time, those are going to be the kinds of people on the frontlines making that happen.

DR. DIAMOND: Yes. And I think we could also take advantage of all the older people. Who are retired from their jobs and would like to contribute, and don't see any way to contribute. They could help in the schools. They could read to children or help them with simple skills or just spend time with them. It would be good for them and good for the children.

[*Children laughing and talking*]

MS. TIPPETT: Adele Diamond is a professor of developmental cognitive neuroscience at the University of British Columbia.

[*Children laughing and talking*]

MALE: Oh, there's a good breeze right now. [Children laughing, playing] Good. Very good. Very good. There's a good one — she's running right towards me.

[*Music: "Mike Mills" by Air*]

MS. TIPPETT: This, by the way, is the sound of those Nepalese children flying kites for the first time — audio Adele Diamond and her husband shared with us. On our blog, we've posted their video of this event. As she mentioned, it took place in the courtyard of one of the bamboo schools started by the Buddhist monk Matthieu Ricard. He's also a past guest of ours, and you can download that show with him, "The Happiest Man in the World," as well as this current program all at onbeing.org. You can also stream both shows on your phone through our new iPhone and Android apps.

On Being is Trent Gilliss, Chris Heagle, Lily Percy, Mariah Helgeson, Chris Jones, and Julie Rawe.