## Web-Based Radio Show

## Series on Learning Differences, Learning Challenges, and Learning Strengths:

## *How to Become the Master of Your Sensory System*

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Good morning. This is Dr. Greenspan coming to you from our web-based radio show. Welcome to our show today. As you may recall, we've been talking about learning – learning challenges, learning strengths, and also learning differences. We've been using the metaphor of a learning tree, where we've talked about the trunk, having to do with our emotional and intellectual capacities; the branches, having to do with the academic skills; and more recently we've been talking about the root system, which is the foundation for both the trunk and the branches. The root system, as you recall, has to do with auditory processing and language and how we take in what we see and organize it – visual-spatial thinking – as well as motor planning and sequencing or executive functioning and sensory modulation – how we modulate sound, touch, smell, and other sensations.

Today, after having focused on auditory processing and language and motor planning and sequencing and executive functioning in the last few shows, we're going to focus on sensory modulation. Now, for some people that's not a household term, but what we mean by "sensory modulation" is how a child or an adult reacts to different sensations, like touch or sound or smell or taste. Every parent has at one time described their children, or one of their children if they have many, as "finicky" or sometimes they describe their children as kind of impervious – hard to get their attention. Some describe not just their babies, but their toddlers and preschoolers and older children as very fussy and very sensitive.

Going back to the mid-1960's and maybe earlier, a number of pioneers identified actual differences in the way in which children and adults react to sensations, so that our nervous systems – the way we react to things like touch and sound, is not the same for all of us. At first, Sybil Escalona and Lois Murphy, two psychologists, identified these

in children who were having difficulties emotionally and socially. Jean Ayers, an occupational therapist and one of the founders of the sensory integration approach to occupational therapy, discovered that these sensory differences were part of a large group of children, some of whom wound up having learning challenges, others of whom didn't, but who had other kinds of difficulties, which is where the term "sensory integration difficulties" got coined. It's important to separate out Jean Ayers' clinical observations about sensory differences from her theory that put the vestibular system as an organizing system for the sensory system and as an important inroad for intervention. Some people throw out the baby with the bath water and they may not agree with Jean Ayers' overall theory, but they should make use of her very astute clinical observations, which can be used quite separate from the organizing theory.

In any event, after these pioneering beginnings, occupational therapists have studied and observed and worked with these sensory differences for a number of decades, and have come up with many, many different approaches to help children cope with them. Also, those of us who work with children with regulatory problems or other developmental problems encounter these all the time and, clinically, I've encountered them in almost all kids, more or less, and many, many adults. So, there are adults, for example, who talk about how parties are hard for them because they get overwhelmed by the sound and why they hate rock concerts. There are others who just crave going to rock concerts and the more noise, the better. Some individuals like to bang into others, while others feel that any kind of uninvited tap on the shoulder is a major assault. So we have huge differences and if we don't know that these are actually physical differences, sometimes we interpret them psychologically. So someone brushing in may be viewed as a hostile act when it's just that we are very sensitive to touch. Someone may think a person who's under reactive is disinterested or doesn't care when in fact he just needs a little more energy in the person's voice to get his attention. The sensory craving individual who loves to skydive and box and wrestle may not be aggressive; he may just crave a lot of sensation and may be able to learn not to be a risk-taker or a daredevil and can get that sensation in very organized and safe ways. So, there's a lot of misinterpretation when one doesn't know one's sensory system.

In terms of our root system, it's important, therefore, number one, to recognize that each sensory component of our nervous system – touch, sound, smell, even how we perceive our own movement patterns (our sense of our body in space) – all of these sensations can be hyper reactive. In other words, we can over react to them so a little

touch feels like something major. It may be different qualities of touch, e.g., for some people it's a light tickly touch; for some it's deep pressure, which is organizing for most people, even those who are hyper sensitive or hyper reactive tactile individuals; or for some it can be deep touch. Many individuals don't like wool clothing, for example, or rough clothing, and may have a mild type of tactile hyper reactivity.

So one pattern is hyper reactivity and this can be in any modality but doesn't necessarily mean that if you're hyper reactive to touch you'll be hyper reactive to sound. Some people just find high-pitched noises or very low-pitched noises, like vacuum cleaners, difficult and maybe children get frightened or panicky once the vacuum cleaner goes on or a boiler goes on in a low, motorized sound. For others it's a high-pitched sound, like an opera singer. So it's very important to recognize that a child need not be hyper reactive in all the modalities at the same time. We have to go through each one carefully and ask the parents questions about the child (or ask the adults if it's about them). Also, we have to observe, because sometimes the person isn't aware or the parent isn't aware that a child is hyper reactive. You may observe the child reacting and getting a little panicky or getting overloaded or overwhelmed, and sometimes this can result in the child's shutting down and retreating and going over to a corner and getting cautious. At other times it can result in disregulation, where the child gets impulsive or acts more immature, hiding under the table or getting very silly. So it can result in a variety of different behaviors in different children. So one pattern is hyper reactive and you need to check it out in each sensory modality.

The second pattern is a child who is hypo reactive – who under reacts. This is a child, often, for whom sounds may not register and it takes a high threshold before they recognize that somebody is talking to him or there's music coming in. When you touch him lightly you may not get his attention, but if you touch him a little more firmly he'll turn and look at you. So these children are under reactive to things like touch and sound. On a swing, the hyper reactive child may get overwhelmed if you swing him fast. The hypo reactive child may require more robust swinging to enjoy it.

Then there's a third pattern, which we call sensory seeking or seeking craving, where the child seeks out a lot of sensation. Some children who are sensory seeking are hypo reactive and they seek out the sensations to supply it, whereas other children who are hypo reactive just simply become more like couch potatoes. If people aren't energizing them up, they seem to retreat into their own world, sometimes getting lost in their own fantasy play if they're very creative. But, regardless, we also have the children

who are sensory seeking, some of whom are hypo reactive, but others who are not hypo reactive, but just sensory seeking, even though they have normal reactivity. Sometimes they can be sensory seeking and hyper reactive at the same time, where they overwhelm themselves, which is a very interesting pattern. They go back and forth between seeking out a lot of sensation then getting overloaded and disregulated and getting impulsive or aggressive or silly. They also seem to have a lot of mood shifts. We describe this pattern of children with rapidly-changing moods as often being a combination of sensory hyper reactive and sensory seeking.

So, we need to observe carefully, to talk to parents carefully, to ask lots of questions and figure out how a child responds to sensations. Again, it may be different for different modalities. A child can be sensory seeking for sound and over reactive to touch or vice-versa. Now the more important question is, what do we do once we figure out how a child is functioning in terms of his sensory system? How does this affect learning? Well, before we talk about what to do, let's talk for just a moment about how it affects learning. For example, there are some children who have trouble reading because they get overloaded by the black print on the white page; they're very visually hyper sensitive. So bright lights and sunlight may be difficult for them. They have a hard time with the black and white print and they kind of get lost in the hodge-podge of letters and can't see the page. Some colleagues at MIT found that by using a kind of soft blue or other filter paper over the printed page will soften the contrast and sometimes just putting a little rectangle around the sentence the child is reading will help the child separate the text from the background. So that can be very, very important to know.

Also, attention will be affected, as well as the child's ability to attend in class and follow directions. If a child is hyper reactive and overloaded and therefore in a panic mode, he may act silly or retreat or get impulsive in class instead of listening. This may be because he's overloaded by the noise and commotion of the other children talking or perhaps the teacher has a particularly low-pitched, loud voice. Sometimes we've found children whose class is next to the boiler room affects this group of children and they're bothered by that low, grumbling sound that most kids tune out.

Children who are under reactive, again, will be inattentive for entirely different reasons – because no one is grabbing their attention and no one is energizing up enough. They have to be very actively involved.

The sensory seeking child has trouble sitting still in class. He needs to be more active and on his feet when he's learning and we have to work on helping him contain himself by giving him more frequent breaks, for example.

So each pattern will present a different type of challenge in the learning environment. This is very, very important to know, as well. Children I see with sensory differences are often identified as having "behavioral problems" when what they really have are sensory differences, which, if attended to, would help them cope and they wouldn't have "behavioral problems." So, these are among the reasons why we have to pay attention to this part of the root system.

Now we get to the important issue of what do we do about it – how do we help the child learn to master his sensory differences? We can start in infancy because we observe these differences in very, very small babies – sometimes they're just there for the first few months of life and then they change as the babies mature; but other times they persist and this is where the fussy or finicky baby becomes a finicky and fussy toddler and then a finicky and fussy preschooler. So when they persist it's very important to keep working with them and, obviously, if they change, then one need not pay much attention to it.

So let's talk about how you help the child master his sensory system. The goal here is to be the master of your senses, rather than the victim of your sense. For the adult, knowledge is very powerful – knowing you have these differences is very, very important. Knowing the kinds of touch you enjoy versus the kinds of touch you don't enjoy and that if you don't enjoy certain kinds of touch it may not be psychological – it may just be a physical difference that you've interpreted psychologically or that others have interpreted psychologically. So it can be very relieving and very reassuring for an adult who thinks he doesn't like to be touched when, in fact, he likes to be hugged but doesn't like light, tickly touch and that he can work out patterns of firm pressure and different kinds of touch that are very enjoyable for him. For the child, too, that can be very reassuring. The child may actually enjoy contact with other kids, but he doesn't like surprises and needs to see where something is coming from and needs to be more in control.

So let's talk more generally about how to help children master their sensory world. First, we should recognize that occupational therapists, beginning with Jean Ayers and many of her followers, and many gifted occupational therapists around the

country now, have worked out a number of techniques to help children regulate their sensory systems more effectively. These include, for example, for the child who is sensory hyper reactive, providing lots of regulating experiences. So, we supply firm pressure for the child who's sensitive to touch; soothing sounds for the child who's over reactive or hyper reactive to sound; more subdued lighting for the child who's over reactive to light; and rhythmic movement with firm pressure for the child who's very, very reactive. One of my colleagues, Rosemary White, sometimes uses a spandex swing to swing a child and provides a lot of tactile and proprioceptive support to help the child calm and regulate. Diane Lewis, a gifted speech pathologist and therapist, who wrote the Affect-Based Language Curriculum with me, will often put children in a swing because it helps their language development when they're better regulated; movement helps them regulate and facilitates language development.

Children who are under reactive need lots of sensory support, such as massage and an energetic voice, and movement helps their systems get organized and helps them become more aware of their world.

For the sensory craving child we provide limit-setting coupled with constructive ways to take action. So we respect the child's need for activity and movement and lots of touch and lots of sound and lots of movement, but we help him do it in organized ways that are respectful of others, rather than in chaotic ways. We're giving the child socially constructive ways to meet his sensory craving needs and also doing it proactively. So, we have that child move around quite a bit throughout the day, as opposed to keeping him stationary and making him feel like a bad person because of his need for movement. Rather than seeing the fidgetiness and fussiness as bad when it happens during dinner or during class, we need to see the child as simply finding out the way his nervous system works and help him to be respectful of others. So we can help him choose the spots where he moves around and we can let him know that whether he makes noises or whether he fidgets we respect his desire to do that. We can help him learn that he'll have organized time when he can do that more and that there will be other times when he has to put in an extra effort to being quiet so others can get their work done. Again, the recognition and the organization of it become very, very important for the sensory craving child.

Also, for all the children, it's important to help them, as they become more verbal, play out in pretend play and verbalize what their sensory systems feel like – what it feels like to have the sound coming in. Does it make you feel overloaded or

overwhelmed? What does it feel like when you want to move and yet everyone's being quiet and you're asked to contain that movement? What does it feel like when you're finally given the chance to move around during recess or gym or during your frequent breaks? So it's important to help the child verbalize his feelings and sensations because it helps him also learn to be a master of his system.

Now, also, probably the critical way we help children and one that has not been as widely discussed, is helping the children understand, cope with, and master their sensory systems as we move up the ladder in terms of their emotional, social, and intellectual capacities. This is what we call their functional, emotional, and developmental levels. So now we're going to talk about how we use our thinking and emotional and social capacities to become masters of our sensory world. Those of you who recall, we've outlined a number of stages of emotional and intellectual development that we call the functional, emotional, developmental capacities. At each of these levels we give children a chance to become the master of their sensory systems. The better we help them achieve these levels, the more they can modulate their sensations and become the master of their sensory systems, rather than a victim of their sensory systems. Let's go through these and show you how it works.

The first one we talk about is attending to your world and being calm and regulated. Here, as we – the adults – help the child find ways of being regulated and soothed and attentive, we're helping him actually regulate his sensory world. For the under reactive child, we're energizing up to help that child attend to sights and sounds, so that the child is not simply tuning into his internal world, he's actually part of the external world, too. We're also not just energizing up, we're doing it in a way that doesn't overwhelm them. They need quite a bit of energy, but we're careful not to go over the top, so we're keeping them calm and regulated and attentive.

The second stage, engagement, is that as we get involved in happy, joyful, shared smiles and shared activities that are fun together, we're in synchrony with our children. We're resonating together, and we're marching to the beat of their drummer. As we're marching to the beat of their drummer and following their lead, as we do in Floortime, they feel part of the social world. Now their sensory system is really in synchrony with our sensory system. If the child likes to move, he's moving with us. As we move with him, we've can better help him regulate because we can move fast, then go to medium speed, and then slow speed as we talk with him and meet him at his level of rapid talk, let's say, if it's a sensory craving, sensory seeking child. But then we can

slow it down with him because we're in synchrony. So the relationship allows the child to regulate his sensory system through his relationship with the other person where we're always synchronizing to some degree. There's a natural tendency that human beings have once they're part of a deep relationship – they kind of do things together in synchrony, just like musicians who are playing together. So that's a very good way to help children regulate – by being part of that relationship.

The third level, back-and-forth interaction, is where children are purposeful and exchanging gestures and facial expressions and pointing. Here, now, we get into big league mastery of the sensory system because we advocate that the adult always be a good "counter regulator" for the child. So now the child is able to regulate his sensory system off the adult and communicate their sensory system requirements and how they're feeling first through gestures, even before words become possible. So when the over reactive child begins looking a little panicky or cautious when the sounds get loud Mommy, seeing that, now softens her sound because she's part of two-way signaling with her child – it's always back-and-forth – and she's counter regulating. When she's losing her child and he's not paying attention and he's drifting off into his own world, Mommy increases the energy in her voice, again counter regulating, providing more energetic support rather than the opposite. This is true for the baby who is over reactive, again, keeping that nice, calm attention. The same thing for touch – Mommy may start off with a little tickly touch and maybe the baby will get overloaded, so she'll go to firm pressure, again, paying attention to the baby's signals. What is the baby learning here? The baby is learning that he, through his gesturing, through his facial expressions, through his tone of voice, through a look of overload or a look of disinterest, can influence and affect what the caregiver does, so he can have an impact on the world! He sees that his gesture, his communication – even before he's talking – leads the caregiver or the external world to change what it does. So it's a cause and effect relationship – it's reciprocal and it's back-and-forth. As the child learns that he can change his sensory world, he can change how he feels inside. He can change how his sensations are working by the impact he's having on the world. Well, that's a tremendous sense of empowerment and a tremendous sense of a can-do attitude. So he's hardly feeling the victim of his sensory system; he's now being the master of his sensory system because that sense of mastery is coming from the impact he's having on his caregiver as she regulates up or down, depending on the child's sensory needs.

For the child who's sensory craving, the toddler who's getting out of control, you find an organized game where he can be in control and not feel like a destructive or bad person. He can enjoy his sensory movement, which is terrific because now the child is able to regulate and get his needs met through sensory craving in a socially meaningful way. Again, the child's having impact on the world because he sees that if he communicates for more movement someone is responding. This is a child who later on will be able to say "Hey, let's go out and shoot some baskets," or "Let's go dancing" or who will suggest something else active, rather than just acting out or being impulsive without any warning. This is a child who can purposefully organize his need for activity. So, here's where the signaling system, starting with gestures, empowers the child to realize he has impact on the world and he can change the way the world reacts to him. He can master, therefore, his sensory system because he masters the way sensations come in. This is the kind of adult who can say, "Hey, this cocktail party's a little overwhelming for me. I need to quiet down a little bit."

Now, we get up to the next level we call shared social problem solving. Here the child is simply using his signaling system, but in more complex ways – he's organizing patterns, he's communicating with facial expressions and gestures, he's taking you to the fireplace where he wants to be read to, or he's taking you to the active place where he wants to explore the trucks and move around quite a bit. So he can really show you what his sensory needs are at the moment. Also, this is a good opportunity to expand the child's sensory world – if the child is only wanting to be read to and engage in cautious activities, the caregiver can gradually move the child to more assertive activities, to using their muscles and their motor system, for example, to find the book that the child wants to read and that may be on the shelf. The parent can play dumb and the child has to drag the parent to the bookshelf and point to what he wants and then help the parent climb up the ladder by getting the chair or the ladder so the parent can go up and get the book. Or maybe the child will climb up the ladder with the parent. So here you can turn a couch potato into a more active explorer all to get that book, which allows the child to be rewarded by some nice quiet reading. So this is a chance to expand the child's sensory world.

For the child who is moving all the time, you can introduce some more slow-motion activities and make a game where you run fast, then at medium-speed, then at slow speed, then in super slow motion – all as part of a game the child will want to win so the child will probably enjoy it. So in this fourth stage of shared social problem

solving we not only show the child that he is empowered to change his sensory world and is the master, but that he can expand his sensory horizons and that's a key goal. Here's a very important principle: gradual expansion, but slowly, always in a calm and regulated manner, and always helping the child meet his needs and feel good while he's doing it. It has to be done very slowly, in a very enjoyable way, by taking advantage of the child's natural interests and tying the expanded activity to his natural interests. If the child wants to be read to, we can help the child be an explorer in order to satisfy his desire. For the child who wants activity, he may have to look at pictures in a book to figure out where to go on the treasure hunt to find the hidden treasure, which may involve a lot of climbing and a lot of movement, or to play a game that he wants to play. Later on he may even have to read the clues himself. So here's where we go from the mountain-climber and underwater explorer to the mountain-climbing, underwater exploring scholar, as opposed to just the action-oriented type person.

Now we get to the next level where the child begins using ideas. Now the child can operationalize or put into words how he's feeling. "Mommy – that's too loud" or "Daddy, let's wrestle!" Pretend play can be used to explore physical activity and different feelings. The dollies can be scared or overloaded or want to wrestle or want to box or want to dance. The child can be active with the dollies. Now words and ideas can be put to the sensory patterns, but most important, in terms of the child being a master of his sensory system, he can now symbolize or put into a form of ideas using words or visual images or pictures what his inner world is like and he can use that to communicate. He can say, "It's too noisy" or "I need to move around more," or "Mommy, that's not interesting." A parent can become a better counter regulator so the child can feel even further he has an impact on the world using words and not just with gestures.

As we get to the next level, combining ideas together, where the child answers why he feels happy, why he feels sad, he can now explain to you why he needs to move around. The child can say, "Mommy, I need to go outside and play," you can say, "Why?" and he can say, "Well, because my muscles just feel like they want to run and I need to do something!" or "Mommy, that's scary when your voice gets loud like that. It scares me. It feels like a lion or a tiger is going to attack me." "Really, sweetheart? Tell me more about that!" as you soothe your voice. That helps the child, again, not only feel that he's in charge of his sensory world, but also talking about the feelings that the senses stir up in him makes it so they're not so scary to him and they're not so

mysterious. As he becomes more aware of his inner world and the feelings and fantasies and images that get stirred up by sensations, these feelings and fantasies won't become frightening nightmares or they won't become frightening images. So if the child is talking about being scared and about worries about being kidnapped or worries about lions and tigers biting him, he's less likely to actually be scared by those things because he can put them into words or pretend play.

This is a wonderful opportunity, as the child is combining ideas together, to expand that sensory world so the child who is sensory over reactive and cautious can be gradually invited through pretend play, where it's safe, to become more assertive. So we might deliberately block his truck or have her ballerina be told she's not allowed to dance today and she may say, "Well, I'm the boss of dancing!" This way we encourage the children to flex their muscles. So, gradually, through the safety of pretending, we can expand the child's sensory world and help a sensory over reactive child become more assertive and the sensory craving child become more respectful of others and more empathetic to other people's feelings and under more regulation and control. We do this all through the world of pretend where it's safe to try things out first, and then in the world of reality, using words to support. So as we explore how the child feels and why he feels that way he'll get a tremendous sense of mastery over his inner world, mastering not just his inner world, but the feelings associated with it. We also now have an ally in expanding the child's horizons because we're helping them do things that are hard for them to do. The child who's under reactive can learn what kinds of activities keep him from just retreating into his own world.

As we move up the ladder we do what we call multi-causal thinking and gray area thinking – seeing shades of gray – and comparative thinking, where it can get even more subtle. The child can describe which sounds are scary and how scary they are – a little bit, a lot, a whole lot. He can fine tune his control of his world through gray area thinking and tell you why he likes activity A better than activity B, which again empowers him to master his sensory world. And, finally, when he gets to reflective thinking he can even tell you about a day where due to allergies or due to not sleeping well the night before he's more sensitive than usual, "Gee, I'm more reactive than I usually am or more finicky than I usually am" or "Gee, I'm having a hard time paying attention today, and it's different from the usual way I feel." The child can be reflective and take even more corrective action on his own as part of reflective thinking. So each stage, as we strengthen it in relationship to sensations and feelings that go along with

these sensations, the child understands them better through our discussions, through our pretend play, through our Floortime, and he child becomes a master of his sensory system.

So, therefore, in summary, we begin with step one, which is recognizing how a child's sensory system works. Two, we pay attention to it and help the child regulate through engagement and always counter regulate or counter balance. Three, we let the child feel power that he can have impact on the world. Four, we engage the child in shared social problem solving where we help expand the child's sensory world and help him have an even greater sense of power over it. Five, we help the child use ideas and words to give voice to his sensory system and to reach a greater understanding, by combining ideas together, of the reasons for the way he feels. Then we fine-tune it through gray area thinking, comparative thinking and, finally, reflective thinking. This makes the child truly a master of his sensory system. All the while there are particular techniques developed by occupational therapists that can be used as tools by parents, children, and educators, which the child can eventually do for himself to become, again, a master of his sensory system. So we should title this whole lecture today, "How to Become the Master of Your Sensory System" or "How to Learn to Regulate Sensation."

That's all for today. We'll be with you next week and we'll talk about visual-spatial thinking. Thank you.