The APS Janet Taylor Spence Award recognizes APS members who have made transformative early career contributions to psychological science.

Award recipients reflect the best of the many new and cutting edge ideas coming from of our most creative and promising investigators who together embody the future of psychological science.

The APS 2023 Janet Taylor Spence Award for Transformative Early Career Contributions joined Ludmila Nunes to talk about their research and careers. In this episode, the second of two, Julian Jara-Ettinger, Emily Fyfe, and Calvin Lai discussed reading and sharing minds, the development of learning and its practical applications, and the importance of studying the gap between what people value (for example, racial equality) and what people do (for instance, racial discrimination) and assessing and creating better diversity training for police officers.

Read more here.

Unedited transcript:

[00:00:11.970] – Ludmila Nunes
Every year since 2010, the APS Janet Taylor Spence Award has recognized a select group of APS members who have made transformative early career contributions to psychological science. Awards recipients reflect the best of the many new and cutting-edge ideas coming from our most creative and promising investigators who together embody the future of psychological science. I am Ludmila Nunes, and this is Under the Cortex. In two special episodes of the podcast, I talk with the six awardees of the APS 2023 Janet Taylor Spence Award for Transformative Early career contributions about their remarkable research and careers thus far. In this episode, the second of two, Julian Jara-Ettinger, Emily Fyfe, and Calvin Lai join me to discuss reading and sharing minds, the development of learning at its practical applications and the importance of studying the gap between what people value and what people do, which may reflect implicit biases, as well as assessing and creating better diversity training for police officers.

[00:01:47.870] – Ludmila Nunes

I have with me Julian Jara-Ettinger, who is an assistant professor of psychology at Yale University. He got his PhD in 2016 from the Massachusetts Institute of Technology. And right now, in his computational Social Cognition lab, his team and himself study the computational basis of humans capacity to reason about each other’s minds, to share knowledge, to communicate, and to cooperate in order to achieve what no person can achieve alone. Thank you for talking to me, Julian. Welcome to under the cortex.

[00:02:23.720] – Julian Jara-Ettinger

Thank you for having me.

[00:02:25.870] – Ludmila Nunes

So I would like to start by asking you, what can you tell us generally about your research? I know you use behavioral studies, which are more traditional experiments, and you combine those with mathematical models and even computer simulations to develop and test cognitive theories.

[00:02:44.490] – Julian Jara-Ettinger

Yeah. So kind of at a very high level. I work in the field of social cognition, and you can think of it. Our long term goal is to understand human social intelligence. So that means studying how humans do all of these really complex things that it looks like only humans are able to do, right? So those are things like language. We can talk to other people, and we can do pretty sophisticated things like express sarcasm or be ironic or imply things indirectly. We can do things like moral reasoning where we can see how other people are acting, and we can decide if we think their behavior is okay or not. And we can do things like social learning, right. So most of the things that you know, you’ve learned from other people, and that’s one of the key capacities that allows humans to build these huge intergenerational bodies of knowledge and to create culture. So the way that we approach this problem is by trying to ask, well, what are the most basic capacities that humans have that allow us to do all of these things, to talk to other people, to think about moral reasoning or to share knowledge efficiently.

[00:03:45.840] – Julian Jara-Ettinger
And we think that one of these capacities is the ability to think about what other people are thinking, right? So when you think about it, is this kind of a crazy thing that we can simulate what’s happening in other people’s minds? And there’s the question of what is our brain doing when we have a simulation or, like, some kind of representation of another person’s mind? And so the way we approach that is by saying, well, it’s kind of difficult to have a good theory of how we think about other people’s thoughts. But one thing we can do is we can try to implement our theories as computational models and then run simulations and see if they start behaving in a human like way. So essentially, a lot of what we do is we have experiments that we run with humans, and then we also have computational models basically kind of participate in simplified forms of these experiments. And that way we can test if they start doing kind of like the things that we ultimately want to explain. So the use of computational modeling for us is a little bit of a tool to kind of, like, make sure that our theories are really well specified and to kind of probe them and figure out in which cases they work, in which cases they don’t.

[00:04:49.070] – Ludmila Nunes

Really interesting. And I know you work a lot with developmental theories and you’re looking at younger people to test these social cognition processes, right?

[00:05:03.150] – Julian Jara-Ettinger

Yeah, that’s right. So the problem when you’re studying something like social cognition is that ultimately we want to explain how adults are able to develop these things. But the system is incredibly complicated. We just know so much about how other people’s minds works, and we use it in very sophisticated and rich ways. So one way to try to make this problem simpler is to ask, well, what are the parts of our social cognition that we learn from experience? Which are the parts that are affected by a culture and which are the parts that seem to be working very early in life? And we care about these parts that are working very early in life because we think that means that’s probably the core that we’re using to represent other minds. And also, it’s what we know that young children must be using when they’re learning all of the things that they learn, right? We know that a lot of very complex learning happens in early childhood. That’s why we’re learning languages and we’re learning so much about the world. So what we try to do is we use our computational models, try to break down these kind of complicated ideas into little components, and then we go and we try to test them in early childhood to try to figure out which parts are already working and which things don’t work yet.

[00:06:12.940] – Julian Jara-Ettinger

And that allows us to figure out which kinds of things even young children find very intuitive or what kind of sophisticated things they can do and which things might require a lot of experience and a lot of social interactions to develop.

[00:06:24.090] – Ludmila Nunes

So you can isolate what’s easily acquired and what has to be learned. And it’s learned through exposure to social interaction.

[00:06:32.150] – Julian Jara-Ettinger
Yeah, that’s right. And we work often with preschoolers or four and five year olds, so sometimes we can also find things that as young as we go, we can’t find any evidence that they’re acquired. And so in that case, my work doesn’t speak to this directly, but then this opens research for people working in infancy to try to figure out if some of these capacities are even working in infants, which then pushes the question to asking how quickly are they acquired? Or is it possible that there are some constraints that when babies are born, they already have some types of social knowledge?

[00:07:05.430] – Ludmila Nunes

Really interesting. So I have to ask you, why did you start studying these social cognitive processes and using these methods? What sparked your interest in this?


From the first time I learned about this field, the technical concept is theory of mind. And the idea that we can represent another person’s mind in our minds. It’s something that we technically do all the time. And I was kind of amazed that I had never explicitly thought about it. Right. We go throughout our lives and have time. We’re thinking about things like, oh, what does this other person want? Or what were they thinking? Or we’re thinking about the minds of our friends and of our families and our loved ones. And it had never occurred to me how much we do that. And when you think about it, it’s kind of a complicated process because we can’t actually see what’s happening in other people’s minds. But, Sampa, we’re really good at just getting a sense of, you know, people’s, maybe their facial expressions, their body language, how they behave, and even very subtle things like when someone’s talking to you and they pause for a little bit. We can use all of these cues to try to figure out what’s going on in the other person’s mind. And that’s just a very sophisticated ability. So it’s kind of like the first reason.


I just think it’s fascinating. I would love to know the answer to this. The second one is just that I was interested in a lot of things. I was interested in language and moral reasoning and social learning. And I came to become convinced that ultimately, all of these things, it’s really hard to make progress in them unless you first try to solve the most basic question, which is what does it even mean to represent another person in social interactions?

[00:08:37.910] – Ludmila Nunes

Because the ability to be a mind reader kind of underlies all the language and all the communication, right?

[00:08:46.460] – Julian Jara-Ettinger

Yeah, that’s right. We think so. There’s some debate, some things not everyone agrees, but that’s something we’ve been working on and trying to find cases where we think that it’s really hard to explain the data without accepting that we’re representing something about the other person’s mind.

[00:09:01.150] – Ludmila Nunes
And looking to the future. What are the main challenges that you see for this type of research?

[00:09:08.750] – Julian Jara-Ettinger

Yeah, so my field usually talks about this problem, as you call it yourself, mind reading. So the idea is that when we’re interacting with others, we really want to know what’s happening inside of their minds, and it’s our job to figure it out. But in reality, we’re often really motivated to make ourselves understood. It’s not a one directional problem. We also often want to make sure that people can understand their behavior and that they know what we’re thinking. So we think a whole other part of the puzzle might be something that you might call something like mind sharing, where we’re not just good at reading other people’s mental states, but we’re also good at knowing how to behave and how to move and how to talk in ways to make other people understand our mind more easily. So this is something that my graduate student, Amanda Royka, has been working a lot on and trying to explore what mechanisms we use for that. On the methodological side, I think one of the challenges is that, again, because social cognition is so complicated and so rich, to study it and figure out what are the key representations, we often need to simplify everything as much as we can.

[00:10:12.120] – Julian Jara-Ettinger

But then once you do that, there’s always a problem of asking, okay, if we can explain social behavior in some simple context, how can we push those theories back and explain how they work in the real world when it’s like, really messy in real time. And you’re walking around the street and there’s just people walking all over the place and you need to make rapid predictions and all these things. So I think that’s one of the key challenges trying to then distill our experimental work to very simple paradigms, but then bring them back to the real world and make sure they can explain real world social cognition.

[00:10:44.590] – Ludmila Nunes

And finally, I would just like to ask you if you have any advice for graduate students or other early career researchers, since you are clearly an example of success in this field and you’re doing this groundbreaking research.

[00:11:01.890] – Julian Jara-Ettinger

I think a lot of it is luck, but research, it becomes a very big part of your life because I think we have the privilege of thinking about really interesting problems, but then it’s really easy for the academic world to just take over in the stressful parts of publication and so on. So I think it’s always good to try to keep track of what are the parts of the scientific process that you really enjoy and try to find ways to maximize your time spending those things that you really like. The second advice, the way that I try to do my research is by constantly trying to think that whatever we come up with, there’s a very good chance that we’re wrong and we haven’t figured it out. And we try to have very explicit conversations in my lab of saying, well, here’s our theory. Let’s assume that it’s wrong, and eventually someone’s going to point out that it’s wrong. Let’s try to anticipate in what way is it wrong and what’s the next thing? So instead of getting two ties to our theories, we try to do some work and then assume that they’re wrong and try to figure out what’s going to be the next thing.

[00:12:02.060] – Julian Jara-Ettinger
That’s going to be a better theory than what we currently have.

[00:12:05.930] – Ludmila Nunes

That’s great advice, because, yes, we are testing theories not to prove that we are right, but we are trying to prove ourselves wrong and pushing our boundaries. Thank you so much for joining me.


Thank you for having me.

[00:12:32.050] – Ludmila Nunes

Emily Fyfe is currently an associate professor in the Department of Psychological and Brain Sciences at Indiana University in Bloomington. She received her PhD in 2015 from Vanderbilt University. Her research is primarily concerned with cognitive development, with an emphasis on how children think, learn, and solve problems in mathematics. She is also director of the Learning Education and Development Lab, which houses a team of researchers doing experimental research both in the laboratory settings and classroom settings on the science of learning and trying to help people to learn better. Emily, it’s my pleasure to speak with you today. Thank you so much for joining us at under the Cortex.

[00:13:18.760] – Emily Fyfe

I’m very happy to be here. Thanks for having me.

[00:13:22.690] – Ludmila Nunes

I briefly mentioned and tried to describe your research, but I would like you to tell us more about it. What did we miss there?

[00:13:31.380] – Emily Fyfe

Yeah, I’m broadly interested in the science of learning, so doing experimental research to understand student cognition, so how they’re thinking about different problems and also things in our environment, whether that’s something the teacher does or something in the materials that can change that cognition, hopefully for the better to develop sort of deep and transferable knowledge. And we do this in lots of ways. I tend to work with children in sort of the early primary school years, so ages four to ten, but my work spans sort of the full developmental range where we do some work with older students and also with adults.

[00:14:09.430] – Ludmila Nunes

And you’ve done a lot of studies on the development of mathematical abilities.

[00:14:15.490] – Emily Fyfe
Yeah, so a lot of times in our lab, what we try to think about is a particular topic in mathematics and how children are thinking about it. So I collaborate with a large number of people, just as an example, on children’s understanding of the equal sign and not just children’s understanding. Actually, more recently, we’ve been asking adults the same question to think about what comes to mind, what do they associate with the equal sign. And so we’ve done all sorts of research to just document their understanding, find ways to improve their understanding, test theories that suggest why they might have misunderstandings. And so, yeah, the topics within mathematics, whether it’s the equal sign or patterns or more advanced algebra, really also drive the research questions in fun ways to think about how the specific topic might be changing the child’s or the students association. Yeah.

[00:15:11.010] – Ludmila Nunes

And I understand your research has a very strong applied value. Could you describe any important insights you got from your research that could be used in a classroom directly?

[00:15:24.050] – Emily Fyfe

Sure. So some of the work we’ve been doing more recently has been focused on children’s early patterning skills. So you can think of something really basic like red, red, blue, red, red, blue, what comes next? And I started this work in graduate school and sort of continued it here at IU in my current position. And what’s fascinating is we’ve been thinking about how children actually have a much greater capacity to do these tasks than we might have thought, especially a more challenging, complex way. So thinking about that red, blue, blue as a BB. So not only are we again documenting children’s knowledge of these topics early on, but actually this work has really important practical implications because there was sort of this big controversy over the math standards, especially in the United States, about whether patterns should be included or not. And in 2010, when the Common Core State Standards were rolled out, patterns were not included in the early grade. So kindergarteners and first graders were not encouraged to have to know something about those patterns. And the work that my group has been doing and and many other groups has sort of shown that, oh, actually, this basic skill really matters and is predicting lots of formal mathematics achievement.

[00:16:38.340] – Emily Fyfe

And so this work really has the grounds for shaking up some what we might call math standards or math policy to think about what it is that children should be focusing on in their early math classrooms.

[00:16:52.950] – Ludmila Nunes

There’s one article that you published in an APS journal Amps in 2021, in which you assess the generalizable effect of immediate feedback versus delayed feedback across many college classes. Many researchers come together to test a big question that in this case has an impact in the classroom. So you’re the lead author in this article, and I thought it was a really interesting one that shows exactly how you are testing something that we know that helps students. We know that giving feedback is always helpful, but there’s always the question, should we give this feedback immediately after they do a test or should we delay this feedback? And in this research, you show that this is difficult to analyze and might depend on the context, might depend on the course. There seems to be a slight benefit for delight...
feedback, if I understood correctly.

Emily Fyfe

Yes. So I’m so glad you brought up this paper because it’s one of my favorite projects to talk about because it covers so many parts of what I love about my job. So one, it really emphasized the team aspects of all the work that we do because it is a large group of researchers collaborating with a large group of teachers. So that part I love. And it also sort of epitomizes the methods that we use, where we can be experimental psychologists and rigorously test things, but in authentic classroom settings, which is not always easy to do. But yes, the third thing it does is epitomizes this sort of theory versus practice that we’re always trying to aim for. So thinking about what theories would suggest immediate feedback is better, or delayed feedback is better, but also in practice, what should we be telling instructors? And you are correct that the results were not quite as easy to interpret as we might like. There wasn’t sort of one large giant effect of this one was always better and this one was always better. But yes, you interpret it correctly. We did generally find trends that there are certain situations where delayed feedback might actually be more effective.

Emily Fyfe

And this was usually in the context of sort of quizzes or homework assignments done throughout these college courses. And so the question is, yes, I’m giving these, say I give a weekly quiz in my class, what should I be doing? And potentially with longer delays. So the longer you wait, so you give them the assignment and you wait to give them feedback until, say, I don’t know, five days later. It gives them a chance to really wrestle and think about that material for a second time. And so that’s one potential reason why that delayed feedback might be better. But yes, certainly this is always the case, but once we do one study, we always say, and now we need to do another one to really figure out when that delayed feedback is going to be more beneficial and in what types of classes.

Ludmila Nunes

And this is an article from 2021. So now I would like to ask you about your future projects.

Emily Fyfe

Yeah, so I am still in touch in collaboration with that sort of many classes team. And so we’ve been thinking about ideas for what sort of study strategies or learning techniques to test next. So that’s been going on particularly in heavy collaboration with my colleague here at IU, Ben Motes. So that’s one of the directions that my work is trying to do, is to keep expanding this mini classes methodology. And another big area that my team and I have been working on is this notion of early patterning skills and what in the world they’re tapping into. One of the questions we always get is what is it about patterns that seems so important? Is it just some sort of general skill that kids are getting, thinking about predicting things and structure? Or is it really specific to math. So those are two of the areas of work we’re doing. The third one I wanted to highlight is really driven by some of my students. And that’s always a fun thing, to have new ideas inspired by graduate students, but to think about not only performance based metrics of learning, but also sort of motivational and effective components.

Emily Fyfe
Right? So we’ve been doing a cool line of research on how feedback influences children’s problem solving, but coding things like how their facial expression and how they’re feeling when they get feedback and how they’re either motivated or not motivated to keep going. So those are some of the fun things that we’ve been working on more recently.

[00:21:24.970] – Ludmila Nunes

Super interesting. And finally, I just have one final question. Do you have any advice for grad students and maybe even undergrads who are trying to get into a research career?

[00:21:38.990] – Emily Fyfe

So my number one thing is that it’s always about these people. I feel like I got connected with some amazing researchers really early on, starting in my undergraduate experience. So getting into a research lab as an undergraduate student really did change the trajectory. I said, what is this job you have, and how do I get it? But all the way through having a really amazing graduate advisor and mentor, I did a one year postdoc and had a wonderful advisor there. Here at IU, I’m surrounded by colleagues who not only support me, but want to work with me and share ideas. And so, yeah, sometimes it’s more about the people you’re working with than the physical place you’re at or the name of the school. And of course, the other thing is always to find something that just really is fascinating to you. Right? So the more you love what you’re doing, the less it feels like work.

[00:22:32.050] – Ludmila Nunes

Emily, thank you so much for joining us. It was a pleasure speaking with you.

[00:22:36.100] – Emily Fyfe

It was wonderful. Thanks so much for having me.

[00:22:48.690] – Ludmila Nunes

I have with me Calvin Lai, an assistant professor of psychological and brain sciences at Washington University in St. Louis. Calvin received his PhD in 2015 from the University of Virginia in his studies how people create, interpret, and maintain social group distinctions, focusing specifically on implicit biases, which are automatic or unconscious mental processes that end up creating a gap between what people value, for example, racial equality and what people actually do, like racial discrimination. He’s also involved in Project Implicit, which is a global project with scholars from around the world that tries to study what implicit biases people have and also educate the public about biases. Calvin, thank you so much for joining me today.

[00:23:52.190] – Calvin Lai

It’s a pleasure to be here.

[00:23:54.330] – Ludmila Nunes
Thank you. So you’re a recipient of the Spence Award, which means you are doing groundbreaking research. Can you tell us generally about your field of research? I already gave some hints, but I’m sure you can explain this way better.

[00:24:09.390] – Calvin Lai

Yeah. So the big thing that our lab is really interested in is taking all that we know about how prejudiced, stereotyping, and discrimination works and then trying to figure out how to develop interventions to prevent or at least mitigate discrimination in the real world. And so some of that has looked at trying to reduce these implicit biases as we swirl around in our minds, trying to educate people about the social science so that they’re less likely to discriminate, or just kind of getting people more motivated to kind of speak up when something racist or sexist happens.

[00:24:46.170] – Ludmila Nunes

And the great example of your work is a recently published article in Psychological Science Actually. It was published last week in which you and Jacqueline Liznick looked at the effectiveness of an implicit bias oriented diversity training on police officers beliefs, motivations, and actions. Do you want to tell us a little bit about that research?

[00:25:11.090] – Calvin Lai

Yes. So we partnered with a nonprofit called the AntiDefamation League, which trains kind of thousands of officers every year on diversity education. And we wanted to see if this program was doing what we would hope that it would do. That is changing what officers were thinking, what they’re feeling, what they’re motivated to do, and what they ended up doing. And we found that in some ways, the findings are completely unsurprising. If you teach people about bias and discrimination, they learn what you teach them. And so officers who took this particular diversity training were reporting belief in the existence of bias and the fact that it could personally affect them for at least one month later. But the kind of somewhat depressing fact that we found was that when it came to what they were actually reporting, that they were doing the job. So in these particular trainings, we teach them a bunch of evidence based strategies based on the social psychological literature. Officers were often reporting, yeah, I really want to do this. They have these kind of strong intentions to use these social psychological strategies after the training, immediately afterward. But when you looked one month later, there wasn’t that kind of follow through playing into this kind of classic problem in research and behavior change, that gap between what our intentions are and actually following through on our intentions.

[00:26:31.860] – Ludmila Nunes

Right. There’s a big difference between saying that you want to do something and then actually ending up doing it. And so that’s where we think a lot of the next research is headed how to close that gap between offices really being motivated, but not finding ways to kind of follow through in using some of these bias mitigation strategies.

[00:26:48.850] – Ludmila Nunes

And this intervention was a one day long intervention oriented specifically to implicit bias. Do you have
any ideas about what might make an intervention more effective than these and maybe with results that last longer?

[00:27:06.310] – Calvin Lai

Yeah, so there’s a couple of things, and I’m going to focus on kind of themes that we saw that I think are going to be true for many forms of diversity training, whether you’re doing it with police officers, in companies, or even in academia. And so one big thing that we often see across industries is that a lot of times these diversity trainings are totally compartmentalized. Right. You get them annually, maybe through an HR module as part of required training, and then you don’t hear about it again for another year. And so even a really good training could die on the vine because there’s no additional reinforcement to help it persist. And so a kind of broad thing to kind of think about is how these trainings ought to be better integrated into the actions of the organization, that ideally, you would get these types of lessons in the training. It would be reinforced in promotion and evaluation, it would be reinforced from messaging from bosses and so on. Another thing that we thought a lot about was that oftentimes these trainings were not practical enough right. That they weren’t necessarily speaking to what you could do very concretely on the job.

[00:28:11.240] – Calvin Lai

And one of the things that we’re finding is that there might not be these great onesizefitsall solutions for combating bias at work that a lot of times we need to think very concretely and specifically about what are the types of places in your daily work activities where you may be discriminating and giving super tailored strategies for that specifically. So those are two things that we saw as potential rooms for improvement.

[00:28:32.350] – Ludmila Nunes

So basically, implicit biases have similar mechanisms in the same routes, let’s say in police officers as in academia. But those are two completely different contexts. So when we are trying to create strategies to actually reduce bias, those strategies are going to be different and we need interventions that are tailored to those different contexts, right?

[00:28:57.210] – Calvin Lai

Exactly. And I think this speaks to a classic cognitive educational psychology issue known as the inert knowledge problem. The things that you learn in one context often don’t generalize other contexts. And part of what’s going on is that you can learn some abstract knowledge, like here’s how prejudice works generally or here’s how people tend to discriminate. But oftentimes in teaching, we’re not given the specific tools to use them in our day to day work, whether it be teaching students or walking around on patrol.

[00:29:26.700] – Ludmila Nunes

Exactly. This is a fascinating field of research, but I’m guessing that sometimes you find challenges not only conducting this research because it seems that you’re applying it to real world settings, but also maybe how it is received. Do you want to tell us about that?
Yeah. So I think that particularly in the context that I’m working, within US. Policing, there’s a kind of double edged sword where, just like school districts in the US. You’ve got thousands and thousands of law enforcement agencies that have a lot of freedom in what they can do or they have a lot of flexibility. Right? So one. Major city department is going to be really different from another one. And that’s really great because there are all these places where we can test or experiment with new reforms, but it can also be a real struggle in terms of standardization and getting everyone up to speed about some of these kind of relatively straightforward best practices because it takes a lot of time for information to kind of diffuse and spread and convince people compared to, say, certain other types of government agencies or sectors where things are much more top down.

And do you have future plans for your research?

Yeah. So some of the things that we’re trying to do is to take some of these kind of hard lessons that we learned from this. What we thought at the time was a kind of best case scenario for training this kind of eight hour long training conducted by this major nonprofit and try to make it more practical, trying to kind of play with delivering these trainings over time, almost kind of like booster shots to help build some of these habits that might not really kind of stick around if you’re just giving one kind of intensive experience. So that’s some of what we’re trying to do now. We’re also trying to use stronger designs such as randomized controlled trials across many departments to really make sure that we’re also getting a generalisability.

And finally, I would just like to ask you if you have any advice you’d like to give to graduate students, to other researchers, early career folks like you.

I think that one piece of advice that at least has served me well is that if you have this ambitious idea or this is the kind of dream project that I want to run, don’t talk yourself out of doing it because you don’t think that you can do it right. Really kind of jump for it and then worry about paying the cost of how much work it will be later. And I think that served me really well where I’ll have these doubts about some really hard projects like this police diversity training stuff. And I’ll just kind of tell that nagging thought in my head to kind of shut up for a couple of months and just try to jump into it head first and learn as I go. Because I think that sometimes we can sell ourselves short by not doing the thing that we know is ambitious, important.

Thank you so much. It was great speaking with you. And yes, I hope we have you back into the podcast to talk more about your research.
It was a pleasure stopping by. Thank you.