

The Mirror and the Lamp

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The Philoctetes Center

Levy: Francis Levy
Nersessian: Edward Nersessian
Cohen: Hallie Cohen
Bloom: Paul Bloom
Browning: Margaret Browning
Chakrabarti: Bhismadev Chakrabarti
Harris: Paul Harris
Leslie: Alan Leslie
A: Speaker from audience

Levy: I'm Francis Levy. I'm co-director of the Philoctetes Center. Dr. Edward Nersessian is the other co-director, and welcome to *The Mirror and the Lamp*. I should dedicate this roundtable to M.H. Abrams, the famous book *The Mirror and the Lamp*, after whom this roundtable is named. Abrams of course had done the classic book on romantic poetry, actually. The kind of transition between mimesis and romanticism in poetry.

Now the exhibition you see in this particular space is *Self-Reflection: The True Mirror*, which has been curated by Hallie Cohen, who is the head of the Art Department at Marymount Manhattan College, and also directs our exhibition space. The exhibition is really about self-conception. And if you go into our annex we have an object—or, what would really be called—

Cohen: John Walter's true mirror.

Levy: It's a true mirror. There he is, John Walters. And what it is, John, when you look into this mirror, you see yourself the way other people see you. That's the both literal and poetic construct that's going on there.

Walters: If I could just say a few words.

Levy: Sure.

Walters: It's a non-reversing mirror. Any mirror you've ever seen in your life you've always seen yourself flipped. And what happens is that flip actually changes your image. You might say, okay, that's expected. But what it also does is it changes what's in your eyes, so that your eyes are different. The things that are based on what's behind your eyes—so the brain, right brain and left brain—comes through different ways. The point of this is that every person in the world has left side over here and right side over here, and that's the map that we use to read faces and expressions, and that's what's on your face. But in the mirror, the only place in the world with left brain over here and right brain over here, it changes what's there. The feedback look at yourself, so you immediately respond in microseconds to this changed image in a way that is basically inauthentic. Whatever is actually there changes very rapidly into something that's

different. And often what it does is it just stops you. You tend to stare at yourself, at that mirror face.

But if you look in this mirror, actually it's correct. Your right eye is over here and left is over here. So whatever's in your face matches what's real, and the interaction is real. You can really see it, that you are alive in this mirror, and if you're not freaking out because you look a little crooked—because that does actually show up for a lot of people—you can see yourself in your eyes.

Levy: I can only say that I was very disappointed.

I'm now pleased to present Paul Harris. Paul Harris is a developmental psychologist with interests in the development of cognition, emotion and imagination. He has taught at the University of Lancaster, the Free University of Amsterdam, and the London School of Economics. In 1980, he moved to Oxford where he became Professor of Developmental Psychology and Fellow of St. John's College. In 1998, he was elected as a fellow of the British Academy. He currently teaches developmental psychology in the Graduate School of Education at Harvard. His latest book is *The Work of the Imagination*. Professor Harris will moderate this afternoon's panel, and I think the idea is that we're going to let the other panelists introduce themselves.

Harris: Sure.

Levy: Thank you.

Harris: Thank you. Paul, could we begin with you? Could you just say a word about yourself? Or Margaret, whichever.

Browning: Well, we've just sorted everything out back in the green room, so I don't know what else there is to say. My name is Margaret Browning. I am from Chicago. My interests are in psychoanalytic theory and developmental psychology and neuroscience and philosophy. I was at the University of Chicago, which is a great place to integrate the really big ideas. The person who became most important to me at the University of Chicago was a philosopher by the name of Susanne Langer—maybe *Philosophy in a New Key* sort of rings a bell with a few people. Great book. She went on and wrote brilliant things. Bhisma said, "Oh, yes, you know, *Mind: An Essay on Human Feeling*," which is the last book she wrote, three volumes, brilliant book, and so it's just really kind of organized my thinking. But my interest is in psychology, developmental psychology, as both completely language, completely neuroscience. It's got to be integrated. And I'm very focused on consciousness, which we just had a conversation about, which was a little bit like, "Oh dear." But we'll get back to it.

Chakrabarti: My name is Bhisma Chakrabarti. I'm a researcher at the University of Cambridge, England. My background is in chemistry and neurobiology, and I have increasingly been working on problems which are slightly larger than the limit of the original fields. My PhD was on genetic and neuroimaging studies of empathy and emotions, and I continue this work now with Simon Baron-Cohen in the University of Cambridge. That's about it really.

Leslie: My name is Alan Leslie. I'm now based at Rutgers University. I think of myself as a cognitive scientist, interested in developmental cognitive science, but also interested in issues in philosophy of mind and those kinds of things. And my background, well, I'm Scottish and I have Edinburgh University, Oxford University, London University in my background. I'm interested in development of cognition, of thought, particularly abstract ideas in babies and preschoolers, and also in what goes wrong in development in childhood autism.

Harris: Paul?

Bloom: I'm Paul Bloom. I'm not Scottish. I'm actually Canadian, which is considerably less exotic.

Leslie: That's right next to Scotland.

Bloom: That's right. It's almost a colony of Scotland, really. I'm a professor of psychology at Yale, and I'm very glad to be part of this panel with this group, because I've long been interested in imagination. A lot of my work has looked at imagination from sort of a cognitive standpoint, looking at the developing ability on the part of children to create imaginary worlds, their understanding of the relationship between these worlds, their understanding of what parts are imaginary and what parts are not. But more and more I've been interested in the pleasure of imagination, so, why do we like imagination so much? If you ask Americans what their favorite activity is—people have done this—they'll say sex. But it turns out, according to time management studies, apparently there's a lot more sex in imagination than in reality. The time an average American spends on sex is just about exactly the same time spent preparing tax forms for the American government.

Browning: Who did you ask?

A: The IRS.

Bloom: The IRS, that's right. But our biggest pleasure, by far, is imaginary. The average American spends hours watching TV. People read novels, people daydream, people go to movies. When our time is our own more often than not we retreat to the imagination. I'm very interested in what sort of pleasure we get from that and how that works, and how that emerges in a normally developing child.

Harris: A long time ago at Oxford I organized a conference—and organizing a conference is tough, because you get people ringing up about whether they can bring their dog and their grandmother and so forth—but one of the highlights of the conference was a poster that was there from Alan, and he's going to tell you about it, because that was the first glimpse that I had that thinking about pretending was going to be important.

Leslie: Yes. So, I guess sort of the reason that I would be invited to an occasion like today, has to do with ideas that I began to develop quite a long time ago now about the nature of pretending, and in the context of the very early emergence of pretense in human development, which is really while you're still a baby, during the second year of life, when children began to pretend play. Many other people have studied the emergence of pretend play before me, but the idea that I had was that really pretending has to do with beginning to think about your own mind in a

certain way, and I made the prediction that when children begin to pretend all by themselves they'll also be able to recognize when other people are pretending. Oddly enough, as far as I can make out, everybody that's studied the development of pretend play just sort of missed that. They hadn't really noticed that children understand when other people pretend and join in and share their games.

Anyway, the analysis that I started to work on said in a very deep sense pretending is actually something social. It's really part of our ability to be part of the social world, and to begin to pay attention to the thoughts and feelings of other people, including ourselves, because we can think about ourselves. That led to certain ideas about what might underlie the social impairment that you find in childhood autism, and it's the distinctive feature of autism. These ideas were developed with Simon Baron-Cohen, who was a young graduate student at the time, and Uta Frith, who's a great expert on autism.

So it's really this link with imagination and pretending. I was saying earlier on, pretend is a very special form of imagination, not just because it develops very early in life, but also because of this deliberate nature, its voluntary nature. One decides to pretend and one retains control over one's own pretense. But also because you can recognize pretending in others. It sort of comes along with pretending that whatever you pretend you're aware that you're pretending. You have this awareness of your own pretending and your awareness of other people. We were talking about consciousness back there too, but—

Browning: So you'll have to explain right now—can we just speak up here? Is that okay?

Harris: Go ahead.

Browning: —how you're going to make a distinction between being aware and being conscious, because Alan is like, I don't know about consciousness, but you know, deliberate intention to pretend and you're aware of it—it sounds pretty conscious to me.

Leslie: Just to avoid misunderstanding, I don't deny the existence of consciousness. Some people do. I don't. It seems to me to be a reality. It's just that I haven't the foggiest idea how to go about actually understanding it. So I distinguish—as a number of others do—between awareness and consciousness. Consciousness really has to do with all the things that nobody can understand at this time. Occasionally you might meet somebody who tells you that they understand consciousness. You talk to them for five minutes and you pretty well figure out they don't really understand what consciousness is. But awareness only has to do with those things that at least we have some chance of understanding at this point in history.

Browning: I'd like to just state my position, because it's completely related to imagination. Just to put it out there—and this is completely Susanne Langer—I think that consciousness is a state of feeling, and it's a neurological state. We just had this conversation before about, well, is qualia something beyond the brain? No. But I'm certainly not looking for qualia beyond the brain. So it's in the brain, but it's a state of the brain which produces an ongoing subjectivity. It's experience. Langer's perspective is to say it is all a state of feeling, and we feel with our sensory receptors, which gives us vision and hearing and so forth. The objective world is what we feel, impact of the world. We feel things within ourselves. We are always, as long as we're up and

moving around, in a state of feeling. Our state of feeling guides what we do. There are a million other things guiding what we do, but the mindedness based on a state of feeling is extremely important. That simply by itself is consciousness. And then imagination comes along as, guess what? The human species takes this ongoing feeling state and starts projecting it into language, ideas.

Talking recently to somebody, I remembered that scene in the Helen Keller autobiography where the water is on her hand, and Helen's there as a child, and Annie, the teacher, is there, and the water, water, water, and Annie's spelling it out, like, hello, there's the water, and then suddenly it was like, oh, the idea. That's imagination. And Paul, I think—Paul Harris—your book *The Work of the Imagination*?

Harris: Yes.

Browning: You know, talking about imagination as a stepping back from the actual. You pull out of ongoing, actual, you're just responding to the world. You take a step back. It's kind of an interruption of things. And that is imagination.

Now what you said, Alan, that would be imagination in the very broadest sense of the word. We're all sitting here living in our imagined symbolic culture. Obviously we're physical creatures, and here we are sitting, et cetera, et cetera. But we have all these thoughts in our heads.

Harris: I think it's going to help us a little bit if we just step back again to those small children who are pretending, and think a bit about autism. Because that was a really important theoretical move in developmental psychology, to start making contrast between the everyday pretending and imaging shown by normally developing children and the limitations that we see in children with autism. So I'm going to ask Alan again if he wouldn't mind saying a bit more about that contrast.

Leslie: So imagination, I think, is a very, very broad notion. In fact I really construe it even more broadly than you have. I think imagination is just something that anything with a mind has. I think it's essential to mentality, because to have a mind is really more than simply to react to the here and now.

Browning: More than that—

Leslie: It is more than that, and it's always to react to the here and now in terms of possibility. I guess that possibility is a sort of very general idea for imagination.

But of course it's sort of important for the brain. It's important for organisms to be in touch with the here and now and to construe it in a sort of correct way, to get the very simple basics correctly. There's a table in front of me here. I'm sitting in a room, as opposed to out in the middle of Third Avenue or something where I might be in danger. These kind of simple things that brain ought to be designed from the ground up to get right. It's sort of striking when you see in still very, very young kids—babies, really—this emergence of this other kind of cognition that breaks the chains of thinking about the here and now and makes that explicit without language—because these babies are too young to really have much in the way of language or to be using

language to code their thoughts. So I feel it's as a property of thought in the first place, rather than a property of language. Then later language piggybacks on this property of thought, and can then express these properties of thought, basically for the purposes of communicating thoughts from one person to another.

But the young baby starts to break the chains of the here and now, starts to think, in a deliberate fashion, about how things might be rather than how things actually are. So when faced with a banana the child can think of the possibility, well this banana, I can pretend that it's a telephone. Here's an empty cup. Yes, but I can pretend to fill it, and I can pretend that it's full. And now that I'm pretending it's full, I can pretend to empty it again, and now I can pretend this empty cup is empty. This seems to me to be a new and very powerful form of thought that develops very, very early in human beings. As far as I know this kind of thought doesn't develop in any other kind of species. I have an open mind in that question, but so far as I can see the evidence is that we're the only species that actually pretends in this full-blooded sense.

As Paul mentioned, there are various links with this capacity and with the problems that children with autism have. They don't seem to develop this capacity for thought at this new level, thought that breaks the chains of the here and now, or at least that capacity is very much impaired. And that has serious consequences for understanding the thoughts and feelings of other people, because there's my reality and there's your reality. For me to understand your reality I need to, as it were, break the chains of my reality, because your reality might be different from mine. That's really how this begins to link into understanding thoughts and feelings in other people, and all of these things are exercises of imagination.

In the movie *Being There*, of course, the whole thing pivots on this simpleminded fellow who just means exactly what he says, and of course everybody who surrounds him just dismisses the possibility immediately that he could have meant just what he said, and so they start to imagine and read into his mind all sorts of meanings and intentions that weren't there. That sort of encapsulates, I think, this whole deep link between imagination and understanding other minds.

Harris: I think it's fair to say if you go back to the diagnosis of autism, which was in the early '40s by a psychiatrist called Kanner, he was very perspicuous in a sense that he identified this very puzzling syndrome, but what he did was primarily to identify a cluster of symptoms, things that went together. One of the primary ones was limited pretend play, and the other primary one was limited ability to understand and engage, to make friends with other people. It was particularly Alan's contribution to start thinking about the possibility that there was some deep connection between those two difficulties.

Could I get Bhisma to say a bit now—he's doing a more neuroscientific approach. Could you say where that's going?

Chakrabarti: When you said the neuroscientific approach, and especially when we are talking about a difficult problem like imagination, it's very difficult—I'm not aware of many studies that have looked at the brain correlates of imagination. I might be wrong. Have there been?

Leslie: There is at least one brain imaging study of pretend—

Chakrabarti: Pretending, yes.

Leslie: Which again links it with these areas.

Chakrabarti: Exactly.

Bloom: There's also one on daydreaming by Malia Mason, I think.

Leslie: Oh, okay.

Chakrabarti: But nothing really on the stuff like imaginative fluency, or like Torrance Creativity Test, kind of the classic test of creativity in a behavioral testing situation, which tests imaginative generativity. But essentially, I mean one of the ideas that's kind of doing the rounds really, is that there is a problem of connectivity in the autistic brain. The back of the brain, which has mostly the sensory cortexes, like vision, audition, is not communicating enough with the front of the brain. That's possibly due to the fact that there is way too many connections in the back of the brain, and therefore the information is kind of getting spread all over the place, and not enough information is getting to the front of the brain.

Now if you take this anatomical detail with the fact that people with autism have a very literal representation—which is basically just as you see, or as you hear is what they will remember or what will be the reigning representation in their mind—you can start to kind of link these two together and speculate that possibly this lack of imagination that you see in autism is due to the fact that their literal representation is really highly rated due to this over-connectivity at the local range in the sensory cortexes. Again, as I said, there's no one study that has definitely showed that yet.

Harris: I guess one example of the kind of literalness you might have in mind would be some of the drawings we see from autistic children.

Chakrabarti: Absolutely. One of the artists, called Stephen Wiltshire, has quite a lot of fame drawing these very beautiful drawings of the architecture of different buildings. They're in exquisite detail. That's of course in the visual domain. You can also have musicians, like Derek Paravicini, who is one of the most wonderful pianists, and he picks up a very complicated piece of music within seconds and plays it with the utmost expertise. So you can have this really very high degree of local detail processing, whether it's sensory, whether it's auditory or visual, and a high degree of reproducibility from what you hear or what you see. Now that is, I think, a very big clue that links with the lack of going beyond the literal, which is imagining.

Browning: Can I say something here? It is the case, isn't it, that infants and toddlers have—what do they call it—exuberant synaptic development. It's just like neurons everywhere, and the idea is there are millions of them, and as you develop in early childhood you are deciding what are the pathways. This is effective, I'm going straight this way, I don't need this, I don't need that. And there is an atrophy of all of those, right? It's just sort of interesting to think that there are these millions of things, and they haven't quite worked out their pathways.

But what I would say in terms of what you're describing with autism—and it sort of goes to Rebecca Sax's idea of theory of mind being you and me and this. What I think of is somebody

who talked about early development. Infants have wonderful social skills. I mean a three-month old infant, you know, babble-babble, face-face, total-total-total. By whatever age, five months, six months, it's totally toys—you know, I'm either doing mom or I'm doing this, and I never put them together. And then, what, nine months, twelve months, whatever, it becomes the whole sort of wonder of, Mom, I could take this and I could combine it with you, and then it's this, and this, and this, and this. That's what seems to be missing or difficult for these autistic kids. Rebecca anyway talked about that they seem to have good empathy with others. They're social, just as social would be okay, I can sort of read you socially, but I can't have me, you and something else that we refer to and we work together and then I understand that you have a point of view and I have a point of view. So pretty compartmentalized, anyway.

Harris: Could I draw you out a bit, Bhisma, on the neuroscientific approach? I guess from a naïve point of view one might have thought that the newer imaging techniques were going to help us to identify the specific area of the brain which was deviant within an autistic child, so to speak. But if I'm hearing you correctly, you're saying the differences and the changes are going to be much more pervasive. They're going to be spreading throughout the entire brain. Is that—

Chakrabarti: Well, I should classify my earlier sentence, because when you look for differences between people with autism and people without autism, then very often in the neuroimaging function, neuroimaging literature, you would ask people to do a certain kind of task. These tasks tend to be the ones where we get a difference behaviorally—if it's a theory of mind kind of task, where you have to guess what a particular character in the cartoon series knows about another cartoon character, or you have to guess somebody's emotion and so on and so forth. There's a very rich literature in this field, and that has found certain very well defined areas, which are called circuits for some reason, though we do not necessarily know about exact connections and the nature of connections between these different areas. I will spare you the anatomic details. But this circuit really is a function of the task that people have been doing in the scanner. If you have another kind of task, then you might find out different areas.

If you take all autism function neuroimaging studies together, across different tasks, you find a very heterogeneous pattern. One thing that's emerging from neuroanatomy studies, really from postmortem brains, and also there's a new technique called diffusion tensor imaging, which basically measures white matter integrity in the brain, so the white matter connecting basically the axons of the neurons in the brain. These functional connectivity and diffusion tensor imaging finds that there are distinct differences in the autistic brain. If that is the case, then we are not talking of a focal neural disorder here at all.

Browning: It's a connective—

Chakrabarti: Yes, so it manifests itself through—you would get different areas depending on what tasks—

Browning: What you were asking for.

Harris: One of the puzzles of autism is that babies throughout the first year can develop, to all intents and purposes, and to most eyes—I mean including the psychiatrists and including the parents—in a relatively normal fashion. It's often only at around eighteen months, twenty-four

months, that one begins to see these worrying signs of the child not pointing, for example, or indeed not engaging in pretend play. Do we know enough about the development of the brain at this point to say that the divergence kicks in at around eighteen months, or—this is an open question.

Chakrabarti: It actually goes quite well with the synaptic pruning, or this cutting down of irrelevant synapses that Margaret mentioned. That pruning generally happens in two big stages, and one of them is pretty close to the eighteen months to around three to four years of age, and then other ones near puberty, I think just after puberty. There are these two majors bits in which pruning happens.

Again, as I say, this is very speculative. No one has actually—

Harris: Paul, we haven't—do you want to—

Bloom: Well I'm interested in the idea if you take imagination in a fairly narrow sense, as the capacity to explicitly establish a representation of the world you know to be false, or at least know to be potentially different from the way the world actually is, and then the interesting claim is suppose you lack that, or you're impaired in that, or even you're very good at that—what sort of things fall out from that? There are issues of pretense or theory of mind. I think there's word learning, in maybe a different sense that you were putting. I think a lot of word learning relies on the ability to suss out the intentions of others, to see that you are referring to that with that word.

Browning: Right.

Bloom: This is, I think, one reason why children with autism can be impaired in language learning, because they don't naturally assume the mental states of others. But there's also counterfactual reasoning. In order to plan what I'm going to do today I have to say, well, if I was to do this, this would happen; if I was to do that, that would happen; and then compare.

Browning: You consider that imaginative? Yes, I mean it's hypothetical.

Bloom: Yes, if I say, if I take the 7:00 train versus the 8:00 train, because neither train I've taken yet, and I sort of say this would happen versus that would happen. Alan here is making a strong claim, and I'm not entirely sure I buy into it, but I like it for its strength, that all of these things should fall together.

Nersessian: The strength of its authors or the strength of the idea?

Bloom: Both. For instance, you take it away from autism—there are some people who are very good at reading minds. They're very good at sussing out the intentions of others. They're above average in that. Are these same people very good at counterfactual reasoning, pretense, possibly certain forms of art and music? Or will it turn out to be more modular? I see this as very much an open question, but a good question.

Leslie: Yeah. I think that talking more broadly about imagination—I said already that pretending is a sort of species, a subspecies of imagination. It's a very striking one, because it goes along always with awareness and deliberateness. I think there are many cases of imagination where

that's not true. Indeed I think that just basic word learning is in a sense imaginative, because when you learn the word 'dog' it doesn't just mean the actual dogs that you personally have come in contact with.

Bloom: Now you're using the word imaginative in a broader sense.

Leslie: Very, very broad, yeah.

Bloom: Then everything is imaginative. Then you wouldn't want to deny imagination to the—

Browning: But that's important, don't you think?

Leslie: Exactly. I think it's the basis of mind.

Bloom: But Alan can't have it both ways.

Leslie: Oh yes I can.

Bloom: Okay.

Browning: Scots do that!

Bloom: No, we're not going to give in to the Scots. Not today. Because you said before that maybe only humans have imagination, in your interesting sense.

Leslie: I said only humans, I think, have pretense in the full-blooded sense.

Bloom: Okay.

Leslie: Versus a subspecies, a special subspecies of imagination. But I think anything that has a mind has imagination. Even including my cat.

Bloom: I guess in that sense it becomes definitional. If you want to do imagination including powers of generalization, then cockroaches have imagination.

Browning: No, no, no.

Bloom: But I think we lose something.

Browning: That's cognitive generalization. I mean that's non-conscious. Nobody needs to be aware of generalizing.

Bloom: So you want to associate imagination with awareness?

Chakrabarti: This was one of the things we were discussing, wasn't it, consciousness or awareness being a prerequisite for imagination or not.

Browning: Right, right. I lost what I was just going to—

Bloom: Definitional arguments, per se, are not useful. If you want to define imagination to include all sorts of general powers that's fine. But there's a narrow notion of imagination, the ability to think of the world and know it's not that way. There's broader notions, or still broader notions, and once we agree on what we're talking about then we might disagree in an interesting way.

Levy: But weren't the advent of literacy and mimesis two major events in the evolution of imagination? Weren't they two major acts in imagination that differentiate—

Browning: Literacy as written language?

Levy: What he just talked about—words, the ability to cognate, to communicate through words and to use language.

Browning: That's actually what I was thinking. Let's say certainly animals communicate. But I don't consider animal communication language, no matter how sophisticated you want to think it is, because I consider language to be based on imagination.

Bloom: So why don't animals—I mean animals generalize.

Browning: Absolutely. Animals are probably smarter than we are. They can read each other. They read each other's intentions. They know what's going on. But it's all in the here and now. It's like, I see this, I'm going here, blah, blah, blah. They don't stop and say, gosh, why don't we name this so we could talk about it? That's not the point. The point is what is this? Is it dangerous? No. Let's keep going. But it's not like, gosh, want to have a conversation about this? This is something that lots of people argue. Animals are enormously communicative, and there's more and more research suggesting that bird calls means go this way, go that way, take one of these, whatever. Quite articulated communication, but it's all in the here and now. It's about let's keep going. You take a left, I'll take a right, whatever. It's not about ideas. I think ideas are fundamentally human and fundamentally products of imagination. An idea is like, let's stop, let's not act, and let's just think of something.

Bloom: So it's frontal cortex sort of stuff?

Browning: Yeah.

Bloom: See, I can talk about the brain.

Harris: Can I pick up on a point of disagreement I sense between Paul and Alan, just to pin it down a little bit more? It seems to me you would both agree that children with autism are limited in their pretending. But then we went on briefly to talk about the ability to use a word and to generalize across an infinite number of exemplars. So far as I know, but maybe I'm wrong, children with autism, despite their limitations to pretend play, don't have problems with that particular function of language.

Bloom: They sometimes show odd patterns of generalization. But they don't—

Harris: They show certain—they pick out the wrong referent from time to time.

Bloom: Right.

Harris: But having identified the referent, I don't get the impression they're stuck with that particular referent.

Bloom: No.

Harris: Or a very restricted set of referents.

Bloom: And of course it'd be strange if they would, because all sorts of creatures can generalize. Generalization is a natural—

Browning: Yeah, that's the basis of cognition.

Bloom: It's far more intellectually impressive to zoom in and pick out an individual. Philosophers tend to get it backwards. They think generalization is impressive. But cockroaches generalize. The immune system generalizes the classes of antigens. What's incredibly powerful is I pick out you with a name, not somebody who looks just like you. I still pick out you if you change your clothes, you put on a hat. That's extraordinarily powerful. It would be really quirky if autistic kids zoomed in on individuals instead of kinds. But they generalize like everyone else does.

Chakrabarti: Yeah, but it's adaptive facilitation, isn't it? You should be able to generalize what is—otherwise you are spending valuable neural resources attending to every bit of local detail, where you could generalize and treat it as a category. Very often that's the problem with autism, that they're attending way too much to the trees and not the wood at all.

Harris: It's true that when they draw—I would think back to one of the first cases that was analyzed, which was a girl called Nadia in the United Kingdom, who drew very detailed pictures of horses, and occasionally particular people. What was puzzling about Nadia was that a little bit later—she was getting various forms of therapy. It's not clear whether they had any beneficial effect, but in due course her language did improve, and at the same time as her language improved the special-ness of her drawing disappeared. She drew a much more generic kind of man and a less specific horse.

Anyway, I'm going backwards and forwards about the extent to which there is a restriction in autism or there is a capacity to generalize.

Leslie: I think one of the things we have to bear in mind when talking about autistic kids is there's a huge range of variation. I mean there's a much bigger range of variation, particularly nowadays when we use this notion of 'autistic spectrum disorder,' which is deliberately broad.

Browning: Everybody has a little of it, yeah.

Leslie: It's deliberately broad. And it's given rise to this huge increase in incidence over the last 20 years. One of the dimensions of variation in autistic kids is in their intellectual abilities, just the very general abilities, and a very large proportion of these kids in fact remain mute throughout their lives, or they have very little or no verbal communication. Those children of

course are very little studied by the likes of us, because we rely so heavily upon verbal tasks to test and study these kids. They're the sort of forgotten autistic kids, where you have this very substantial degree of mental retardation.

But you also have individuals on the spectrum who have above average IQ. They don't have any mental retardation. Some of them have perfectly good language skills. So we shouldn't fall in the trap of talking about 'them,' or this is what they're like, because there's a huge variation there.

But, still, to turn to your point, it's nonetheless interesting that a lot of these basic cognitive and social functions remain in autism, including their social sensitivities, which I think were mentioned a couple of minutes ago. It seems to me that the word you want to use in connection with autism is 'complex'. It's a very complex disorder, at every level: genetic, neural, cognitive, behavioral. There's a huge amount of variation, probably more variation than exists in the normal case.

Levy: Would you consider Asperger's as part of that?

Leslie: Yeah, they're generally considered to be on the spectrum. All of these things are decisions that are made literally by a panel of psychiatrists. They're not really based on natural facts that we truly understand. They are stop-gap decisions that are made by a panel—exactly what the diagnostic categories might be, which number you get—and those labels are based on various kinds of behavioral things. Ultimately these things will be based, I believe, on things like genetic analysis, neural analysis and so forth, objective measures, as might exist with a physical disease, but at the moment we're a long, long way from that.

Nersessian: Paul mentioned Kanner's idea of classifying these conditions. But if you have some that are mute and some that are seriously retarded, and some who are functioning at a higher level, it may be you are dealing with very different conditions, ultimately.

Leslie: Yeah. So the reason for thinking that there might be some kind of golden thread that runs through the whole gamut—that's just a hypothesis. One has to be careful that it doesn't transform into one of those—

Browning: Truths—

Leslie: Yeah. But the idea is that—and this really comes out of this study by Lorna Wing in 1979, who looked at this very large cohort in the UK of kids who were at risk, and separated them into groups that showed autism or didn't. What differentiated the two groups was always that the kids that were placed in the autistic group showed a much more severe impairment in the social domain than a child with whom they were individually matched in terms of general intellectual, verbal abilities.

Nersessian: But some retarded children would fall into this first group. Not all autistic are retarded.

Leslie: Exactly. And if you say what's the difference between an autistic retarded individual and a non-autistic retarded individual, the answer basically is social impairment, communicative

impairment and impairment in pretend play. Those are the three pathognomonic, the distinctive signs that separate autism from non-autistic.

Browning: But to throw in another angle here, I don't know this from any literature, but I'm assuming that attachment relations with autistic children, let's say with their parents, are not a problem. They're perfectly loveable kids.

Leslie: Right.

Browning: So there's some social connection.

Leslie: Absolutely.

Browning: I mean if we're just doing social, I'm right here with you, mom—

Leslie: Yeah, that's a very good—

Browning: If you want me to start sharing a world with you, I don't know if I can go there. But you and me, we're okay.

Leslie: Yeah.

Browning: I mean would you agree with that, from what you've seen?

Chakrabarti: Yes, and no. I've got an autistic cousin, so from my personal experience and from my experience of the various people I've tested over the years, I definitely think that, yes, they do respond to their caregivers very well, and you can have a perfectly social relationship in the way that you are defining it.

However, if we are to look at the figures from genetic studies, ideally twin studies—the classic bread and butter to establish the genetic nature of any condition—you would do twin studies and dizygotic and monozygotic, and also see family trees, we do see that it runs in families. One of the hallmarks of the phenotype is a lack of social abilities. If that is running in the family, then you might expect that—I mean even the social environment that the child is exposed to is not really as—

Browning: Not testing them really as much as another environment.

Chakrabarti: Yeah, so the gene and environment is very closely interlinked there. You can't really measure out how much of the social environment the child gets is affecting his behavior versus how much is the pure genetic effect.

Bloom: You can compare them with siblings though.

Chakrabarti: Sorry?

Bloom: You can look at non-autistic siblings as a way to factor out the familial effect.

Chakrabarti: Yes. But you can't quite parse out—I mean very often the genetic studies have not been able to parse out the particular mutation that is there in a single case. Now of course there is this huge interest in copy number variation, which means that it's not really one gene, or one polymorphism that's there in one twin versus another. It's due to the fact that when the DNA is being passed on from one generation to another, certain bits of the DNA just get duplicated more times than other bits of the DNA. You might have the same sequence of DNA as your brother, but you might have more copies of that gene, so you're expressing more of that protein. That's just a recent thing that has come up in the last couple of years.

Bloom: Can I ask this question from a different direction, which is we're talking about the disassociations issue you raised with empathy and theory of mind, social cognition, which is what Alan has worked on. Psychopathy is often brought up as a disassociation in another way, where psychopaths are considered to have a lack of empathy, caring for other people, yet arguably have no impairment in imagination and pretense and theory of mind. I guess I'm curious whether other people here agree with this description, and if so what does it say that these two things are really separable?

Leslie: I think it's a very good point that Margaret raised that autistic kids, despite this being the case that the distinctive signs of autism are social impairment—that shouldn't be understood as saying that autistic children lack all social sensitivities or intelligence. That's absolutely not the case, and we've been aware of that all along. One of the main motivations for our work was to account for those aspects of social sensitivity that are impaired in autism, while allowing that there are other areas, for example, autistic kids become attached to their parents, and they show normal things like stranger fear and so forth. More recent studies, including some of my own, suggest that when it comes to judgments about moral good and bad that autistic kids retain some basic ability there as well, and that's usually associated with empathizing, so you empathize with the victim. This is not always a popular line, but it suggests to me that a lot of these abilities, quite basic abilities for our brain, at a basic level, have a modular design, that there are components that are to a large extent independent of one another, and those independent components together form a foundation on which the rest of the mind builds.

Harris: But from a naïve point of view we're inclined to say that children with autism have difficulty in putting themselves in the place of somebody else, particularly as indicated by the classic false belief task. But now we're underlining the fact that with respect to concern for others they seem to have some capacity to put themselves in the shoes of other people. Do you want to spell that out a bit more?

Leslie: Yeah. Again, I return to this idea that as soon as one starts to talk about autism the word complex turns up, and usually a pattern of findings that's very hard to understand. One of the things that autistic children can do is to draw the distinction between somebody transgressing by breaking some kind of conventional rule, such as if I turned up today wearing pajamas. That would transgress a sort of social convention, but it wouldn't involve a victim. I'm sure the audience here wouldn't—

Bloom: We'd live with it.

Leslie: Yes, you would put up with it without too much distress.

Bloom: We'd put it to a vote.

Leslie: You'd put it to a vote. But to put this kind of in the childish form, if Mary pulls Johnny's hair then you have a moral transgression and a victim, so Johnny's crying. Normally developing children start making the distinction between those two things about three years of age. We've found that autistic kids will also make the distinction, but I pushed this one step further and said is it just maybe that the autistic kids are reacting in a knee-jerk kind of way to the fact that, say, Johnny might be crying after getting his hair pulled? So we tested them with a story in which there's a crybaby, so this is, let's say James and Mary. Mary has a cookie and James has a cookie. They both have their own cookies, but James says to Mary, "I want your cookie too. Give me your cookie too." And Mary says, "No, I'm going to eat my cookie all by myself," and James starts to cry. Mary's done something that's made James cry, so he's showing these distress cues. But, of course we wouldn't say that Mary's done something bad because James is a crybaby. It turns out that preschool children agree with us. They tend to think that Mary did something that was actually slightly good in not giving him—

Bloom: Right.

Leslie: See, people are going, "Oh, yes, quite right." Normally developing kids feel the same way. They're on Mary's side. And so are autistic kids. These are the kinds of puzzles that they throw out. That's a sort of empathy, a sophisticated kind of empathy.

Bloom: I think that's actually a great study. I would draw a distinction, which I think feeds nicely into your study, which is there's different forms of empathy and concern. There's what you call 'imaginative concern' that could be, you know, I can infer that you must feel insulted by what somebody said, and I feel bad for you. That inference can be very complicated, such that even a normal five-year old can't do it, but an adult could, because those are social norms, putting yourself in the other's shoes, knowing you and so on. And that you'd expect, as you ramp it up, would be harder for autistic kids than for normally developing kids. But then there's the gut-level concern which we often see in babies and young children, which is if I see you scream it's going to affect me. And we know this, we know even babies—

Browning: We know animals too.

Bloom: We know babies, we know chimps, we know even rats are affected by the screams of other rats. There's some very low level things, neurological level, connecting I think to your work—and you should speak about this—but on sort of low level emotional contagion that doesn't require—. Some empathy requires a little theory of mind, some a lot of theory of mind, and some requires no theory of mind at all.

Chakrabarti: This actually taps on exactly my work, because the starting idea for my research was really this fractionation of empathy, one fraction being called 'cognitive empathy' and one called 'emotional empathy.' These names were really the common minimum denominators that I had got across the literature, but these were first proposed by a lady called Edith Stein in 1919 in a doctoral thesis. She was a philosopher who trained under Husserl. And this fractionation really captures—this cognitive fraction of empathy is the one that is more akin to the theory of mind or more deliberate, "conscious"—within quotes—processes that we link with understanding other

person's mental states, beliefs. Definitely false belief task is very much cognitive empathy driven, because there is no facial expression to mimic and understand, whereas the emotional empathy really is much more possibly—I mean if we go by fractions it's possibly driven by mirror neurons, and you look at a particular facial expression, there are some neurons in the brain that help you mimic it covertly, not overtly, and hence give you the understanding what's the emotion that person is experiencing. That's a much more gut level feeling. So these are the two things.

However, Stein was extremely clear in her writing that there's this third kind, which she called 'sympathy,' and this has since been written by Frans de Waal and Stephanie Preston as well. If you're walking on the street and you just fall down, my immediate reaction would not be to fall down myself. Automatic contagion doesn't necessarily mean just copying.

Browning: Good point.

Chakrabarti: So possibly, in falls, my automatic response would be to give my hand. I think this is very restricted to primates. I don't think non-primates show this kind of helping behavior. This is a function of the, I guess increased neuro-cortical size or something, but the larger the social group the more the instances of social behavior like this.

Bloom: It's a point raised by Aristotle, which is because your pain hurts me I could blame you, I could hate you, I could run away from you. This additional layer is something which is interesting.

Levy: What do you do with sociopaths? You talk about autistic people, you have Jeffrey Dahmer, he's now autistic.

Chakrabarti: I should really get the definitions clear. Are sociopaths the same as what we call psychopaths in the UK?

Leslie: Pretty much, yeah.

Chakrabarti: Okay, right. So psycho-pathology and autism, this is an idea that we have written about and James Blair has also written about, though no one actually has tested the two groups together so far as I know. As psychologists we love double dissociations, and if we can show that cognitive empathy is impaired in autism, so they fail false belief tests, and emotional empathy is impaired in psychopathy, hence they would pretend easily that they know you and they'll kill you without a second thought—

Levy: They're two time losers.

Chakrabarti: This is an interesting hypothesis, which I'm definitely very keen to test out myself. But we haven't done it so far.

Nersessian: My experience clinically with psychopaths is that they don't lack empathy. They only don't apply their empathy when they want to do something which is to their benefit. They're perfectly capable of having a loving relationship with their children, empathy towards their children, taking care of their children. But when it comes to a need, when it comes to a

situation where their gain is involved, then they are perfectly happy to suspend any sense of empathy whatsoever.

Chakrabarti: But is this taking care done in a more rule-based fashion, in the sense that—

Nersessian: No, not at all. In therapy I've had psychopathic patients who are very empathetic towards me, and I don't lack empathy towards them. The only time I begin to lack empathy towards them is when I see that in a situation of some kind of disagreement or conflict, whether it's divorce, whether it's business disagreement and so on, they have absolutely not the slightest sense that they're doing anything wrong and that they're hurting the other person, even though the other person is right.

Leslie: Could I ask, in your opinion, whether the psychopath who expresses empathy for you or for his or her child, do you think that's genuine, or is that—

Nersessian: It comes across just as genuine as the one from the non-psychopath, so that's all I can say. How can you decide in that kind of a situation whether—

Browning: Well, it feels the same.

Nersessian: It's not giving lip service, no. It's not about giving lip service.

Leslie: In a sense, one of the things one could be inclined to think about the psychopath is that they're actually rather good when it comes to theory of mind skills, because one of the big pleasures is manipulating other minds, and often they're terribly good at that. It qualifies them for being successful politicians and so forth. So one wonders whether in fact—I mean it's a good question, how you would actually test that.

Nersessian: I haven't done any research on this, but I think sometimes when people talk about psychopaths not having empathy it's that they're assuming, by virtue of what they do, they shouldn't have empathy.

Leslie: Yeah.

Nersessian: But it doesn't work that way.

Chakrabarti: Yeah, the disassociation isn't that clean that we would love it to be.

Leslie: James Blair, who did these extremely interesting studies that I think started off our interest in these kinds of things went into an institution in the UK called Broadmoor, which is Her Majesty's Prison for the Criminally Insane, I think that's the subtitle of the place. This place contains people who, either through psychosis or through something like severe psychopathy, have broken the law, find themselves not guilty by reason of insanity and then are placed in Broadmoor, at Her Majesty's pleasure, which is the phrase that's used. So he found these two groups of psychopaths: one that had merely murdered others in a callous way, say in the commission of robbing a bank and a couple of policemen or something got in the way so they killed them, versus another group who actually took pleasure in killing and torturing and so forth, you know, the guys that we regard with horror. He gave these standard tests that are used

with preschool kids, and he made it into an adult fashion, between this conventional transgression and a moral transgression.

What he found for the really bad guys, this group that seemed to take pleasure in killing and inflicting pain, they made errors on these tasks, but in a sort of interesting way, which was they would make the same judgments about conventional transgressions as they made about moral. So they considered it a moral transgression to wear pajamas on occasions like this, which suggested that in fact they didn't really appreciate the distinction in the first place and were simply trying to be manipulative, as in, look what a decent person I actually am. I actually consider it to be morally wrong to chew gum in class, or something like this.

Nersessian: Related to that, the one dramatic case that I've seen was when I worked briefly, early in my career, at Riker's Island. the person I saw was psychotic. He had killed a woman because he said he'd never seen a woman's vagina and he wanted to see a woman's vagina. To him it was reasonable that since they were not going to voluntarily show it to him he would kill one and have a look at it. After doing that he went into a state of panic and then was arrested and brought to Riker's Island. But that's the one case I've seen. I don't know anything about autism, but it's hard to imagine in other situations a total lack of empathy without psychosis.

Harris: Do we have some more thoughts—

Levy: It may be a time for the audience to get involved.

A: I'm a cognitive science student, and part of why I came is the luminous nature of the panel today, aside from my normal attendance. One thing I think was just touched on, especially with regard to autism research, but it comes up in all of these questions, especially in shared intentionality questions, is the role of the body in these processes. Specifically I'm thinking in terms of sensory feedback, body maps, the use of bodily mimesis, which we didn't quite touch on, but I've seen some research around on. I just wondered if any of you would like to comment on the role that might play in future directed imagination and pretend play and the distinctions between—if there's any research that you know of that shows the role of the body in these processes.

Browning: We're bodiless, apparently.

Bloom: Well, there was some discussion of emotional contagion, and one of the interesting developmental differences, which I've seen informally because I have two sons, is that when you're young the contagion goes all over. You can't watch a kung fu movie without jumping up and kicking things. You can't watch somebody cry without crying yourself. Laughter makes you laugh. For adults too, there's a lot of evidence we do this. But I think we can suppress it quite successfully, a therapist being the ultimate example of skilled suppression of facial feedback and emotional contagion. We can keep the same face regardless of what the person is doing. But that's a very difficult skill and happens slowly developmentally.

Chakrabarti: There's a very nice paper that's just coming out in *Behavioral and Brain Sciences* by Susan Hurley—she's a philosopher who proposed this five-layered model, which maps somewhat developmentally how these different layers of—the first, emotional contagion, how

you suppress it with different cognitive mechanisms. And of course there's the theory of body work, which is Alan's—I'm sure he will talk about it.

Leslie: Yeah, in that work I mean body in a very general sense, to contrast with the social world, so the world of physical bodies, which would include tables and so forth.

Harris: But it's perhaps worth mentioning there's a huge amount of interest and research at the moment in the question of imitation, and the extent to which imitation is something that is common across the great apes and human beings, or whether human beings show certain hyper-imitative abilities. One tentative hypothesis, but I'm glad to be corrected and refined if I'm getting this wrong, is that in the case of the great apes they will often copy what another member of their group does. But the analysis that seems to work so far is that they see that a certain result can be produced. For example, they see one of their group pick up a stone and smash it down on a nut, break open a nut, and eat the nut. By virtue of watching that member of their group they see that a certain consequence can be brought about, and they then start playing around with bricks or stones, and they eventually achieve the same result. Again, I'm open to correction on this, but something that seems to be more peculiar to human children is a very careful copying of what somebody is doing, even when the person is not necessarily doing it in the most efficient or rational fashion. It's as if the child is saying to itself, "I'm not sure what they're up to here, but I better do it just as they're doing because then I'll achieve the appropriate result."

Bloom: There's a lovely paper coming out—this is very supportive of what you said—by Derek Lyons and Manny Santos in the *Proceedings of the National Academy of Sciences* that finds that finding your describing in like a hundred different ways. They have these things, like they have a box and it has a clear lever, and an adult says, "Let me show you how to open this box," and slides the lever up, taps the box twice, goes like this, opens the box, takes it out. Kids will imitate it. They'll do everything. You press them not to—they will. They have this lovely design where the person runs out of the room, and then someone else shouts to the kid, "Hey, get the thing as quick as possible," and the kid goes, "Okay." So it's not task demands.

Then they have other studies with capuchins, finding that, in a sense, capuchins are more rational. They just say, oh, I'll move that out. So you're right. Humans are strongly imitative in a way that other primates don't seem to be.

Leslie: There was a lovely study a number of years ago by a Hungarian team with fifteen-month-old babies, which I think shows an astonishing understanding of body, which is that if an experimenter demonstrates turning on a light by banging the light with their head, banging the switch with their head, if the experimenter has her hands free while she does that then the children imitate what she did. In other words, given the chance they will operate the switch by banging it with their head. But if the experimenter is wearing a straightjacket, so there's some sort of explanation of why she can't use her arms, and bangs it with her head, then these children, seeing that, will imitate simply by pressing the switch with their hands. At fifteen months.

Browning: Fifteen months?

Leslie: Fifteen months, yes. So that's a sort of extraordinary example of understanding something quite deep about the body.

A: My background to a lot of this is with that mirror. The classic mirror test for self-awareness is where they put a dot on the animal's forehead when they're anesthetized, and then those animals that rub their dot when they look in a mirror, they figure they're self-aware. That's their test. Very few animals pass. I think there's only about four or so.

Browning: Four species, yeah.

A: Right. I asked some of the researchers because I wanted to see, well, let's try this with the True Mirror, see if that makes any difference, because I think there might be, because they're more expressive in the True Mirror, based on what my ideas were. So I asked them. I said, well, if you look at the chimp and stuff, they can say he's self-aware because he rubbed the dot, but did you ever see him actually introspective, like actually looking in his eyes the way we do? He said no. It was kind of a new idea to him. That is very uniquely human, to actually look in our own eyes, and a distinguishing characteristic of who we are and what we think about versus any other species, including these four that pass that test. Any thoughts on that?

Harris: I think you silenced us with this. Well, not Alan, apparently.

Leslie: The thing that I could add to that is autistic children readily pass that mirror test. They do have a sense of self.

Harris: But it is also true—there's been a lot of discussion of autistic children's sensitivity to mutual gaze, right?

Leslie: Yeah, that seems to be a different—

A: As a matter of fact, he took the mirrors and tested it with autistic children, and he said that they passed the test less, that they recognized themselves less—

Harris: The Rouge Test.

A: I'm not sure whether it was a test or whether they just didn't respond to themselves as much as in a regular mirror. He took the assumption from that that they had less of a sense of self than—

Bloom: There's also a lot of debate about what this test shows. It's quite interesting, but just as in words like imagination and consciousness, words like self are horribly ambiguous. What you need to pass the test is a mental model of your body, an appreciation of how mirrors work and a desire to see how you should look. That would be a very different sense of self than when we talk about sense of self regarding consciousness and theory of mind and so on. You could very easily build a machine that could pass the Rouge Test, even though the machine would have no sense of self in any interesting regard. It's hard to work it all out. Actually, like issues of looking into your eyes for introspective interest, it's over my head, but that sounds more closely related to what we're really interested in when we're talking about self.

A: Right, and it was like a distinguishing between animals do this, this and this, but this is one thing they don't seem to do.

Bloom: Yeah.

Leslie: One of the things I suppose that I might do if I was to stare into somebody's eyes is that I'd be trying to see into their soul through their eyes. I can see into my own soul without looking in my eyes. I have that sort of advantage in the case of self.

A: I'm a conceptual artist, and I actually want to hear more about what was advertised in the flyer, but when I listen to the discussion I have a different comment. First of all, I would like to say that I'm not from any movement defending rights of animals, but I would like to talk about that, because from my point of view no kind of learning is possible without at least basic imagination and pretending. If there is no imagination in animals' minds they would not—lions never would learn the behavior of their mothers how they could hunt, or birds would never eat sod.

Browning: You think that requires imagination?

A: Absolutely. When lions see their mothers, how they hunt—they pretend in their mind that they also could do the same thing and they start to learn it. And also, an alpha male would never fight for their first place in their—I don't know how it's called—

Harris: Hierarchy.

A: —in the hierarchy, because he would be afraid. He would believe only in the same woman, because it's dangerous to fight with alpha males. He would never pretend in his mind to be another alpha male. There is all different examples. Also about empathy, it's my personal experience when I was in Russia, once I was in small village and I saw many crows, and they, I don't know, cried and did something—there was a lot of them. I didn't understand what's going on. Then I saw a small crow on the ground with a broken leg. They tried to lead him to the place and tried to frighten all other, I don't know who, for example, humans. Don't touch him. So it is possible empathy even in this species, you see? From my point of view every human behavior has basic features in animals.

Chakrabarti: Absolutely. Most of the neural mechanisms have evolved from the basic hardware that's already there in lower species. I think different instances of social behavior have been anecdotally reported in birds, and even—I mean the big problem for social behavior, when we mention it like that, is when people start talking about bees, because we are talking a very high level of social organization, without instances of the stuff that you just mentioned, this example of crows. That's a very organized society, but not many instances of caring for injured bees is known about. I haven't read or heard about that. Social structure is one thing, and social behavior is another thing. So the instance that you mentioned, the crow, whether it's a function of social structure, saying that the baby crow must be removed—as if executing a social rule, versus something that's spurred by a sense of—

A: There's no empathy—

Chakrabarti: Yeah, I don't know. You have to kind of take your choice on that.

Levy: You'd put your money on animals. If there was the choice between animals or computers, you'd put your money on animals—

Chakrabarti: Yes.

Browning: Oh, totally. Raise your hand, animals over computers.

A: You mentioned the development of the capacity for pretend play in children. There's a counter-phenomenon that I wonder if you have any insight into, which is the loss of the capacity among many people as they get older to distinguish between pretense and actual reality. A concrete example that comes to mind is the attack on the Harry Potter novels in some fundamentalist religious circles on the grounds that this is actually a threat to their own belief system, which represents a failure to acknowledge pretense in a number of ways. First of all, it represents a failure to acknowledge that the Harry Potter novels are themselves pretend. They're not an actual assertion of a counter system. It represents a failure, perhaps, to acknowledge that the system in which they believe, to which they attach allegiance, is itself perhaps the result of some kind of imaginative process, rather than a literal response to the here and now. Do you have any insight into this sort of counter—

Bloom: I would actually give a slightly different interpretation on it, but then I'll turn around and agree with you. I think a lot of the objection to these things is fully aware that it's fictional. I'll switch the example a bit. If there was a violently anti-Semitic TV show I might say, hey, I wish that wasn't on. And you could say, hey, don't you understand that's just a story? I know it's just a story. I'm fully aware of that, but I dislike the message the story conveys. Why would it make a difference? That's where you get into an interesting fact, which is the human mind is, to a large extent, porous between fiction and reality. Things we learn in fiction get incorporated into reality, including moral facts. There's a lot of psychological data on that. For instance, there's one study—and this actually fits your point about age, because they did this with older adults. They gave them a series of medical facts, and some of them they said, this one is true. This one is false. This one is true, this one's false. What happens a week later when tested? They had remembered them all as true, because it's very difficult to parcel them out.

Even if people can initially tell fiction from reality, the fiction will permeate in their minds. And that's a reason why fiction makes a difference, good and bad.

A: I would distinguish, though, between the anti-Semitic fiction and something like the Harry Potter novels. If something is anti-Semitic, that suggests kind of polemical purpose underneath. It's the polemical purpose that you're objecting to, in other words, you're making a point about Jews or the Jewish religion. To see a polemical purpose with regard to religion in the Harry Potter novels, it seems to me, is, again, to confuse imagination and reality.

Bloom: But in some way I think you're underestimating J.K. Rowling. My sympathies are with you. I love Harry Potter, the movies, at least. The book's too long. But in some way Rowling does want to convey moral and social messages, including a famous one after the fact, where she said, hey, Dumbledore was gay. Get my message here? I think that's a nice message. But if you

said, hey, Dumbledore was Republican, I'd say, oh no, the wonderful Dumbledore? So there are messages.

A: But don't you think the attack on the Potter novels was initially not something like that? It was, this is proposing wizardry as an alternate system. The idea that wizards can have a system is a threat to my raising my children to believe in whatever.

Nersessian: I think there's a difference between not being able to pretend and purposely trying not to pretend for getting some other plan or need or whatever fulfilled. I think the people you're talking about, they're purposely acting as if they don't want to pretend in order to make this point that they have—I'm sure each of them is perfectly happy to pretend in other situations.

A: Let me just make one other quick point. Then I'll sit down and listen. I don't want to come across as anti-religious across the board, but I think whatever religion one might ascribe to, you have to then reject a whole other set of religious assumptions that other people hold. Whether you're religious or not religious, you have to assume that a lot of people are religious based on their own fantasies, and that people have incorporated what is essentially a product of the imagination, a counterfactual situation, and attached to that as reality.

Harris: I think you're putting your finger on a very important psychological point about the imagination, one that psychologists have largely ignored. We tend to think of the imagination and the ability to represent possibilities as allowing us to think about the not real. But it seems to me we use it a great deal, and children use it a great deal, in order to construct a picture of reality. For example, when children learn about the history of their community or their nation, all the events that they're told about, whether it's the Civil War or the War of Independence or Julius Caesar or whatever, are events that they obviously can't witness firsthand. They have to construct those in their imagination. But the interesting thing about history is that we are instructed, or led to take it to be true. I think we have a tremendous facility for that, and I think it's extremely important. That doesn't prevent us, as you're pointing out, from sometimes taking for true things which perhaps we ought to be a bit more skeptical about. But in some sense I have sympathy with these fundamentalist objections, because they're exemplifying the very point that I think psychologists have neglected, namely this capacity to take for true that which you can only imagine, which is, I would say, uniquely human.

Nersessian: Could autistic children, or could autistic children who became adults be religious?

Leslie: That's a very good question. I actually haven't thought about that before.

Harris: It's not something they manifest in any florid way.

Bloom: Jesse Berring has a nice review article in an obscure journal, where he reviews all of the evidence bearing either way on this, and it's a very short article. But the claim is interesting, which is a lot of people with autism, the higher functioning sort, love religion. They love the rituals. The Judaism, they're crazy about the preparing things and so on. But again, this is very high functioning, because these are the people who can talk about it. They don't seem to believe in supernatural beings.

Chakrabarti: Yes, it's more of a systemizing variable of the religion, so this complex system with definite rules.

Leslie: Yeah, I mean just to make a comment on the previous point that was raised from the floor. It seems to me that kind of example in general is not so much a function of imagination and reality as a functioning or a collapsing between religion and politics. And it seems to me that what's distinctive about fundamentalism—and it's really a political movement, whether it's based in American Protestantism or in Middle Eastern Islam—these are really political movements that co-opt religion. Of course there are many other kinds of examples in history.

Harris: Some people would say that it's the religious movement that co-opts politics. I think there's a lot of debate to be had on that particular question.

Leslie: Yeah.

A: I'm a psychoanalyst and group therapist, and I write frequently on film. I was struck in the film by the name of the character, which is Chance, and then I was struck by your comment about psychopaths. Having written about psychopaths in the movies, there's a distinction made by Michael Douglas, who started the serial killers unit at the FBI, that there are two kinds of psychopaths: organized and disorganized. The organized psychopath is capable of planful actions. But the character in the movie doesn't seem to be capable of planful actions, and I wondered if you would comment on that, and if imagination isn't another way of establishing a tentative plan, which is not evident in this kind of behavior. I think Kosinski's choice of the name Chance gives us a key as to what he's really telling us about this character. Things happen to him, events by chance happen to him: he's hit by the car, he's taken in, the man is dying again, he gets to tell the people the same story and say the same word and they treat him very differently. But in terms of autistic children and the research on imagination, how does planful activity get examined?

Bloom: I would just repeat the point I made before—I think that's a great question—which is I do think that planful activity requires imagination, even in the narrowest sense possible. In order to explicitly plan for the future you have to say, if I were to do this, and I set up a world, and if I think that I've done it I'd be hopelessly confused. I have to hold it as a counter-fact, or what would become of that? If I were to do that, separate from this, what would become of that? Which option is better? We do this sort of effortlessly, but if you think about it, it's an extraordinary act, and I think there's probably great differences among psychopaths, among normally functioning people, into how well you can do that.

Chakrabarti: If I could add to that, you're talking of a very conscious phenomenon there, where you think of consequences. If I just take this glass and bring it to my mouth, my mouth muscles are already preparing, or showing signs of activity, preparing for me to take a gulp from this glass. But recently there was this experiment done by Rizzolatti's group, who got facial EMG and magneto-encephalography, which showed that even for such planned actions, people with autism do not show the preparatory muscular activity. He argues that it's action chains that are not coordinated. This is action at a very basic level. This is not conscious planned action at all. So that's just—I mean last year's PNS paper, a very, very nice study on that.

A: Hi. I was wondering what you think is the connection between imagination and creativity? Like an artist—I know they use inspiration and passion for their art, but what part imagination plays in that, and if you know anything—

Nersessian: I think Paul should be able to answer this.

Harris: Well, there's a sense in which psychologists have banged their head somewhat unsuccessfully against questions about creativity.

Bloom: Somewhat?

Harris: There was a flurry of work, I guess, in the '50s and '60s, trying to look at very creative people, be they architects or scientists, and trying to identify certain distinctive features of their—

Browning: Csikszentmihalyi, is that what you're thinking of?

Harris: Well, that would be one. McKinnon would be another. There was an English psychologist called Liam Hudson who was a third. But I don't think it led to any clear cut conclusions about what distinguished the truly creative architect or the truly creative biochemist from the less creative ones. If anything I think psychologists have retreated, and I would applaud them for doing so myself, to, if anything, a somewhat more pedestrian view, at least from the point of view of the outside world, of when we use our imagination. That was partly why I myself used the phrase 'the work of the imagination' in writing my books; I wanted to draw attention to the fact that the imagination is all over the place. It's used in all sorts of domains, including the domain of planning, as Paul has pointed out, including the domain of causal analysis. We often ask ourselves, how did this come about? How might it have ended up otherwise if things had been different? We do that both with respect to why our particular relationship with someone is going through choppy water or what the origins of the first World War were. We engage in that kind of counterfactual thinking.

I'd be interested to hear reactions from other people on the panel. I myself think that that's a good move, because it takes away a bit of the mystery and it gets us to start thinking about the extraordinary ability of children to think about things that are not here and not now, but merely possible.

Browning: I just want to add something to this: wouldn't you agree then that anything that is not here and now and part of what you're doing this minute requires imagination to be there? I mean history—you said planning is imagination. To even think about history, whether it's true or fiction or whatever it is—I mean it's not here in front of us. Anything that's not here is of the imagination.

Bloom: Sure. But consider another example. Consider mathematics. Autistic children can be very good at mathematics. Even babies have abstract mathematical understanding.

Browning: Right.

Bloom: Yet I think in a deep sense that's not here and now, math. There's no material objects. Numbers are very abstract entities. I would just say that there's different cases. History is interesting, because it really does require imagination, even in a narrow sense of creating another world and understanding it.

Browning: But you don't think that math is imaginative?

Bloom: I think if math is imaginative then it requires a different sort of analysis regarding autism, because it doesn't—in the same sort of imaginative, showing up and pretend, or counterfactual reasoning, or fiction.

Harris: It's a very interesting example. I guess my first reaction would be to say that mathematics seems to be special in the sense that, first of all, it's a very highly regulated domain within which you can make various maneuvers. And there's a sense in which when you make those maneuvers you're neither making real maneuvers nor fictional ones. It seems to be a world that's neither the one nor the other. I'm not putting that terribly well, but I think you sense what I mean.

Bloom: I'm not being entirely constructive here. I'm trying to say that it's more modular, more complicated than to—I don't want to subsume too many things under one thing, because then I worry we'd just lose any distinctions whatsoever. Everything is imagination and nothing is imagination.

Browning: No, but everything isn't imagination. Go ahead—

Chakrabarti: I was thinking more on the mathematics example, but mathematics as a system primarily obeys laws of formal logic. And no matter how imaginative your mathematical models are they have to be governed by the same laws that govern the rest of the system, whereas when we are talking of pretense and possibly non-parameterized situations, which are like more social situations, where you don't have the same rules for everything. Possibly we are talking of two different domains altogether, I mean the social domain with its non-measurable, non-parameterizable variables, versus mathematics with its formal rules.

Bloom: I would agree with that. It's not really abstract versus concrete. That's more dimension.

Chakrabarti: Yeah.

Bloom: I just wanted to say quickly that I totally agree with what Paul said about the fact that our field has not done any progress with explaining genius or creativity. But I think maybe we can do well with some very basic fundamental things, and one thing I would point to, building off the discussion other people had about drawings, is I think art tends to require some sort of actual, social understanding of the self and other. Often the artist is representational, often art seeks to evoke emotion in others, evoke certain ideas in others, and perhaps one reason why children with autism draw like machines is because there's nothing communicative, there's nothing expressive about it. It really is like a machine. People have pointed out that the artwork of Nadia is exactly like a street artist, who when copying something goes to it, so they copy it upside down, because then when it's devoid of meaning you can copy it more accurately. Maybe what this work points to is some sort of social component, maybe a non-obvious social component in these creative enterprises.

Leslie: If you mean creative in the socially honored sense, you know, to be a Warhol or Beethoven or so on, psychologists haven't done well there, and I think you never will, and I think you shouldn't even try. But if you mean creative in a much more mundane sense, such as just what you or I do every moment of the day when we make up sentences that have never been said by anyone before, I think there we've done better. It's that sense of creativity and imagination that I'm interested in. It's just the things that socially we regard as being perfectly every day, mundane, and you can't really boast that your child does it because every child does it. But those things are wonderful; they are marvelous, exquisite, and they are creative and imaginative. It seems to me that you shouldn't think that to be creative is in some kind of opposition with rule govern, because it's really rules that allow you to be creative in the first place, whether it's speaking a language and creating new sentences in the language or even being a Warhol, and there the rules of art are much more ineffable than the rules of language, but still, Warhol knew perfectly well what those rules were and what he was doing breaking them. There's not an opposition. It's really rules that create creativity.

Harris: Can I just pursue that for one second more? You can have clearly anarchic visual artists, but can you have anarchic mathematicians?

Bloom: Well it's more with Alan's point: there are people who broke the rules of geometry, the non-Euclidean geometry, so you took away an axiom to see what happens—

Harris: Okay.

Bloom: —and none of it's good. All these terrible things happen when you—parallel lines meet, of course you can have anarchy, but I'm not sure you can have anarchy in visual art too. I think what comes off as anarchy is successful to the extent that, as Alan pointed out, you're deliberately flaunting the rules. But if my kid scribbles on something not knowing the rules and I bring it to MOMA, they're going to say, "Who cares?" Because he didn't know what to break.

Levy: Should we take the last question?

Harris: Sure.

A: We talked today about the link between imagination and empathy, and examples in terms of autism and psychopathology of a lack of empathy. But I wonder if there's anything interesting to say about the opposite, people who are extremely empathetic. I don't know if there's a linkage between imagination and empathy. I'm just thinking quickly—an example for me is like dogs and cats in pounds. I never think about it, and then I got an email where a specific name of a dog was mentioned and suddenly I found myself much more empathetic. I'm just curious whether there are any studies about an excess of empathy or a greater amount of empathy.

Bloom: The phenomena you're talking about is well documented, which is you stick a name in and empathy shoots up.

Browning: Yes.

Bloom: A picture will swamp you. George Gergely, again the Hungarian groups, have speculated about the mirror image of autism, which is people with their empathies being turned up too high.

Browning: What happens to them?

Bloom: One suggestion is a form of paranoia, which is you're trying to get into everybody's head all the time and it becomes too much.

Nersessian: In psychoanalysis there's been cases—.

Bloom: Because people become depressed, or because—

Nersessian: Yeah, people become depressed, or people become overly emotional in a situation.

Browning: Do they disregard themselves when they're overly empathetic?

Nersessian: That doesn't really have much to do with them, but they can't stop themselves from becoming overly emotional in a situation.

Levy: Like the Borges character Funes de Memorias, remember that? He remembers everything and he can't remember anything.

Chakrabarti: This one particular group of patients—I shouldn't call them patients really—people who have the diagnosis of touch-vision synesthesia, who are a very interesting group to study in terms of this excess of empathy that you just mentioned. So this group of people, if they see somebody else touched they feel it on their own skin. When you administer general instruments of empathy, like empathy questionnaires and stuff like that, and also measure their brain activity in the scanner, you find increased brain activity whenever they see somebody. So as you would guess, we are taking a very body-centric view of empathy here, and this particular special group might actually represent some form of connection between areas that are not normally connected that strongly, hence giving us this excessive knowledge of the other person's sensory feeling. But again, I don't know about whether they're good in imagining things or not.

Harris: I just wanted to say I have a student who's looking at an interesting group of children, roughly between six and eleven, and these are children growing up in ordinary meat eating homes but they have decided that they want to be vegetarians. When we talk to these children we find a couple of things which are difficult to put together. On the one hand, if you ask them why they don't eat meat they talk about the suffering of animals and wanting to avoid that. But then if you quiz them about other people who eat meat, you might have thought they've erected a moral rule about this. You shouldn't cause that kind of suffering. But they're remarkably tolerant toward people, including of course people in their own family, who do eat meat. It's an interesting combination of sort of heroism, but tolerance.

Now in relation to this particular question, what we don't yet understand is how they've arrived at that decision. But the thought that keeps going through my mind is that these children have—I wouldn't want to in any sense say it's an excess of empathy, but they've enlarged the circle perhaps more than some of us in this room, and therefore they feel animals' pain more acutely than we do, and they've made the decision on that basis.

Bloom: I'll ask the Simon Baron-Cohen question: are these children predominantly female?

Harris: Two-thirds are female.

Bloom: Thank you.