

## Web-Based Radio Show

### The Mind and the Brain Part II


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Welcome to our Web-Based Radio Show. This is going to be Part II of “The Mind-Brain Relationship” and it is going to be an amplification and clarification of what we talked about last time. Last time we talked about how experience is necessary to create the mind which, in turn, creates the brain, or wires the brain, as it is sometimes colloquially called. I wanted to amplify this today because this is a complicated concept and subject and one that we get lots and lots of questions about and one, as I have mentioned before, we have been struggling with as a human society for many thousands of years. This is the way it works.

First, lots of evidence now exists from animal and human studies that experience is necessary for the brain to develop properly. Proper experience can develop a healthy brain and improper experience, or experience that is stressful or depriving can contribute to brain development that is not considered healthy. We only have to look at infants who have been deprived in orphanages to see that they can’t relate to others, many have low muscle tone or are just floppy and have trouble moving or don’t develop language as well as inappropriate behavior and emotions. Those infants and young children who are considered to be well nurtured who are brought up with healthy experiences seem to thrive and do well. When we do neuro imaging studies we often see differences in the brain structure of children and adults who have been through these two opposite kinds of experiences.

So we know that experience is critical. Also, lots of animal studies which we cite elsewhere, support the idea of brain plasticity; that Mother Nature prepared the brain for developing after the baby is born, rather than pre-wiring the whole set-up. This is so human beings can adapt to different environments. So there are only some basic capacities present at birth. Having established that as a fact, it is not refuted anymore or not even questioned because there is such overwhelming evidence for that; having established that, we need to look at how it really works and why we say that experience creates the mind and which in turn creates brain, because typically we tend to think about it the other way around – that healthy brain creates a healthy mind.




Let's take a newborn baby, a shining example, and then we'll elaborate a few principles from this example. A newborn baby starts off life with some basic capacities—they can see, they can hear, they can move, and they can experience what we might call global emotions like pleasure, displeasure, calmness, excitement, or distress. We see that with newborn babies all the time – yelling and screaming or looking calm like happy campers, although we don't see the big smiles for a few months, often.

Let's take a typical situation of a few week old or a one month old baby and mommy or daddy are playing with the baby and trying to get the baby look to the left, right, or up or down. If Mommy makes available pleasurable sounds and looks a little bit to the left and has a pleasurable, animated facial expression, there is a good chance that over a few seconds, the baby begins moving his or her head toward the left to find where that wonderful, beautiful, pleasurable sound is coming from and then sees maybe not the whole face but sees movements of the mouth that are associated with pleasure. Then maybe mommy rubs the baby's hand gently and there is some touch associated with this as well. And what do you know? The affect or emotion of pleasure is now helping the baby coordinate looking, listening, and maybe even touch along with movement. Now how does the baby do this? The baby does this because they can experience affect and pleasure, and then they can move, look, and listen. But they don't yet have the smooth capacity to initiate this on their own. They are just learning how to do this. So the baby is equipped at birth with the capacity to learn to engage and experience with the basics of the ability to see, to hear, to smell, to touch, and to experience some affects or emotions, and that these emotions can guide the baby towards things that are pleasurable.

There appears to be three steps that happen as a new experience is being mastered. First the baby, or it could be an older child too, reacts to some enticement in the world; what we call enticing experiences. So here is the enticing mother's voice – that is the relevant experience. The baby responds to the enticement or the pleasure and we get a reaction. That reaction leads the baby to begin putting these different aspects of their abilities together in one smooth coordinated pattern of movement – looking, listening, maybe experiencing touch – under the guidance of that pleasurable affect.

Then we begin seeing the baby kind of synchronously joining in with mother as she does this. We begin seeing a pattern of shared experience or synchronous experience. It is not so much a reaction but it is sort of like they are doing it together, like instead of the dance teacher showing you the step and you're doing it, you are now doing it smoothly together like Ginger Rogers and Fred Astaire in a movie; they are synchronized. The baby is working with the mommy or daddy in that same experience of turning and being guided by the pleasure.

The third step is the baby begins taking the initiative and can start initiating, for example, a little game (an older baby) to begin initiating interaction. He will woo, for example, by three or four or five months, a parent with a big smile and keep trying to woo that parent to smile back, rather than reacting to the parent's smile with a smile, and




then having shared smiles. Now the baby, when they get to the initiative phase, they can initiate it.

What we are proposing is that initially, the baby's emotions; that pleasure, helps the baby learn. It begins with the synchronous experience developing the mental capacity, to what we call the first stage of development – to be calm and regulated and take an interest in the world. Then it helps the baby begin the second stage of taking a special interest with real pleasure – the big smiles – in the human world by 3 or 4 months of age. But if this goes well, the baby starts initiating. We believe that as the baby starts initiating, that is the sign that the pathways in the brain have formed that makes this ability easier now for the baby to do.

What are those pathways? Well, the baby needs to form connections between the parts of the brain that look, that listen, that experience touch and smell with those areas that experience movement. It is the baby's affect or emotions and pleasure at looking at mommy's face and hearing her voice that leads the baby to have that experience that, in a sense, helps the baby connect these capacities together. So that is first a mental ability as we go through the steps of reacting, synchronizing in a kind of rhythmic pattern together, and then initiating. As the baby initiates, that is a sign that the pathway is now being formed.

Now what is the evidence for this? Well, the evidence is two-fold. When babies have this healthy, first experience of pleasure; of coordinating their senses with looking and listening with pleasure to mom's voice, babies who do this seem to thrive and begin developing well. Where we don't provide this; where the baby is deprived within an orphanage or a very depressed single mom or depressed single dad who doesn't care for the baby and the baby is not getting any kind of interaction, we don't see that ability to take initiative to look and listen. We don't see that ability to develop that beautiful smile by 3-4 months. When we do brain imaging studies of babies who have been deprived, we see differences in the way the connections between the different centers of the brain; the different parts of the brain. They are not formed in the same way as with healthy development.

So what we have here, then, is evidence that the experience is central. But just like with body memory and learning to play tennis or learning to play a musical instrument, you don't have the brain pathway there from the beginning. If you did, it would all be under genetic control. Instead what you have is the capacity to learn through using some basic equipment as the learning occurs. It goes through these three steps of reacting, of rhythmic synchronicity, and then taking initiative. Over time and with practice, you develop what is called the "body memory" or it is a sign that the brain pathway is there which makes this easier and enables the baby or child to take more and more initiative.




Now what we are going to do is trace these fundamental principles through the stages of development. Again, the evidence for this is that when we don't provide the enticing experience that we are getting and help the baby negotiate these three stages of being enticed and reacting and synchronizing and then initiating, their mental capacities are different – often dysfunctional. And, then when we do brain imaging studies and look at their brains, their brains are not properly forming. There is a lot of evidence of this from animal studies as well as human studies when we provide stressful experiences rather than pleasurable experience and calming experiences and soothing experiences early in life we also see irregular or abnormal development, so it is not just deprivation. So there are “healthy building experiences” that build healthy minds and brains, and those that are not as healthy.

I'm going to trace these next through the different stages of development that we have talked about, but I wanted to help clarify from what we talked about last time how the process works. It is guided by the baby's emotions – their affects lead the way because it is the pleasure in looking and listening that leads the baby to turn to mommy. It is the pleasure in that voice and that touch and that nice smile that leads the baby to begin taking a preferred interest in the mommy or the daddy or the other caregiver and we see this shared synchronous big smile; not to be sure that is helping the nervous system develop so that the baby is capable of the big smile. Yes, that does require brain development, but again it doesn't happen unless we provide these “enticing experiences” where the baby reacts, synchronizes, and then initiates.

So we have established that the baby is enticed by experience, reacts to that, then forms a more synchronous pattern with that enticement, and then begins initiating. As the baby initiates, through the effect of really practicing the ability; through using the looking, listening, and the other senses guided by affect in an interaction with a caregiver, as the baby is doing all of that, the parts of the brain that coordinates all of these experiences are beginning to form connections with one another.

So the first stage, we call “Regulation and Interest in the World.” That is where we see the baby learning to calm and that is because they are experiencing pleasurable, calming affects of their environment that are tuning in to their nervous system. A hyper reactive baby is helped with a more soothing voice and more slow movement rhythmic patterns and touch, and the under reactive baby is greeted with a little more excited and energetic enticement and so forth.

Then we go to the second stage, which we call “Engaging” or attachment or forming that relationship proper where we see the preferred emotional interaction with the primary caregiver. Here, we see the same three stages. Initially the baby has to be enticed into that big smile – we work pretty hard at it. Then we see it synchronized with us – we are smiling together. Then we see by 3-4 months or sometimes by 4-5 months the baby initiating – smiling and wooing. They are the seducer. They are the enticer. What is happening is that mental capacity is forming; the mind is forming. The mind is




forming the capacity to form engagement to form a relationship – not just coordinate the senses and motor patterns under the guidance of affect but now to actually focus it on a relationship that is a preferred relationship. Mommy gets a different response than daddy and daddy gets a different response than Aunt Tilly who hasn't been seen for a long time, and a stranger gets an even different response. So we see different reactions to those voices and looks and smells and touches that are familiar and pleasurable to those that may not be.

The mental ability is developing from experience, and as that mental ability develops and as we practice it, we go from the reacting to the enticing experience; the synchronizing with the exciting experience, to the initiating. That is when we believe the pathways in the central nervous system in the brain are formed, to some degree. Again, last time I used the example of a musicians who used their fingers a lot – they have more neuronal connections in the areas of the brain having to do with those fingers they use in playing the instrument. This is not going to happen with a novice who is just learning to do it, just like you don't have body memory the first time you hit a perfect tennis ball. But eventually, if you do it a thousand times, you develop that “body memory” and likely, although we don't have evidence in these neuroscience studies, your nervous system is functioning differently.

Now as we go from the second stage to the third stage, which we call “Purposeful Two-Way Communication and Emotional Signaling,” the baby now starts off in the same way. They react to different emotional expressions with the parent with different emotional expressions back, but first we have to entice a smile, a frown, holding up something on your head while giving a big smile or giving a curious look and the baby reaches for it and gives an emotional expression back. As the baby reacts to these enticing emotional experiences, we see the baby give a big smile as they reach for that funny rattle on your head or give vocalization with you. Then we get a back-and-forth rhythm going, but we are still working very hard to entice the baby into that back-and-forth rhythm. Then as we do this, we see the baby start initiating more and more. They start making sounds or hand gestures or leg or body posture gestures to entice us into these interactive games with them guided by more and more different types of emotions – curiosity, pleasure, even annoyance and anger, delight – various textures of different emotions. As these mental capacities are being formed, the baby is differentiating or learning how to experience and initiate different emotions as a part of two-way communication and interaction. As all of this is occurring, the baby is forming the pathways in the parts of the brain that make this possible.

What part of the brain makes this ability to sequence experience possible? Well, we are beginning to bring in not just the emotional centers of the brain which we brought in from birth, not just the parts that help the baby see and hear and move and experience touch and smell and other sensations in a coordinated way with each other; not just forming connections between these parts of the brain, but now we are bringing in the




parts that have to do with initiating, and to some degree, anticipating, and to some degree, planning. That has to do with the frontal lobes and the prefrontal cortex. So now between 5-6 months and 10-11-12 months, we are seeing the baby going from the reacting stage of two-way communication; two-way back-and-forth emotional signaling to initiating the emotional signaling.

Pretty soon you get to a fourth stage where this initiation of emotional signaling takes on a life of its own and gets very, very, much more complex. So again, we are seeing experience that entices, that the baby and toddler react to, we see a period of rhythmic synchronicity with these experiences and the caregiver and then we see the baby initiating more and more. So we see experience, we see the mental capacity to do this form for two-way communication, and then we see the brain pathways that support it; that enable the initiative to occur developing. Where this doesn't occur, we don't see these pathways develop to this same degree like in the example I gave of deprivation. Or, where there are stressful patterns rather than pleasurable, two-way communication we see different types of brain growth.

As we go through the stage of emotional signaling and two-way communication, new mental capacities are forming for now preverbal communication. This starts off with the emotional signals – our affects. This leads to a fourth stage that we call “Shared Social Problem Solving” where we see babies now take mommy by the hand or daddy by the hand to search for a toy or find food and point to a favorite food in the refrigerator. Basically what they are doing is using a continuous flow of back-and-forth emotional signaling to involve a social partner in some shared social problem solving – getting a need met. This involves a new mental capacity of lots of back-and-forth communication and lots of planning and anticipation with a social partner. Again, when it is guided by affect or emotion, there is a goal or a desire. The baby is clearly with this stage and the prior stage is developing a will and a sense of intent. So when we talk about the development of “will,” the capacity is developing here.


Here too, we need an available social partner. If the caregivers – mommy or daddy or the daycare center – are not available for shared social problem solving – let's say we have a baby who is in a busy group with a lot of noise and is being overwhelmed and overloaded all the time, let's say that baby is hypersensitive to sound. That baby will get overloaded and may retreat to a corner of the room rather than interacting and engaging in shared social problem solving. Or, a baby who is under reactive and no one is energizing up to entice that baby into interaction to find out what the baby wants so the baby can learn to take you so you can go out the door together, that baby, too, doesn't develop this capacity and we don't see this stage coming in as a mental capacity. But also, where these stressful experiences are occurring, for example in studies of busy daycare centers with just group experiences for babies, there are higher levels of the stress hormone, cortisol, by the end of the day. In home-reared infants who are not being overloaded with a group experience, they have a more healthy pattern of cortisol which



seems to be going down. We know that these stress hormones change the physiology of the brain; they change the way these pathways get wired. So we have the stress pathways getting developed as opposed to the pathways that will lead to smooth social problem solving. We see the beginnings of impulsivity; of inattention rather than nice attention and nice focus and problem solving beginning as mental difficulties at this stage. We also know from later brain imaging studies that there are differences in their prefrontal cortex and their frontal lobes and the connections these have with the other parts of the brain for a smooth functioning central nervous system. So again here, healthy experiences lead to healthy mental capacities which, in turn, after practice, when the child takes over more and more initiative after being enticed into the experience and after sharing the experience with you in the rhythmic kind of synchronous stage, goes into the initiative, the pathway is being formed. But, unhealthy development and unhealthy patterns of experience will undermine this and we'll get the opposite kind of reaction. We will get faulty experience, faulty mental development, and faulty brain development. So again, we are establishing the connection between these, but again, where the experience comes first, the mental capacities come second in formation of the mind, and the brain formation comes third.

A lot is happening during this fourth stage. The baby is learning to problem solve, the baby is learning to signal when they are angry rather than just go into patterns of fight-or-flight or get impulsive, they are learning to signal when they are happy, they are learning to woo you rather than just grab you – they are learning to be, in a sense, to be wooing and cute and going through a series of gestures so that you will pick them up and give them a big hug and do it not only willingly but wanting to do it. So they are learning to communicate and learning all the social moves and learning to read your emotions, when you are tired, when you are overwhelmed, when you are unlikely to be playful, and that way they are learning to be less demanding. So they are developing very complex mental capacities for solving problems and for interaction which they don't learn about unless the shared social partner is there to help them master these capacities. While we don't have evidence that every little subtle brain pathway that supports these since the general evidence is there, we can only assume because the mental capacity we are seeing eventually as the baby initiates it or the toddler initiates these new capacities for the connections within the brain.

It is no surprise that children with autistic spectrum disorders, even those who won't be diagnosed until later, begin showing their first problems, we find, in their shared social problem solving. They often don't have this continuous flow of interactive gestures that they master even though the lack of language or lack of creative pretend play or problems in peer relationships don't occur until later, but they aren't learning to read social signals, they aren't learning this subtlety of nuance of social interaction, and therefore it is not surprising when they have trouble reading peers or responding to peers properly. Or, they aren't developing language meaningfully – instead they are just




memorizing or scripting or lining up their toys rather than playing with their toys in a meaningful and natural way.

So we shouldn't be shocked or surprised when we see problems developing later because often there isn't the demand for these skills at this early age. So when we learn to look for them, we see the importance of these mental capacities again enticed through the experience with the caregiver practiced and the mental capacities developed for, let's say, not just shared social problem solving but modulating anger through social signaling, modulating even loving interactions through social signaling, learning to express curiosity in a wide range of emotions through complex interactions and, in a sense, having a preverbal language with a lot of vocalizations and the beginning of some words. As this develops, and the baby or toddler right now is really developing the sense of self – I can make things happen; who I am as a person; putting pieces together – and developing a sense of the other person – who mommy is and who daddy is as the more complete human being because they are recognizing how mommy's movements and facial expressions and reactions to them all kind of fit together. Their basic capacity for pattern recognition is being used now, but in a very meaningful way to facilitate social development, emotional development, and intellectual development as new mental capacities, and that is then making more connections between the emotional centers of the brain – the centers that process sensation and help the baby move and initiate with the frontal lobes that help the baby plan and sequence. Sometimes these are called executive functioning and we are beginning to see more and more of the cortex; the part of the brain having to do with language and thinking begin to get recruited as individual words are being used and as thoughts are beginning to develop.

If we go from the fourth stage to the fifth stage, that is the stage of what we call "The Emotional Use of Ideas." We see creative thinking and pretend play. A baby is now able to sit down on the floor with their dollies with mommy being one dolly and saying, "I'm hungry" and the baby feeding that dolly and mommy feeding the baby back when the baby is holding the dolly. Or we can see trucks that are crashing and we are taking trips to the moon. And we see shared pretend play between caregivers and toddlers and young preschool children all from about 18 months up through 2 ½, 3, and 4, and this gets more complicated as we go along.

Now again, where we don't have a caregiver enticing a child into pretending, they may pretend on their own a little bit with their toys after they have seen another child do it, but it's not shared pretend. They are not joining their ideas with the ideas of someone else into an elaborate drama. They tend to be much more simpler in dramas. So for shared pretending we need the enticement of the caregiver or other children who are very enticing – older children who may entice the younger child into the pretend play. We need the joint pretending together and then the child initiates more and more – "Mommy, you be the baby and I'll be the school teacher" or "Mommy, you be the baby, I'm going to feed you." We see the baby taking over with more and more initiative as this mental




capacity for using ideas emotionally and meaningfully and creatively comes into being in Stage 5.

We see this in the meaningful use of language – “I want a hug!” or “I’m mad” or “I’m hungry” or “Daddy, please get me that toy” as opposed to just scripted language which we see in irregular or in unhealthy development. Now as this is occurring again, we have the enticing experience. We have the shared experiences or the sharing of these capacities together. Then we have the baby or the toddler now or the preschooler taking more and more initiative. So we see the enticing experience, we see the mental capacity develop, and as that mental capacity gets practiced, we can see that as the child takes more and more initiative, they are developing the brain structures; the body memory, so to speak, or entering into this stage of human development. What is happening now in terms of the brain is that the cortex is being recruited more and more; the higher levels of the brain that involve thinking and creative play in a healthy way.

If this goes well, we get to the next stage where the child; the preschooler often between ages 3 and 4 is learning to connect ideas together to become a causal thinker and answer “why” questions. “Why do you want to go outside?” “Because I want to play and it will make me happy.” Or, “Why are you sad?” “Because you took away my toy.” We’ll see that instead of just impulsive actions like hitting, biting, or scratching. Or we will see that instead of simply lack of language development or just scripted language where the baby just repeats the same thing over and over again. Now in irregular development, for example, babies who have been deprived in orphanages, we see scripted language or no language at all. In children who for biological reasons have not been able to enter into these emotional interactions, we see, again, scripted use of language or no language at all as with children with autistic spectrum disorders.

Here is the interesting finding. Where we help a baby with an autistic spectrum disorder, or a young child negotiate the stages that they have missed like emotional signaling, and entice them into back-and-forth interactions with emotional signaling, and then entice them into pretending and creative use of ideas, we then see meaningful use of words as the words come in even if they are delayed; even if it is in a five year old or a 6 year old or a 7 year old. We now have brain imaging studies of children who receive this approach, where we go through the stages of enticement, of sharing, of helping them take over the initiative with these healthy experiences, what we find is that the emotional centers of the brain are becoming reactivated or becoming activated where they weren’t typically in studies of individuals with autistic spectrum disorders. There are teenagers who have done exceptionally well with this approach. We have looked at their brain imaging studies in a pilot study of a small group and they are very similar to typically developing teenagers, and these are teenagers who have the mental capacities now to be empathetic and creative and engage in complex interactions with others. So we are very encouraged that this paradigm of how the mind and the brain relate to each other is the basis for a new way of thinking about intervention. We go back to where the baby or




child got off the path of healthy development and get him back onto healthy development.

As higher level thinking becomes about, we have talked about this before so we won't go through all these stages, it goes from causal thinking to multi-causal thinking to gray area thinking to reflective thinking – more and more areas of the nervous system are being developed. More and more areas of the nervous system are, in a sense, coming on-line. This is through enticement first – we always engage the child and pull him into a relationship, get involved in synchronous or rhythmic patterns with them through the enticement, and then we help them take over the initiative. We help them do more and more and more. And as they do this, and we help them master each of these healthy stages, we begin seeing healthier and healthier development. The sky is the limit for many of the children, even with autistic spectrum disorders. Some, because of neurological impairments, we can't go as quick or as far as we would like to go. We are working on ways to improve that. The steps they are able to master can be mastered in a relatively more healthy way than where we don't provide healthy experience. That comes back to a basic issue, then, of healthy experience versus unhealthy experience and what constitutes experiences that build healthy foundations and build healthy minds and in turn, will build healthy brains.

Before we come to the question of what constitutes healthy and unhealthy experiences that sets this process in motion, we come the question of just how far this goes. Healthy experience creates healthy minds and mental capacities and healthy brains all throughout the course of life. It is not as though this ends by age seven or age eight. We know now that the mind and brain are developing and you get new capacities of abstract and reflective thinking and as you get into the adult years and you take on new experiences your capacities for reflective thinking expands. When we spell this out in *The First Idea: How Symbols, Language, and Intelligence Evolved from Our Primate Ancestors to Modern Humans*, taking the stages of healthy development always up through the aging process as more insight and more wisdom develops. From each stage from infants up through the aging, especially in the aging process when some people feel that mental capacities are on the decline, it is critical to have these enticing experiences which lead to shared – some synchronicity experiences that lead to more and more initiative. Whether you are fighting off degeneration or whether you are forming new connections; and you are always probably doing a little bit of both. You are probably always balancing a little bit of loss with a lot of gain. Again, this is a lifelong process, and we won't repeat what we have talked about in *The First Idea* but I think the basic model is now pretty clear.

Now let us talk a little bit about the difference between healthy and unhealthy experiences which sets the motions for healthy mental or unhealthy mental development and process, which in turn sets the stage for healthy brain or unhealthy brain development. We know from our studies of autistic spectrum disorders, that it is the




interconnectivity or more and more evidence pointing to the interconnectivity of different parts of the brain that seem to be irregular or not functioning in a healthy fashion in individuals with autistic spectrum disorders. We know that in order to get these connections going, you have to go through these stages of healthy development that I talked about.

Each stage has experiences that start that first step of enticement going. Enticing the baby to look and listen, pleasurable interactions to entice the baby for the big smile, back-and-forth emotional signaling to get the baby cooking in terms of our third stage of two-way communication, being a shared partner – the challenges to get the baby or toddler into a continuous flow of back-and-forth interaction to get that fourth stage going and expand it into more and more problem solving and more and more interactive capacities. Shared creative pretending and enticing the baby into pretending and into using ideas meaningfully and creatively to satisfy needs and wants to get that fifth stage going, and challenging the baby into logical thinking to get that sixth stage of causal thinking and asking the “why” questions and giving multiple choice answers with a good choice first and a silly choice second to get the baby thinking. We do this again with our children with autistic spectrum disorders and with children who are in orphanages or deprived or have other kinds of compromises and can ignite this process to get it going. This then goes up through the stages – you don’t get peer play capacities unless we have peer play dates and lots of practice with peers. So we have to give the child the opportunity for peer interactions even if the child doesn’t seem to want it or tries to avoid it because children will avoid what they don’t do well and will embrace what they do well. To help a child be reflective we have to ask the child’s opinion about things and ask him how they feel about the world and how they size themselves up in comparison to others so that they can reflect on themselves and, in a sense, think about their own thoughts and own ideas and own feelings. To expand into our lessons in adulthood all the new experiences in a modulated way, in keeping with the child’s nervous system and tailoring the experiences to the child is very, very important.

In our DIR® Model, we meet the child at their “D” – their developmental level as I just mentioned, whether they are engaged or a two-way signaler or a shared social problem solver, we meet them wherever they are. We then tailor the experiences to their individual nervous systems (the “I” part) – more soothing or more energy depending on whether they are more reactive over- or under- or sensory seeking. We talked about this elsewhere so I won’t go into more detail. Then we create the “R” part in the DIR® - learning relationships that are geared to these, that go through the stages of enticement, sharing, and then helping foster initiative; challenging the child more and more and more.

So for the first time, in a sense, in human history, we understand what experiences are necessary for healthy mind and, in turn, healthy brain development. But we also understand the nature of unhealthy experiences. It goes beyond simply deprivation or stress or being overwhelmed or being abusive or being neglectful. These have been



identified for years and years. Repetitive experiences – experiences that learn by just repeating are not building the healthy foundations. Rote learning at school as opposed to understanding and discussions and thinking – again won't lead to the healthy patterns we are talking about. Too much screen time on computers and TV as opposed to human interaction doesn't provide the experiences we need for healthy development. Instead it provides one-way communication and creates subtle but faulty experiences. Not enough interaction with caregivers – with mommies and daddies in the family creates problems. Not enough peer play, as I mentioned before, creates challenges.

So we have, for the first time in human history, a roadmap of healthy development. We have a more subtle roadmap of all of the unhealthy patterns. Unfortunately, as we are moving ahead in the world, we are institutionalizing some patterns that are unhealthy like having babies in groups for long whole days where their stress hormones go up by the end of the day. That may not be a healthy experience to have full day daycare for babies and toddlers and preschoolers, although that is becoming institutionalized. Overstressed parents that are both working until late hours and leaving the care to inexperienced caregivers who don't have the intuitive ability to provide these healthy experiences – that might not be healthy for our children. Too many electronic toys and screen time may be, as I mentioned before, unhealthy.

So if you have the roadmap for unhealthy development, we also have the roadmap for healthy development. That can change the way we intervene. It can change the way we bring up children who don't require intervention or don't need interventions. And, it opens the door to what a colleague of mine likes to call, "raising the bar." Raising the bar without stressing the children but providing more and more of the healthy experiences just like becoming attuned to a healthy diet in terms of what kinds of food to entice our children to enjoy. We can now begin using our roadmap of healthy development to give all children a good start in life with these healthy foundations.

So experience leads to the mind which in turn leads to the brain. Healthy experience leads to healthy enticement, healthy minds which take over in by taking initiative and leads to healthy wiring of the brain and occurs in that sequence. Unhealthy patterns are all too abundant around us and clear as we have more and more individuals in prisons, from unhealthy backgrounds, and as we have more and more successful people who are role models for everyone else, we see what healthy experience can do.

So with these thoughts, we will conclude our show for today. We will pick up more on these themes in future shows. Thank you.