

Transcript: Creating Healthy Connections: Nurturing Brain Development From Birth to Three Featuring Alison Gopnik, Ph.D.

Hello and welcome to ZERO TO THREE 's exciting new podcast series for parents: Little Kids, Big Questions, made possible with the generous support of MetLife Foundation. ZERO TO THREE is a national nonprofit organization devoted to the health and development of babies, toddlers and their families.

I'm Annie Pleshette Murphy, a ZERO TO THREE board member, and the host of this series, which will showcase interviews with leading child development experts on the issues most pressing to parents today, based on findings from a recent parent survey ZERO TO THREE conducted also with support from MetLife Foundation.

I am pleased to welcome Dr. Alison Gopnik who will be joining us today to talk about early brain development and how young children learn. Alison is a professor of psychology and affiliate professor of philosophy at UC Berkeley and is the author of a fascinating book Philosophical Baby. This is such an interesting subject. I am so happy to be talking to you today Alison.

A: I'm glad to talk to you.

Q: So, you have written a lot about babies, about babies' brains, about what we know about, umm, this kind of miraculous, umm, explosion in research and what it has taught us about babies. 30 years ago we really thought that babies were—weren't really—they were not just blank slates to a lot of people, but they—they really were, irrational, egocentric, and that, umm, there wasn't this—this amazing growth that we actually can see in ways that we never did before. So what are some of the most exciting arenas that you and others are working in that helps us understand how babies learn, and—and—and what goes in those not such little brains?

A: Well, there's really been a major revolution in our understanding of babies and children over the last 30 years or so, and I think part of it's come just because we've been taking babies and children more seriously. But a lot of it is because we've developed new methods—new ways of asking babies questions in their language instead of in our language. So, as adult psychologists, or just adults in general, we're used to thinking, well the best way to find out what someone thinks is to ask them. And of course you can't do that with infants at all. They really look dumb if you ask them questions. But even with preschoolers, uh, if you ask a preschooler what they think about something, you're likely to get a

beautiful stream of consciousness monologue about birthdays and ponies, but you're not likely to get anything that sounds very rational or logical.

So, the first thing was that we had to figure out how we could get babies and children to tell us what they know in a way that doesn't, uh, require them to use language to talk, umm, or at least that requires them to do that in very simple ways. Uh, and a lot of the research has come because we've figured out by using videotape, for example, how we could take where babies look, what they reach for, what preschoolers say and answer to a yes/no question—we could use those kinds of techniques to actually pose questions to babies and children the right way and get them to answer them. And what we've discovered is that even the very youngest children already know more, learn more, care more, feel more than we ever would have thought in the past.

So, one of the big—biggest changes I think that's happened most recently is how amazingly much babies know from the time they're born. So, far from being a blank slate, even the youngest babies already seem to have some basic ideas about other people, about language, about the physical world—about the objects around them. So, for example, newborn babies already imitate the facial expressions they see other people around them producing. Umm, so, if you stick your tongue out at a newborn baby, the baby will stick his tongue out at you. Umm, that might not seem too amazing until you think about the fact that there aren't any mirrors in the womb. So, babies have never seen their own faces, and yet they seem to link the way it feels inside of them when they smile and the smile they see on the face of another person.

So, I think our first—the first port of pass was to say, "My goodness, babies know much more than we ever would thought before. They're not blank slates." But the more recent work, which in its way is—is just as exciting, says, well, babies are born knowing a lot, but they also learn a lot, and they learn a lot even when they're very little babies.

Q: What is happening in a lab let's say when you're—when you're testing a baby like this?

A: Right. Well—so, there's a lot of different techniques that people have used, but one of the important ones is what's called the looking time technique. And this takes advantage of the fact that babies look longer at things that are surprising or unexpected than they do at things that they expect to—and predict to happen.

Uh, let me tell you—give you another example—a fairly amazing recent, uh, study by my colleague, Faye Chue at Berkeley, and this was a study where she showed children a box of mixed-up ping pong balls- 80% white, 20% red, and then the experimenter would take some balls out of the box, uh, and sometimes what the experimenter did fit the statistical pattern in the box. So, for instance, the experimenter would take four white and one red ball out of the mostly white box. Now, that's something that is completely predictable. That's the kind of statistical pattern that you'd expect. But sometimes the experimenter would do the opposite: she would take say four red and one white ball, uh, out of that box, and it turned out that in that case the babies looked longer even though it wasn't that that was an impossible sequence of events that could have happened, but it was just much less likely than the four white and one red. And babies seem to be sensitive to that probability. They seem to understand the fact that that was an unlikely outcome. These babies are just like scientists looking, and when they—when they see that four red and four white they say, “Aha, a less than .05 probability- a significant result.” There must be something else going on here. This couldn't just be random. So, as you say, even grownups have a lot of trouble understanding probability, but it turns out that little seven-month-old babies, umm, already are—are figuring out quite a lot about it.

In a follow-up study, Faye Schewe and Tamar Kushner at Michigan did a study where they tried to ask: When babies see these patterns of statistics, do they actually use them to say figure out what's going on inside of the mind of another person? To test that, uh, problem, they did just the same experiment I just mentioned with the ping pong balls, but now they did it with little toys—yellow ducks—green ducks and yellow ducks. They either take mostly green frogs from a container that had mostly green frogs with just a few yellow ducks, or else the baby saw the experimenter take, umm, mostly green frogs from a container that had mostly yellow ducks. Okay. So, uh, then the experimenter would give the babies a bowl full of green ducks and a bowl full of yellow frogs and put out her hand—hand and say, “Can you give me one?” So, here's the thought process. Let's take the first case. Suppose the experimenter takes mostly green frogs out of a mostly box full of green frogs, well that doesn't tell you anything about what she likes. That's just a sort of random draw from the box. So, really there isn't anything else she could have done but take the green frogs. But if she takes mostly green frogs from a box full of yellow ducks, then that tells you that that isn't something that could just happen by chance. That's a really significant event.

Q: She selected what she wants.

- A: Exactly. So, the best explanation for that pattern of statistics, if you were a little scientist, or a little psychologist, is, “Oh, well, she must want the green frog.” And it turns out that that’s exactly what the babies conclude. So, when they see the person take the green frogs out of the box full of mostly yellow ducks, then they’ll give her the green frog, whereas if she takes green frogs out of a box full of green frogs, they’ll either give her green frogs or yellow ducks equally. So, they seem to be able to use the statistics to figure out something very important about other people, which is this is what these people like.
- Q: This reminds me of this wonderful study that you know very well of the little gold fish and the broccoli, I’d love you to talk about that, ‘cause to me it’s one of the most elegant pieces of research that I have heard about in a long time. And for parents it’s—it’s really I think a wonderful thing to picture, and is something you can do at home.
- A: So, so far we’ve got babies seem to know about statistics, and they can use statistics to figure out what someone else wants, but there’s a deeper question, which is when do babies get to realize that what they want may be different from what someone else wants. And that ability to take the perspective of another person is a very, very profound ability. It’s at the root of a lot of our social and moral lives. And the conventional wisdom was that that wasn’t something that developed until children were eight or nine years old. Umm, we thought maybe we weren’t asking the babies the right way, so we thought maybe we—if we ask the babies about something that they know in a way that they understand we could show that they could take someone else’s perspective earlier. So, we—the way we did this was we gave them two bowls of food. One bowl of raw broccoli and one bowl of, uh, Pepperidge Farm Goldfish Crackers. And, all of the babies, even in Berkeley, like the crackers more than they like the raw broccoli. Uh, so, then what we did was we showed the babies the experimenter taking a little taste of each—from each bowl of food, and she would either make a happy face—so, she’d go, “Umm, yum—uh, crackers—I tasted the crackers,” or else she would make a disgusted face—she would go, “Oh, yuck. Crackers. I tasted the crackers.” Half the time she acted as if she had the same preference as the baby. She said, “Mmm, crackers,” and, “Oh, yuck, broccoli.” But half of the time she reversed it. Uh, half the time her preferences were the opposite of the baby’s. So, she said, “Mmm, broccoli,” “Oh, yuck, crackers.” And then she put the two bowls of food out, one bowl of broccoli, and one bowl of crackers, uh, and then put her hand out and asked—said to the baby, “Can you give me some?” Now, the remarkable result was that the eighteen-month-old babies would give her the crackers if she liked the

crackers, and they'd give her the broccoli if she liked the broccoli. So, these very young babies, only eighteen months old, already seem to understand that someone else might have a different preference than they did, and that—interestingly from the perspective of morality, they also seemed to have the impulse to give someone what they wanted rather than what they wanted. On the other hand, the fifteen-month-old babies didn't do this. So, the fifteen-month-olds just always gave her the crackers.

Q: Which is what they love. So, then this idea—this term that we've heard a lot, umm, you know, this egocentricism—this idea that what you like or what your point of view is, is really what's dominant, is something that—that really has this dramatic change in just such a short period of time.

A: Exactly right. So, it turns out that, uh, the—first of all, the two remarkable things about this study are that eighteen-month-olds—such young babies who are just starting to walk and talk could understand something so profound about other people. But the equally striking thing is that this isn't just something that's there from the get go. It's not there innately. It actually seems to be something that babies are learning between the time they're about fifteen months old and about eighteen months old. And that's where the green frogs and yellow duck study comes in. Uh, we think that the way that they are learning may be by looking at what people do, looking at the patterns in what people do, and figuring out from those patterns, oh, I see, people sometimes don't want the same thing.

Q: Right. Right--absolutely fascinating. What all of this speaks to is this amazing growth in their brains in their early years. What I'm hearing, Alison, is that there—there is this connection that the—that, you know, just as having a child experience healthy relationships, feel good, be nurtured you know has an impact on their brain development. It seems to me that their brain development also makes them more empathic people. I mean, is that—is that fair to say? Is there—is there also that connection?

A: I think what we're increasingly discovering is that it isn't as if there's, uh, a strong separation for babies between their cognition—what they're figuring out about the world and their social and emotional life. So, if you think about this whole field of figuring out what's going on in the mind of another person, that's something that's cognitive in the sense that babies are using these abilities to say—do statistics and do experiments to try and figure out what's going on in the world. But of course once you figure out what's going on in someone else's mind, that really changes the way that you interact with them. And the opposite is true too. So, the way that

babies are learning about other people's minds, and the kinds of conclusions that they're drawing about other people's minds depend on what kinds of things they see other people do. So, if they see other people behaving say in, uh, a loving and secure way, then that seems to be evidence that lets the baby say, "Oh, okay. That's the way love works. Umm, when you love someone, you take care of them." Umm, whereas if they see someone behaving in a way where say when the baby cries the caregiver turns away, then babies will conclude, "Oh, that's the way human interactions work." So, there's a—a constant back and forth between the kind of emotional and social information that babies are getting, and the kinds of cognitive, uh, learning capacities that enable them to figure out what's going on.

And there's another piece as well, which is all of this learning takes place in a protected, nurturing context. And one of the evolutionary ideas is that that early period, uh, it's a period where we're just free to learn and explore without actually having to put all that learning to work. And then later on as we're adults we can take all the things we learned when we were babies and we can actually put them to use to practically get on in the world. So, the picture is that having a caregiver who's actually willing to invest in taking care of you is one of the prerequisites for being able to do all this amazing learning that we know babies are capable of.

- Q: Right. Fascinating. So, that, you know, this idea of our babies being dependent on us from birth in a way that other species aren't, that that actually is directly related to the fact that we can think in ways that most other species can't.
- A: Exactly. Umm, a good—a good generalization is that you need someone to take care of you if you're going to be able to be that free and creative.
- Q: Right. We're laughing about this, but I think that what underlies this is a—is a very serious concern in terms of how important it is to understand this and to respect this, because, uh, the—the kind of interactions that we have with our children when they're very young, whether—it's helping them understand things, you know, interacting with them, stimulating their brains, you know, really playing with them also, is so unbelievably important.
- A: I think there's something very important to emphasize here, which is that often when parents hear how much their babies are learning and that they're learning from parents, their immediate reaction is to think, "Oh, well, I should sort of be like a teacher in school to my baby." Umm, their first impulse is to think, "Oh, well, I should make sure that my nursery school looks more like a second or third grade, or, you know, high school

than—than just like a place where the children are running around and playing.” And I think it’s very important to emphasize that the research shows just the opposite. So, one of the most exciting things I think in the very recent research has been, uh, that psychologists are starting to show that playing actually is a way of figuring out the world. A lot of what babies and children are doing is like what scientists are doing. So, what looks like just playing and messing around to parents is actually a very clever, experimental research program.

Q: Right, is there an example of a couple of toys that you can think of that if you were shopping for a three-year-old you would say, “Okay, this is the kind of thing I’m talking about. This is a toy that will pro—provide endless amusement, because this kid is gonna have to, umm, you know, play with this toy to, as you say, kind of figure out how it works?”

A: Well, one thing is that we know that just as exploratory play seems to help children to understand the world, pretend play seems to help children to understand the world. And in particular pretend play seems to be especially important for understanding other people. It turns out that children who engage in a lot of pretend play and sort of children who have crazy imaginary friends, and spend a lot of time off in these weird alternate universes with Ninjas and mermaids and so forth actually are better at understanding people. And we think that pretend play—something like have—they have an imaginary friend, is like a little scientific thought experiment trying to figure out how do people work, what can I predict about what people will be like.

So, the kinds of toys that let children themselves do lots of different things, uh, that let there be lots of exploration, and that support lots of different kinds of pretend, like uh, you know, a little toy farmhouse with lots and lots of, uh, animals and—umm, and little people in it, or a pretend cell phone, or a pretend computer—things that allow children to try out all the different ways that adults, uh, function. it’s a sort of a catch—catch-22, which is in some ways the less the toys do the better as far as the children are—are concerned, because the more there is for the children to do. And the children are always gonna be much more imaginative and think up much more—many more new things than any toy manufacturer could. So, the old standbys like, you know, toy brooms, and toy dishes, and toy tea sets, and I think in new days toy computers and, uh, toy cell phones are examples of things that let children explore in lots of different ways.

For toddlers, good old-fashioned building blocks, umm, are something—if you think about how many different things you can do just with a set of four blocks, or a set of five mixing bowls. Umm, that actually lets you do many, many more different things than, uh, most electronic toys do, and

those things also play into exactly the problems that children are trying to solve at this point. There's certainly nothing wrong with teaching children to recognize letters, but that's actually a much less profound discovery than, uh, the discoveries that children make by pretending to be princesses or by stacking a bunch of mixing bowls.

- Q: And I'm—I'm assuming, and—that—that it's very important that when a child is playing and if you join a child in their play that you really let them lead the way; that letting them figure out that the blocks may not stay in that tower if you put that big one on top is something very important for them to struggle with and experiment with, than to show them that it's great to start with the big block on the bottom.
- A: Right, there's a kind of double-edge sword about teaching that on the one hand teaching can be a very quick, efficient way of learning specific things, but on the other hand teaching too much can actually, uh, narrow down the options that children would get if they were just spontaneously exploring. In our experiment it turned out that if you just said to the children, "I don't know how this toy works; let's figure it out," the children would go and solve that problem. But if you said to them, "This is my toy, I'm going to show you how it works," they would just imitate exactly what you did, not try to work through rationally which of the things that you did actually worked and which ones didn't. If you see, you know, a wonderful preschool teacher, you'd see that they sort of intuitively get a sense of when to let children explore and figure things out for themselves, and when to just give them the right hint at the right moment rather than having an agenda that you want the children to accomplish.
- Q: Okay, Alison. Thank you so, so much. This was fantastic. And, umm, we wish you well, and thank you so much for your time.
- A: Glad to talk to you.