Sabbatical Study Sensory Processing Disorder

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Background:

I have chosen the topic Sensory Processing disorder (SPD), because over time we have become aware that many students start school with a variety of inhibiting issues, some of which are not readily identifiable.

Amongst some of the possible problems can be…difficulty with

- Socializing
- Learning challenges
- Doing physical activities
- Generally not being able to participate fully in the school day without a 'melt- down'
- Showing anxiety
- Withdrawing from a situation
- Being over or under responsive to situations
- Various combinations of these.

This may have a minor impact on their lives, but it can also be major in some cases,.

Resources in the education system are often quite limited, difficult to access, and of quite limited duration. Unless a student exhibits high or very high needs, assistance from appropriately trained staff is scarce, especially in small rural schools.

When we enrolled a student with Very High Needs ORS funded student (StudentA) our journey began to gain momentum. Some traits we were observing in student A, we also noted to a lesser degree, in other students.

This report is not about those with identified high or very high needs, but rather those with sensory processing needs, that don't meet the ORS criteria.

Sensory Processing Disorder.

The purpose of my research into sensory Processing Disorders (SPD) was to…

- Develop a greater understanding of Sensory Processing and Sensory Processing Disorders.
- Specifically look at how students arriving at our school with this disorder, could be integrated successfully into the school environment and ready to learn, especially our multi- level classroom situation.

- Provide leadership by assisting staff to modify teaching practices and make cultural changes that may be required in order to meet the needs of these students.

This report is designed to be a working document for those 'at the coal face.' It is research on information that can be put into practice by any classroom teacher who may observe signs, of which they are unsure, in students with whom they work. I have made every effort to put things in a practical and useable way and avoid jargon.

What is Sensory Processing?

Sensory processing, (formerly known as sensory Integration), is the term that refers to the way the nervous system receives messages from the senses and turns them into appropriate motor and behavioral responses.
Briefly, sensory processing is the ability of the brain to receive, interpret and organize input from all of the active senses at any given moment, to enable us to interact appropriately in our environment. (A. Jean Ayres)

It is like traffic lights…when the traffic lights are working correctly traffic flows without any problems. However when the lights are mal-functioning we see…road rage, panic, frustration, people lost and of course traffic jams. We witness reactive behavior and high stress levels and this typifies the student with a processing disorder.

I want to briefly review our senses and sensory development in order to understand how children with SPD can struggle when the messages are not received correctly. We are all familiar with our 5 senses, ie. sight, hearing, touch, smell and taste. Some however maybe less familiar with vestibular and proprioception senses which are less often discussed.

Understanding how these 7 senses inter-relate is a critical part of this research…

Sight

Sight or **vision** is the capability of the eyes to focus and detect images of visible light and generate electrical nerve impulses for varying colors, hues, and brightness. Visual perception is how the brain processes these impulses – recognising, differentiating and interpreting visual stimuli through comparison with experiences made earlier in life.

Smell

Smell or **olfaction** is our ability to detect scent – chemical, odour molecules in the air. Our olfactory system begins in our nose which has hundreds of olfactory receptors. Odour molecules possess a variety of features and, thus, excite specific receptors more or less strongly. This combination of excitement is interpreted by the brain to perceive the 'smell'.

How olfactory information is coded in the brain to allow for proper perception is still being researched and the process is not completely understood, however, what is known is that the chemical nature of the odourant is particularly important because there may be a 'chemical map' in the brain.

Taste

Taste, or **gustation**, refers to the capability to detect the taste of substances such as food, certain minerals, and poisons, etc. The sense of taste is often confused with the "sense" of flavour, which is a combination of taste and smell perception.

Humans receive tastes through sensory organs called taste buds concentrated on the upper surface of the tongue. There are five basic tastes: sweet, bitter, sour, salty and umami (savoury)

Hearing

Hearing, or **audition**, is the ability to perceive sound by detecting vibrations, changes in the pressure of the surrounding medium through time, through an organ such as the ear. As with sight, auditory processing relies on how the brain interprets, recognises and differentiates sound stimuli.

Touch

Touch, or **somatosensory**, is a perception resulting from activation of neural receptors, generally in the skin including hair follicles and a variety of pressure receptors respond to variations in pressure (firm, brushing, sustained, etc.).

The somatosensory system is a diverse sensory system that is spread through all major parts of our body. At its simplest, the system works when activity in a sensory receptor is triggered by a specific stimulus (such as heat); this signal eventually passes to an area in the brain uniquely attributed to that area on the body and this allows the processed stimulus to be felt at the correct location.

Vestibular

The **vestibular system** explains the perception of our body in relation to gravity, movement and balance. The vestibular system measures acceleration, g-force, body movements and head position. Examples of the vestibular system in practice include knowing that you are moving when you are in an elevator, knowing whether you are lying down or sitting up, and being able to walk along a balance beam.

Proprioception (Sometimes known as “place in space”)

Proprioception is the sense of the relative position of neighbouring parts of the body and strength of effort being employed in movement. This sense is very important as it lets us know exactly where our body parts are, how we are positioned in space and to plan our movements. Examples of our proprioception in practice include being able to clap our hands together with our eyes closed, write with a pencil and apply the correct pressure, and navigate through a narrow space (www. 7 Senses Foundation)

Children are always taking in information as they explore their environment. They try new activities and as they succeed they use this success to further their learning.

Dr Ayres, (Sensory Integration and The Child 1979) describes this sensory development like building blocks being placed one on top of the other.

The bottom block relates to the **primary sensory systems** where the baby is taking in all sensory information…the basis for all future learning. Although all the senses are in play at this time, the main ones are touch (skin) gravity and movement (vestibular) and muscles (proprioceptive). Touch gives a pleasant feeling, especially around the mouth which is extremely sensitive. Sucking, being held and rocked develop that connection between the child and mother.

The vestibular and proprioceptive senses begin to develop…eye movements, seeing people and objects, both still and moving, and seeing and copying facial features. New movements are developing…head and shoulder lifting, arching the body, taking weight on hands, pivoting on their stomach and turning to sounds. With this increased movement and balance comes increased confidence. The vestibular sensations about gravity, coming through the inner ear, teach them they are connected to the earth and is safe.

The second block sees **sensory motor skill development.**

Body awareness is increasingly developing and with this comes bilateral / two sided coordination enabling children to move in a smooth and coordinated way. They can pass things from hand to hand and as this develops hand preference begins to show. Posture improves and with this stability of the neck which also helps them to hold their eyes steady and observe the environment around them. As they become more coordinated the more active they achieve…crawling, crossing the mid line and using both sides of their brain. As these, touch, vestibular and proprioceptive senses are maturing they are developing 'motor planning' or praxis ie. once they do something, like rolling over, they have to initially plan the actions required, but with practice, can do it without effort. When using these sensory motor skills all the time, activity levels become regulated and their senses are becoming well developed and organised.

The third block in the developing child is that of **perceptual motor skills.**

At this stage children have increased understanding of sensory information being learned. Through their auditory sense they understand language and are communicating by talking. Visual discrimination is developing and they can discriminate where people and objects are in relationship to themselves. They can hold a crayon, draw simple pictures and catch a ball as their eye /hand coordination develops. (visual and motor integration) Their ability to do activities such as a puzzle or shape activity indicate their senses allow them to see, handle and understand how to fit the pieces correctly. Their basic skills continue to develop and strengthen.

The final building block is **academic readiness.**

By now children are more efficient and purposeful in their actions. They can discriminate between different touch sensations. Their gross motor skills are smooth as their proprioceptive, vestibular and tactile senses work together. They jump, runs and play. Their fine motor skills

have developed and they have a constant preference for one hand. They can visualize situations from the past in the future and their social competence is further developed…sharing, being reasonable when things don't go the way they expected and showing empathy. They are now ready for academic learning...the development of conceptual skills ie. learning to read, use numbers and apply what he has learned one day to what they learned previously. So they now have complex motor skills, an attention span, organized behavior patterns, left/right body and brain organization, can visualize, have a feeling of self-worth and self-control. **They are ready for formal learning.**

Of course this is what is considered **typical development,** but as we all know, each child progresses and develops at different rates. Development is dependent on so many factors…the input during the crucial first 3 years of life, the constant encouragement, love and nurturing the child receives during this time, is vital!

The first 3 years are the hard wiring of the brain for the future. At birth a baby's brain weighs about 350grams, at 3 years it is 1.2Kg. and as an adult our brain will be about…1.4Kgs! It is very obvious the importance of input by parents to ensure the child reaches their full potential. It is suggested that from birth to 18 months babies are indulged so all sensory processes can develop in a nurturing , empathetic and positive environment. From 18 months to 3 years they need to be 'shown' consequences…they will not understand these but they are part of the necessary ongoing development. (Nathan Mikaere Wallis, Brainwave Trust Aotearoa)

What is Sensory Processing Disorder?

Sensory Processing Disorder is a condition that exists when sensory signals ***don't*** get organized into appropriate responses. Pioneering occupational therapist and neuroscientist A. Jean Ayres, PhD, likened SPD to a neurological "traffic jam" that prevents certain parts of the brain from receiving the information needed to interpret sensory information correctly. Because the messages are inaccurate the person finds it difficult to process and act upon information received through the senses, which creates challenges in performing countless everyday tasks. Motor clumsiness, behavioral problems, anxiety, depression, school failure, low self- esteem, social challenges and other impacts may result if the disorder is not treated effectively.

One study (Ahn, Miller, Milberger, McIntosh, 2004) shows that at least 1 in 20 children's daily lives is affected by SPD. Another research study by the Sensory Processing Disorder Scientific Work Group (Ben-Sasson, Carter, Briggs-Gowen, 2009) suggests that *1 in every 6 children experiences sensory symptoms that may be significant enough to affect aspects of everyday life. Symptoms of Sensory Processing Disorder, like those of most disorders, occur within a broad spectrum of severity. While most of us have occasional difficulties processing sensory information, for children and adults with SPD, these difficulties are chronic, and they disrupt everyday life. (www.SPD Foundation). SPD can affect just one sense or multiple senses, and those with the condition can be either over responsive or under responsive.*

Sensory processing difficulties can fluctuate depending on the student, eg. one day the child will be happy to wear any clothing and then suddenly begin reacting to different textures and then again later, this may disappear. These fluctuations in sensory processing are common in students on the autistic spectrum, they have often developed their own coping strategies to avoid the experience eg. fingers in ears when an unpleasant noise is experienced.

Sensory issues can be categorized as:

Sensory Modulation Disorder – A child who is **overresponsive** to sensory stimulation may have a tendency to respond to certain harmless situations as if they were dangerous or painful

- Doesn't like being touched
- Gets agitated if bumped into
- Screams when hair is brushed or washed
- Gag on certain food textures
- Scream/covers ears when there is a loud noise (dog barking, vacuum cleaner)
- Have a fear of ordinary movement activities eg. swing, slides.

An **underresponsive** child tends not to feel stimulation at the same intensity that a typically developing individual feels. These people require frequent, longer and more intense stimulation to get the same response.

- Under responds to pain
- Chews on inedible objects, clothes, toys, sticks,
- Crashes/bumps into things
- Gets tired easily
- Tends to avoid contact with others.

The **sensory seeker** craves sensory experiences and often tries to meet their needs in socially unacceptable ways

- Turns volumes up extremely high
- Crash into things on purpose
- Enjoys rough play
- Always seeks out things to touch
- Finds it hard to sit still…fidgets
- Licks, chews or sucks on their clothes or non- food items.

To confuse the matter further, a typical child with sensory modulation disorder could have a combination of all three, and these can be affected by a variety of changing situations eg is the person tired, has changed routines or other factors?

Sensory Discrimination Disorder - This child has difficulty understanding the quality of the sensory information he is receiving from his environment. It can be difficult to tell the difference between similar sensations. This child may

- Have trouble distinguishing between different sounds…'rat' and 'bat' may sound exactly the same
- Not understand what they are touching without having to look at the object…hands in a paper bag and can't differentiate between two objects
- Appear clumsy or awkward
- Have trouble recognizing the difference between various smells, tastes or textures of foods.

Sensory Based Motor Disorder The children with this disorder are those who have trouble making their bodies do what they want them to do. These are the children who have difficulty responding appropriately to the proprioceptive and vestibular information they receive from their environment. They don't get the messages from their muscles and joints that help them understand what their bodies are doing. (proprioceptive) And they have trouble with balance and understanding where their body is in relation to earth (vestibular) When these are not in sync it is difficult for the child make his body respond effectively**.** **Dyspraxia** and **Postural disorder** are part of this.

A child with **Dyspraxia** has difficulty imaging, coordinating and executing movement. It can involve gross, fine or oral motor skills or a combination of all three. This child may

- Appear clumsy and trip over
- Bump into others, break things, seem accident prone
- Have problems with chewing and eating
- Have trouble with dressing, grooming or self- care
- Have trouble holding a pencil or completing atask.

Children with **Postural Disorder** tend to have poor muscle tone. They may

- Have trouble getting on with tasks they have to complete
- Seem tired
- Have difficulty sitting up straight
- Have a poor sense of balance and fall over…even fall off their seats
- Have sloppy untidy handwriting.

Is There A Connection Between Sensory Processing and Other Disorders?

Sensory Processing is on a continuum – on one end are those with mild dysfunction and at the far end people with severe issues. Included on the continuum are those with ADHD, Aspergers, Autism and other pervasive developmental delays. From my reading, the connections seem strong, but that is from my point of view. I feel Dyslexia, Irlens and other learning difficulties where a child has problems with one of the four steps of learning ie. input (taking in information), integration (processing and interpreting), memory (using, storing and retrieving) and

output (sending the information through language or motor activities) must have a connection as they are all related to our sensory processes.

But of course who has not at some stage experienced processing issues? Too much or too little sensory stimulation can confuse the brain eg. Finding yourself in a confined space, on a bad plane flight or passing a pile of smelly rubbish can all cause temporary sensory issues.

Causes of Sensory Processing Disorder .

As with many neuro-developmental disorders, the exact cause of Sensory Processing Disorder has not been identified. Preliminary research suggests it is often inherited. If this is so, the causes are coded into the child's genes. Pre-natal and birth complications have also been implicated and environmental factors may be involved as well, (Lucy Jane Miller- 'Sensational Kids: Hope and Help For Children with Sensory Processing Disorder.' 2000)

Here are 11 Basic Key Signs of Sensory Processing Disorder. Do you see any of these traits in a student you may teach?

1. Extra sensitive to touch - they don't like being touched or can't be touched enough.
2. Sensitivity to sounds – they may cover their ears when the same noises don't bother others.
3. Picky eaters – they will only eat a limited range of foods and those with which they are familiar.
4. Movement – unusual body posture, seek constant movement or have difficulty with personal movement.
5. Hyperactivity – they can't sit still during the day or get to sleep at night or calm themselves down.
6. Fear of crowds – crowded areas bother them to the point of frequent public meltdowns.
7. Poor fine or gross motor skills – they have difficulty in hand writing or kicking a ball.
8. Excessive risk taking – they may be unaware of touch or pain or heights or danger.
9. Avoidance of sensory stimulation – they won't put their hands in anything messy such as glue, clay or mud. They will only wear certain clothes.
10. Trouble with balance – they may be accident-prone or fall more often than others and have a preference for sedentary activities.
11. Easily distracted – particularly by noise, movement and touch.

Common Causes of Sensory Reactions

- School clothes, particularly labels
- Shoes and socks
- School bells and fire alarms
- Hand dryers

- Whistles
- Air conditioners and heaters
- Canteen, Lunch orders arriving to the classroom (smell and crunching wrappers)
- Smell of other peoples lunches
- Smell of perfume, shampoo, deodorant, skin lotions, coffee, cigarette smokers clothes, body odour
- Yelling or shouting by students or staff
- Fluorescent lights
- Lining up, particularly being somewhere in the middle and being touched
- Being hit by a ball when it was not expected
- Stuffy or hot rooms particularly if there is a large crowd
- People sitting too close to them and touching
- Movement of people or things eg. a curtain flapping
- Noise from others such as clicking pens, sharpening pencils, moving chairs on a hard surface etc
- Noise from overhead fans
- Other teachers' voices from the next room
- Other students' voices in the next room
- Having to change clothes in a changing room

NB sometimes it may be a combination of any of these or just one thing that can cause a sensory reaction.

Because there are so many different ways a child can be affected by sensory processing issues, it is impossible to list all the different ideas we could implement, to alter our practice. Here is a short list of some things for you to consider in your class room:

- Check which of the seven senses are causing the issue… noise, light, movement, touch, smell or too much visual stimulation.
- Ensure there is routine and structure in place.
- Ensure consistency and predictability in the child's day.
- Use visuals and guidelines so the child understands what they have to do.
- Use timers for being on task and transitioning to something new or different.
- Teach problem solving skills.
- Simplify your language…not too many instructions.
- Use short breaks.
- Model what is appropriate, what is not and explain the difference.

- Promote peer understanding and tolerance.

It is helpful to gather information from the parents…these problems usually occur at home as well but sometimes are less severe as children learn to cope in a familiar environment.

Older children may be able to tell you what upsets them but not always why. Using the above information may be able to help you identify what the problem is.

This is just the start!

The following are a list of resources I have found useful and would recommend for implementing strategies for assisting students. I know, there are many more available.

1. "Practical Sensory Programmes For Students With Autism Spectrum Disorder and Other Special Needs" (Sue Larkey)
   This book is the starting point after identifying one of the 11 key signs of sensory processing disorder or difficulty. It contains in depth sensory check list, further identifying issues as well as activities and evaluative ideas.
2. "The Ultimate Guide to School and Home" (Sue Larkey and Anna Tulleman) This gives key strategies to support ways of assisting children with varying disorders. It is a very opractical resource.
3. "Behaviour Solutions for the Inclusive Classroom" (Beth Aune, Beth Burt and Peter Gennaro) This is an easy book to use…see a behaviour and look it up. Quick and Easy.
4. "Making it a Success" (Sue Larkey) Covers strategies for classroom and playground. It includes worksheets, strategies for programmes to enhance student learning, teaching situations, ideas for support staff working with students and target behaviours for successful classroom participation.
5. "Developing Social Skills" (Sue Larkey and Gay von Ess) Practical ideas for social skill development.

Summary

It has been an interesting journey. The more I have read, had discussions, observed and researched, the more aware I have become of the complexities of these issues. Once there is a suspicion or diagnosis of a child having a sensory processing issue, the way we as educators react, will impact on how the challenge is met, how that child will have his needs met and how integration into the school community is reached effectively.

It has been difficult to specifically research sensory processing without entering into the realms of other learning disorders, the inter relationship is so closely connected. Remember we are not looking at our students with high needs but those we notice in our classroom and

schools, who are having difficulties being able to cope on a daily basis, with activities and learning that most other students cope with readily. We should reflect on four of Temple Grandin's (www.templegrandin.com) statements…

- *"There needs to be an emphasis on building and expanding the skills a child is good at. Too often children get locked into a label eg. ADHD. Dyslexia or autism etc. and they cannot see beyond that label.*
- *Children with a 'label' often have uneven skills, they may be talented in one area and have a real deficiency in another." As teachers we need to work on the areas of weakness but not to the point where the area of strength gets neglected.*
- *We need to place "More emphasis on what children can do instead of what they can't."* and
- *We need to "Remember what works for one child may not work for another" "People in the world who tell you 'you can do it', they are the ones who really make the difference"*

From this research I have compiled checklists and information, using some of the resources mentioned, gathered and catalogued the resources above, for quick reference for staff, and will use all this for school wide professional development in 2015. We will be considering our identification processes, looking at our teaching practice and how we can alter this to suit the needs of the student so they integrate successfully into school.

All this information will be shared as part of the Small Schools' Principals' Professional Leadership group I am involved in. Special interest will be on trialing the checklists, for identification of SPD children, to ensure they will work within all our school communities.

Let's all strive to be one of those who does make the difference!

Bibliography:

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www.templegrandin.com

www.webmd.com/children/sensory-integration-dysfunction

www.7senses.org.au

www.sensoryworld.com

"The Traffic Jam In My Brain" Genevieve Jereb (On line professional Development October 2014) Sensory Tools.net

Teaching Strategies for Successful Education (Professional Development course Brisbane Sept. 2014) Sue Larkey and Dean Beadle

"Not Crazy, after all these years" article by Kayla Langhorne.