Interview Transcripts - International Edition

Names starting with A to G

This document contains transcripts of the expert interviews in *The Science of Early Child Development, International Edition*. Transcripts are listed alphabetically by the name of the interviewee and the name of the video clip. Click on a name below to go to that person's interview transcripts:

Aber – implementation science (2:27)

As critical as the science is, the bigger challenges are implementation and policy challenges. So, I'm a card-carrying union member, I'm a developmental scientist, I deeply believe in the positive role science can play in revealing what children's development is all about, what's most influential, and guiding us to good intervention strategies, but identifying an intervention that works is light years different from figuring out how to scale those interventions with sufficient quality to have population based impact. And so, I think, this forum has shed a very bright light that in almost every country in the world, the gap between science and reality for an entire population of kids on the ground is a very big gap.

The second insight, though, is that we don't have to despair in the face of that gap. There are many things we are learning how to do, so through implementation science, we're learning how to deliver programs more efficaciously, with higher fidelity at lower cost, and if we don't learn how to do these with equal power for lower cost, the economics of the situation will not allow us to have population-based impact. We're also learning that some policies can really enable that kind of activity, and some policies actually discourage or throw up severe barriers to that kind of policy, and we're learning that advocacy with policy makers can help us strengthen some of the enabling factors and reduce some of the barriers. But it's pick and axe work, there's nothing fancy or glorious about it. You go in and you develop relationships and you hope that reason and sense will out over time.

Aber - Scale-up in West Africa (5:10)

An example of positive scale up in West Africa is work we've been doing in Ghana with the Ghanaian Education Service. Ghana realized over a decade ago that the very poor outcomes for children very early in elementary school could not be turned around with more effective preschool. So, they were influenced by global and African research that suggested that preschool could improve children's readiness to learn in school. They weren't sure how to do that. So, we are involved with them in a randomized trial of preschool teacher training initiatives where we're trying to help support the Ghanaian government support in service teachers, move away from a rote 'drill and kill', kind of traditional approach to early education, and to a more play-based, dynamic, language enriched, including not only academic learning, but social-emotional learning. That was partly influenced by what's called the learning metrics task force. The Secretary-General created a group to say 'if we're going to have millennium development goals or sustainable development goals in education, how are we going to measure progress in learning and what is learning. And the great contribution to that learning metrics task force is that they broaden the notion of learning beyond literacy and numeracy to include social-emotional learning, to include moral and character and aesthetic development. So there's seven domains of learning. The Ghanaian minister of education was deeply involved in the learning metrics task force, he felt that that was a great thing that social-emotional learning could actually help return Ghana to some of its roots about how you nurture and develop kids. So we're, but policy is a funny thing. All of that stimulated this trial which we're in the middle of right now, but policy gallops along. The Ghanaian parliament decided that they liked this so much that they want to train 51,000 untrained preschool teachers before the results of the trial are over. So you don't put the brakes on progressive policy to wait for the study, you just pray that the study will support the model that the policy makers are galloping along to embrace for you, and they're embracing it for political and constituency reasons. The second thing I'd say about Ghana is, Ghana is a case study of what's happening all over Africa where people in rural areas are flooding to urban areas. The urbanization of Africa is stunning. There are now about half a billion people who live in African cities. By 2050, a billion and a half people will live in African cities. The population of African cities will triple between now and 2050. So that draws resources from already poor rural areas and creates need in relatively resourced urban areas. So the whole issue of urbanization is important. And the other thing I've learned, partly through the work in Ghana, but it's been repeated often here in the forum is we are not going to be able to serve the worlds kids if we rely only on public sector resources. The private sector has to become involved in what they would think of as 'this market', what we would think of as 'this sector'. And in African slums, in Accra, Ghana 85% of four and five year olds are in preschool, and 85% of them are in private preschools; Private, entrepreneur schools that have grown up because parents demand that their kids be in some kind of school, so parents pay a big part of their tiny salary to have their kids in private preschools. That tells you something about parents hopes and aspirations about what education can do for their kids, but the government is not subsidizing these schools, those are parent paid schools and another big dimension of work that has to be undertaken is to understand how public and private schools can both serve young kids well.

Alibhai – assessment challenges (1:54)

One of the main challenges in my practice, first of all, was getting context-relevant assessments. So a lot of the assessments I used were actually standardised on British children, because I qualified in the UK and that was what was available to me.

I mean, one of the big problems we've been having with some of the research institutes, is a lot of their focus has been on the sort of the academic world, and so it doesn't sometimes translate well into clinical practice. So those are one of the main challenges that I think need to be developed. Actually, developing very context-relevant assessments.

Some of the sort of standardised language assessments, because obviously the whole syntactic structure of Kiswahili is different from English, and even though the child may learn English at school, a lot of the way they actually sort of order words within a sentence, will be based on their mother tongue or their local language, which is the Kiswahili. And so if you were to use that sort of standardised score, I think you'd get a sort of a false kind of score.

Also a lot of the assessments used in the UK are actually standardised on monolingual English-speaking children. It will be very difficult to find a monolingual-speaking child in Kenya – they're multilingual, if not bilingual. So that's another consideration you have to make.

Obviously that then brings challenges into the assessment and when you do the assessment and get a language mix, how do you sort that out within that? So the scores actually become irrelevant. And what I usually use assessments for is just to form a baseline in order to compare the child with later on, as opposed to hand the scores to a child or write it in a report as you would, for example, in the West.

Arnold – adapting context (2:17)

It's a, again, an interesting question, how do we adapt programs to the local context. And maybe sometimes it is that, particularly when we've got a program that we feel is working very well in one place, and they're really wanting to see how it can be adapted for other contexts. But I would say that one of our strengths, is that really we take, as the starting point, the cultural context that children are growing up in and the socialization processes that support that, that growth and development.

So it's not so much adapting, it's looking at what is already happening for children and how can that be. How can the best of that be really supported so that children can have the supports that they need to really grow up healthy, happy, well-nourished, safe from harm, lots of opportunities for learning, growing up with a sense of self, sense of identity and self-worth and able to get on with others and contribute to their families and their communities as they grow because, after all, that's what we all want for all of our children.

But understanding the nuances of that, within a particular cultural context, understanding people's child rearing beliefs and values and actual practices, is key. And particularly key is that we understand people's concerns and worries and the issues that they face. If we're really going to be able to design, with families and communities, programs that will work we have to be taking those things into account.

Arnold – child work (2:29)

Because in many places now we hear about children's work only in negative terms. We hear "child labour", which of course, when it is child labour rather than child work, is a very serious issue that needs to be addressed. But perhaps the emphasis on this has rather distracted attention from the fact that children everywhere love to help in adult activities. It's actually a very important part of how children learn. Certainly many of the contexts where we work, helping, whether it's sweeping in the yard, it's helping plant in the fields, it's helping with washing clothes, many of these sorts of things are really an avenue to respect and recognition from the adult world for children.

And they're enjoyed as activities in their own right, but that they're also a big part of really building children's sense of self worth. So we do need to be very careful, I think, not to sort of undermine that and actually, if one works with parents to, to really help them see how just talking a little bit more while they're side-by-side with their child in some of these daily chores, can really, really help build their children's language abilities, their confidence, and that's key.

In many countries where families are living in extreme poverty, it's very understandable that they are often really focused on putting food on the table, on the child's physical development, and perhaps social responsibility. They're not often understanding just how much they can do just through everyday conversations, and taking an interest in what their child is doing and saying, how much that really will help their children's development.

Arnold – mentoring teachers (2:41)

Home-based programs are really quite important for us in a number of contexts because in many places, like Afghanistan, Kyrgyzstan, Tajikistan, the necessity is to develop high quality ECD programs at low cost. There's ambitions to really ensure universal coverage in the areas where we, where we work in many countries and this means really quite creative ways of thinking about how to do this.

For example in Afghanistan, where the early childhood program has been established fairly recently, almost all of the ECD groups there take place in a community member's home and usually there's a slightly older woman as one facilitator who has that sort of experience of life and motherhood, and understands from her own world how children grow and learn, and then often paired with a slightly younger woman who will have had more education and will be literate, and we find that combination is a good mix.

All the teachers go through initial training, and that does vary from country to country how long that training is. But perhaps the most important thing is, everywhere we work there is the very, very strong emphasis on really hands-on mentoring support for teachers. And I think this is what really, we have found is the most effective.

One of the things we found for example in Tajikistan, is the use of key teachers to really provide supports to a cluster of centres or schools around them is a very, very effective way to reduce attrition. Because people feel that somebody cares. It's for all of us whether we're the young child or an adult—that sense of appreciation and somebody really being interested in what you're doing is just so key.

Arnold – access to ECE (9:24)

Good morning, again, everybody. So where there is no financing we have heard this wonderful history from Sumit Bose about the extraordinary increases in public investment in children in India. It is so impressive. We have heard an optimistic scenario from Jan on the promise of domestic revenues, which is fantastic, but I am impatient. I want to know what is going to happen over the next now and over the next few years for kids in the many countries where there is still no financing for young children.

Actually, my presentation does end up being optimistic as well, but I want to bring us back to the reality of what is happening in many countries for young children that is very tough at the moment in terms of their just is no financing for them.

Let's look at the trends in early childhood education access. Of course, all of us in this room are very committed to the whole age range, prenatal to 8 years old and the caregivers. I wanted to hone us in on the preschool access issue for a minute just because that is where got some good data, and I think it tells a story that is relevant for the other age groups within the early childhood age span as well.

What is happening? Well, in low and middle income countries, pre-primary GER has certainly been going up from 27 in 1999 to 45 in 2011. That means access for 53 million more children. In fact, 25 million of those are from low-income countries. Those are all UNESCO Institute of Statistics figures by the way.

If we look at the regional picture, we have got something that looks relatively good over the left-hand side, Latin-American and the Caribbean and Central and Eastern Europe. As we go along the graph it is looking pretty dire by the time we get to the Arab states in Sub-Saharan African that still has 18 as its GER. The green ones are the recent figures obviously.

So we are all going in the right direction, but are we looking good here? Well, Sub-Sahara African the lack of access is really serious. Eighty-two percent have no access, Arab States 77 percent no access. In South Asia, it is still over 50 percent of kids with no access. That really means that there has been a failure to provide adequate financial resources whether it is from national governments, from donors or the private sector the money has not been there. Then of course even where there is investment is it reaching the kids who need it most, the poorest kids, the most disadvantaged kids. I realize you can't possibly read the list of country names there, but all you really need to be getting from this graphic is those red dots are all in the 20 percent region and those much nicer looking green dots, some of which are virtually at 100 percent they are the rich kids. Those poor kids, even where you have got an average that doesn't look too bad it is not reaching the kids who really need those supports.

Sheila Manji I hope you will be able to talk to later as well. Sheila, do you want to just stand up for a second so people know who you are if they want to talk to you on the coffee break. She and I together with Venita and others have been working on a background paper for the next EFAGMR, looking at what is happening in terms of access and what is happening in terms of policy, particularly looking at private and public provision.

We have also been looking at what is happening with access with the gaps. You can see here the red lines are the wealthiest quintile; the blue lines are the poorest. We have got this for dozens of countries now. It is so tragic seeing this that this gap is really widening. It is the old elite capture story, even when it is public provision (audio cuts out). The good news side is we are finding more and more with many of us working in this area that flexible approaches tapping into a range of financing options can really break this cycle. I am just going to show you a couple of examples from Central Asia where we do a lot of work. The same would apply with our programs in Africa and the Middle East. In Tajikistan and Kyrgystan we have been able to work closely with government starting pre-primary classes in under-utilized school classrooms. That has really been adopted now for the national model for roll out. There is real commitment now from the Ministry of Education to take on at least one of those salaries to pay those teachers. At the moment they are being paid by the community.

Kyrgyzstan is further ahead. In fact the salaries for these teachers in alternative models have all been absorbed by the government now as the operational costs as a whole have. Afghanistan pre-schools in community homes are not so far along. It is going to be 10 years before we can really see the sort of absorption of costs by government.
I have two more slides only. There are a lot of different pieces of this financing solution. Private sector, I am talking about both civil society and for-profit groups here do have a role to play as both speakers have been saying. The fees that parents and communities offer, the income generation also done by the pre-school associations and the communities, the fundraising also often done by the community so three very important pieces of community contribution here which often really does go uncounted and needs to be looked at.

Most important of all is that local and national government budget support. For all of that to work there has to be a lot of work on awareness and engagement, getting everybody involved. What we want to see is the government budget absorbing more and more of the operational costs. The reality is that everybody is going to have a role to play.

This one we may talk about in another session more. I just want to mention this because it is quite exciting. We are starting now to work on sustaining social development through economic drivers in a non-profit trust mechanism where an investment vehicle is setup, financing facility investing in businesses, both economic drivers are returning a profit and then a percentage of both financial returns go into a nonprofit trust mechanism that then disperses funds for social development such as ECD.

We are doing this now in Afghanistan in Tajikistan. We are just about to get going on it in West Africa. It is one of those pieces of the puzzle that I think does offer quite a lot of promise. I went a bit overtime, I am sorry, but thank you very much.

Ateah – co-sleeping vs bed-sharing (2:27)

Maternal bed sharing practices has been a long time, I guess, practice. Some parents will say that this is something that, you know, their parents did with them and they feel very comfortable doing it. Certainly it's easier for mothers who are breastfeeding to bring their infant in to bed with them. So it's commonly done around the world. But we know now that there are risks involved with bed sharing. In some parts of the world a mother and an infant might share a bed on a hard surface on the ground or in a place where there isn't the same sort of risks that we often have in other countries – North America for sure, Canada and the US. We often have very soft mattresses, a lot of bed clothing and, you know, it's a very warm, close environment. And unfortunately we've had, you know, many instances where parents, mother or father, but usually the mother because they are the closest to the infant usually in bed, can rollover on an infant or the infant gets wedged between the side of the bed and the wall. And all of these deaths are so tragic and 100% preventable.

And so, there are certain factors in particular that make bed sharing risky for example when there are a lot of covers, when a bed mattress is particularly soft, when a parent is under the influence of drugs or alcohol, when a parent is unusually tired.

Healthcare providers and experts are looking at promoting – we call it 'co-sleeping' rather than 'bed sharing'. So that for the first six months what we like to do is encourage moms to breastfeed, absolutely, up to a year, two years, breastfeeding is so very, very important. But at night that the infant after breastfeeding be placed on their own sleep surface and we say a government approved crib. Their own separate sleep surface on their back and without a lot of covers that could possibly cover their mouths.

Awiti – a hopeful future (2:49)

There's a lot of hope.

What has kind of dominated the discourse around Africa's movement is this Africa Rising narrative. Some of – I think about six of the fastest-growing economies that are actually in our sub-region here in Eastern Africa. And there's an emerging middle class, you know. There'll be variations about how you define that, but there is suddenly more people with a little more money in their pockets chasing after goods and services. And in their way, more kids are getting born into families where parents have the capability to bring them up. The mothers will carry them to full-term and have them in a safe healthcare centre, and more kids will survive their first birthday, their second birthday, they're fifth birthday.

The question really as we were talking about before this segment, is can we then tap into that survival opportunity and create a thriving moment for the African child? And what are the socioeconomic things that we have to grow up with? So first is good nutrition and a balanced environment that is safe for these kids to develop all the psychosocial skills alongside with their cognitive capabilities and an education that grows that potential of the mind into thriving adults.

But also under-guarding that is an economic infrastructure that gives their mothers the capability so support them with good nutrition and good shelter and good housing. So I think that the opportunity and the moment of the Africa Rising narrative comes with fundamental responsibility for the African political class. There's no free lunch. You have these babies but you must fend for them.

And for parents, your babies are going to survive but you should then knock on the doors of your government through a political process, in a democratic process to hold the politicians accountable for providing you with the wherewithal to raise your kids.

So I think it's going to create that back and forth. And one of the things that Mo Ibrahim talks about around governance is that we've seen the rising democratic participation. And I think this is where the conversations are going to be. So parents are going to be asking, "What's in it for me and my children and the future of this country?" So I think that's going to put a lot of pressure on the political class to create that and tap into that moment and opportunity that Africa is so blessed to witness at this point in time.

Awiti – invest in women (2:05)

So well fathers I think are not useful for many things these days, especially in the era of women's empowerment. It's just world over and I think that dynamic in the family – and as the late Tanzanian President Mwalimu Julius Nyerere put it, if you educate a woman you educate a whole community. If you educate a man you educate a single individual.

So I think it is that capability of women to extend through that altruistic nature that they have to nurture and care for their kids. But if then an income, a salary, in the hands of a woman goes a long way because it's invested into domestic business, that there will be food, there will be shelter, there will be care given to the parents. And some of studies that have been done on education assessment actually link early education attainment in children to a mother's literacy.

So for instance in this country, the chances that a child will be able to read at Grade 3 hinges very fundamentally on whether the mother was literate or not. So those are early education achievements, and that's why I say that putting resources in the hands of mothers, they're the most immediate contact for the children.

And I think that fathers too have a role to play, but I think the emphasis really has to go into empowering women and making sure that women can go out into the labour market and find jobs. But then they need to be reassured that there's somebody responsible taking care of the children at home, because otherwise most women will not even venture to go and find work. And I think that also constrains then the possibility of moving these families up in a socioeconomic way, but also growing the pace of that African middle class. There are some things more important than money, and children are.

Awiti – urban migration (3:17)

We're looking at the changing demographic dynamic in Africa and the numbers of people who will be born or who are migrating into cities and trying to grapple with the social policy that will support this new promise for Africa.

Africa, as you probably know, is the least urbanized landmass on the planet. But more recently the pace of urbanization has picked up tremendously. So for instance East Africa here, Nairobi for example, the rate of increasing the urban population outstrips the rating of national population increase by about 60%. So it shows you that more people are now getting born and moving into cities.

I think what really changes fundamentally is the social context. So in traditional African settings in the villages, you're raised in a community where everybody has some familial ties to you. Cousins, uncles, aunties, etc. In an urban environment, everyone is a neighbour who probably doesn't come from the same ethnic community, has no familial ties.

So that idea that kids are raised collectively in an altruistic kind of way where people share responsibilities and you're your neighbour's child keeper, that dynamic breaks down. And what kicks in is mutual suspicion. And it is not just suspicion that's unfounded because there's been a lot of instances where children are abducted or abused by neighbours who don't share any familial relations with the children. And parents just generally are a little apprehensive about leaving their child in the care of a stranger, for instance.

And I think what it does also is to constrain labour opportunity spaces for women. In the village they could leave the kids running around the yard under the watchful eye of a grandmother, and they go to the farm and work all day, and someone will be taking care of the kids. Or sometimes they're within shouting distance.

Being in that environment is much more complicated. If you leave your child to go and fine work, you must be able to afford daycare. So I think it's got this – it's socially dislocating but I think it also imposes a new financial burden to households, but also constrains the capability of women to provide labour in an intensely money-based environment.

And so it means that children have less opportunity for thriving. They're either locked up in a small, squalid house with sometimes not very good ventilation, and there's not space for play and stimulation and that socialization. And I think this is something that we need to really worry about. Just like African cities are not ready for just about everything, the influx of people, automobiles and crowded roads. I think we also don't have the social and physical environment to enable kids who are now born in a very different environment to actually thrive.

Barr – behavioural biological connections (2:43)

One of the earliest and most interesting examples of a behavioral-biological connection, where it was the behavior of the infant initiating a biological response in the mother, was the demonstration that infant's cries stimulated the milk let-down reflex. This is a wonderful one because of course nutrition is absolutely critical to the survival of the infant. Crying is something the infant does from birth, from the very first birth cry on, and it turns out that these cries are very effective stimulators to the milk let-down reflex which helps establish successful lactation.

So that's just one illustration and that's mediated by the oxytocin pathway for lacto-oxytocin pathway, and there are others. Oxytocin, as it turns out, is a critical hormone for regulating a whole variety of maternal caregiving behaviors. This has been most well worked out in animal species, as you can imagine, but indeed the oxytocin has become of significant interest in understanding why parents provide the right kind of caregiving for their infants and how important that is to the right feelings of affiliation and attachment that mothers have for their infants. So it's almost certainly the case that very similar pathways occur in the caregiver and that's what you'd expect, indeed, if it is a dyadic, or dual if you like, kind of system that is central for this early good start, you'd expect it to be effective for the parents as well as for the infants.

Because one of the anecdotes I like to describe is just imagine how remarkable the organism is that has been designed by human nature. In that metaphorical sense, that we can raise infants in which they receive milk from their natural mothers on an average of every 15 minutes in the first two or three years of life from breast feeding. Or they can be raised on the milk of another species as we've been doing for the last few decades and feeding them every four hours. That's a remarkably resilient organism. So what is the lesson of that for understanding how we should take care of our infants. And I think one of the lessons is that the range of normality and potential strategies that are available to us to raise infants is much broader than we might think.

And what's fantastic about the mother-infant pair is that you can have successful infants being raised by mothers in a whole variety of contexts with a whole variety of strategies depending on what the challenges are.

Barr - infant crying (1:50)

That's a terrific question about infant crying. We have essentially very little idea about why some infants cry much more than others. Except for some very obvious truths which is that there's hardly a behavioral or a biologic or morphologic characteristic that we know about in humans or any other species that doesn't have a huge range of variation and why we shouldn't expect that for crying is really not such a surprising answer in a way. There is a huge variation in height, there's huge variation in skin color, there's huge variation in all kinds of functions that we know about. And there's huge variation in the amounts infants cry. Interestingly, anything that has a huge variation like that has context in which it can be beneficial and context in which it's not beneficial.

So we can illustrate that by the wonderful story of Martin deVries' observations in the Masai infants where he took a sample of infants and rated them according to temperament characteristics and then came home and found out that just like in North American infants you have some infants that cry a lot and some that cry less. The ones that cry a lot are called difficult temperament infants and the ones that cry less are called normal or slow to warm up infants. And then when he was away from the Masai they happened to suffer from famine that occurred during the winter and he went back the next summer and looked up all of the infants and as you might expect from the context of the story that I'm telling, the infants who were the difficult crying infants were more likely to have survived the famine. In that context crying a lot was life saving for those infants, relatively speaking.

Barr - infant memory (4:14)

Infant memory is a phenomenon which I would say 15-20 years ago nobody believed in. The construct that these infants, when they come out of the womb, have the capacity for memory was really something that was beyond most people's imagination almost. And a whole series of experiments, and mostly experiments that gave us an opportunity to access infant memory, has changed our concept about infant memory completely in the last few years. Now there's absolutely no question that infants have memory, they have memory for sounds, they have memory for sight, indeed there's lots of very substantial evidence they have memory of experiences that they had in the womb which we can then tap later once they are born.

But the particular angle on this that we're beginning to look at is What is the possibility that infant feeding has some at least short term effects, on the functioning of the cells that are relevant for memory?

And in order to do this we use a paradigm or technique which is called an information processing paradigm. There's all kinds of reasons to believe that this paradigm tells us something about the development of cells that are relevant for memory. And the paradigm effectively asks us to look at the infant's ability to turn toward sounds. It's called a head turning procedure. And the infants are presented with sound from one side or the other and whether they turn to that sound and continue to turn to that sound after the stimulus is continued repeatedly allows us to get a handle on whether they can remember a sound that they have heard and learn over a sixty-second period, a ninety-second period, a 120-second period, or even over hours and days. So this paradigm has been wonderfully successful at doing that.

And we did ask the question as to whether or not a feed prior to them needing to remember this particular sound or particular visual stimulus affects the amount of time that they can remember sounds that they have already learned. And it turns out that that is true, that an infant that has had a feeding of nutrients or breast milk or a formula feed prior to undergoing this procedure is able to remember a sound they have learned longer than an infant that just gets a water feed, which is pretty compelling. These babies are two to three days old when we do this experiment. And so this becomes a wonderful illustration of the potential importance of feeding for the development of infant memory.

Now while this phenomenon is very robust and we've shown it two or three times now it's important to remember that there are a lot of questions still to ask about the relationship between feeding and memory. And one of those is - Is it the act of feeding itself that is relevant for them having this improved memory or is it something about the nutrients that they receive during the feed? And there is at this moment mixed evidence about this.

It can be certain parts of the nutrient package that they receive or it might be the behavior or some combination of those might be important for the successful memory experience that they have. The other important question is

Does it have something to do with the interval between feeds? Does it have something to do with whether the feeding, whether the memory improvement is only for a few seconds or few minutes or is it possible this might affect memory over a day or more? And those sorts of questions are very compelling and are now open to be asked and we now have the techniques with which to answer them.

These are all however very labor-intensive studies and go on for a long period of time before you get these answers but it is really an exciting area to think that early infant feeding would have a difference for early infant memory. And we hope that that kind of question is going to be asked more often and demonstrated more often as well

Barr – pre-birth memory (2:40)

Well the experiments about why and how infants learn in the womb are quite wonderful and there's a whole series of them. But let me just describe to you one of the more famous ones which is called The Cat in the Hat Experiment. And The Cat in the Hat refers to the story that Dr. Seuss wrote. And these investigators, DeCasper was one of them and Pfeiffer was the other one, had this brilliant idea of having mothers read a passage from The Cat in the Hat to their infants in the womb in the third trimester of their pregnancy. And they did that, I believe it was three or five times a week for about 15 minutes per time; it wasn't a very long time reading. But they did it repeatedly in the later weeks of the pregnancy. And then when the babies were born the infants were fitted with headphones. You can imagine sort of infant headphones. And they had a pacifier put in their mouth that measured the amount of pressure of sucking that the infants did when they sucked on the pacifier. And when they hear something familiar they tend to suck with more vigour and more quickly.

And this allowed the investigators to do an experimental manipulation which is always the gold standard for everything we're trying to do when we study infant behavior. And they were able to selectively feed back to them through the headphones their mothers reading the same Cat in the Hat passage that had been read to them, so to speak, while they were in the womb during the third trimester. Or a control passage which wasn't The Cat in the Hat which was another passage of equal length and also read by the mother. And the interesting results were that it was only when The Cat in the Hat passage was read back to them that the increase in intensity and speed of sucking occurred. Which was pretty impressive evidence of the fact that they recognized the passage that they had been read to prior to the birth experience.

And now there are many, many studies out there that have used similar techniques and with other kinds of stimuli and it's not limited to reading or anything about The Cat in the Hat particularly but a lot of stimuli that infants are exposed to, in a sense, in the womb earlier, can be demonstrated to have been remembered later. So it's become a wonderful example of what is generally referred to as learning in the womb.

Barr – PURPLE crying (5:13)

You know, I must get asked that question about how do you get through this early increased crying period more than any other question in my whole professional life. There's probably no more compelling question once people find out that I have any interest at all in the crying of infants is to how to get through it. And part of the reason is not surprising. It turns out that the characteristics that crying has in the first three to five months of life are unique to the first three to five months of life. And they all have the capacity to frustrate caregivers. So if I can go through a few of those just to remind you, and we try to capture these in the phrase "the period of purple crying". Not because the infants turn purple, although they sometimes do when they cry a lot. But rather because the letters of the word purple each refer to one of these six properties which is frustrating and specific to the first few weeks of life, months of life.

The first P refers to the fact that in general, and most parents who have especially high-crying infants will know this, that the crying tends to increase in the first two months of life and then reaches a kind of a peak and then begins to decrease over the next two or three months of life.

Now for any particular infant they might increase quickly and decline more quickly or take a longer time to increase and decline but in general the maximum amount of crying occurs during the second week of life. Now any behavior that is in a sense negative, that increases no matter how good a caregiver you are, no matter what you do, is extraordinarily frustrating. And that's exactly the character that crying has and because of this early peak pattern crying can be terribly frustrating to mothers or any caregiver at all.

The second characteristic is that part of this crying is inconsolable crying jags, if you like, or bouts of crying that go for minutes to hours sometimes, up to two to three hours is not uncommon and some infants can cry much longer than that and still be completely normal.

But these crying jags come and go for no apparent reason and unrelated to anything in the environment. Contrary to common expectations it's not related to wet diapers, it's not related to feeding; these crying jags come and go on their own with no apparent explanation. So that can be frustrating as you can imagine.

Thirdly, they're resistant to soothing, and that's the R in the word purple. No matter what you do, drive them around the block, feed them, they'll calm down just a little bit for just a small period of time, as soon as that's over they start crying again.

The second P is for the fact that when they're crying like this they look as if they're in pain even though pain isn't part of the story. And there's no way you can tell from the facial grimness or from the sound of their voice whether they're in pain or not but they seem to be.

The L refers to the fact that these bouts are long lasting. I've already alluded to the fact there can be three to five hours of crying per day but individual bouts can last for 35 to 45 minutes, on average and often up to two hours and more.

And finally, even though we don't know exactly when the crying's going to happen, it tends to cluster in the evening hours, which is what the E refers to. We call this a diurnal rhythm, there tends to be more of it in the evening, less of it during the day. They may cry at any time but it tends to cluster in the evening hours. And as you can imagine, that's when parents are most frustrated, most tired, when dad comes home from work and he might think that the baby's just crying because he's there but actually this diurnal pattern is well recognized and it's independent of whether dad comes home from work.

So all of these characteristics are very, very frustrating. They all make us as caregivers seem to be out of control as far as this particularly negative experience is concerned, and there's nothing that's more frustrating than things that are beyond our control. We don't like that. It doesn't sit well with our understanding of what we should be as good caregivers and to the extent that this is beyond our control that's very, very frustrating.

So this understanding that these characteristics are there, that we have inherited them as part of our evolutionary inheritance, that in some contexts they have very positive value in terms of the survival of the infant, like in the Masai infants who were going through a famine, and just remembering that, it's not our fault if they're crying, once we've done all the usual and wonderfully intuitive caregiving things which we typically do as humans and caregivers. And we need to remember to do that. It is helpful, it is important, but some of the crying is not going to be stopped by that and that however is not our fault. And knowing that there's an end to it is probably the other most important piece of information that all caregivers need to know. There's no way that it's not going to be frustrating. It will be frustrating but it does come to an end and it is normal and it's not their fault.

Barr – sensory pathways (3:57)

That's a huge question. But one of the ways we can think about that is to understand the different sensory pathways, each of which has a biological substrate underneath it. So for example, if a mother is holding an infant, there are a number of sensory pathways that are activated. One is the touch pathway, of course, and that generates a whole series of central neurological stimuli that activate certain neurotransmitters in the central nervous system which then become functional in terms of how the mother responds to the infant and so on in a continuing circle. Similarly, it helps regulate temperature of the infant, and that's critical, especially when the infants are very, very young, but even later. And thirdly, there's the en face position we talk about where the mothers and the infants are looking at each other. That generates the pathway of sight and vision and a variety of pieces, if you want to put it that way, of information that flows through that pathway. And the fourth one, which we are more excited about all the time because of the new research, is the smell pathway, which is very, very important for many other animals, in fact absolutely critical.

In humans it's not quite so important because we have the other pathways we've been talking about but the smell pathway has been very interesting in terms of infants identifying their mothers and beginning to have appropriate interactions around important functions like feeding right from the first minutes after birth.

So all of these pathways have a biological substrate through which these sensory inputs are being transmitted. They affect the mother and the mother's response to the infant and in the infant they affect the response of the infant to whatever else is going on in the dyad. A particularly nice example of that in our own work is the issue about how the mother and the infant together, as opposed to the infant being separated from these biological pathways, can handle the stress of early pain. And the paradigm that we use for that is the kind of pain experiences that every normal infant in our society has which includes what we call the PKU heel stick for phenylketonuria, where we take a sample of blood at birth to see whether or not that particular genetic disease is present in the infant or the infant's at risk for it, and in the process of studying that we can study whether or not the infant's response to this pain experience is the same or different if the infant is being held by the mother or separate from the mother, at the same time. That is, not at the same time but separate from the mother during the time that procedure is being performed.

And it depends, interestingly, on which pathway you measure to understand what the effect is. And they're not all the same; it's not like everything goes up or everything goes down. But it's a very interesting complex of responses depending on the system that you're looking at. But when the mother is in contact with the infant and all of these sensory pathways are being activated, all of the neurotransmitters that are in the brain that need to be used in order for these sensory experiences to be experienced, that the infant's response to the pain experience is reduced significantly, in most measures on the order of 50 percent or more. So it turns out to be a very powerful, if we can put it this way, analgesic. Although it's not a pill that the infant's taking but it has similar effects and indeed stronger effects than most of the analgesics that we can give, that we can give to infants. So we consider this a nice demonstration of the power of these early regulators when the infant and the mother are together.

Bhutta – created disadvantages (1:12)

The figure of 200 million comes from estimates of children growing up in extreme poverty, growing up with forms of chronic malnutrition that lead to deprivation. And, therefore, that figure by many estimates could very well be conservative. But what it does tell you is that we create those hierarchies and we create those disadvantages frequently even from before birth, even before children are born. We create those disadvantages by creating disadvantaged adolescents, disadvantaged mothers, girls who are not educated or not supported, not empowered within their families to be active members of society.

And as a result, therefore, you have this whole cohort that grows up with natural programming for failure. And they don't fail and just disappear from the face of the earth. They remain members of society and many at times behind the delinquency and the fact that you have disaffected youth who have no hope.

Bhutta – examples of investing (2:56)

So here is the good news – the good news is that investments to improve the health, development, potential economic growth of populations are not dependent upon GDP per capita income. So if you look at how countries in world have done this, some of the remarkable examples of progress have come from the poorest countries of the world. The defining difference between those who have made progress and those who have not is that they haven't shied away from the problem or brushed it under the carpet. That they have faced it square and center. They've had the political will to do something about it and they've had evidence-based policies.

So Bangladesh, a basket-case of the 70's, a country coming out of conflict with some of the poorest indicators for health and nutrition in the region, today has one of the most remarkable examples of progress in South Asia. How has Bangladesh done it? They've done it through a range of measures and you could argue and say well they haven't had political stability, they've got poverty but you know, they've been, despite notwithstanding everything, they have been able to empower their society. They've been able to empower their women. They've been able to provide education at a trajectory that is today able to provide education to families who are able to comprehend, understand and own those things.

Similarly in Africa, for every troubling example, you have examples of countries like Malawi, like Rwanda – Rwanda a country that all of us remember for the horrors of the genocide it went through - today is a case study of progress, development and improvement. Why? Because they've had a government and they've had leaders in public health who said, you know what, we have a problem but we'll do something about it. And then they've gone on and not only implemented but they've also monitored, evaluated, changed their course, put things in place and low and behold they've been able to achieve progress. So there isn't rocket science in this. This is something that if countries wanted to do, they can.

Now I'm not saying for moment that poverty is not a barrier. It is a barrier. But I think solutions can be found and confidence can be given to policy makers and others that you could do a lot more with the resources that you have available and then you will be able to garner more resources. So today is a combination of things that we need to do including getting more health for the investments that they are making and also more investments in health. And all of these are intertwined with evidence-based implementation of policies.

Bhutta – inequity (2:08)

The world is beautiful when you look at it. But it's an ugly world also because, if you recall, that particular quotation from Tagore it was that "Fate has allowed humanity such a pitifully meagre coverlet that in pulling it over one part of the world, another had to be left bare". So he was just stating as a matter of fact his position that there was not enough distributive justice in the world and that many people were fated to be deprived, to be hungry and naked and homeless which is what he observed during several of his trips in Bengal in and around the time of the first of the great famines. Now that is a very pessimistic view but it's an important view to underscore that we do face tremendous disparities and inequalities in the world today and while inequality is a reality of life, inequity isn't. So my point when I mention those data and figures to students is to underscore the fact that inequity is an unjust inequality. It's something that we can do something about. We may not be able to change the social structures of the world that there will be the rich and there will be the middle class and the poor. But when the poor are deprived of basic rights and access to food, to health, to nutrition, to security through structural mechanisms, which are unfair, then that inequality becomes an unfair inequality called inequity. Every child born in this world today has a right to his or her fifth birthday and to a similar opportunity as a child grows up to be a school age kid or young adolescent girl as anybody else anywhere else in the world.

Bhutta – investing (2:01)

The population pyramids of many parts of the world are changing so rapidly. Today the proportion of young people in countries in the Middle East are 60-70% of the population. Now that is something that if invested in properly could be the population dividend. But if not addressed properly it could also be the population quicksand that countries can sink into. So whose responsibility is this? So you could argue, turn around and say it is the responsibility of nation states to invest in their own populations. But when people are living in strife, conflict, abject poverty and affected by geo-political issues, then it no longer remains a national priority it becomes a global priority. So I think, moving forward there is tremendous opportunity for doing something about this. How do we do this? Strengthening family structures, investing in the health, nutrition, mental health and well-being of young girls, empowering them. You educate a girl, you educate a family, you educate a village. And this is exactly where investments need to be made. I mean, I for one am convinced, having spent a lifetime working in public health, is that some of the best gains in health and in society need to come from outside of health. And that is the reason why I think the sustainable development goals provide us a huge opportunity of linking important investments – gender empowerment, investing in education, investing in safe living conditions and safe environments, security, peace and of course improving nutrition and health. If you're able to do this in a manner that is inclusive, then we will not have the 200 million deprived children living in the world.

Bhutta – resilience (3:03)

Resilience is something that you very rarely bring from outside, many societies have resilience built in because of their own experiences, their own social structures. There is a book just out on Pakistan called: “Pakistan, a hard country”. I think what the author meant by the title, it’s a World Bank person who has written this, but the author probably meant by that title is that it is a country which is very strong and resilient and he is probably correct, because despite all the challenges that we have as a nation, the average Pakistani is resilient.

Now, resilience stems from a number of things, it stems from a lot of individual attributes that are hardly acquired, they are things that you are born with. Social networks within the communities and societies that people live in which are extremely important in our country, in our people have no shortage of social networks. We are what we are today because we live very closely together. You maybe surprise to know that indigenous philanthropy in this country is far greater than any external assistance that this country receives.

These are reflections of social safety networks. So, what can I tell you about resilience except to say that we need to take advantage of the inherent structures that contribute to resilience in our society to use those for the very purposes that we are trying to work on supporting health, nutrition, and child development. If you tell communities what is it that this will contribute to them in the long term, they will find ways and means of supporting structures and providing, so called, to some of these poor families at risk of adverse outcomes themselves.

So, I am generally very optimistic in terms of civic society engagement a lot of my own work in my research program is focused around community support groups, which allow women and families to come together, to through way positive deviance process have learning, self-learning from positive examples from their own communities, working with the Lady Health Workers program which is one of the back bones of the primary care program in this country supporting progress and development; and it’s early days, but whatever we are learning from our own research and impact assessment from these kind of approaches, is really very supportive of this notion that if you empower people and if you give them hope, people will generally find a way and it’s generally the right way.

Bhutta – SDGs (2:07)

So as you know the sustainable development goals which have now replaced the millennium goals, the MDGs, are very different in that health is just one part of it. But a lot of the goals, those that relate to the environment, poverty, living conditions, nutrition, gender sensitivity, adolescent health, climate change; they're interlinked. And they're linked to each other because they are fundamental determinants of health and outcomes. So one thing that has happened with the background discussion and planning for the sustainable development goals is that we have very effectively said, we've made good progress as a global community in reducing mortality. It's now time to also bring into the discussion the whole issue of quality of outcomes, morbidity and recognizing that to save a life, but not to give that life proper opportunities for growth, development and optimal outcomes is actually not a global purpose. So as a global community, we are now really very focused on quotes, un-quotes, allowing all children, families everywhere the opportunity to develop to their best potential. And this means that, fundamentally, we are not looking at band aid solutions of you know, providing interventions to save a life here alone. That's important in its' own right but not sufficient. But we are looking at the entire continuum of child health, school health, adolescent health, maternal health, early new born, infancy, children as a continuum in terms of seeing what are the risks, the barriers, the pit falls that need to be addressed and how can they be done both within health and outside of health.

Bhutta – social determinants (6:40)

The big picture in countries like mine is that: of every thousand children born in my country, roughly about a hundred will not live to see their fifth birthday; and of those a large majority close to around sixty will actually die in the first four weeks of life, many within the first few days. So, the imperatives of working on issues of child survival, newborn survival in developing countries such as mine necessitated a change in tactics.

OK. So, one was to look at the context of the major challenges of maternal newborn and child survival in Pakistan as in the most of the developing world where the birth in its maximum. There are several things that come to the floor: one is that it is bigger than the health issue because if you look at social determinant of health, there is a very close relationship of maternal newborn and child mortality with simple factors like: maternal education, women's empowerment, social structures, poverty, distance, access to health services and so on and so forth.

In terms of distance many people ask me: are all of these, address outcomes, mortality rate, clustered in the remote spot of the country? The answer is no. If you are poor and have very little access to services or social barriers, five kilometers can be as long as five hundred kilometers. So, there are a lot of underpinnings of address health outcomes that one should be very aware of.

So, in our own work around maternal newborn and child survival, we have specifically focused on understanding the determinants, some of the immediate causes, looking at the evidence base of what works and how best to implement what works. So, a large portion of work has been around the implementation strategies to make things happen at community level, using low level health workers, community delivery platforms.

Now, as we get into saving lives for families and communities one big question is saving lives for what outcome? To saving a life of a child in a newborn period only for the child to die six months later due to diarrhea is quite meaningless exercise, to save the life of a six months old child from something like diarrhea and pneumonia only for that child to die from another disease in a year or two years' time again is questionable.

To save all of these children only for them to develop polio at five years of age is also a travesty, so increasingly we became aware of the importance of linking survival with quality of life; and when you come to quality of life immediately it becomes very clear that one has to look at a lot of determinants of physical, mental, nutritional, long term outcomes, things that actually go way beyond the childhood period and hence you begin to think of the entire outcomes of maternal and child health in developmental terms.

So, we began to realize in our own work that it was very myopic to just focus on saving lives even though it became a very important consideration and precisely for this reason we diverted a lot of our resources and attention to number one understanding the link between survival and quality of life.

I want to give you just one specific example: roughly about a third of all newborn deaths in Pakistan or other developing countries that you do a condition called Birth Asphyxia. Birth Asphyxia is been small babies are unable to breath at birth and therefore have oxygen and circulatory deficit which cause brain damage and death.

Now, we realized that for every baby who dies at Birth Asphyxia there are two or three who survive at some degree of handicap; and there are many others who have insults quite similar to that of Asphyxia who survive with significant handicaps. So, that gives you an idea that when you try and tackle disorder like Birth Asphyxia you not only saving lives you also preventing morbidity, you are also preventing complications; and some of these children who survive but have complications are huge burden on families and societies.

Similarly, undernutrition maternal infections and maternal micronutrient deficiencies are also major contributors to adverse outcomes in the newborn period and young infants and those adverse outcomes are associated with problems in later childhood that may in the simplest form be just difficulties in learning but in a more extreme shape could be deficits in growth that lead to long term outcomes such as inability to become active, productive members of society, not being able to contribute as well as earning members.

So, we are now beginning to discover that it is not only to saving lives it is also the net contribution of the so called missed opportunities for child development that contribute to the health and wealth of nations. So, I believe that we need to very strongly advocate for the importance of investing in health and development as a major trajectory through which countries can pull themselves up from the bottom of the development rank and rise up.

So, the paradigm should be that no country in the world would ever be able to rise out of the depths of poverty and the depths of poor health outcomes without investing in healthy child development and also support for strengthening these social networks around women and their education.

Black – experience in brain development (1:45)

In development, sometimes we think about two kinds of experiences - there is experience expectant and experience dependent. Experience expectant are things that the organism, primarily the brain, is expecting in be – to be able to develop.

So an example of that is that as the auditory cortex is developing, then the brain expects to be able to hear sounds and then responds to those sounds, develops in response to those sounds, expects to have sight and responds in – to those, expects to have some of the nutrients available and responds to those nutrients. And if not, then development can be challenged or can be thwarted to some extent.

Experience dependent has to do with the individual. So the easiest example is probably language, so that if a child hears French then they will start to understand French and then they will be able to form words in French that sound like baby French. If a child hears Japanese, then they will – the same thing will apply, they will learn to understand and they will learn to start make sounds that then are molded into Japanese. So those vary by the individual, but certainly shape early development.

Black – implementation science (4:41)

Many of us have been trained either as health care providers or teachers or professionals to work with individual children or classrooms of children, and we study children's development. We learn what methods may work best or compare different methods of helping children learn, and from what we've learned, if we're doing research then we may write papers about how those things work, but what we're really interested in is knowing how to scale up what we have learned, how to move from science to practice.

Many of us really don't know how to do that, and what we've learned is that there is a speciality which is called implementation science that enables us to move from science to practice. So a typical way that a researcher might think that they're moving to practice is by writing an article or publishing a paper, but really the number of papers that are read or articles that are read is not high.

A second way they may do it is by putting it on a website, good news more people can look at it, but it's still not making it happen. What implement – implementation science does is it makes it happen, there are new ways of doing that that health care providers or teachers do not necessarily know. So some of those ways include involving a community, working with stakeholders, keeping track of what one has – is doing, keeping metrics. The system that we've used is called MERLA, that stands for monitoring, evaluation, research, learning and adapting. This is how it works. Monitoring means that as you are moving a program forward you have to make sure that it's continuing to work. So you're looking not only at the outcome, but you're looking at how far it's reaching. Are you reaching those children who are most vulnerable, the hardest to reach? Because if you think about equity, they're the ones who need it the most. The only way you'll know if things are really working is if you – if you keep track of it. If you have the metrics to be able to know how far you have reached.

So the evaluation then is evaluating those metrics, and they also include the workforce, have you trained enough teachers or enough health care workers to be able to implement the program that you've shown works. So you evaluate what the metrics have shown you. Just collecting the data would not be enough, you have to be doing the evaluation. That leads into the research where you're studying is what you have done actually having the impact on children that you thought it did. If you set up a very nice program but the children don't attend, or you set up a very nice program, but the teachers don't teach it, then it's not really working. So you have to do the research to see if it works.

What the L stands for is learning. Who's learning is that? That's our learning, and what we learn is are we making a difference, are we reaching where we want to reach, are the teachers or the health care workers implementing the program the way that we think it should be implemented. If the answer is that there are gaps, then we move to the next which is we adapt.

So by adapting, we go back to the monitoring and we have a continuous quality improvement. In implementation science it's all about the continuous quality improvement because that's how you get sustainability, that's how you are able to scale something because a community is not going to go for scaling something that doesn't reach, that doesn't work.

Black – nurturing care framework (3:37)

When we worked on the Lancet series in 2016, we were looking for an organizing framework that would enable us to describe early child development and then to develop programming related to early child development. So by reviewing the literature and recognizing what children need to develop, we came up with the term nurturing care.

Nurturing care encompasses five domains, so those domains are indivisible and what that means is that they are all necessary. No one single domain is sufficient and if one domain is not working well, that influences the entire system. So that's an important concept that is – can be somewhat foreign in our implementation where we have lots of siloed sectors.

Well what are those five domains that we're talking about? One of them is health that children need strong health and they need protection through immunizations. So they need access to health care, and we see that in many children have access to health care but certainly not all, so children need health.

The next thing they need is healthy nutrition. The primary reason that children are not reaching their developmental potential is lack of adequate nutrition. It's both enough food and it's also the micronutrients, so food that has the adequate vitamins and minerals, and they need it – they need food given to them, that they receive food when they're hungry and that it stops when they're full, and they need to learn how to eat so that they're managing their food. So nutrition is more than only food.

The third thing that they need, and not in any particular order, is opportunities for early exploration and early learning. Children have a tremendous desire to touch things, to learn how things work, and they need to have the opportunities to do that and to have learning surround it in that exploration.

The fourth thing is responsive caregiving. What that means, that's the emotional, social aspect of the back and forth so that children learn that when they reach out, that there's a response. It does mean that children get what they want, it means that there's a back and forth, that there's a response, that someone listens.

And the last thing is they need protection. So they need protection from violence, they need protection from toxins, they need protection from adversities, protection from infections, there's a whole host of things that children need protection from. They need the security that comes from having a daily routine and a daily schedule so that they don't feel anxious. If you want your child to feel secure, then you provide that routine and that protection.

Blackstock – international perspective (2:55)

I've had the privilege of visiting with Indigenous peoples or First peoples all over the world in many countries. And what I find is that there is some common beliefs despite the diversity and I want to emphasize that diversity.

But one of the commonalities I like to tell people and this may be helpful to early childhood educators is that we believed our ancestors were mostly right particularly when it comes to children and interacting with the environment and all the rest of it. And Western people think their ancestors are mostly wrong. That's a fundamental kind of understanding of this honouring of knowledge that's been passed from one generation to another about child caring, about what love means, what relationship means. The other is a fundamental understanding of the importance of our place in the interdependent world.

You'll often hear First Nations people, Indigenous people around you talk about their relative that happens to be an animal. And that is because there's an understanding that all life is interconnected, not only all life, all time and space is interconnected. And I think that finally with global warming and other types of climate issues, people are starting to understand that the land is a determinant of health for children and all children need to learn it. We need to teach all people, all children about how to respect and honour wildlife and how to live in community in an interconnected way. That is something that Indigenous people hold dear and have a lot of knowledge on.

The second is a sensibility that we're actually not that important. That when we situate our life in the context of long continuum of time that we will all be forgotten. So if you spend your life trying to be remembered, now only is that a fruitless activity, but you're wasting time that you could be devoting to how do I leave a footprint. Or as many of us in the indigenous community call the breath of life, how do we breathe that forward in a way that we're a good ancestor to those generations will come after us.

And that really is our place in the world is to honour those teachings that were given to us and all of us have them to honour them, to share them and to give our own gifts in a way that sets up that next generation in the best way possible. So those are common international Indigenous beliefs.

Bocking – adverse environments (1:50)

There are a number of examples of where adversity affects prenatal environment. From a physical environment perspective, we know that if the fetus is exposed to, for example, high blood sugar, if the mother has diabetes that has not been well controlled and her blood sugars are high, that transfers across the placenta to the fetus. And then as that high blood sugar triggers the fetus to grow excessively and that can create all sorts of different complications. So that's one example of a physical adversity. We also know that stress, and, you know perhaps toxic stress or stress that is not able to be managed in an effective way; that that can create an increase in hormones, stress hormones in the mother. And that can then affect how the fetus develops and then being exposed to those stress hormones. It's important though to differentiate between excessive stress or how we react, or how we respond to stress from in an abnormal way or, a way that's not as effective as the way, people you know, can react to stress on a on an ongoing basis. Because we know that a certain amount of stress is important, it's part of our lives and, being able to deal with that is something that's critical. So maternal stress that's excessive or toxic, or severe at a critical window in development; those are examples of things where an adverse environment or experience can give rise to changes in fetal development.

Boyce – reactivity (2:45)

Reactivity refers to the deviation of a biological parameter from some kind of baseline or resting condition. So, for example, in its most rudimentary form it might be the deviation baseline heart rate from resting levels to an accelerated level during the performance of some kind of a challenging or threatening task.

One of the unanticipated findings from our work has been that the children who are exceptionally reactive in these biological systems to challenges and laboratory stressors, not only have more disease and disorder under conditions of naturally occurring stress but when raised or embedded within social circumstances that are truly supportive and nurturing and predictable. They don't just have normative levels of these kinds of disease outcomes but they actually have lower, significantly lower levels. And our interpretation of that finding has been that what we're seeing in reactivity is not just stress susceptibility but in fact is susceptibility to all kinds of social conditions, both good and bad. So that biological sensitivity to context refers to this group of children's tendency to have much worse outcomes under undesirable circumstances and much better outcomes than their peers under very good circumstances.

And you know, our colleague Steve Suomi's work is a good example of the homology between the kinds of things that we're finding and the kinds of things that Steve has shown, for example in cross-fostering work. And the same, by the way, would be true of Michael Meaney's work in a rodent model. But what all three of those have in common is the finding that when you take these exceptionally sensitive individuals and place them into highly nurturant, supportive environments, you don't just normalize their outcomes, you actually find that the outcomes are better than normal.

Boyce - sensitivity to context (2:41)

Well what we have discovered in the course of doing laboratory studies of children's responses to stress, biological responses to stress in the lab is that there's a sub group of kids that have quite exaggerated heightened responses in one or both of the major stress response systems that are in the brain and in the periphery. And the interesting thing to us is that those, that sub set of children that we think of as highly reactive to the challenges that we present to them, when we take those kids and observe them in naturalistic epidemiologic studies where we're actually looking at incidence of illness or behavioural disorders and so on over time, the kids who have this feature of being biologically reactive in the lab, in all of our studies have had either the best outcomes or the worst outcomes, nothing in between. And it depends on the character of the natural social environments in which they are being reared, which of those they display.

So kids who are coming from homes where there is a lot of conflict or violence, where there is some form of child maltreatment, the kids who are highly reactive in the lab have the worst outcomes in those circumstances. Worse even than their peers who have similar social circumstances but don't have the reactivity characteristic that we see in the lab.

The interesting thing though is that the same kind of reactive child, in a very positive environment, had the very best outcomes of any of the children that we study. So it's as if they're kind of more permeable, or open to the effects of the environmental circumstances.

Boyce – stress and epigenetic changes (2:16)

We know that there are these powerful effects of socioeconomic status on health outcomes. Little people, big people, mental health, physical health, it's always there. In fact, it's the most powerful predictor of health and illness that we have within our toolkit of epidemiologic predictors. The question is how does that happen, and one of the ways we think it happens is that people who live in more disadvantaged communities, neighbourhoods, families, have far more in the way of stress and adversity that they deal with than do people from more affluent communities. And that stress comes in the form of parental depression, parental separation, violence, noise, housing problems, all kinds of ways in which both kids and adults in disadvantaged groups have more in the way of stress.

So what we have been now studying is how this differential exposure to stress may be affecting health through what we call epigenetic changes in the structure of the genome that may lead to the turning on and off of genes that control the brain which then affect mental health outcomes like depression or anxiety or whatever.

We do know that in experimental animal models that these affects can be transmitted across generations. We don't yet know for sure whether that is actually molecular biologic transfer across generations or whether it's behavioural, that it's sort of the behaviour that's imparted to one generation then gets imparted to the next generation and so on. But certainly in lower animal models there is evidence that epigenetic structural confirmation changes in the DNA can go from one generation to another. Whether that happens in humans or not, is still, we're still not clear about.

Boyce - symphonic causation (1:34)

The phrase nature versus nurture implies that there is some kind of a play-off of one versus the other and a decision of either proportioning variants to one versus the other and I think the understanding that is emerging is that in almost no case is it an issue of nature versus nurture but rather a case of nature and nurture and the ways in which those things work together to produce health and well-being or disease and disorder.

Symphonic causation is sort of a whimsical term that I used in my presentation to describe the interaction between aspects of the person that are biologically given - those that are heritable and part of the genome or expression of the genome. The interaction of those kinds of properties of the individual and the kinds of experiences that an individual has. And what we're learning over the years, and especially right now, is the way in which those sort of given properties, that are more biologically based, interact in certain systematic ways with experience to produce the outcomes that we're interested in health and development and well-being.

Brussoni – fears are a barrier to play (2:06)

For several years I've been a scientist with the BC Injury Research and Prevention Unit. A lot of our work deals with the barriers around letting kids be able to play in the ways that they decide and one of the biggest barriers is really fear, right? So there's fear from parents either of injury or something horrible happening to their child or even their clothes getting dirty or those sorts of things. There's fear on behalf of educators or municipalities in terms of liability or things like that and so fears that are really limiting what kids are allowed to do and so we're in a culture of what I call anxiety-based caregiving.

So, decisions about what kids should be allowed to do are being made based on people's fears and dealing with those fears rather than what's best for the child. And so a lot of our work is trying to address those fears, right, so because many of them are blown out of proportion based on the statistics or the research that we have in terms of the likelihood of kind of negative things happening. And yet we're putting a lot of restrictions on kids based on that. And so it's really about, first of all, moving from an idea of making decisions based on fear and anxiety to making decisions based on children and their needs and their competencies and so on so it's more child-centred decision-making rather than the adults managing their own fear. And so we need to kind of broaden our perspective to think about what is actually reasonable for a child to be able to do and that has changed over time.

It used to be that it was completely normal for kids to play outside after dinner until the street lights came on or to be able to climb trees or those sorts of things and yet, now, those are quite unusual things. And so it's about changing the way we view those to bring back a balance and a reasonableness to how we think about things.

Brussoni – risky outdoor play and child health (1:50)

In 2015, we published a Systematic Review which was actually part of a broader process. We did two Systematic Reviews that then ultimately led to the Position Statement on Active Outdoor Play. So one of the reviews was on what is the relationship between risky outdoor play and health? And so we looked across the literature at the research that was available and, specifically, we were looking at studies where, that included a comparison group. So a group that got exposed to risky play and the group that didn't and if it didn't meet those criteria for children aged three to 12 then it was excluded.

And so we ended up with 21 studies that were included in that and not all elements of risky play were reflected in the literature. You'll recall that the term risky play itself is actually quite new and so we had to be a bit creative on how we did our searching but we included risky play supportive environments, play where there's a chance of getting lost, play at heights and rough and tumble play. So, as I recall, those were the four that we ended up finding material for.

And, so what we've found, essentially, was that risky play was positively associated with health. Specifically it promoted physical activity, reduced sedentary behaviour, promoted social behaviours and, for me as an injury prevention researcher, I think what was more interesting than those findings was a lack of finding of an association with injury. So we didn't see an increase in injuries as a result of risky play which has been one of the big things that people are so worried about.

Chen – community-based early childhood programming (5:11)

In China, most 3-6-year-old children can be educated and cared in kindergartens, while for those aged 0-3, they are mostly taken care by their parents, grandparents or other caregivers, which reveals that the public services for 0-3 children and their families are still insufficient.

UNICEF China is now working in partnership with different departments and agencies of the Government of China to develop a programme that supports early childhood family education and care at the community level. Now our program is being piloted in 60 communities in Hunan, Hubei and Hebei provinces. Our main task is to build up an early childhood development centre for children.

Caregivers including parents and grandparents can bring their kids to the community-based ECD centres to play with others, and they themselves can also acquire professional guidance with respect to parenting skills and education. The coordinators and workers at the ECD centres are mostly recruited volunteers from local communities. Their spirit of service, professional trainings and resources enable the volunteers to create an environment supportive to children's play and development, and to effectively communicate with or guide parents on scientific parenting issues. And we also developed a scientific parenting website as a professional resource support for caregivers and the volunteers.

Meanwhile, ECD centres are aligned with local departments of health and civil affairs to solve the issues on early development and health of children, and to disseminate related knowledge to caregivers. In addition, the community ECD volunteers visit parents and caregivers with children aged up to 3 years in their homes to understand the situation and provide services for those unable to participate ECD centre activities. By now, the 60 ECD centres have reached nearly 7,000 0-3-year-old children. The trained volunteers have provided specific home-visit services for around 3,000 children and their caregivers regarding their family environment.

Early environment around the infants is of great importance. A nurturing and responsive environment -- caregivers actively communicate with the babies, and are sensitive to their needs – plays a vital role in children's brain development. And to promote children's brain development lays down a foundation for their lifelong development and happiness. So, early years is really important for a person.

During the 2-year project implementation, many babies and their parents gained a lot of supports from the ECD centres. Some children became more willing to read, play, and interact with others. Also, they have more active emotions. The parents and grandparents who used to rearing their children alone at home, can acquire guidance by the ECD volunteers in the ECD centres, and discuss their parenting issues with other caregivers. So, they feel less loneliness, and their parenting problems can be supported. And then the whole community becomes more harmonious and warm because of such services for children. I'd like to highlight the professional improvement of the

volunteers during the past two years. They become more confident and active after several project trainings and a large amount of interactions with parents and their children. I think the atmosphere of the community is also getting better because of these interactions.

Chen – reflecting community and culture (2:09)

China is a multi-ethnic country with rich and varied cultures, which is also an important resource for our early childhood services. Children should live in their own cultures. The splendid local cultures can influence or nurture children as spiritual nourishments. So we will not use the so-called modern or dominant urban culture to replace local cultures.

When communicating or interacting with parents, our volunteers always try to use local materials and resources. For example, we applied a method called “baby basket” in the trainings to show how to play with children by utilizing local fruits, cooking utensils, or other safe materials. And we also encourage children to wear local clothes and touch local handicrafts or cloth to feel their different textures.

Different dialects are also important, as we do not want children to forget their own dialects. We encourage the grandparents to speak dialects when interacting with children, including reading local nursery rhymes, naming the vegetables or other things around children by using dialects, etc. as what children hear, touch and learn are closely related to their living environment, which can nourish children and maximize their learning effects.

Clinton – love builds brains (2:54)

So I'm an infant, child and adolescent psychiatrist and I've spent a lot of my time trying to understand how I can support parents and caregivers, early childhood educators and teachers, how I can support them in their role in helping children to be the best they can be. And we've got, we've had an explosion of knowledge about how the brain grows and people, you know, talking about oh, you need enriched environments and stimulating and I think that that's made people a bit fearful about oh, I might kind of wreck it, not do it quite right. So I really wanted to come with a normalizing message of love is what children need. What they need is the back and forth, the serve and return of everyday activities. It's to build children's language; it's not about flash cards. It's about lovingly interacting with them, talk to them, take turns with them, read to them.

So that loving approach to brain building I felt was really very important to bring to parents because fear interferes with learning and we really want parents to be able to enjoy these years, not be afraid, "oh, I'm not doing enough of the right thing".

Well, when I talk about how the brain moves from weighing about a pound at birth to weighing three pounds in the first couple of years and the experiences, all of the things I talk about; talking and soothing ; that it's those experiences through the senses that literally builds the brain.

At first parents are a bit fearful, you know, if their children are over three or six they go oh, I didn't do that, I didn't do that. But then with more dialogue, recognizing that the experiences that the majority of children have are ones that are really good enough, that the loving nature of interactions, that it's more important to put down your cell phone and interact with your baby. That it's more important to have the buggy, the baby facing you because the baby is a little scientist. Their brains are formed by the loving interactions so they're watching your face. They're watching what you do. They're watching to see is mommy or daddy are they making a strange face? If they are I'll hold back. So introducing the baby as a scientist, as a little marvel, parents love it, they absolutely, absolutely love it.

Clinton – teachable moments and the stress response (2:26)

And I've got a simple way that I think of when the stress system gets turned on, why it's the non-teachable moment. So if we think of our stress system as when there is some perceived threat in the environment, and for some kids that's hearing no; but when there's some perceived threat in the environment our body goes in to survival mode and there's an organ, two little sets of brain clumps called the amygdala in our brain and that's the fight or flight. So that is, oh, it's dangerous, we need adrenaline to get running out of here. Or we also not only need to run, but we need to keep running so we need cortisol, our stress hormone. So boom, the cortisol, the amygdala send signals down and, you know, we've got much more science than I'm talking about, but the amygdala will get the release of adrenaline, we get the release of cortisol.

But there needs to be a way that says oh, you can turn the tap off now. You're not being chased by the bear anymore. And so I think of this like the porcupine I have here, that the amygdala senses some kind of a danger and its prickles go up. And when the prickles go up, zoom, imagine then the adrenaline and the cortisol. Well this guy has got a good buddy called the hippocampus, that's our friend as parents and as teachers. It is new learning and memory. So here we have a threat – that door suddenly slams shut. The porcupine, it's a threatening thing but the hippocampus says oh, it's ok it's windy. Right? So they work very well together except when this porcupine is being turned on – threat, threat, threat, threat, threat. The hippocampus may be trying to send signals over but eventually biologically we know, there's cell death in the hippocampus. And this is the non-teachable moment.

So when I talk to parents about how much of the time are you trying to get through to your kids, and the porcupine, it's a non-teachable moment, and how can you rebalance it? Well how you can rebalance it is through connection, through relationship first.

Clinton – co-regulation of the external brain (1:38)

When babies are born and in the first couple of years of life, the baby is completely helpless and any emotion; babies have emotion, they absolutely do have emotion, and any emotion that they have, if it becomes overwhelming, they need to be co-regulated by that adult. So the adult has to be like the external brain, as it were, of the child to soothe them. So if we think of the brain as being comprised of billions of brain cells called neurons, they will be firing, the area, the emotional area of the brain when a baby is crying, is firing, firing, firing. They haven't made the connection to the thinking part, or they don't have procedures or memory, so they don't know how to do it, to soothe themselves. So they need the adult, someone who's bigger, smarter and kinder to be coming in and helping soothe them. That's how we need to be responding. So I very frequently in presentations talk about you cannot spoil a baby. When a baby cries, they're emitting to you the only way they know how and you need to be their big external brain and help support them. You're not spoiling them. Babies who are picked up cry less, not more.

Clinton – self-control vs. self-regulation (1:06)

The difference between self-regulation and self-control; self-control, if I'm sitting here and I'm worried about what's the next question going to be or as we walked along the hall, coming to the studio, there was a disturbance. I can be sitting here very well-controlled, self-controlled, but my mind is spinning all over the place, not able to focus as much on you. I'm really paying attention out there. Biologically, inside my heart racing and my guts churning, so I appear regulated but biologically, emotionally, behaviourly I'm still. But I am not calm, alert to learning if I've got something else going on. So the self-control is what I appear. Self-regulation is much, much more complex.

Clinton – attachment and predictability (3:02)

The essential part of it is that parents can be many things; teachers, physical caregivers, playmates. But unless the parent is predictably there when the child is sick, distressed, upset, then that child even though the parent's doing all the other things, they develop an insecurity about what the world is going to be. So a secure attachment is what we want for kids. And a secure attachment is when the baby is distressed, as I've said, sick, under whatever circumstance, they emit and the caregiver responds. So if that happens, securely, often enough, then we know from research that those infants grow up to be more competent and capable children, adolescents and adults in the absence of any bad things happening in their life.

Whereas there are other children who the parents are not predictable; so sometimes they'll come and soothe the child, sometimes they won't. So they are quite insecure. It's like, oh, if I send out this cue and am I going to get responded to? So those children can be very anxious. There are other parents and infant dyads or combinations where the parent just doesn't respond, just doesn't respond. And that baby develops procedures to deal with that as well. And they also, their attachment is insecure, maybe avoidant and we know that they don't do as well.

The scariest ones though are where the infant is distressed and the parent causes fear. So the person that you want to be there when you're fearful is actually the cause of your fear. That creates a disorganized attachment and in that situation the babies don't have any procedural memory to know what to do. They're just so discombobulated.

So why is it important? Why is it so important to respond to your baby's needs predictably in that way? Well one, because it's helping build the brain and the ability to soothe. It's helping build the amygdala, hippocampus and other connections and in the long term, it's making a big difference in terms of health later in life because it affects the immune system, how the immune system gets built. But it affects your pleasure and happiness and competence in your ability to cope later in life. So attachment is a really pivotal core function to understand.

Clinton – parenting styles and brain development (2:42)

One of the beauties of the science of early childhood is really offering people a solid knowledge base of how the brain works, what are effective practices. So what we know from the science is that the most effective parents are not the jellyfish parent who says "oh, don't do that, don't do that, don't do that – oh, ok go ahead and do it." "Don't put the cat in the microwave, ok honey, ok?" So there's lots and lots of love but there isn't a whole lot of structure. The other kind of family that's worrisome and that's because of longitudinal data that shows that families who are predominantly 'brick wall' "Do it now because I said so." "You just wait until your dad comes home." Those brick wall, cold, coercive parents we know that doesn't work well in the long-term. That the best outcomes for kids are the backbone parents who are more authoritative. So they're more democratic. They have lots of love but very, very clear expectations and high expectations.

So what's the difference in the brain of children who experience that kind of parenting. And for me that's linked in to the stress system that when you have a parent who is brick wall, punish it, punish you, do it this way – what that generates in the brain is mistrust. What that generates in the brain is anger. What it does is it makes your limbic system, your emotional system be the one that's taking the most charge. Whereas, when you're authoritative, when you're a backbone, then you are connecting with the child first of all, you really want to go to that dance, but you know our family don't really approve of eight-year-olds dressing like that and going to that kind of a thing. It really makes you angry, I know, I know. So what that is doing is connecting to the thinking part of the brain, making the connection and building the pathways between the limbic, emotional part of the brain but the thinking planning, organizing part of the brain. So that being connected makes all the difference in the world.

Clinton – fathers and babies (2:06)

I'm hugely pleased, I think we all are hugely pleased to see, one, the attention on fathers and the role of fathers in raising children, that that's being much more highlighted. In our society, women were more traditionally home with babies and so they were more studied. But now as we see dads spending more time, people are saying well, what's the relationship like with dad?

We know mom's brain changes when she has a baby, all of the biology changes. Well what are the brain changes that happen in dad's brain, you know, as he interacts with the baby? Are there things happening there? And we are finding out wonderful things that, yes, there absolutely are things that happen in dad's brain as well. The 'I know you', the interacting, the oxytocin, there's all kinds of very neat systems.

And it's great to be learning about because the male brain and female brain are different. Dads interact with babies typically in a different way. You know, if a mom sees a baby, they may go oh, hi honey, how are you? But a dad, this is Dr. Berry Brazelton talks about – dads – they come in and they energize the baby. You know, the baby is sitting in the car seat, the dad will go, they'll you know, poke them in the belly and all the way up. Wow, this is wonderful, this is activating the baby. Mom soothes the baby. The baby's two systems are being built. Now that's not to say that while if you're a single mom or a single dad that you know you're baby is destined for difficulty. No, definitely not. But it may be that you want to be thinking about expanding your circle so that there are, that babies do get exposure to both men and women who are crazy about them, whose eyes light up when they see them.

Clinton – developing coping and competence (2:28)

Those of us in the world of child development are trying to think of ways; for younger and younger, how to help kids cope and have the innate competencies or have the competencies built to be able to deal with challenge. And we know - surprise - that the building blocks of being able to cope with challenge is having a predictable "other" there to help you get through the difficult time. And the difficult time may be that Jamie over there took my blocks and I want them now. How does a toddler learn how to go from, he took it now, whack! to "Jamie, I really wanted to play with that. Can we take turns?" How that building; and that's coping, that's coping – how that develops is through the modelling that happens with high quality childcare, that happens with high quality parenting where instead of saying "don't be like that!" you say "oh, you're really frustrated with that. We're going to use your words". Because when you use your words, this is what you say to the toddler, but we now know from the work of Adele Diamond that when you use your words, when you're actually labelling your feelings, then you are making more connections to your thinking brain.

So helping little ones cope is helping them use their language, labelling their feeling, giving them a language for it, acknowledging their feeling. So if we think of healthy mental development, we think of little ones learning how to experience, manage and express their emotions. And how they do that is one; being allowed to have them, two; having a nurturing adult who set the limits but give them the words and the understanding this is tough and model what it is that would be helpful for them. That's how you develop competency in the social and emotional realm.

Collins – conversations with children (3:32)

So my priority for early years educators is the same as it is for all educators in this regard, and it's about constantly improving the conversations we have with children, it's always about the conversations and the relationships, that is the heart and soul of the matter. How do I construct my conversations with children that encourage them to progress, that support them to think harder because that's when you learn, to make - to take the extra step, to trust me and risk a new step into the - you feel like the known into the unknown. So it's always about improving constantly my capacity or our capacity to have better learning conversations with our children.

I think the link between better conversations, sustained shared thinking is very strong and profound. We, in England, we're increasingly talking about the notion of dialogic discourse with our children at all ages. How do we create conversations that which by the way I'm supporting and encouraging children are through the conversation moving thinking forward, creating new ways of thinking and new ideas of being constructed on the run?

So it's not seen as a conversation that confirms or a conversation that asks you to describe or a conversation that gives you an instruction to do the next thing, it's actually the conversation that does the learning. And I think there's much more we can do in that. It doesn’t mean that you have to step back as a teacher from constantly believing that the task is to keep everyone on task. The task is the management of the space.

That is a big bit of it but actually it's when the opportunity comes at the right times really looking at something in the eye with a child and really having a meaningful authentic conversation together about it. That's a hard thing to do by the way. It's a really difficult challenge. And it's not talking more, that's not the same as using your language to ask children to elaborate, exemplify, move their thinking forward, create new connections, these are very difficult prompting conversations as adults as well as with children.

I think we underestimate what children's understanding is all the time. And the consequence of that is that they begin to shut down and give us what they think we want to hear. They think we want too often short low-level utterances and therefore that's what they give us. Because if they dare to take a risk and go further in conversations they can be cut off, they can be reminded that isn’t what we're talking about, we're talking about this narrow thing here.

I think we miss out on genuine authentic conversations which enrich all our lives. But we, as teachers, miss out on the opportunity through the talk help deal with the misconception, move the child on, go deeper, make a new connection. I think it's a very efficient way of teaching as well to use conversations. And I wish kind of I wish I could do it better and constantly working on that which I think we all should.

Collins – mastery (1:32)

One of the interesting I think developments in our work recently, particularly around mathematics, we've been doing some studies, where children are spending more time not being stretched to learn new things but being encouraged to go deeper with what they know. Now this is sometimes wrapped up in a classic bit of education fashion language known as mastery. But you might also talk about it in terms of the concept of roaming in the known where children are going deeper to spend more time in what they already know too.

And I think in early education it's very important that you secure for children confidence in what they know and knowing and not constantly driving them through an arbitrary curriculum that's been set to meet the needs of something much later. And I think we're beginning through the research to understand the value of that mastery that deep knowing and that time, spending time in what you know to build an understanding - to secure the pathways that are being laid and to build a better appreciation for what knowing feels like as a generalizable concept not only for the child most importantly but for all others around it. So that's an interesting area of development for me which I am increasingly examining and looking at through our studies.

Corter - contributing to self-regulation (1:06)

We know in young children for example that what happens in utero can contribute to it. Stress, nutrition, and of course parenting is crucial. Once children emerge into the world and how parents are sensitive to parents cues, how they provide appropriate challenges for young children. How they talk to their toddlers about the world can equip the child for this lifelong development of self-regulatory ability. And we know from some of the long term research that these abilities in early childhood actually predict adult success in terms of economic success, social adaptation, relationships, avoiding crime and so on. So we know self-control, self-regulation in early childhood is building towards adulthood.

Corter – influencing self-regulation (1:06)

For example playing a game with the child and modeling an appropriate self-regulated role in that game for children so that's something that early childhood educators can do. And there are other forms of programming that can build self-regulation. It's not as if self-regulation happens on in play. For example, research on older school age children shows that martial arts training can be a contributor to the ability to manage and control one's behaviour and emotions and energy. So, it's not the only form of influence on self-regulation, but it's a very powerful one that children can do together quite naturally if we manage it properly.

Corter – monitoring play (1:56)

If you ask children what they like about early childhood programs, they rate play as the thing they like the most, but if you ask them what don't you like about your program, they also mention play gone bad. For example, when other children don't let you join in play, that sort of thing. So not all play works perfectly and professionals, early childhood educators need to monitor the play of children. They need to support it in ways where it is productive in the development of children's self-management, self-regulation, and even for pre-academic skills and literacy, math, and science, and we know from research that it can, if properly structured, lead to self-regulation, but we're not quite sure about all the elements of play which do that. But we do know that play needs to be structured so that children stay in dramatic roles if that's what they're doing. So they extend them so educators can monitor and step in and help do that, but we're not just talking about free play, we're talking about intentional monitored play where educators are thinking about the skills that children may be developing.

And play is particularly important in terms of monitoring the play of individual children because all children are different. Not all of them will go to the center where dramatic play is happening, so how do you move children around programs so that they're getting the experiences, the play based experiences, that will help them develop as individuals.

Corter – self regulation (1:37)

Starting with self-regulation, we're discovering more and more about how it develops right from the period of pregnancy all the way into adulthood, and how early experience help shape self-regulatory capacities throughout the lifespan. So self-regulation means a number of different things in the literature. People talk about self-regulated learners when we're looking at school age children but we know it's something that begins well before that. So it's actually learning to manage yourself along a number of dimensions including emotional, behavioural, cognitive and learning, and social interactions, so it's really a whole collection of self-management skills. Their core cognitive abilities around being able to focus attention and shift attention. Having working memory that allows you to keep things in mind and being able to inhibit both your thoughts and your actions appropriately. But we sometimes think about it as being a self-control that means dampening down. However it also includes the ability to activate and mobilize energy to do things that you need to do. So it's a very important set of skills that have a lifelong course.

Corter - self-regulation and play (3:02)

The relationship between play and self-regulation is complicated because it's a coming together of two things which in themselves are quite complex and important for young children for lifelong development.

Play is also a complex and rich world that children are part of. It's what they do. It's a natural course of development from infancy right into childhood, and it's a very powerful medium for learning and development if we can shape it properly, and we're learning more about what needs to be there for children in play environments in order to become better self-regulated. We know for example that certain types of play are structured in a way that allow children to explore roles through dramatic play for example, can be powerful spurs to the development of flexibility, working memory, children staying in roles, not stepping out of their roles helps them practice inhibition. So, these are sort of core self-regulation skills that we think are actually being developed in the dramatic play of children, and there's a number of lines of research that convinces that play is important for young children, and helps in the development of self-regulation.

People have paid a lot of attention to the role of dramatic play and that's a form of play that allows children to explore roles. It allows children to maintain the memory of the role they're to be in with their peer. It allows them to be flexible in terms of adapting to new situation in an imaginary dramatic play situation. A child who may be playing on her own may well be focusing her attention on something and sustaining and building her ability to focus on other things she's doing and if she's doing that in a busy classroom, other children may come up, ask her what she's doing. Maybe she responds appropriately but she can maintain a focus on what she's doing and work on the development of focusing attention.

Curtis – documentation considerations (6:03)

So I think when I think about documentation and when I talk about it, I want to really make clear there's a difference between pedagogical documentation, which the definition is the study of the teaching and learning process, and documentation as a product. Documentation is the act of studying what's going on. So, I think there are skills required for that. You have to be a skilled observer and really look closely for details. So then one of the best metaphors I had was when I was in graduate school my graduate teachers Elizabeth Prescott, she said that she thinks about observing as collecting little beads for a jeweled necklace. She said you capture these little gems, these little beads, you capture this one and this one and this one and this one. And they're all these little stories of this child or these children. And then after you've collected a lot you have a whole big group to be a beautiful necklace of what happened. So, I think that for me always relaxed me about this idea of observing to document what was happening, that I could look at this little gem and save it and remember it and treasure it, right? And that it would be just one of many. So, I think that's one part is to again slow down, see the little moments and the gems. And that's just you and your eyes.

I think it's always useful to have a focus ahead of time that you help yourself, I'm going to look for this today and I always suggest people look for what kids already know and know how to do. Don't look for what they can't do. So, you know, look for how do kids already know how to get along. Find all the places that kids are getting along and what are they doing rather than how they don't know how.

There's a real skill to taking photographs for study and I think that's a huge issue in this new age of 10,000 photos. So, I think you'd have to cultivate a practice of really limiting the amount of photos you take and really deciding what photos you're going to take. And then as you go delete ones that aren't useful. Because it's, what you have to understand is you're being like an archeologist, a researcher. You're trying to collect things that help you study what's going on. So you don't want to have 10,000 things and you don't want to have big wide shots of children in a whole big group. You might take one of those to show the context but then you want to zoom in.

And you want to look at taking photos of children in relationship with each other. What do their eyes look like, what do their bodies look like, what do their hands look like? And children in relationship with the materials, how are they showing you their intelligence?

I usually advise people not take more than two minute video clips because they're too hard to watch. And if something's going on longer again you think about that little gem. You have a two minute thing and you can turn off the camera and then start again if it's still going 'cause to me the idea that you're just going to capture everything isn't accurate.

And it's really hard to write when you're with a group of children, for me anyway. So, what I try to write down is things that my camera can't capture and that my video can't capture. So, I write down what children say and maybe the amount of time I was watching this particular thing. I think again you have to find your own rhythm that way. If you're a writer you do that writing, if you're not a note taker then you find the things that you don't capture in other ways to remember to remind you.

And then you study, right? You decide, you look at this stuff and you use the thinking lens or another protocol that asks you to look at some deeper issues about what's going on, about what you know about this particular child, about this family, about child development, all of those things. And you make meaning, you decide what does this mean, why do I think this is important? And then if you want to do a documentation product, to me it's a whole other step, which is what am I going to make visible and why, which is a whole other thing to think about. Here's a story that's unfolded, what do I want people to know? And then you decide the audience.

I use my documentation a lot with the children where I show them back things that they're doing that I love because I've seen the power of that to help them grow a repertoire of play to see themselves in these really positive lights, to see their own competence and to see each other.

And then you think about you want to offer it to families and there's many forms that goes in. Like people do newsletters or we do learning stories in our program. It's something we learned in New Zealand where actually - we write a little note, descriptive letter, to the children about what we saw them do. And then we say why we thought it was important and then we say the next steps and then we send those home to parents. And then we ask parents what do you think? And then we print out what the parents say and what we say and we have a portfolio where we include it for the child to take with them as they move on. Or you can do documentation displays, you can decide what do we want to make visible on our walls?

And the people who are best at it are the schools of Reggio Emilia. If you go to the 100 languages of children they're not these tiny little pictures with these little - they're like these gorgeous museum quality displays. And I don't think you have to do that level but I do think you need to think about what are you putting up, what do you want to communicate? How are people going to see this, what are the visual literacy skills like how people read from left to, right to left, this way, it's a Z pattern that I learned. And then how photos, how they capture your eye, you don't want to have a lot of extraneous things on a board 'cause people can't see what's there.

Curtis – reflective practice (2:03)

I would define and describe reflective practice as a teachers' process of research, gathering that details of what's unfolding with children, slowing down to really marvel and notice what children are doing and collecting that information in some way for study through notes or photos or videos. And then looking at those traces of children's activities, interactions play to think through them, to make meaning of what's going on. And I think you make meaning in different ways, you do that with other people, your co-workers, with parents, with other professionals and also with the professional literature, like reading research and things about learning theory and brain development.

And so, that process of collecting and studying and then deepening your own understanding. It's not necessarily you, do something right away with what you've learned but I think over time you develop a habit of mind to deeply appreciate children and to see what are all the possible ways I might respond or interact to extend or to enhance these experiences we're having together. So, it's not about finding a right answer, it's about finding all the possibilities and using real life practice as the source of what you study and then finding different ways to make meaning.

And then you do choose, you choose what you're going to do based on those things and sometimes you do it in the moment and hopefully with some thoughtfulness because you've been practicing that away from the moment. And then sometimes you make plans that are longer term, now I'm going to try this next week and see what happens. So that's how I would define reflective practice.

Curtis – sharing documentation with children (4:24)

In the centre I was in we were studying the roles teachers might play with children to extend their learning and investigation and these two children had been like for a really long time watching a ladybug be on the ground and follow it around. And the teacher was there with her notepad and her iPad and she was taking photos. And it went on for a really long time. At the end of it when they were wrapping up to go inside, she called them over and said hey, I want you to see what you just did. And so, she opened up her iPad and she showed them images of themselves studying. You were looking so closely, look at there's the ladybug. So, just in that moment to help them see themselves and this interest they took to show it back to them was making their thinking and learning visible to them. So, that's a short quick thing you can do in the moment.

I've done that same kind of thing but with project over time and this was with toddlers where I decided to offer them flubber, it's that cornstarch and glue material that turns into this stretchy cool stuff. And I think it's a really great substance for toddlers because it responds to them. What I did over time is I in the moment I just describe to them what I see them doing. Oh look, when Karen put his finger in the flubber it made a hole. So, I'm just kind of not overwhelming them with narration or description of what I see them doing and what I notice is that when they hear me and they see each other, their repertoire grows of play. So, they all start sticking their finger to make the holes or they all start stuffing it into something. But they all sort of take up this new way of doing it and I've just been describing to them what they do. So, to me that's a really simple form of documentation and you've got to be careful 'cause you don't want to talk at them the whole time they're playing but you're just careful about offering these things you see, some new idea.

And then from that I was taking images. And so I went back and I started a little binder, tiny, one of those little half binders 'cause they were toddlers, of pictures of them doing these things to study. And I'd have it out whenever I put this flubber out on the table and they would spend some time looking through it and I would see things like them imitating the behaviour and the picture with what they were doing, like putting their finger where people's fingers were. And then again, I think what that does is grow their repertoire of possibility. This project with flubber lasted like the whole entire year with this group of kids. You know, initially they stay for a few minutes, by the end of the time they were staying for over a half hour. And these are like under 2 year olds, 12 to 24 is what this age group was. I think documentation can change children's lives. I think it develops their identity, it's like this conscious intentional way to offer children a positive, confident identity. So, you show them back themselves, you show them back their skills and their competence. And they develop a confident identity.

And then I also think it helps them, it changes their lives by helping them be better learners because they become more aware of their own thinking and their own ideas. So, if somebody has shown me my idea and they've shown me a picture of what I do and I can see it, I have this notion that I have ideas. And once I have that notion I have ideas I can come up with more ideas. And that's what I find when I offer children back their ideas, they always come up with

more, right? 'Cause they get oh yeah, I had that idea and how I have this idea. So, I think it changes their lives because it's a confident portrayal that you're being really intentional about showing them in a really competent light. And then they gain competence by seeing their own ideas and being able to use their own. In fact, I think that's your job as an early childhood educator is to see everybody's ideas and make them visible, that you spend your day noticing what people are paying attention to, what they're doing.

Durrant – building block 1 (2:54)

Well, there's what we call building blocks of the program. The first is helping parents become conscious of their long term goals for their parenting. So much of parenting just day-to-day is dealing with one stressful moment after another. At least that's the way it often feels to parents. Of course, it's also full of many wonderful moments as well, but sometimes it's the stressful ones that stand out to us. And we think that, you know, sometimes it's all just so frustrating because we need our children's cooperation. But if we're always stuck in those moments of stress when the child won't put her boots on or he won't eat his dinner or she won't go to bed, then we can get caught up in the stress of the moment, and we can often respond in a way that we regret later because as we know, when we're under stress, our thinking brains kind of turn off, and our emotional brains take over.

So what we want to do is refocus parents on, really, what they're trying to accomplish over the long term, which helps them to maintain their thinking brains and help them remain rational in a stressful situation. So we want parents to think about what kind of characteristics they want their children to have when they're grown. What kind of people do they want them to be? And when we ask that questions all over the world, parents say the same things. They say things like I want him to be independent. I want him to be confident and non-violent, empathic and kind, and to get along well with others and to be fair and honest and have integrity. And those are the kinds of things that parents aim for all over the world when they stop to think about it. But in those moments when they're two, and they're touching something dangerous, we tend to forget those goals. And so what we want to do is help parents refocus in moments of stress and think about what they can do in that moment that will help them reach their long-term goals. And when they stop to think that, they usually think, well, hitting isn't going to teach them to be nonviolent, and yelling and threatening isn't going to help them become confident, and just taking things away from him or sending him to his room isn't going to help him develop skills in conflict resolution, for example, or getting along with others. So what could I do in that moment that would keep him safe, teach him what he needs to know and help me take a step towards those long-term goals.

Durrant – building block 2 (3:03)

The second building block is really has two components. And one is providing warmth, and the other is providing structure. We know from many, many years of parenting research that it really all boils down to those two things. And what that means is that children need to be learning in a climate of warmth, which involves, really, physical and emotional security and safety. They have to know that they're safe. They won't be hurt, that they don't feel under threat. When we feel anxious, whether we're children or adults, when we feel anxious, it's very difficult to take in information, to process it, and to then make use of it in our behavior. And so what we want to do is minimize the child's anxiety, take away the fear. So that means that children need to feel that they're always loved and that they will not be hurt by their parents either physically or emotionally. And when they are sure of that, they're in a much better space for taking in information and processing and learning from it. But that has to go hand-in-hand with what we call structure. And structure is not control, and it's not coercion. It's not forcing the child to do what you want them to do. What it is teaching. It's giving the child the information that she needs in order to learn what it is we want her to learn.

So if, for example, the child is two years old and reaching for a knife, we know that's dangerous. We know that that can't happen, and the child needs to not touch that knife in case they get hurt. And they need to understand why that's important. So if in that situation, we simply respond with a slap on the hand, the child might remove her hand from the knife, and it might possibly deter her from touching a knife, but not necessarily because she doesn't know why it matters. And she doesn't really to her, it's a random event, and she doesn't really understand what the problem is, and she hasn't learned anything from that. If we say if you go near that knife again, you're going to go to your room, she still doesn't understand why it matters. So we know that all of us are much more likely to cooperate with any rules or instructions if we understand the reason why. And I think as adults, we can reflect on that in realize that that is definitely the case. We're going to be much more likely to follow a rule or an instruction if we understand why it's important. So structure is helping the child to understand why it's important.

Durrant – building block 3 (2:27)

The next building block is understanding how children think and feel, which is really understanding child development, and realizing how important certain developmental tasks are along the way. So what we do in positive discipline is that we teach parents about child development, and the key developmental tasks, and how those relate to what we usually think of as disciplinary situations. So for example, there are many parents who see infant crying as a disciplinary situation. So they might intervene by shaking or hitting, or yelling, or ignoring, thinking that those responses will teach the child not to cry, that this is --this is a matter of self-control, and I can teach that child either by through physically punishing him, or ignoring him, and that that will be an effective way of disciplining the child. And we know, of course, as developmentalists that that just isn't what crying is all about at all -- that crying is a very important developmental task. It's a way that children organize their brains, it's a way that they communicate; it's the way that they exercise their muscles. It has a -- many very important functions. It also is a signal that the child could be in distress of some sort.

So we help parents to understand what behaviors mean developmentally, what their--their actual function is in the child's development, and how it they influence the child's brain development, their development of self-regulation, and their relationships with us. So that's just one example. Of course we go right through development, from birth right through adolescence, because we believe that it's very important for parents to understand that the foundations are laid in infancy for adolescence. So if we take crying as an example, if we respond sensitively to an infant's crying, we start to build that trust and attachment that is the foundation of their relationship with us when they're teenagers.

Durrant – building block 4 (3:36)

The next building block is problem solving, which is really about thinking through specific situations and trying to identify as many reasons as we can for why a child might behave in that particular way. So it might be crying, it might be reaching for a knife, it might be breaking curfew at the age of 14, whatever it is, we help parents think through what are all the reasons why that might happen. The reason we do this is because we really focus a lot on parents' attributions, their belief systems. Why -- each one of us has a theory of why people behave as they do. And so if our theory is that when my child reaches for that knife, it's because she is defying me. I've told her not to touch that knife, and she's defying my authority, then I'm very likely to respond with punishment and possibly quite harsh punishment because I take it personally. If, though, I understand children's development, I understand that at that age, they don't understand danger, that they haven't had enough experience with injury to know about pain, necessarily, that they are curious, and they need to touch everything to understand it, to learn about it, that they just don't have the experience and the knowledge that we have to make those decisions about what to touch and what not to touch.

So once they understand child development, they can come up with many more reasons why a child might reach for a knife. They understand that the range of motivations for that behavior is much broader than they might thought it was previously. So once they can identify, and they do, they can identify a long list of reasons why children behave in the ways that we --you know, we give them scenarios to think through, and they can come up with long list of reasons why a child might behave in those ways, then they start to realize why hitting isn't going to help and why yelling and threatening isn't going to help, or why ignoring or sending them to their room isn't going to help because it's all about learning.

It's all about scaffolding the child's understanding. So when they see those reasons, and they identify themselves all the reasons why a child might behave in that way, they can come up with much more constructive responses. They can think about what's my long-term goal? I want my child to be safe. I want my child to understand danger so that she can make good decisions for herself when she's in dangerous situations. I want her to have that information and build those skills over time. If that's a long-term goal, then they realize very --it becomes very obvious why hitting her isn't going to teach her that, yelling isn't going to teach her that, calling her names isn't going to teach her that, but giving her information and showing her how to keep herself safe is going to teach her that. So it all becomes, by the end, very obvious what a teaching response would be, a positive discipline response would be, and why hitting, yelling, name calling, ignoring, sending a child away, why those things aren't positive discipline responses.

Durrant – celebrating independence (4:37)

Yes, when children begin to talk, we celebrate, when they begin to walk, we celebrate, when they do these things that signal their independence really, we celebrate and yet there are some aspects of their independence that we don't celebrate, in fact we try to stamp out. And those are things like saying 'no', or deciding what they want to eat, or deciding what they want to wear. And those are actually, although they can be irritating for a parent who needs to get out the door, who's concerned about the child's nutrition, who wants the child to look perfect because they're going to get their pictures taken today, the parent can feel frustrated because it's not going their way. Those are also actually signs of independence that should be celebrated.

And I think sometimes parents get irritated not because they're thinking about the child, but because they're thinking about what the implication is going to be for them. This is quite common, and as a parent myself, I can relate to this feeling that if your child isn't behaving as all children you think should behave in a public place, you feel the pressure of the public eye instead of thinking about 'what is this behaviour mean from the child's point of view'; 'what are they trying to communicate to me' and 'what does this signal in terms of their development.

So when children, for example, first start to say 'no', parents might interpret that as defiance, say. They don't, if they're interpreting it as defiance or a threat to their authority, they're not recognizing this very important developmental progress that this child is making in their ability to say 'no, I can make my own decision'. And if we think ahead to our long term goals and what we really want our children to be able to do in terms of their competence when they're older and we're not around anymore to guide them, we want them to be able to stand up for themselves, we want them to be able to state their opinions, we want them to not do what everyone tells them to do, we want them to be able to voice. And that begins with the word 'no'.

Now there are of course behaviours like running in to the street, or poking fingers into electrical outlets, or doing dangerous things that we can't let children do but we need to guide them around those safety issues in a respectful way that doesn't squelch their sense of competence, and their sense of independence, and their ability to feel that they can say what they think. We need to nurture that while keeping them safe. And of course one of the best ways to do that is to child proof our homes so that those kinds of episodes simply don't occur. If the child has a safe environment then she can explore, and she can set her own agenda to a large extent.

Certainly there are situations where parents have to get out the door on time. There are just practical, everyday kinds of incidents that arise many times in every family's day and I think it's the way that we respond to those that matters. Certainly, the parent has to get to work on time and they can't just sit and wait all day so the child needs to also learn that there are certain expectations that have to be met, but that can be done in a way that respects the child's developmental level; that respects the child as a person, as an individual, and still meets the parent's needs. Hitting and yelling and punishments are not going to help the situation. They tend to make the child even more resistant.

Just like adults, when barriers are put up all around us, we tend to want to break through them. So parents need to build their skills in eliciting children's cooperation, not coercing them to comply. Those are two very different things; different processes.

Durrant – child–caregiver match1 (2:43)

Yes, temperament and parent behaviour are very much interwoven and there is certainly a constant bi-directional relationship. And it isn't even moment-to-moment; it carries a history with it. So we become almost conditioned to responding in certain ways to certain behaviours over time. But certainly a child who is, for example, more active, more reactive, more impulsive, less persistent, less regular in their rhythms, is more difficult for the parent if the parent has a different temperament. So a very low activity parent with a high activity child can create some real challenges because that parent's expectations are just not going to be met by the child, and there's nothing the child can do about it.

So in those kinds of situations, if the parent interprets that child's behaviour as being 'bad', or as being a threat to them, or as defiance, then they are likely to punish the child for simply being themselves: needing to jump, needing to run, needing to climb and be in motion. That's something that the child needs to do but if the parent doesn't see it as the child's temperament but sees it as constant challenge, then the child gets punished for being who they are and that child becomes frustrated, becomes resentful, feels misunderstood, feels they have to become someone who they are not.

And so I think it's really important for parents to understand temperament, not only of their child but also their own temperaments and really look at the match between their own temperament and the child's temperament. Because where they match, there's much less conflict. It's where they don't match that problems arise. And if parents can be helped to assess that, then their own responses can change dramatically because they understand more accurately the child's true motivation.

Durrant – child–caregiver match2 (2:19)

In most cases, children want to please us. They aren't trying to make us mad. They aren't testing us, they aren't being stubborn or bossy. They are simply being children, and they are demonstrating their own personalities and temperamental characteristics.

Parents can guide them. Parents can help to shape their behaviours. But they need to recognize that their own personalities can sometimes be contributing to the conflict; that it's sometimes the parent's own impulsivity, or the parent's own lack of persistence, or the parent's own high activity level, or reactivity that is actually eliciting a response from the child that then turns into a conflict. So I think if parents can look at this as two temperaments and two personalities coming together that neither one has a whole lot of control over, and then they run into situations where those two temperaments may not jive, then they can stand back a bit and look at the situation and maybe address it from a different angle.

So for example a child who jumps on the bed all the time: the parent may not want the child jumping on the bed because it could damage the bed. So they need to, the child needs to stop jumping on the bed. But what the child is showing is that they need to jump; that this is a physical need that they have. And so what a parent can do is, rather than spanking the child for jumping on the bed and telling them they're bad, or threatening them, or saying 'how many times have I told you', recognizing this is a child who needs a lot of physical activity: what can we substitute that this child can jump on? Maybe they could have a little trampoline or maybe they could set up some cushions or maybe there's an old couch somewhere in the house that they can jump on. And the child can get that energy out while not damaging something that is important to the parent. So in that way that parent would recognize the child's developmental and physical needs but also meet their own needs.

Durrant - discipline vs. punishment (3:16)

Punishment and discipline are not the same thing. Many of us think they are and they get very easily confused. And this is true around the world, I've found that the word discipline is often associated even with military discipline and usually harsh punishment. That's kind of what it means.

So when -- in our minds at least so when we hear discussions of, if adolescents in our communities are getting into trouble, for example. We often hear calls for more discipline and what often is implied by that is more corporal punishment, more harsh punishment, more coming down on them like a ton of bricks basically is what we call for out of fear. That response is really motivated out of fear of a feeling of lack of control. And that's true in moment-to-moment parenting as well is when we feel afraid. When we feel out of control and we feel powerless, we're much more likely to respond coercively, force-fully, harshly, and punitively.

When we feel like we understand the situation and that we're competent at dealing with it, we're much more likely to respond in a constructive way that moves us closer to our long-term goals. So this connotation that the word discipline has acquired is really unfortunate. It's become equated with punishment and the two are not equivalent at all. In fact, they don't even overlap. Discipline comes from the same root as the word disciple. And disciples are followers of a great leader. If you were a disciple of someone, you respect that person. You consider them wise and you follow what they do because you value what they have to say.

Discipline is the act that fosters that sort of feeling in people. So what we're trying to do is build that kind of relationship where the parent is a mentor and the child is a learner. So that doesn't come from punishment. Discipline is about teaching in an environment that fosters the child's learning. Children can't learn when they're afraid. They can't learn when they're anxious. They can't learn when they're stressed just like we can't. If we're afraid that our teacher's going to hit us, that our teacher's going to mock us or embarrass us or humiliate us, we're too afraid to try and it's through trying and making mistakes and having a teacher that helps us learn from our mistakes that we progress and we become increasingly competent and confident in our skills.

So discipline is all about teaching, mentoring. Punishment is about imposing something that the child doesn't like in the hopes that it will deter them from doing that next time.

Durrant - intervening (2:00)

Yeah well in situations where children are really doing things that are just not acceptable because they harm other people, they need to know that and there need to be clear limits to what is considered acceptable by the family, or the teacher or the caregiver. But I think that, in situations like that, it's very important again to think 'this is a disciplinary situation'. If I immediately think punishment, I might spank or yell or criticize or shame or humiliate or punish in some way whereas if I think of this as a disciplinary situation where I need to teach something very important then I approach it in a very different way. First I try to understand what is motivating the child's behaviour. Why is the child bullying that other child? Is the child, you know, lacking in social skills and unable to express anger in an appropriate or less harmful way? Is the child lacking in empathy? Is the child failing at school and feeling a need for a sense of power? What is behind the behaviour?

And if we understand that, then we can take action that will actually change the behaviour. And each of those motivations would lead to a different disciplinary response. But again discipline teaching. Discipline is communicating, explaining, giving information, helping children see another person's point of view, and setting clear expectations but not in a way that exacerbates the situation which physical punishment generally does.

Durrant – Introduction to Positive Discipline (1:53)

The positive discipline program has three primary aims. One is to provide an answer to the question if I can't spank my child then what do I do? This seems to be a question that is common around the world and many people have a difficult time articulating what that response could be. Another aim is to provide an effective constructive alternative to hitting and yelling and to punishment in general so we want parents to really go away with actual tools and skills that they can use in situations of conflict and when they're feeling really emotional, frustrated and angry, which of course happens in parents daily lives and we also wanted to provide an explanation of what children's rights really means.

When we talk about children's rights in relation to discipline, often parents think that what we're saying is well they have the right to do whatever they want to do or we let them do whatever they want to do but that's not at all what we need. Children's rights in the context of discipline really means protecting them from violence and humiliation so making sure that we uphold their rights to dignity and physical integrity, and also their rights to voice their views so positive discipline is really centered around understanding the child's perspective and when we do that then we're much more likely respond in a way that makes sense to them, that they see is fair and that actually helps them to learn.

Durrant – negative effects of physical punishment (3:44)

Well research is highly consistent. We know, from a recent meta-analysis that was conducted on all of the research on physical punishment that's been conducted over the last decades, that is consistently, reliably, a predictor of a number of long term negative outcomes. It does not predict any positive long-term outcomes. The only positive--in quotes—outcome, might be compliance. So when a child is doing something that they're not supposed to be doing and the parent hits them, they're likely to stop. But that doesn't always happen.

Sometimes, well, in fact in a lot of cases, the child isn't able to. They're not developmentally ready to meet the parent's expectation or control that behaviour. Or they, for example, if a child is spanked for not going to bed, it doesn't address the fact that that child might be afraid of the dark. So even compliance is not, by any means, a reliable outcome.

But the outcomes that are more reliable are things like increased aggression levels, poor relationship between the parent and the child. So even at very young ages, children who are slapped on the hands are more likely to avoid their parents. Decreased motivation to explore their environment. Many parents think that by slapping their children's hands they'll teach them not to touch dangerous objects for example. But really what the child learns is that their environment causes them pain and so they explore less, they touch less. And we certainly know from everything that we have learned about child development that exploration is absolutely critical to their brain development and their intellectual development.

It also predicts poor mental health. So we see higher levels of depression, anxiety, eating disorders, sense of hopelessness. And we see a higher likelihood of anti-social behaviour as well. So while some parents feel that if—and I've heard this many times—that 'if I don't spank my child when he's six, he'll be in jail when he's 16'. Actually, the research shows the opposite is the case, that the more children are physically punished when they are young, the more likely it is that they will get into trouble later.

And these things are all inter-related of course, because as the child experiences pain at the hands of the parent, the trust in the parent becomes eroded, the attachment becomes eroded, the time spent with the parent decreases because the child avoids being with the parent and so the parents has fewer opportunities to teach the child coping skills, they have fewer opportunities to teach them other ways of dealing with their own conflicts and their own frustrations and so there's an interference in the development of their competence and their coping skills. The parent of course, is a powerful model. Sometimes we think only in terms of punishment and reward in terms of how children learn, but actually a very powerful part of learning is modeling. So what we see others do who we think are people of wisdom and knowledge, we internalize that as 'the right thing to do'. So when we see our parents hitting when they're angry, we learn that that's an appropriate thing to do.

Durrant - opportunities to teach (4:44)

Learning about emotions is one of the biggest challenges for children. I think if we remember that they're born into the world without even a sense of self, that to expect them, by the age of two or three when they've just developed some language and they're just starting to understand about relationships to expect them to be able to understand their emotions, reflect on them, control them, plan for them, is just absolutely unrealistic. And yet that's a situation in which children are often physically punished: for tantrums, for crying, for getting angry, for yelling—and really what these children are demonstrating is that they have emotions just like we do, but we have decades of experience in how to manage them.

What we need to do is draw on those experiences and have a more constructive and more competent response than the child. So, if we respond at the two-year-old's level of yelling and hitting, we're not doing anything to make use of that opportunity to teach them ways of managing their emotions. We don't want to kill their emotions. Emotions are an important part of being human--and expression and experience and communication and enjoyment—but we do need to help them understand what they are.

A young child who's having a tantrum or having a 'melt down' is going through a storm--an emotional storm-- and they're as frightened of it as they are angry. They're really scared of what their bodies can do to them. And so if a parent, the parent who they most depend on and trust and need for their security then hits them, or yells at them and escalates that storm, the parent has really violated the child's trust and sense of security and they've also missed their greatest opportunity to help that child start to learn about emotion.

So if the parent can stay calm, and can provide a secure base for the child while they're going through this and then later when things have settled down to be able to help them label the emotions they felt. To show the child they feel that way sometimes too. To talk about what they do when they feel that way. To communicate that they're there to help them, they're there to provide a safety net for them when things have gone just out of control in the child's mind and heart. That they'll be there to help them through it and that they will help them learn to manage that over time. So what I think is ironic is that many situations that we call 'disciplinary' situations we often link that to punishment situations when really disciplinary situations are teaching opportunities. So a situation where a child is saying 'no' or is crying or screaming or throwing himself on the floor and pounding, that if a parent thinks of that as a disciplinary situation and they automatically then link to punishment, they're going to come in and probably lose that opportunity whereas if they think of a disciplinary situation as an opportunity to teach, this is a window of opportunity to help move my child along the developmental pathway to my long-term goals. Long term goals often include things like being able to control anger or express it constructively, to communicate clearly, to cope with sadness and disappointment, to be able to delay gratification, to be able to express emotion in a way that doesn't harm other people. And so to get to that long-term goal, parents need to seize these early moments to start giving that information and support and teaching to the child.

Durrant - physical punishment (2:40)

Well, they do it for a number of different reasons. I think the first thing to always remember is that most parents love their children very much, and what they do intentionally, they usually do thinking it's in the best interests of their child. So some parents will spank their children or use other forms of physical punishment intentionally thinking this is a way to teach the child what they think is important for them to learn. Other parents will strike their children impulsively, when they're angry and regret it instantly. Those parents don't think that it's the right thing to do or the best way to teach the child but they're reacting in the moment to frustration and the adrenaline that rushes through them.

So there are also experiences in parents' lives that can sometimes generate a feeling of wanting to get even and that can be another reason why parents hit their children and it's a sense of retaliation or 'I'll show you you can't do that to me'. So that's another sort of emotional context, I guess, in which it happens. So in most cases parents are spanking because they're angry and frustrated and they have sometimes 'painted themselves into a corner' as well. They've threatened the child, and then when the child doesn't comply for whatever reason—maybe they can't—they feel they have no choice but to follow through and I think that's one risk we run when we tell parents 'always follow through; whatever you say, make your words count'. Because if they, in a moment of desperation, threaten a child, they have to follow through even though backing down would probably be a better response.

So there are a few parents who spank their children because they really think it's the best thing to do. But most are doing it because they have lost their tempers. And we know from research that most parents actually think that the most frequent outcome of physical punishment is not learning, and it's not respect, it is actually parental regret: they really don't want to do it and they would rather have other responses ready, very ready at their disposal when they're in a state of high emotional arousal.

Durrant - physical punishment is abuse (2:05)

But what we know from 30 years of research is that what we now call child abuse, which is people who are identified and, you know, either charged of have their cases/reports substantiated, that those people, really, are just trying to teach their children a lesson. That they aren't usually cruel or crazy or anything different from the rest of us; that they are people who believe that by striking their children they would teach them something that they thought they needed to know. And that in retrospect they may still even justify it, that what would you have done? What else would a person have done in that situation?'

And really, what we've learned is that if we target physical punishment, that mild spanking—that word spanking is even interesting—but if we target that we can prevent so much of more severe kinds of acts. That we can't sort of carve out this zone of aggression, parent to child aggression and say 'this is okay. This is healthy aggression'. Or 'this is non-violence. It's just not reality. It's a way that we have of justifying our own actions to ourselves, but it's not reality. The reality is that physical punishment has immediate potential to escalate and that it is, that it reflects a difficulty that the parent is having in finding a constructive solution and it indicates that that parent needs support. So we shouldn't just be accepting it and justifying it, rather, we should be targeting it and doing everything we can to help parents find positive ways of guiding their children.

Durrant - crying (0:59)

When babies are crying, if a parent assumes that that baby is crying just to make them mad, which is not an uncommon assumption, then that parent is likely to either ignore or to get angry and to shake that baby. If the parent has a recognition – recognizes the developmental aspects of crying, they're much more likely to say that child is signaling me about something, and I, as the mentor, as the teacher, as the one with the wisdom, knowledge, and experience, my job is to figure out why that's happening and to not respond with force because that doesn't make any sense, given the child's developmental level, but to respond in a way that is going to help that child learn that I'm here, that I – they're safe.

Durrant - rights-based program (1:25)

Yeah, positive discipline is a rights-based program, in the sense that first of all we know that the convention and the rights of the child states very clearly that children must be protected from all forms of violence includes physical punishment and humiliation. So when parents call their children names, when they embarrass them, when they humiliate them, when they force them to, you know, do things that degrade them, those are all forms of violence. So if we as a country have ratified the convention, and we are obligated to do all we can to eliminate all forms of violence against children. So this program addresses that, in the sense that we're trying to help parents find ways of interacting with their children that are non-violent. And we teach them through warmth and structure, we don't we don't just tell them you can't hit. We tell them why hitting isn't going to get them where they want to go, and give them information about what will help what will be much more constructive, and help them understand the reasons why, and really internalize that.

Durrant - scaffolding (3:34)

Scaffolding refers to a process through which we teach children, by evaluating where they are right now in their understanding, what the next step in their understanding would be, and then giving them the information and support they need to get from where they are to that next step, not doing it for them, but giving them the information they need to gain that skill. So then they move to the next level of understanding and skill. And then once they're there, we give them the information and support they need to get to the next level. So we might be modeling, we might be talking and explaining, we might be helping, we might be doing going part way and then help helping them finish the rest of it.

You know, I'll give another example of when my son was in school in another country, he learned how to sew, and he was about six years old. And he came back with a dragon that was as tall as I am. Now of course he didn't sew every stitch in that dragon there's no way he could have done that. But what the teachers did was use that project to teach them little by little. So the first step was let's figure out how you choose the fabric you're going to use. So they go the store and they talk about it all, and talk about how the different fabrics, you know, behave, and how they'll feel. And then they teach them how to thread a needle by doing it over and over again, and helping him find it, and giving him, you know, a needle with a great big hole that'll help him do that easily so that he gets the feel of it and understands the action. Then they show him how to make a stitch, and then he starts to learn to make stitches. And he the first ones aren't very good, but they give him advice along the way, and model and model, and he learns and learns, and he gets better and better and better.

And that's really what scaffolding is. It's instead of saying do it this way, and then when the child doesn't succeed, saying well that was a stupid thing to do, or go to your room, or well, you know, do it'll you get it right, that's not helping the child. That's not helping them build their skills in any way, but saying well let's see what happened here, you know, what did you try? Okay, well maybe what if you try it this way? Try it this way and see what happens. Then the child is learning.

First of all, they're learning that they cannot do it correctly and it's okay, they're learning that they can come to you for more information and support, and they're going to actually acquire skill, because you're helping them to become problem solvers. So when they become parents, maybe they'll be better problem solvers too, because they'll say well that didn't work very well, that didn't go the way I wanted it to go, what happened here, what did I try, what else could I try, what might work better, why didn't that work, what's – what's going on? So whether you're sewing, or whether you're cooking, or whether you're building a bridge, or whether you're building a house, or whether you're parenting a child, it's all the same process of just thinking okay, well why – what's going wrong here, why are we not getting where we want to go, what else could we try, let's try that and see how that works for us.

Durrant – understanding child development (1:11)

So we're really helping parents to refrain their negative perceptions of children's behaviour. So as opposed to kind of surviving it, looking at it as a thrilling development, and what a tantrum symbolizes for example in terms of the child's development. A tantrum might be something that a parent feels completely overwhelmed by, and many parents feel afraid that if they don't control that, the child's going to end up in jail when they're 16 or something. If they can understand that tantrum is the sign of their developing emotional awareness, then they can look at it entirely differently. It doesn't mean they hope their child has tantrums all day long, no. And what we want to do is use those opportunities to help the child learn more about their emotional development, to acquire a little more emotional regulation each time. But instead of seeing it as brattiness, or stubbornness, or defiance, or non-compliance, help parents see it in terms of the developmental task.

Durrant - universal program (2:38)

The program was originally conceptualized as universal information that every parent can benefit from. And -- and we recognize that every parent needs support even parents with PhDs in child development need support, information, new ideas, new perspectives. You get tired, you get stressed, you get caught up in the moment no matter who you are. And so what we wanted to do was help parents to think it through, to be prepared, to practice, to plan, to recognize their stress triggers and so on and we see that as a universal need.

And so it was conceptualized as a universal program, meaning that it is appropriate for all parents, and that it's it is never going to be used -- I hope -- as a targeted program. We -- we have not thought in terms of risk. In -- in my own personal view, while I recognize that there are certain situations in parent's; lives that make them more vulnerable to perpetrating violence for example against their children, just because there may be some statistical relationships between certain factors and parent's; behavior, those factors actually explain very little of the variance they explain very little of violence and we know from just prevalent studies on physical punishment that it's universal, and it doesn't really matter what your socioeconomic status is, what your marital status is, what your gender is, what your educational level is. Most parents have struck their children, so the -- it – it's it has never really made complete sense to me to only provide parent support to parents that we define as at risk, because we're all at risk -- everyone of is at risk. And so I really wanted to provide something for all parents, whether they are low-income or high-income, whether they're living in Japan or Mongolia, or Latin America or Canada, Whether they're -- they have five children or one child, and no matter what their educational levels are. This is meant for everyone.

Fernald – conditional cash transfer programs (1:27)

Conditional cash transfer programs work by transferring cash to, usually the mother in the household. The idea with conditional cash transfers is that they address two needs: a short-term need and a long term goal. The first goal in terms of the short term need that a family has need for cash, that it can relieve that sort of acute pressure. For example: a child is hungry, a child needs shoes, a house need a roof, a child needs a bicycle; that it can relieve that kind of pressure.

And then the second goal is achieved by the conditionalities of the transfer. So the cash part is alleviating the short term need, and the conditionality means that in order to receive the cash, households have to comply with a series of behaviours, and what those behaviours relate to, there are a variety of different kind of behaviours, but in general they relate to positive health and education behaviours. So this means that in the case of a pregnant woman, that she needs to attend a health clinic on a regular basis. This means that children attend regular growth monitoring checkups, that they receive micronutrient supplementation if they are undernourished or having any growth faltering, and this mean that for older kids that they go to school 85 per cent of the time. There's some requirements for older adults, but it's really focused on the younger children, on households with young children I guess I should say.

Fernald – Mexico cash transfer program (3:05)

I have spent the last 10-15 years involved in the evolution of Mexico's large scale cash transfer program, and was involved in the follow up, the three to five year follow up and the seven to ten year follow up of child development outcomes from a large randomized control trial that began in 1997.

So the most amazing thing about this study is that it was randomly assigned at the community level in 1997 which is rare in a kind of a large social study like this, and so we were able to follow children who had been enrolled in the program, they're now probably 15 years old and we followed them at two different time points. So there are two key findings that came out. The first is there were effects on reducing behaviour problems in the children who had been enrolled longer in the program than those who hadn't been. So the main effect of reducing behaviour problems was clear at three to five years and also at seven to ten years, that was a very clear and significant finding for both of those time periods. Those were looking at the program effect. The second thing we really wanted to do was look at a dose response relationship to the cash the households were receiving. So for example a household that received, this was now looking at children who had been enrolled in their program their entire lives, this is looking then at how much cash the household is receiving, and then looking at how the children develop and what we found was that they households that received more cash as part of the program, controlling for all of the baseline variables, and all of the housing, and all of the household and parental variable etcetera, the household that had received more cash, those children were the ones who performed better in terms of cognition, in terms of language, in terms of having fewer behaviour problems.

So it was a finding showing really that among children who had been enrolled in a program for their entire lives, there's really a clear dose response relationship, and improvement in cognitive and language outcomes for those children who had received more cash, who had been in households that had received more cash.

There's a very high take up rate so I should mention that the Mexican cash transfer program increases income by 20 per cent, so it's one of the biggest increases. For example I just wrote a paper about the Ecuador conditional cash transfer program and that one only increases income by seven per cent. So there's a very big range in terms of how much income households receive and the Mexican one is at the higher end of the range, so the compliance rate is quite high, in Mexico it's reported to be 97 per cent compliance in all groups, so this allowed us to be able to do this dose response analysis without worrying about a significant part of the population dropping out.

Fernald – monitoring and evaluation (1:53)

In terms of monitoring and evaluation and what's important, I would say the key is to monitor and evaluate, because from my perspective as a researcher being able to see the effect of a program, you can't do that unless you have baseline data, unless you have data collected throughout the process, you cannot do it if you don't have end line data to look and see the effectiveness. I think it's easy to lose track of how important it is to monitor and evaluate programs when you're so wrapped up in the administration of the program itself, but keeping an eye on the fact that being able to show that a program works or doesn't work is really key to them being able to replicate that program, improve that program etcetera.

So where I would start in terms of thinking about evaluation of any program is really thinking about what the goals of the program are and what the program is trying to achieve. For example, I might come in and have a really different idea of what a program is supposed to be doing than what the person designing the program or funding the program has, so in terms of thinking about if the goal of this program is, for example, lets say this program was targeted at three to five year olds and really wanted to increase readiness for school. So let's say we agreed that the outcome was really looking at readiness for school, then what we would do is figure out what are the things in this culture and this context that would make a child ready for school. In some countries and contexts it may differ, but what gets many children ready for school in many countries and in many contexts is literacy, numeracy, knowledge of numbers, knowledge of letters, and some socio-emotional awareness, and some ability in terms of executive function and executive control to inhibit inhibitory control.

Fernald – programme reduces maternal depression (0:46)

The program had a significant effect on reducing depression in mothers. So, this was really exciting because it's a clear pathway. People always ask what is the cash doing? I see two clear pathways. One is that households can simply purchase more books or toys for their kids and that could improve cognition or improve language but another clear pathway that really comes out of the mental health and psychology literature has to do with the fact that mothers who are getting cash are less depressed, and we have shown this now, and are then able to be more sensitive caregivers for their kids. So I think both of those pathways really seem to be at work.

Fernald – programmes in resource limited countries (1:12)

Conditional cash transfer programs can be helpful strategies for much more resource limited countries but they have to modify expectations of participants, I think that's the key. The Mexican program, which has requirements in terms of healthcare participation, participation in education etcetera, that's a very high degree of expectation of a participant that requires a lot of social support. Conditional cash transfer programs in Malawi for example are much more limited. They focus, for example, on adolescent girls, on keeping them in school. So in that case it's girls who are already in school or who are at risk of dropping out are receiving a stipend, a bonus, for staying in school. So that's not requiring any more investment in the infrastructure of a healthcare system or even in other schools, this is targeting children who, adolescent who are already in school.

The point is that they've used cash transfer programs in more specific domains where the requirements are able to be fulfilled, for example in Tanzania where they use cash transfer programs for girls who stay HIV negative and Malawi using a cash transfer program for girls who stay in school.

Fernald – scaling up challenges (1:13)

We know what works in a more contained, perfect work smaller environment but then what happens when you bring it to scale? I can tell you a perfect example, which is that we have these great models of parenting interventions. Smaller scale, but really beautiful effects of home visitors coming to the house and teaching children how to make toys and coming on a weekly basis and now I'm looking at a two years after a large scale up of a parenting intervention in indigenous population in Mexico, and what this means now though is a lot of modifications to what that intervention looks like. For example, it's no longer feasible to go to the home, so we have women coming to a community centre. It's no longer feasible to have it focused just on one child who they're targeting because if a woman's coming to a community centre, she has to bring her three other children. So I was just last week in Chiapas observing this intervention and seeing the room full of love and energy and chaos. You know, 30 women and 40 kids in this room receiving education about parenting is a really different kind of intervention than you know one on one in a household that's much more controlled and contained.

Fleming – MAVEN (1:20)

I'm part of a study called the MAVEN: Maternal, Adversity, Vulnerability and Neural Development project. It's a longitudinal sample. We assess mothers during their early pregnancies and we follow the mothers and their kids up through now six years post-natal, post-partum. We've been looking at the genetics of mothering in those mothers. We now at six months post-partum we're looking at how the mothers interact with their babies. So we observe them, we do videotaping of their interactions with their babies. We give them questionnaires, which gives us information on how they feel about mothering and their babies, and we do general coding of their sensitivity, so do they respond contingently? Do they seem to notice what they baby's doing? Are they inattentive? Are they attentive? So we can get an assessment of how they're interacting with their babes. We've also collected buccal swabs to get some of the genetic information and we've been looking at genes that are related to neuro-transmitters in particular which we know are very important for mothering in other species.

Fleming - mothering (2:15)

Often mothers who have had very poor early experience being mothered, they've been neglected or they've been treated harshly, that will influence actually how they mother later on and also whether they want to mother.

That's sort of an environmental reason for mothering. The work I've been doing is much more biologically based I'm sort of, concentrate much more on the role of hormones and mothering. So we know that hormones can predispose other animals, non-human animals to want to mother, but there also seems to be a role of hormones in human mothering, but not alone you see. So they're early experience matters and maybe their hormones matter. So you have those kinds of environmental and then hormonal factors. You can look at whether mothers have support around them. That can help them adjust to mothering or transition into mothering if they have a lot of support. It's one situation if they're alone, in they're quite poor, if they're have been sort of not supported by their community then that makes it much more difficult to mother. So contextual things matter. The brain matters. We've done a lot of work on neurons in the anatomy of mothering and how hormones act on that brain to predispose females to mother after they've given birth. But of course, you can mother without undergoing hormonal changes. We know adoptive mothers will mother. Now what's interesting is that in other animals, you can show adoptive mothers will mother as well, so you don't need the hormones in order to do the mothering, but it helps, it just helps.

It's sort of multi factorial to be academic, so why do mothers want to mother? I think there are probably a lot of different reasons and a lot of different mechanisms.

Fleming - mothering variation (2:06)

Mothering isn't unitary. It's not as though there's something called mothering. It's very complicated. It's got many aspects to it and what I've been studying is how mothers emotional state impact how they interact with their babies. How mothers executive function and cognitive function and attentional function impacts how they interact with their babies. How mothers memories will influence how they interact now and later with first and second babies. So that I think they there are many general process systems like memory, like emotion, like attention and executive function and perception which are general process functions which have to be recruited in order for a mother to be attentive, to pay attention, to be attracted, to be in the mood to do it as it were so that you have to understand the role of all of these in order to understand how a mother is with her baby, or an animal mother is with its baby.

In humans we know there are many, many aspects of behaviour that influence mothering, like if a mother's depressed, that's a really rough place to be. You're depressed and you're not responsive, you know, and in fact your baby very rapidly learns to deal with that, but it's a very difficult emotional thing. It's nothing about how much those moms love their babies, they love their babies, but if you're depressed then these other things take over, and so you're not able to respond in the same way. So I think you have to think about mothering as being quite complex and that's what I study.

Fleming - three genes (2:26)

The genes that I'm interested in are mostly those genes that we have a strong basis for believing should be important given what we know about the role of the brain and the role of neurotransmitters.

In particular dopamine, serotonin, and oxytocin are the three gene types that we've been working with. So we find out whether they're variations in these genes in mothers, and indeed there are. The serotonin transported gene, there's a lot of variation, three variants of that. Dopamine receptor genes, there are also a number of variants for those genes, as well as oxytocin, which is a gene for a transmitter that's actually been implicated in bonding and mothering in many contexts.

Then we look at those variations, we look at the variations of the mother's behaviour and we try to relate the two. We find, indeed, that there is not only that there are variants say of the dopamine genes, which seem to relate to the variation sensitivity in mothering. But, in general, it's never a direct effect, or in general it's not usually a direct effect, so that we also find that how mothers have been raised, that is their early experience interacts with the kind of genotype that they show. For instance with the dopamine genes, with the serotonin genes and with the oxytocin genes, and what that means is that you can have had a bad experience in early life and only if you carry a particular variant of that gene will that early experience be seen in somewhat sub optimal or difficult mothering behaviour, okay. But if you have the other variant of the gene, even though you've had a poor early experience, it somehow protects you so that you show less difficulty in your mothering. So that's what we mean by an interaction, and I think that tends to be the case for many of these gene effects, is they don't, they're not really direct effects, it's not as though if you've got a particular gene this is how you're going to mother. It really does interact with many factors, early experience being a very important one.

Gluckman – developmental origins concept (0:40)

Well the concept is very simple. It simply says that things that happen early in life, from before you're conceived, through pregnancy and in infancy, have consequences for the rest of your life. They affect your risk of getting obese, of getting heart disease, of diabetes, mood disorders, bone disease and so forth. It's not just one mechanism; it refers to the fact that a lot of different biological mechanisms are affected early in life which have echoes right through life, and potentially into the next generation.

Gluckman – preconception factors (2:12)

There is increasing interest in the role of what happens before the baby is actually conceived. It is clear that the nutritional state of mother, her body composition, her micronutrient status, does have influence on what happens to pregnancy, and to pregnancy length, in terms of the birth weight of the child, and in terms of longer term consequences in terms of the risk of developing these problems of obesity, diabetes, and so forth. We have known for a long time of course that micronutrient deficiencies have direct effects on the fetus. For example, folic acid deficiency around conception leads to a greater risk of neural tube defect and so forth. So it shouldn't be a surprise that more subtle changes in the conditions of the egg as it's maturing, might influence the changes in the gene switches, the epigenetic changes, that lead to consequences later in life. What's now appearing to be very interesting is that father may have a role too. That there are changes in the gene switches within the sperm, signals in the microRNAs that control the way in which genes are turned on and off, which are affected by what father does in the months before conception occurs. It appears that obese fathers are more likely to give birth to children who are more likely to be obese. There are other suggestions, but they are only suggestions, that alcohol, smoking, other things might also affect the sperm, and therefore affect the child in the next generation. These are subtle effects, but it makes them no less important because all said and done, 70% of the people in the world will ultimately die of heart disease, or diabetes, or cancer. And to the extent that we can reduce the risk of that in the modern world, by changing the way these gene switches are set in early life, may have may magnify into major effects later in life.

Gulshaeva – importance of play (1:15)

Well I think for, it is highly important and if we talk about our own context, generally play in the society and even by parents was not considered as important in the development of the child. It was considered as something that we would just do and that would not have any meaningful, any meaning and impact on the child development. But since we all know from the early, from the early childhood development and from all the practices around the globe, play has significant impact in the all spheres of child development be it physical, cognitive and social, emotional part of child development. So, that is why we are now trying to encourage the shift in parent's mind from, to understand why play is important and why it is important to provide children with diverse opportunities for play not only in house, in the home environment but also outside in the communities.

Gulshaeva – pressure on primary schools (1:27)

As a result of the ECD, the existing of the ECD centers and the work that we are doing, there is more demand on ECD on primary teachers because when kids come to the primary schools, they basically are aware of the pre-primary curriculum. So, that puts demand on primary teachers to make the learning at the primary level more enjoyable so that the kids, basically they are able to sustain the kids in the school. And we have some anecdotal evidence from the school, from one of our ECD centers in Rushon where the ECD teachers were sharing their thoughts with us and saying that this year the cohort that has graduated after a month or two in the schools, every afternoon when they go out of the school, of the primary school they come back to us and tell us that we don't want to go there because there are no resources, because we don't play, because we do not have, we do not enjoy it. We need to work more with primary teachers to make the learning at primary level as enjoyable as we can, as it is in the ECD centers, so that the kids sustain that joy, that interest for learning that they have taken from ECD.

Gunnar – attention (1:41)

And one of the new frontiers now of course is we just can't keep finding out that the early experiences matter, and that you can be in deep trouble if you don't have supportive early experiences. We have to try to figure out what to do about it. And the attention area is one where I think people are going to make the biggest headway, sort of the soonest. Because we're beginning to understand a fair amount about interventions that improve your ability to focus, your ability to attend. And there are a number of different programs out there that are working on areas like this. So there's the, what is it, Tools of the Mind, Adele Diamond has studied that, and you are improving attention and attention regulation with some of those kinds of activities.

So, there's a lot of interest out there, one of the things that folks are looking at is yoga; mindfulness meditation - the kind you would do with kids - which is really about focusing, calming, etcetera. So they're trying things like that. Do we know what to do yet? No, there's a lot of activity out there of doing what we call pilot work, the initial, so you get an idea. It might work. We tried some mindfulness training in the preschool down here last summer and it improved executive function. It improved their attention over, I couldn't believe it. Now you've got that data, you've got to go back to NIH and say, "Okay, we've got some evidence now, can we do a randomized trial in a larger scale to see if it actually works?" And can we try it with children who have more difficulties etcetera. So, it's a new horizon.

Gunnar – attention abilities (3:18)

We know that there are many children who struggle with attention and attention regulatory problems. And we know that some of those kids have had absolutely the most perfect, gentle, sweet childhoods. They probably carry a very high genetic load for attention regulatory problems. But, we also know that many of the kids that we see with those problems come out of a context of chaos, and adversity, and so on. If you go down the socioeconomic ladder to kids that are growing up under poverty and you look at those kids in school, you see much more evidence of Attention Deficit Hyperactivity Disorder.

We, in my own research, I have studied children adopted from orphanages. And part of my interest in those kids is they certainly have been growing up in contexts without the relationship regulators of stress biology. We know that when we look at the biology of stress in the context of the orphanage, we're seeing very clear evidence of chronic activation of the systems. And, yeah, when they're adopted, they go into homes with families that have really jumped through a million hoops to adopt them, and are pretty well educated, typically, making reasonable income, because that's what happens, know how to look for resources for their kids and are doing about everything they can think of. They aren't perfect parents but I have never met one. I mean, I'm not one. You're probably not one. Perfection is really a tough one, but they're, generally speaking, quite good parents.

So, I can look at what the impact of early adversity is on these children's development. One of the biggest signals we see is Attention Deficit Hyperactivity Disorder, is they have problems regulating attention. And even the ones who are not at the level of being classified with that are struggling on all the kinds of tasks that we have that require using drawing in your prefrontal cortex to regulate your basal ganglia to perform tasks in sort of a competent-we're doing a lot of work trying to figure out exactly which regions in the prefrontal cortex, which tasks have been the most influenced.

The have problems with working memory. I'm pretty sure that that's going to be one of the chronic ones. They aren't too bad on planning, but they certainly have problems with what we call cognitive inhibitory control. Real struggles with playing red light, green light for example. Or Simon Says. Those kind of tasks where you have to inhibit a pre-potent response they struggle with. So if you have kids who are growing up chronically in really adverse environments, and they have these attention regulatory problems, they also often have aggression problems.

And we talk about externalizing. They are the ones that drive you crazy in the classroom. And they're likely to pop another kid and show real problems with aggression. The kids that we're seeing out of orphanages have the attention regulatory problems, they don't, often they don't have the aggression problems. And we know from research where you improve concurrent parenting that you can really pull externalizing problems down for kids. So we think that what we're seeing is the impact of early adverse care on brain development in the context of pretty supportive caregiving, and the kids really wanting to do the right thing. But they still can't do it with their attention.

Gunnar - brain and stress (4:10)

The brain is one of the major target organs, as we talk about it, for the stress hormone that I study: cortisol. There are many receptors for cortisol in the brain in very different regions. Whether or not you want to talk about it as a problem for the brain or what the brain is supposed to be doing, you see effects of this hormone on the brain. To understand these effects, you need to know that there are two different kinds of receptors for this hormone. One kind is called the MR receptors and these are typically occupied, that is, the hormone is hooked to the receptor causing the receptor to make the cell do what it's supposed to do. These are typically occupied when cortisol is in its base or typical non-stressed range. Those effects tend to be what we call promotive. They're healthy for the brain. They help support the brain doing sort of healthy, growth-promoting things. As the hormone rises into the stress ranges the other receptor, called a GR receptor, begins to be occupied. The GR receptor tends to do and trigger those events that are energy demanding of the cell. And many of the effects we talk about as being challenges or threats to the brain are due to the fact that you get the cell operating in a very energy demanding mode.

But it reduces the ability of the cell to take up glucose which feeds the energy processes. So what you get are cells that are threatened because they're working very hard and they aren't able to pick up the energy that's necessary to return them to a quiescent state. So you do actually see changes in dendrites, the connections between brain cells, in high energy use areas like the hippocampus which is an area that's involved in memory and the dendrites begin to be sort of curled back and not as able to talk to one another. Or you actually see death of cells in these high energy use areas like the hippocampus. So one implication of this is with very high levels of this hormone over long periods of time, which the body doesn't like you to do, it tries to fight against that, you do see reductions in memory abilities, specifically what we call episodic memories. Memory for explicit events like where you parked your car this morning. And so you see those things.

In another area of the brain the amygdala, which is very involved in emotion processing, cortisol actually seems to up regulate or increase the activity there. So that with chronic stress exposure you get an area of the brain being on sort of a hair trigger for receiving and responding to threat and a memory capacity that's reduced. Those are two of the kinds of effects that people have looked at the most because we can model them in animals. Cortisol also has lots of receptors in the frontal regions of the brain which are involved in what we call higher order thinking: working memory, ability to plan, ability to inhibit behaviors, and so on.

Here we don't really know as much about what cortisol is doing. And probably the other thing for your students to realize is this system tends to operate in an inverted u-shaped pattern. Too little isn't good, too much isn't good, it's like Goldilocks and the Three Bears. There's a range of this hormone that's promotive of healthy adaptation. So it's not like we want to say "Let's get rid of this hormone from the body." "Let's never react to stress." Not true. What you're looking for, with healthy adaptation is a moderate stress response but it can be turned off and you get the benefits and you avoid many of the costs of stress.

Gunnar - measuring stress (2:46)

It seems very odd to people when I say well, I study stress, I study the stress hormone and the first thing they ask is how do you get measures of this? And I say I just take spit and that's very strange but the logic is simple. When we produce this hormone in the adrenal it goes into our bloodstream and goes around and does its work in the body but some of it seeps out into saliva through the pyrotic gland. The part that seeps out is the part that is actually not attached to proteins and that's the part that's biologically active in the body. So we can measure the concentration of this hormone in saliva and get a very accurate index of its concentration in blood. And that's why we measure it in saliva and of course with kids it's great, it's an easy thing to do with many children. Nothing is easy with all children but most children are happy to play our games. We don't ask them to spit. Surprisingly little kids don't like to spit. They'll spit if you tell them not to but not if you ask them to. So we use various techniques. One of them is a little bit like dip-stick candy. Maybe your students know what that is. We give them a roll of a long strand of cotton and a little cup with a few grains of sweetened crystals in it. They dip it into that, eat it, dip it again. The wetter your cotton is the more you're collecting all the little grains and then we just take the cotton away. And as far as they're concerned they've played what we call the tasting game.

(Example of tasting game done with children)

Non-invasive and it allows us, because the kids like it, to do it repeatedly so we can study them over the day. We can study them over a session in the lab taking as many as six samples in two hours. We can study them across days in child care and it's so simple parents can collect for us at home which allows us to look at home versus another setting.

Gunnar - prefrontal cortex (2:00)

The regions in the prefrontal cortex, the higher order thinking and reasoning regions of the brain. But some of those regions in the medial –middle-- area are involved in stress regulation. The logic here, nature's logic, seems to be, that if you're going to grow, if you're going to live in an environment of threat, you need to be an act first, think later person. And so these biases you're seeing, and what's happening to the brain, are getting you to perceive threat and react, and the prefrontal cortex isn't saying, "Wait a minute, let's think about it. Should we run? Should we not run? Was it a tiger? Did it have stripes?" It's going [slap] "outta here!"

And you're getting bias towards that. That's what we think is happening. We're looking for evidence of it. It certainly fits with what we think is one of the biggest challenges for children who grow up under really chronic stress. Which is they get into environments, like school, where they need to think, a lot, and inhibit action, a lot. And it's really, really hard for them. Especially when there's any distraction around, especially if anything's going on at home, which it often is, which is making them feel more anxious that day, is that they really are getting tipped toward act first, think later.

And the school context, the context we need for making a really good living, is a struggle because the brain, through eons of evolution, has mapped itself towards survival in a very different kind of environment. And we're learning ways to help those children rewire, right, and we're looking for evidence. The clearest evidence we ever see is a reduced brain volume, especially in the prefrontal lobes. That's been the, I mean, consistent, over and over and over and over again, our finding the prefrontal cortex really struggles to develop in the context of adversity.

Gunnar - relationships buffer stress (2:14)

So, I spent a good part of my early career trying to understand what regulates stress in very young children who were too young to regulate stress by controlling and predicting and all of those things. And the biggest thing was relationships. So what regulated, incredibly powerful stress regulators, to be in a secure attachment relationship with a person who is present. Not just to be in a secure attachment relationship and that person isn't present, but to have that person present and you trust, and we're still trying to figure out but I think it actually influences a region call the orbital frontal cortex, and it probably actually short circuits the signals to stress biology.

So what, for example, we studied babies when they were going to their Well Baby checkup—I use doctors a lot to stress babies because they could do things to make the baby healthy that were way more stressful than I could do—and we were interested in the physical exam and the shots that babies get. Two big shots. One in each thigh. Two months, four months, six months, and sometime in the second year. And we followed babies over those shots, and boy, at two months they're little bodies were going off like crazy, but that was probably okay because they don't have all those receptors yet for stress biology.

And then it began to shut down and by 12 months, they didn't elevate at all. Now, they cried like heck. They hated having shots. Their heart rates went up. But their cortisol didn't budge. Unless they were in an insecure attachment relationship with their parent, in which case it activated, not horribly, but it was as if the presence of that secure relationship was serving as a buffer. And the less secure relationships were sort of leaky buffers. We of course know that if you take that buffer away, if you send a child to child care, and they're alone, they've lost their buffer and they haven't yet made the relationship with the person in the day care centre, it's going to take weeks of every day that baby's going to elevate, a lot. But after a time, after about two, three weeks, they only elevate a little bit.

Gunnar - sensitivity and responsiveness (2:50)

So we constantly hear about the importance of sensitive and responsive care and the challenge is figuring out what that actually looks like. One way to translate that that we've talked about is like a game of tennis. Serve and return. This is the basis for all early learning is that kind of serve and return, you have with a sensitive and responsive adult. So the baby goos and you respond.

The challenge is whether you're responding too much and that's where the sensitive part of this comes. I don't know if you had a hovering mother. Luckily I did not have a hovering mother, but the kind of parent that is just over you all the time. Every little breath you make. They're there. They're wiping your face. They're looking at you. They're trying to be, they're being so responsive they're driving you nuts. That is over-responsiveness and it's not sensitive to what the child needs. And that's why we have both of those words: responsive and sensitive.

So, it's critically important to be able to read the child's signals to figure out when they need you and when they don't, when it might be important to step back and say, "No, you can do this" or when the child falls down say, "Oh, you're fine. Get up" kind of thing is actually more sensitive than, "Oh poor baby you fell down. Are you all right? Oh my goodness". Because what you're trying to do as a parent is to find that balance between what my child wants, what my child needs, and where my child needs to be tomorrow.

And you don't want to under-respond: "Oh, you're fine. Get up". You know, my parent never understood that I had needs. "You're fine. Get up." But you don't want to over-respond. It's a tough job being a parent. It's a horribly, horribly tough job. Some kids are much more forgiving than others. They can grow up into being robust kids in a range, even if we don't quite get it, none of us by the way get it right, and a robust range of us getting it wrong, other kids are more delicate. They need a bit more, the range of your variation is a bit more narrow.

But of course we can generally judge by watching how the kids are. And if you're watching families, if you're watching families, I sometimes tell my students to stop thinking and just, "How do you feel?" If you're watching and you're feeling is "Ahh, that feels good", then that's probably they found a reasonable balance. If you're watching, you're getting tense, and you feel like, "Eww, I don't know what's wrong but I don't feel good watching this", something's off and when you do the analysis you might be able to figure it out.

Gunnar - stress biology (3:15)

The research I do is research studying the effects of the biology of stress on human brain and behavioural development. Stress is a, the biology, the physiology of stress, is a really important mediator of the experiences we have and the impacts that that has on our brain development and our physical and health development as well. So, I'm very interested in that biology and we study that to try to understand how experience, some experience, especially adverse experiences, get under the skin and shape the way that we develop and our health.

So there are two arms of the mammalian --we're mammals—of the mammalian stress system. One of which people are very familiar with because we get really direct feedback from it. And that's the sympathetic adrenal medullary system. That's the adrenaline surge system. The one that you have a fright experience, you feel your heart suddenly racing, you get a lot of energy and you can run like heck for a very long period of time. The fight-flight system.

And we get measures of that by measuring heart rate. We can look at the two sides of the nervous system: the parasympathetic calm down side, we measure something called vagal tone. It's the extent to which you have variations in heart, in beats, timing between beats, that's related to respiration. And that's what the vagal system does. And the sympathetic arm of that system which we look at as something called pre-ejection period: the time between when your sinoatrial node says "beat", and your heart beats.

And so when you have more adrenaline flowing, that's shorter. So, the heart says, "beat" and it goes. Okay, so we can measure autonomic activity to get an idea of the fight-flight side. Also supporting, and extremely critical, is the hypothalamic pituitary adrenal cortical system. Notice that the adrenals are involved here in both sides. This is the outside part of your two adrenal glands. It produces something called cortisol in humans. It's a steroid hormone and it organizes long-term responses to stress.

So it helps you to sort of go from running immediately to being able to sustain that for a longer period of time. It also shapes the way the brain will respond to the next adverse experience. So we're very interested. My lab is particularly interested in that side of the stress system because, in terms of that question, how does it get under the skin and shape the way we develop, I'm interested in the regulation of that hormone which will shape longer term responses to stressors and life's challenges.

And we measure that in saliva. Because you produce this hormone, this steroid hormone, it goes into your blood stream, and some of it just seeps into your spit. So I can collect saliva and get a sense of how much of this has been produced in the child's body.

Gunnar - stressful events (2:21)

So in thinking about the kinds of stressors that children can encounter, we've talked about sort of the positive kinds of stressors. Right, where the child is actually in their repertoire to maybe figure out how to deal with it. There's a supportive caregiver around. They're developing competence while they're doing it. And we've talked about toxic stressors where there is no supportive caregiver, or the caregiver's gone over to the other side, the child isn't able, and they're producing chronic activation of stress biology which is wearing the system down.

There's an inner mediary, or a different type that we talk about that is tolerable. Stress. And that's, boy, big activation of stress biology, typically because of things that are way outside of the range of what a child can deal with on their own. Natural disasters. A terrible car accident. Death of a parent. We can go down the list. Famine. War. But we know that in those contexts, still, the most important predictor of whether the child will do well is, is there someone who is serving as that protective, supportive other that can step in as the biggest mediator of this. If there is, then he child will probably be able to do reasonably well. Maybe even learn something from those situations.

But if the, unfortunately, what makes those things shift over to toxic stress, is they frequently break the caregiving system also. And that's why as a society, we try to step in when we're doing it right to re-establish a caregiving system in those contexts. But we're not always very successful.

It needs to be someone who can be consistent, responsive, I mean we do what we can right. I mean if the caregiving system is completely broken we try to identify somebody for at least a period and then try to get them into permanency. It's that shift to permanency we often struggle, struggle with. And in many contexts, there's just not the infrastructure to be able to do that. So there are a lot of kids worldwide who are growing up learning to act first, think later.

Gunnar - stressors vs stress (3:43)

So when I start talking about stress and the impacts that it can have, the story sounds pretty scary. And very quickly parents and educators would like to remove all stress from a child's life which is really a bad plan. In research on stress, we distinguish between those things that can activate stress biology, and we talk about those as stressors, not as stress, because not everyone will react the same way.

We talk about stress as the actual activation of the biology, because in terms of what can impact the body, it's the activation of the biology that we've got to be the most concerned with and the way the body reacts to that activation. So, on the side of stressors, everybody's a little different when we start talking about things that are milder. So, I don't know about you, you might like to ski, but being on top of a mountain on skis, looking down at that little clubhouse down there is a massive stressor for me because I don't know how to ski and I'm going to kill myself trying to get down the hill.

So how we react to events has a lot to do with our interpretation of those events. Whether we feel safe, or threatened, or whether we think we can control those events, or not, whether we can predict when they're going to happen, or not. And for young children, especially whether we have a partner with us who is capable of providing safety.

So that's the stressors side, and we can talk about all sorts of particulars. The stress side, we're designed to be able to activate these systems. We need these systems. If you can't activate these systems, you're dead meat. And we know this because, in premature babies, for example, sometimes as a result of being born so premature, they're not able to mount effective stress responses. Those babies have terrible blood pressure. They're at risk of dying. They're actually given stress hormones to try to get their blood pressure up and to try to get them capable of managing.

So we have to be able to activate these systems. But these systems, along with doing wonderful things to mobilize our energy, and focus our attention, and help us remember what's dangerous and threatening and so on, are also very catabolic. They're all about breaking down energy stores, making nerve cells shoot, and fire off and create chemicals, etcetera. So it's like too much of a good thing. It really becomes a bad thing. So, if you're chronically activating these, running them high, then you're sort of, you're producing incredible wear and tear on the body. Something that's been called "allostatic load".

So we're preserving ourselves through activating these systems, allostasis, but there is a cost to that; an allostatic load. And it's all that allostatic load that builds up over time and creates big risk for mental and physical health including diabetes, and cardiovascular disease, and effects on the immune system, and increased risk for emotional disorders, and learning problems.

With young children, these stress hormones are even more problematic if they're run unchecked. Because the brain is developing itself in the context of these chemicals that are potentially creating problems, and are shaping a highly anxious, fearful brain. So, anytime in life, chronic stress ain't so good for us. Chronic stress. Chronic activation of these systems. Early in life, we're building the brain, and the context of chronic activation, and that's sort of a double, double issue

Gunnar – toxic stress (1:58)

So, when does it become toxic? That depends on the individual because some of us are a little more robust, we have better repair mechanisms. We're still learning about what that biology of repair mechanisms are about. We have neurotrophic brain growth factors that can fix things and so on. Others are more vulnerable. Many, for various reasons, some of us are better able at turning off stress.

So there are all those individual differences. Genes are going to be important. We vary. The experiences we have during development that write on our genes and affect how our genes function, are going to influence it.

But we do know some things that are very, very difficult for most individuals, and certainly most children, to deal with. And repeat after me. We can always, we can all go down the list. They are those kind, and we call these toxic stressors, that is they're likely to produce toxic stress: maltreatment, physical abuse, sexual abuse, severe neglect, repeated loss of caregivers, bouncing from one foster care home to another, living, growing up in a context of having extreme violence. They're all the things that we know, and in fact, one good way with young kids to figure this out is, if you're not growing behaviourally, if you're falling behind on your developmental milestones, if you're not physically growing as well, that's a pretty darn good indication without taking a spit sample, that what you're seeing is a child who is experiencing chronic stress.

Because part of the whole stress biology is, influences those things. We put growth on hold. Because we're trying to survive in the moment. So growth goes on hold. All aspects of growth go on hold to try to survive. And you just don't develop as well.

