

## Asynchronous development and sensory integration intervention in the gifted and talented population

Anne Cronin

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Parents of children who develop differently are under different pressures and have many difficult decisions to make. As the Internet makes information so accessible, families often find themselves in information overload when looking for resources for their child. Popular books like, *The Out-of-Sync Child* (Kranowitz, 1998) have informed families about sensory integration difficulties that might have never been referred to an occupational therapist. Families of children who are both highly gifted, and have some other exceptionality are increasingly looking toward sensory integration as a resource for their children. The special education literature abounds with documentation of the social and emotional consequences of having exceptional abilities and learning disabilities, when one or both of the conditions is unrecognized, can be pervasive and quite debilitating (Baum et al., 1991; Durden & Tangherlini, 1993).

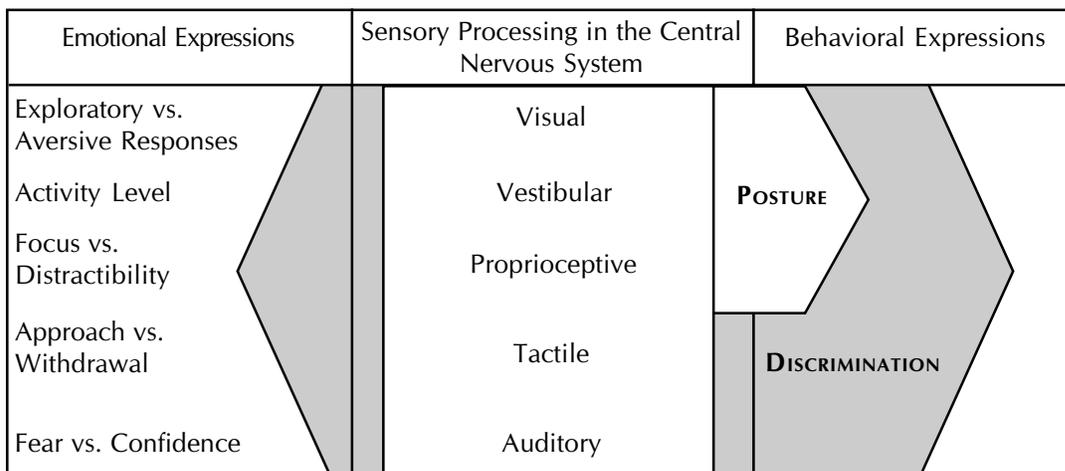
These emotional and social consequences lead parents to search for new and different strategies to support their children. Many parents have asked me for additional information and resources discussing the use of sensory integration strategies, like those described by Kranowitz (1998), for gifted and twice exceptional children. There is no research or even case report information specifically addressing sensory integration and giftedness. For that reason this paper will provide an overview of sensory integration and current relevant literature, and discuss this in the context of existing literature about the characteristics of gifted children.

Sensory Integration is a theory of brain-behavior relationships originally proposed by A. Jean Ayres in the 1970's (Bundy, Lane, and Murray, 2002). It has been an exciting idea and has led to much research and speculation in the past thirty years. Information and research about Sensory Integration Theory falls into three general categories:

- Normal development and aspects of sensory integration in the typically developing child
- Sensory integrative dysfunction
- Sensory Integration interventions

In normal development, Sensory Integration theory explains why individuals behave in particular ways. Learning is believed to be "dependent on the ability to take in and process sensation from movement and environment and use it to plan and organize behavior" (Bundy, Lane, and Murray, 2002, p. 5). Because sensory integration cannot be directly observed, the theory has been dependent on research in neurobiology. Explanations of the neural basis for SI have changed dramatically from Ayres' original speculations with increases in understanding of the nervous system. Ayres originally de-emphasized the role of cognition in development, hoping to tap underlying, subconscious neurobiological mechanisms. Current research demonstrates that the nervous system is more complex, and less of a hierarchy than once believed. This means that although there are subconscious neurobiological mechanisms, they cannot be isolated from thought and intention. I emphasize this point here, because parents seeking sensory integrative support for their gifted child should be sure that their therapist uses this more modern model. In my experience, gifted children do best when cognitively engaged.

The following diagram is adapted from (Bundy, Lane, and Murray, 2002, p. 7) to present an overview of Sensory Integration theory in the context of development.



In this conception, sensory integration, in typical development, supports the development of posture and fine discrimination of environmental demands based on sensory cues. Normally it also is reflected in an “inner drive” toward exploration, engagement, participation and confidence in interactions with both the human and non-human world.

*Sensory Integration Dysfunction*, then, is when a decreased ability to process sensation results in difficulty participating in daily functional contexts and interferes with learning and behavior. The research suggests that there are two general types of sensory integrative dysfunctions, dyspraxia and poor modulation. Dyspraxia relates to deficits in the behavioral expressions side of the diagram above. Children who are dyspraxic are often described as clumsy, and may have difficulties with handwriting. These are children who join teams and may “clown” rather than build skills, because the clowning draws attention from their deficits. The literature describes many of these problems common to populations of children with learning disabilities and attention deficits. Gifted children with these additional exceptionalities should, in theory, respond in a manner consistent with other children treated for dyspraxia. The research on the impact of sensory integration interventions for dyspraxia is mixed, but generally positive. I have attached some current research citations to this paper for further exploration.

Poor modulation, called *Sensory Modulation Disorders*, has been an area of great interest in recent years. Ayres first described the idea of “tactile defensiveness.” Ayres observed that some children responded to ordinary touch as though it were painful or distressing. These children tended to have many functional limitations. They could be very picky about their food, their clothing, and their daily routines. Children with tactile defensiveness sometimes had delays in handwriting and other fine motor skills. These same children disliked settings where they might be touched unexpectedly, like the playground or on the school bus. Ayres description of this pattern was so appealing, and so intuitively explained patterns of behaviors, that it has been adopted by diverse disciplines like psychology, nursing, and education.

Ayres proposed that tactile defensiveness occurs because the nervous system does not make sense of, or adequately discriminate tactile information so that the individual can respond to touch in a sub-conscious way. Additionally, it has been observed that other sensory systems can have similar disorders in modulation. Therefore, the category of tactile defensiveness was expanded to be a category of sensory modulation problems. This type of SI problem I most commonly hear about from parents of highly gifted children. Sensory Modulation Disorders have been very hard to measure empirically. For more than 20 years diagnoses were made on the basis of observation and history alone. More recently a series of tools, the Sensory Profiles (Dunn, 1994; Dunn and Brown, 1997; and Dunn and Westman, 1997) have been promising. This tool is a sensory history questionnaire that has some normative comparison data and has been statistically analyzed to determine patterns in sensory responses. This instrument has been very useful in identifying persons whose sensory responses were far outside the “norm” and in identifying recognizable patterns in the results. Whether a statistical significance in sensory processing is a “disorder” continues to be a personal judgment.

Now here is where I’m moving away from SI into the literature of giftedness. Be aware that most occupational therapists providing sensory integration do not have any training in the special developmental and behavior issues of gifted children. Dabrowski (1964) described patterns of overexcitabilities consisting of inborn, heightened abilities to receive and respond to stimuli. His theory related to creativity and the creative process, and has been widely applied to the gifted population. Overexcitabilities are expressed in heightened sensitivity, awareness, and intensity. Mendaglio (1995) and Lind (2000) offer similar views. These authors do not describe these overexcitabilities as “disorders,” rather as characteristic features of the exceptionally creative.

Dabrowski goes on to state that “Each form of overexcitability points to a higher than average sensitivity of its receptors. As a result a person endowed with different forms of overexcitability reacts with surprise, puzzlement to many things, he collides with things, persons, and events which in turn brings him astonishment and disquietude” (1964 p.7). Is Dabrowski describing something that Sensory Integration trained therapists would label a “sensory modulation disorder”? The two look the same to me as a clinician.

So, do highly gifted children with clearly identified “overexcitabilities” need occupational therapy? This is where it all gets muddled. The first question for parents to ask is “Do your child’s reactions to sensory experiences limit his or her ability to do things that are meaningful and important to the child or to your family?” If you answer is no then I would suggest you look at some sensory integration materials and perhaps the “Alert Program” (Therapy Works, 2000) as a tool to help your child recognize and learn to manage their own excitabilities. Although they may not be experiencing difficulties now, having a language to discuss what they are feeling and being aware that not all people experience things in the same way, are important tools in helping the child cope when new challenges emerge. I do not think that you must have an occupational therapist involved at this level, although an assessment and the development of a “sensory diet” may streamline the self-education process.

For those of you who did feel that your child does have activity limitations secondary to their sensory sensitivity, I have provided some more detailed information. All of the published research on the efficacy of Sensory Integration has been conducted on children with identified delays. Highly gifted children with identified difficulties in some area are considered twice exceptional (or as having dual exceptionalities). In most cases, the twice exceptional label is given when the child's intelligence scores are in the gifted range, but some other score, like reading, language, or attention, fall below a normative range. I think that the outcome studies can be considered without reserve for this group of children. Most Sensory Integration research has focused on observable motor behaviors and studies have consistently shown the gains are few and unpredictable, similar in general to similar focused 1-to-1 perceptual-motor training programs (Wilson, et al. 1992, 1994; Bundy Lane and Murray, 2002). In response to these findings, researchers have expressed concerns about the appropriateness of the outcome measures used (Polatajko et al., 1992; Cohn and Cermak, 1998). Cohn (2001a, 2001b) and Cohn, Miller and Tickle-Degnan (2000) have done some innovative studies to address the need for different outcome measures. This research identifies parent expectations from therapy and positive outcomes perceived by parents whose children received sensory integrative therapy. Interesting to our discussion, one of the major benefits reported by parents was a language to describe sensory sensitivities, and strategies to address and avoid sensory "meltdowns."

Even without dual exceptionalities, children can have participation limitations that are very distressing and limiting. Typically, in these children, the scores on all testing are so high that they do not qualify for either a label or services, but there are wide discrepancies in their scores. For example, verbal and analytic scores can be in the profoundly gifted range, while motor skills and attention may be in the low normal range. The outcome studies for Sensory Integration interventions are not strong, even with the "usual" populations, and so may be even less applicable to our gifted kids. For parents with kids of this type, I would advise learning more about sensory integration and the Alert Program (Therapy Works, 2000). I have been very successful in supporting kids with a sensory diet and with a framework like the Alert Program to educate them on the basics of self-regulation. In both Dabrowski's theory and in Sensory Integration, the unusual sensory reactions are seen as an integral part of the individual to be accommodated and to be worked with. In fact, many of the strategies offered by Lind (2000) for dealing with "over-excitabilities" are similar to sensory integration strategies.

Attached as an appendix are a brief description of a sensory diet and a non-standardized sensory history. In summation, I believe that sensory integration strategies can be highly useful in aiding families in understanding and accommodating their highly sensitive children. I am hesitant to label this condition a disorder, and do not see intervention changing the condition, as much as educating everyone on strategies to manage and regulate the sensitivities. I do think that seeking out an occupational therapist with experience in sensory integration can be very helpful, but be aware that you, as parents, will need to educate her or him on the unique aspects of the gifted child. Be sure and ask questions, and encourage therapists to consider and explore research documenting the outcomes of therapy with the gifted population.

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**Sensory History Interview**

When possible interview both the child and a parent. You may change the phrasing and offer examples to clarify items. Record any discussion under "remarks."

<b>Touch</b>	No	Sometimes	Always or a lot	<b>Remarks</b>
1. Do you like messy art projects, like finger paints or clay?				
2. Do you avoid getting your hands "messy"?				
3. When you were little did it bother you to have someone wash your face?				
4. Do you feel like you need to wash your hands often?				
5. Does it bother you to have someone else wash or comb your hair?				
6. Do baths bother you?				
7. Do some clothes bother you because of the way they feel?				
8. Do the tags in clothes bother you?				
9. Do you mind wearing insect repellent or sunscreen?				
10. Do you prefer long sleeve clothing even when it's warm?				
11. Does it bother you when people touch you, even if it is a friendly pat or hug?				
12. Does going to the dentist bother you?				
13. Does it bother you to go barefoot outside?				
14. After someone touches you, do you feel like touching or rubbing that spot?				
15. Are there foods you avoid because of the way they feel in your mouth?				
<b>Movement</b>				
16. Do you like carnival rides that lift you off the ground?				
17. Do you like playing on a trampoline?				
18. Do you get scared in high places?				



	No	Sometimes	Always	or a lot	Remarks
19. Do you avoid games that include climbing and jumping?					
20. Do you like moving fast, like you do on a skateboard or skating?					
21. Do you like rides or swings that spin you?					
22. Do you have trouble sitting still?					
23. Do you get carsick easily?					
24. Do you like riding on busses?					
25. When you are playing, do you fall more than your friends?					
26. Do you like to practice new things privately?					
27. At school do you often lean or lay on your desk?					
28. Do you get tired more easily than other kids?					
29. When you were little did you walk on your toes a lot?					
28. After spinning or jumping, do you find it hard to settle down?					
<b>Sound</b>					
29. Are you too distracted to work if there is a lot a noise around?					
30. Do you think you startle or get more upset at loud noises more than other people?					
31. Do you get confused or distracted in noisy places like the mall or the school cafeteria?					
32. Do you enjoy music while you work?					
33. Does making little noises, like tapping a pencil help you to focus?					
34. Do you often get accused of not paying attention?					
<b>Vision</b>					
35. Does bright sunlight hurt you eyes?					
36. Do your eyes seem to get tired or water easily?					
37. Do you prefer dimly lit rooms?					
38. Do you put puzzles together easily?					
39. Do you like toys like lava lights to look at?					
40. Do you get lost easily?					
41. Do you dislike drawing or writing?					
42. Is your writing very large compared to your friends'?					

## **Sensory Diet**

A sensory diet is a family centered approach of providing sensory integrative therapy to meet the needs of a specific child and family. Sensory diets are not food diets, although food may be used in them. Sensory diets are activities that we use to help us feel calm, alert, and in an “optimal” state of arousal.

Sensory diets are planned, scheduled activities imbedded throughout the day to help these individuals achieve or maintain an optimal arousal level. A sensory diet should include the input and support of parents, teachers, and any other involved adult.

## **Developing a Sensory Diet**

A sensory diet requires the family to document the daily routine for 4-6 days, with notations for particular problem times. It also requires the occupational therapist to observe the child in natural settings, including home, school, and daycare. In some cases, these observations may be supplemented by videotapes of the child.

Typically, with a pre-school child you would work within the regular activity routine to assure a sensory activity at least every half-hour. If the regular activity has a sensory basis an additional activity need not be included. With older children you schedule the activities based on need and on logical breaks in their day. Many older children can learn to manage their own sensory diet.

## **Considerations in Planning a Sensory Diet**

An occupational therapist should work with you to tailor the sensory diet to your child’s needs.

A sensory diet should include alerting activities, organizing activities, and calming activities based on the performance of the child. This includes interventions for specific problem areas, using “calming activities” during stress periods and “alerting” activities during slow periods.

Guidelines:

1. Routines are important so start simple and work up. An example might be after breakfast, after lunch, after school, before bedtime, or every 2 hours.
2. Use an activity that the child has an interest in, this will stop an opening confrontation.
3. When the transition is made between activities and during an activity. Try counting to 5 before making a transition.
4. Watch for signs of child starting to relax by facial expressions, these mean the child is involved in an activity that is working at that time. Crying, whimpering, and laughing can mean it is time to cool off or calm down.
5. Change the routine occasionally for variety. This will help to keep the sensory diet interesting. This also helps with the ability of change in their environment
6. Talk with your occupational therapist regularly to make sure the diet that you are using is age appropriate and is still fitting your child’s sensory needs.

## **Sensory Activities**

Sensory diet activities are usually quite simple. The following lists offer a few examples of activities that may be done at home....

### **Games (alerting activities)**

- Obstacle Courses including dragging/sliding things
- Silly Walks (e.g., crab walk)
- Red Light/Green Light
- Running Races
- Tug-of-war
- “Stop Dancing” where you freeze and hold you body posture at breaks in the music



### **Swinging/Bouncing (alerting activities)**

- Inside swings
- Trampoline
- Hanging or pull-up-bar
- Outside swings/hammocks
- Exercise ball
- Jump Rope
- Stilts/Roller Skates

### **Exercises (organizing activities)**

- Climbing
- Tumbling/Head Stands
- Wheelbarrow/Camel Play: Have the child carry loads on the back like a camel.
- Pushing a loaded box/wagon/cart.
- Running/jogging/biking/Stair Climbing
- Horsie and Leapfrog: These are great contact sports. Leapfrog is where one person jumps over the other. Next the other person does the same.
- Roughhousing: This can be a good all over sensory experience especially if you push, pull, tug, roll, and tumble. Make sure to use proper safety precautions.

### **Other Sensory Stimulation (organizing activities)**

\*\*If a child is sensitive to touch they should not be forced to do texture activities

- Dumping and Pouring: Give the child a cup and bucket. Put blocks, dry beans, sand or water in the item. Then have the child dump the material back and forth from one to the other.
- Paper Ripping: Let the child have some type of paper material. Allow them to tear strips, squares, or circles from the paper.
- Music listening/dancing/singing
- Pushing and pulling activities: playing with a "stretch " toy or stiff clay
- Finger painting with plain paint first then adding in; sand, cereal, rice, or other textures.
- Cooking Play: When you are cooking let the child play in the cookie dough, bread dough, etc.
- Dress-up: Collect a box of dress-up items for the child to use. Items can include hats, gloves or mittens, scarves of different materials, etc.

### **Calming Activities**

- Cuddling with pillows in a "hideout"
- Making a "kid burrito" by rolling the child up tightly in a blanket, or a "kid sandwich" by (carefully) squishing the child between two gymnastic mats or sofa cushions.
- Deep pressure massages, back/neck rubs, cuddles or hugs
- "Heavy work," such as moving furniture, carrying heavy bags, or lifting weights.
- Hideaway: Use towels, sheets, blankets, and other materials for placing over a table or two chairs put together to make a fort for the child to play in.
- Quiet music listening, books on tape
- Warm bath or shower
- Pushing on walls with, back, buttocks, hands, head, or shoulders.
- Sucking on something... it can be ice water from a squeeze bottle, a Popsicle, or anything else the child enjoys