



Sensory Processing Disorder

Sensory Processing Disorder is a disorder caused by immature nervous system development and coincides with many other diagnosis such as *Developmental Delay*, *Attention Deficit Disorder (also the hyperactivity type)*, *Learning Disability*, *Dyspraxia*, *Apraxia*, and *Executive Functioning Disorder*. It is a very strong component of the profile of a child on the [Autism Spectrum](#), for which there is a separate section on this website. Sensory Processing Disorder can also exist without any other diagnosis and is a “hidden” disability in many struggling learners today. Children with this disorder frequently are gifted intellectually, though never reach their full potential and parents and teachers are puzzled by what they perceive the child’s ability could be, but the level at which the child is performing at school and at home. Many of these children are called “lazy” and underachievers as if at will, yet is struggling with this underlying difficulty. It is very difficult for these children to identify what they are struggling with since they only have one body and one nervous system, and have no idea that the child next to them is perceiving incoming sensory information differently than they do. Children struggling with this disorder often suffer from poor self-esteem, low frustration tolerance and even emotional tantrums that seemingly are unexplained by themselves or the observers. Researchers like Dr. Lucy Miller is working avidly at providing excellent research in this area and there is great hope that this disorder will be accepted in the DSM5 in 2012, which will enable many physicians to learn about this disorder and correctly diagnose it, so intervention could begin as soon as possible. Parents and therapists have been treating this disorder for years, since Jean Ayers famous work started in the early sixties. This work has stood the test of time and there is active research to support it. There are multiple children today who are getting the help they need, but there are many who are not and this is a sad situation for the children and their families.

What is Sensory Processing?

Sensory Processing is the ability to take in, sort out, and give meaning to information from the world around us. It is the neurological process of taking in sensory information (i.e. sound of someone’s voice, clothes that you are wearing, the temperature of the room). It takes place automatically (instant reaction) and unconsciously in normal development as information is taken in through our senses (i.e. touch, movement, sight, and sound). This is not a conscious or intentional process but an automatic process and therefore we do not have to think about it on a daily basis, we simply access it and use it.

Sensory integration theory was developed by Dr. A. Jean Ayres. She has provided us with a theoretical framework that links a neuroscience perspective in interpreting and understanding

human behavior. The term sensory integration is now a term under the umbrella term of Sensory Processing to encompass a wide array of sensory difficulties, such as sensory modulation as well. Normal sensory processing and normal development coincides as developmental milestones are reached in a motor, as well as social-emotional and play development. Learning is dependent on the ability to take in, process, regulate, and integrate sensation from movement and the environment and then use that information to plan and organize behavior, or to do everyday activities. Sensory Processing form the framework for play, learning, work, and self care. Many individuals who have deficits in processing sensation also have deficits in producing appropriate actions, which interfere with learning and behavior.

There are three components to consider when discussing an individuals sensory processing ability: *Sensory Modulation, Sensory Integration, and Praxis*.

Sensory Modulation is the capacity to regulate and organize the degree, intensity, and nature of sensory input (not over or under reactive response) in a graded and adaptive manner. This impacts an individual's ability to achieve and maintain an optimal range of attention for performance in activities such as play, social interactions, and learning. Behaviorally this is mostly seen as a sensory seeking or a sensory avoiding type of response and is often misunderstood as stubborn, oppositional, or silly behavior.

Sensory Integration (discrimination) is concerned with how the different sensory systems discriminate different sensations as well as interact with each other to achieve functional outcomes such as fine and gross motor skills, as well as, praxis ability.

The other area that frequently is affected by sensory processing difficulties is **Praxis**. This is the ability to conceive of, organize (plan), and carry out or execute an unfamiliar motor activity. It is that ability by which we physically and mentally figure out "how" to interact with people and objects in our environment. Praxis includes creating an *idea*, mentally *sequencing / planning* each step required to translate the idea into action, *motor execution* or the actual performance of the plan, and *adaptability* or the ability to automatically adjust the motor plan as he / she is performing the action. This is a complex process performed at an unconscious level of the brain that is very important for efficient motor coordination, learning novel motor tasks (i.e. riding a bike, printing letters, play skills, to name a few), turn taking, playing sports, and so on.

Praxis ability is also considered to be a building block for **Higher Order Thinking Skills** (executive functioning) and sequencing tasks, which include memory, especially active working memory, organizational skills, and attention. Higher Order Thinking Skills are necessary for learning and processing more intricate information and the development of more complex reasoning and sustained attention for learning. Therefore, difficulty with praxis will directly impact academic functioning and those skills necessary for learning, processing, and reasoning information, such as reading comprehension and written expression.

Intervention Principles

The primitive level central nervous system (brainstem and midbrain) functions lay the foundation for higher level central nervous system functions (cortical level). The cortical level is the level that individuals are expected to perform at in an academic environment. Very frequently children are expected to perform according to their intelligence level at the cost of underlying processes that are not fully formed and not fully supportive of the learning task at hand. This causes great conflict inside the child and sets up many moments of frustration. Sensory integrative processes underlie the development of self regulation, development of motor and sensory skills, development of social and interaction skills, and very importantly, the child's sense of self. Graded and specific sensory input is necessary for brain functioning and promotes development in all areas. It is very important that we do not rely on sensory stimulation alone as a method of effective intervention, but that the child is actively participating in his sensory experiences and that we are following his or her lead. Enhanced sensation as a part of meaningful activity that requires planning and organizing of adaptive behavior, improves the ability to process sensation, thereby enhancing learning and behavior. The more the child is intrinsically motivated to participate the more meaningful the sensory experiences would be to the development of more efficient neural pathways.

Sensory Processing Disorder does not "go away over time" without intervention. The child simply learns to "cope" with it at the cost of social, sport, academic and career choices. Intervention does not promise perfection, as we are not sure it even exists, but it will deliver greater adaptability, functionality and learning potential.

Though we are talking about developmental processes, it is important to note that the brain remains neuro-plastic until we leave this world permanently. The prime time for maturation of the central nervous system does occur between 5 to 7 years of age, but this does not mean there is a sudden cap or ceiling at that age. Once a child is older, his habits and most frequently used central nervous system pathways are more strongly formed, and even though this might mean taking a longer time to work through these habits, it certainly does not mean that we cannot effect change. We see ample change in also older children.

In order to effect change, you have to deal with the development of all the entry points of stimulation of the body as this is the first order of business as the baby is born. This does not mean families should not seek biomedical interventions if they are so inclined, but it refers to where our intervention program starts. It is a simple fact that we have to consider the origin of a problem, if we are going to be able to effect the product.

We do not believe that it is about the behavior or the outcome or product, that which we can "see". It is about what is causing that behavior, motor performance, learning difficulty, etc., to occur and how do we deal with this in our intervention plan. We believe in the child's ability to react to what pressures the environment is placing on him or her and that the child would want to participate in anything they feel successful at. On that same level, they will want to avoid what they do not feel successful at or feel uncomfortable with. All of us love our comfort zones and why should the child be any different.

One of the key features of our program is to first work on the underlying mechanisms that are driving his / her difficulties with attention, motor coordination, activity level, social skills, impulse control, learning, and so on. By doing this we are laying the foundation for the ability to perform with more automaticity, making listening, learning, socializing, and general performing a more natural process.

A final thought is that it is about process and not product. If a child understands the “how” in getting there and has the ability to figure things out, the product will always be there. The building of self esteem does not lie in following other people’s expectations or agenda’s, but having the ability to cause an effect on something or someone yourself and know that you have done it. The achievement has to be yours! So many educational programs we visit are very well meaning and well thought through, but lack the understanding of the complication the child’s emotional world brings to the table. Sometimes it is not about inability (often wrongly assessed as uncooperative, unwilling or even stubborn), but about fear and anxiety and using whatever means the child has to get out of the situation. It is so important to us that our families understand this, though we understand that these areas are incredibly gray and our need is so high for the child to be “better” and enjoy life more.

A Developmental Progressive Program

Over the years we have developed a phase system that seems to work well with our children who exhibit Sensory Processing Disorder. Our program is defined as a developmental progressive program that truly enhances all the developmental aspects based on typical development. The program is not an overnight cure and is certainly no “quick fix”, but it focuses on the steady development of core issues affecting the very areas of need that we see in their behavior, motor performance, learning, listening, and so on.

Though the methodology used in the different programs may appear to be similar for each child, the art of facilitation and programming is different for each child. We have not originated the different programs, though we certainly hold certifications in all the different aspects and attend national and international conferences to remain updated in newest developments. We have researched these programs and have first-hand experience that these programs work as described in the multiple [testimonials](#) on our website. It is not about only having one program to offer, but deciding at each juncture, which program would be more beneficial for the child at this point in time of his or her development. What we will describe now is the general direction of an intervention program that might take 18 months to 3 years, though not ongoing and with periods of consolidation and “breaks”.

Phase One:

The developmental processes that started during the development in the womb continue to work on maturing the central nervous system when the baby is born. This is the first place of origin, not in terms of causal entities, but in terms of known intervention program planning. We

use [Sensory Processing](#) as our primary “developer” in the first phase of 6 months. In order for the brain to learn and grow, it has to depend on the processing of incoming information as a first process. If the processing in our different senses is delayed, it makes sense that the way we organize and respond to the incoming information will be delayed as well. During the initial [assessment](#) all the different sensory systems are looked at in depth and the primary players that is causing the most difficulty is identified. Our occupational therapists and physical therapist is trained in sensory processing work and there might be different possible options for your child to consider.

Under Age 2

If the child is under the age of 2, we might suggest attending [occupational therapy](#) and/or [physical therapy](#) during a 10 day intensive (one hour daily) with the combination of home programs at home that might include [Therapeutic Listening](#) over a stereo system at home. The 10 day intensives might occur twice in the period of the first 6 months. We also might recommend a 5 week course in [Infant Massage](#) to empower the parent with a powerful tool that is not only essential to the somatosensory system, but also assists tremendously in those early bonding and attachment times. To also initiate social and emotional wellbeing and play, we may recommend [DIR / Floortime](#) services as well. This is a very process oriented approach that enhances praxis, problem solving, and play skills. This could be included in the 10 day program, or consist of a monthly visit at home through our [DIR P.L.A.Y. Project](#), when a Floortime Practitioner will coach the family in how to use this method at home more effectively to effect generalization of skills as early as possible.

Over age 2:

We would recommend the 10 day intensive program as well [occupational therapy](#) and / or [physical therapy](#), again with the combination of home programs that may include sound therapy, such as [Therapeutic Listening](#). Or we might make a recommendation for a stronger clinic based intensive program, which will include occupational therapy and / or physical therapy with [Tomatis Training](#). This program has been highly effective in creating lasting results in children of many different ages and there are multiple [testimonials](#) on our website testifying to this.

There are some things we would like to mention with regards to intensive programming. Families often have the idea that any program would be a “quick fix” for their child. We have not seen this exist. What we have seen, is that if you stay true to development and gently build the developmental layers one step at a time, the child certainly has more “hold” for the layers that still is to come. During the course of adding Tomatis sound therapy work to our therapy intensives, we have seen quite miraculous results and we have seen slower results. Though it is becoming easier with experience to predict some possible outcomes, the focus must remain on the process of development rather than expecting speech on the second day of treatment. The treatment is highly individualized and follows the curve of the child’s development. We have

certainly witnessed some general areas that always improve, such as body awareness, motor planning, more awareness of the environment (being more open to the world), increased ability to play and certainly improved listening ability. We always see increases in the areas of sensory processing during our post assessment after the intensives.

Another aspect that families need to understand about intensive neural work, is that most of the time the clinical changes are seen, before the functional changes at home and at school. The child has adapted to his or her developmental delays, which has become the comfort zone with which they cope with. Just because they have new pathways does not necessarily mean they will trust it overnight, but some children need a little bit more time after intensive treatment to enable the new skill and start trusting it enough to use it. Having said this, there are of course other children who appear to have been waiting for this change all this time and start using it as soon as possible. Much depends on the emotional life of the child, and their hidden fears and anxieties. We have never truly experienced a real regression in skills, but we have observed overreaction to the ability to take in more information than before and not quite knowing what to do with it. It is almost like the blind man, who can now see, but wish he could not, because the visual world simply contains too much information and is considered overwhelming. We have also seen what Dr. Berry Brazelton talks about in his books on typical development (Touchpoints), as observed in temporary accessing of old behaviors, while the new learning is occurring at another end. Over time the skills come together and the child is in a much better place. We do not want to create unrealistic expectations in parents and therefore we are taking the time to make this clear. At the same token though, read the testimonials, as we really do get remarkable results from this highly effective intensive therapy program.

Just as children might be hypersensitive to sounds, they might also be quite sensitive to visual information and we might recommend an [Irlen Syndrome](#) screening for some children to assess whether colored filters might correct their visual perceptual experiences. At the end of the first 6 months of treatment intervention, a re-assessment is completed to compare the changes made, as well as plan the next steps of intervention.

Phase 2:

For some children this phase (6 to 12 months) is a continuation of the weekly [occupational therapy](#) and [physical therapy](#) services with home programs, as well the [DIR / Floortime](#) work. We also would like to assess the child's speech language therapy intervention programs from other sources at this time. Since the child's is more receptive to language work at this time, the time is ripe for children to really benefit from more intense [speech language therapy](#). Some children might benefit from one or more 10-day booster loops of therapy intensives with [Tomatis Sound Therapy](#). Others might be ready to complete a program called [Interactive Metronome](#). This program is ideally suited in the developmental trajectory when the child is struggling with sequencing, albeit in motor skills or speech language skills, or organizational skills, social reciprocity and timing, as well as needing improved motor coordination skills.

Sometimes we might see from our assessment that the child can benefit from more [Sensory Processing](#) work with Tomatis Sound Therapy, but in combination with the [Interactive Metronome Program](#). We will then combine the two programs in a 15 day intensive over 3 weeks to complete [occupational therapy](#) work with [Tomatis Training](#) during the first hour and [Interactive Metronome](#) in the second hour. This frequently occurs when the child is not quite ready for the exact rigor of the interactive Metronome program, and needs some intensive therapy work in the first hour to gain more intensity and readiness. All the while though, parents will report functional changes. This phase is generally concerned with working on the motor planning and organizational structures of the brain and will also affect the child's ability to pay more effective attention and also promote increased active working memory. At the end of this phase another [re-assessment](#) occurs.

Phase 3:

This phase could also constitute a period of between 6 to 12 months and could still involve weekly therapies with home programs, though the home programs are more directed to refining higher order skills and executive functioning skills, such as social and fine motor skills. It makes developmental sense when you consider that we have first spent time working on incoming processing, then how the brain organizes it, then how the child produces a product, albeit socially or academically. So frequently we observe treatment plans that want to see the fine motor and social skills develop above and beyond what the child's developmental layers are capable of. When you test fine motor dexterity the child may have all the fine motor muscles intact, but it is really how the brain is organizing itself in applying the goal to the action. Some IEP's have handwriting as a goal for years, yet if the child is unable to plan his or her thought into a productive action, all we will have gained is rote memorization skills, which the child will not be able to apply flexibly very readily and in the same timing and rhythmicity as his or her peers.

During this phase we could also be recommending more therapy intensive work through the combination of occupational, physical, speech language and DIR / Floortime therapies. These could also occur in combination with Tomatis Sound Therapy, Interactive Metronome and [Captain's Log](#), a cognitive training program. Intensives could be anything from two, three to four hours daily for a period of two weeks and usually with 2 to 3 months break in-between.

We might also recommend an intensive loop of [occupational therapy](#) to specifically target learning to read and write the alphabet. The first level is working through the alphabet upper and lower case. The second level works on word attack, and the third level on reading and writing comprehension. We also utilize [Balametrics](#) and other laterality based activities during these three levels of programming. This program, might be a combination of more than one intensive of 10 days times 2 hours daily with weekly visits in between and will be individualized for each child's needs. Attention is paid to the complex visual, auditory, and motor aspects of learning to read and write.

At this time we hope to not have overwhelmed you, but to have given you insight into what it takes to plan a comprehensive intervention plan for a child with Sensory Processing Disorder. We also do not contend that other medical, biomedical, counseling or other services are not relevant, as we certainly do refer as needed. This is merely a synopsis of what we are currently offering as we continue to develop our understanding of Sensory Processing Disorder.

For Siblings and Families:

Mothers: We are currently completing a pilot program for our Tomatis Pregnancy Program for mothers in their third trimester of pregnancy. Since research is showing us that many siblings of older brother and sisters could have possible developmental delays as well, we wanted to offer something for at-risk mothers as well. Since we have seen so frequently, how children calm down and express so much less anxiety while in our intensive programs with sound therapy, we wanted to offer this same calming opportunity to the pregnant parent. It is only a 10-day commitment, but quite powerful in calming both parent and unborn baby. The new born baby can hear and smell everything the mother is exposed to in the third trimester of pregnancy. We also then highly recommend completing the 5-week course of [Infant Massage](#) as soon as mother can make it in after the new baby is born to assist with those crucial early developmental months.

Siblings: Many parents have requested over and over again for programs to assist the siblings of their children with special needs. Groups do work to some extent, especially when the children are able to verbalize their feelings and are able to express them. We have found another avenue over the years to be quite effective and this is through the medium of [Play Therapy](#). It focuses on the child's external expression of their inner self in a totally accepting and validating way. We provide this therapy at our facility as well. This makes it easier for parents to travel to one place and possibly have both children receive their therapy at the same time.