The impact of Sensory-Overstimulation

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My mother, a principal at a primary school in Mpumalanga, was worried about the pupils using the public transport, because while they were in this restricted space, they were exposed to very loud music and high noise levels. When these children got to school, they were either in a zombie-like state, as if they were suffering from a meltdown, or they were so hyped up, that it was almost impossible to get them to focus or concentrate for learning.

This made me wonder if sensory overstimulation has a role to play in learning processes and how does it influence a child’s ability to perform academically. Could there also be a correlation between children that are over-stimulated and their ADHD behaviour?

We know that babies and toddlers can easily get over-stimulated because children are born with an immature nervous system, making it difficult for them to process a large amount of stimuli at one time. New-borns under 3 months old can easily become over-stimulated by everyday occurrences such as bright lights or loud noises. Although some babies can tolerate a new stimulus well, others might easily become over-stimulated making it difficult for parents to calm them down.

Toddlers have started to gain control over their ability to react to stimuli in the environment. They learn to shut things out in ways they couldn't as infants. However, they're still new at this skill and can get over-stimulated after a long day or by being around too many people or too much excitement (Hitchcock, 2011).

Dr. Dimitri Christakis (2011), a Professor of Paediatrics at the University of Washington, presented a TEDxTalk on Media and Children. He said, in 1970 the average age at which children watched television was four years. Today, the average age is four months.

The typical child before the age of five is watching 4 ½ hours of television per day, 40% of their waking hours!

According to Dr. Christakis, recent studies have linked television to the over-stimulation of an infant’s brain, leading to the development of Attention-Deficit/Hyperactivity Disorder (ADHD) in young children. He also indicated that in the first two years of life, the brain triples in size. Connections that form in the brain, or synapses, are based on early life experiences. Dr. Dimitri Christakis (2011) and his colleagues had an overstimulation hypothesis which was: “Prolonged exposure to rapid image change during critical period of brain development would precondition the mind to expect high levels of stimulation and that would lead to inattention in later life”. In other words, the mind gets conditioned to a reality that does not actually exist.
His studies have shown that the more kids watch TV before the age of three, the more likely they are to have attention problems in school. He specified that for each hour watching television, a child under the age of 3 increase the chances to have attention problems later with 10%. According to Dr. Christakis, (2011) we are technologising childhood today in a way that is unprecedented!

To conclude the study, they’ve build a mouse model of television viewing (Christakis, 2011). The sounds were from the Cartoon Network channel and the lights were photo-rhythmically generated by those sounds. Exposure for the mice, started at 10 days of live TV, 6 hours daily for 42 days (basically their entire childhood spending in front of a television). After 10 days, they’ve assessed their behaviour with two tests:

- **The first test measured their activity and risk taking and was called the ‘Open field’ test.** According to Dr. Christakis, mice have two competing instincts: to avoid being in the middle of any open area to minimize the chance of being killed, but their competing instinct is to search for food and this mean that at some point the need to go and explore their environment.

  With a computer Dr. Christakis tracked the movement of the mice. The controlled mouse (not exposed to the mouse television), spend most of its time around the perimeter of a box. But the mouse that was exposed to the television, not only spend a lot of time in the middle but they’ve also noted more general activity. This mouse was a hyperactive and a risk taking mouse.

  ![Image of Open Field: Travel Pathway](http://rootsofaction.com/blog/are-we-over-stimulating-young-children-dimitri-christakis/)

- **The second test was called the ‘Novel object recognition’ that tested short-term memory and learning.** A mouse was put into a box with two objects. It would then explore both of the objects and after a period of time, Dr. Christakis would take the mouse out and an hour later they would replace one object with a novel object and assess how much time the mouse spend on each object.
The mouse that had a good short term memory, would spend more time on the novel object opposed to the one that watched mouse TV that spend the same amount of time on both objects. It was as if they couldn’t distinguish the two objects; or they just didn’t care but they were not learning and they were not acting like normal mice.

http://rootsofaction.com/blog/are-we-over-stimulating-young-children-dimitri-christakis/

But how does it happen that an older child or even adults get over-stimulated?

Sensory overload occurs when one of the body’s senses experiences over-stimulation from the environment. There are many environmental elements that impact an individual. Examples of these elements are urbanization, crowding, noise, mass media, science and technology, and the explosive growth of information. Sensory overload is commonly associated with Sensory Processing Disorder and Sensory Defensiveness (Wikipedia, 2013).

“The senses are the gateway through which information from the outside world is processed and relayed to the brain” (Lombaard 2007 as cited in De Jager 2012). The senses are linked into a sensory system, which consist of a set of accessory structures, transducers or receptors and nerve tracks (Ruch 1984 as cited in De Jager 2012). According to De Jager (2012), there are senses that gather information from inside the body (near senses namely proprioceptive system, vestibular system and kinesis) and there are senses that gather information from outside the body (far senses namely touch, smell & taste, hearing and sight). Stimulated senses fill the brain with information and in doing so, wake up the brain to process and integrate information (De Jager, 2012). According to De Jager, the brain prefers to receive new information on a concrete level using as many senses as possible to form a clear perception of the information.

For learners to function with effortless ease, be truly independent and experience learning effectiveness, their senses need to be well stimulated and integrated. Stimulation and “movement activates the neural wiring throughout the body, making the whole body the instrument of learning” (Hannaford 1995 as cited in De Jager 2012). When learners are
functioning optimally, clear messages are fed from all parts of the body to the brain and back again to the body "in a loop" (Promislow 1998 as cited in De Jager 2012).

According to their Website, Wikipedia (2013) the sociologist George Simmel attributed to the foundation of sensory overload in the early 1900's. Writer of *The Metropolis and Mental Life*, Simmel writes about an urban scenario of constantly appearing stimuli that trigger the brain’s senses. He writes about a barrier that must protect the individual from this constant stimulation in order to keep one sane. In short, Simmel concludes with stating that the urban life, full of its stimulations at different scenarios, provides excitement to our nervous system.

The downside is that too much exposure of this sensory overload depletes the body’s energy reservoirs. Lacking the appropriate energy to react at new situations can form the bland mentality of an individual. A person’s mentality can be detrimental with a high degree of exposure of sensory overload. The raw reaction to new stimuli will be different when a person’s sensory experiences are overloaded (from past stimuli), compared to when they are not overloaded, the experience will be more pure.

Sensory overload can result from the over-stimulation of any of the following senses:

- **Hearing** (Auditory Hyper-sensitivities):
  
  Loud noise or sound from multiple sources, such as several people talking at once.
  
  The child overreacts to loud and/or unusual sounds. There may be filtering issues as well, so the child has difficulty attending to one thing and gets distracted easily by sounds in the environment. These children may experience many sounds as painful episodes (Mays, 2010).

- **Sight** (Overload from Visual Stimulation):
  
  Bright lights or environments with lots of movement such as crowds or frequent scene changes on TV.
  
  This child gets overexcited or shuts down when there is too much stimuli in the environment. This helps explain why "The Mall" frequently puts children (and some adults) over the edge. Of course, in the case of the mall, there are many other reasons to experience sensory overload (and probably one of the reasons it has become a great hang out for teenagers—who are constantly sensory seeking) (Mays, 2010).

- **Smell and Taste**:
  
  Strong aromas or spicy foods.

- **Touch** (Tactile Defensiveness):
  
  Tactile sensations such as being touched by another person or the feel of clothes on their skin.
The child over reacts to a variety of touch experiences from the feeling of the clothes worn each day to the texture of food in the lunch box.

Hypersensitivities vary greatly between children and even the same child might enjoy some sensation one day, only to gag when touching the same thing the very next day (Mays, 2010).

**How does over-stimulation influence a child with ADHD?**

According to Hitchcock (2011), a child with attention-deficit hyperactivity disorder, or ADHD, can easily become distracted and inattentive in an over-stimulating environment such as a large or noisy classroom. Children with ADHD have an inability to keep their emotions in check and lack the ability to shift from one mental activity to another. This can cause children with ADHD to become over-stimulated and act out in ways such as hitting, making large messes or doing other distracting, silly or disruptive behaviour.

Reducing the amount of surrounding stimulus for a child with ADHD may help decrease hyperactivity and impulsive and inattentive behaviour.

**What are the symptoms of sensory overload?**

There are a wide variety of symptoms that have been found to be associated with sensory overload. These symptoms can occur in both children and adults. According to their Website, Wikipedia (2013) some of these symptoms are:

- Irritability
- "Shuts down", or refuses to participate in activities and/or interact with others
- Avoids touching or being touched
- Gets overexcited
- Covers eyes around bright lights
- Makes poor eye contact
- Covers ears to close out sounds or voices
- Complains about noises that do not affect others
- Has difficulty focusing on an activity
- Constantly jumps from one activity to another, never completing a task
- Irritated by shoes, socks, tags, or different textures
- Over-sensitive to touch, movement, sights, and/or sounds
- Has trouble with social interactions
- Extremely high or extremely low activity levels
- Muscle tension
- Fidgeting and restlessness
- Angry outbursts
- Sleeplessness/fatigue
- Has difficulty concentrating

The first strategy that applies to all sensory processing dysfunction is to provide movement. When muscles and joints are activated by moving them, nerve impulses go to the brain,
stimulating “organizing” areas of the brain. These areas in turn influence focus, attention and energy level (Mays, 2010).

The role of the skin

The skin has the biggest receptor area of all the senses and reaches from the crown of the head to the soles of the feet (Lombaard 2007 as cited in De Jager 2012). The sense of touch develops as a result of sensory receptors embedded in the skin (subcutaneous layer); in mucous membranes of the mouth, vagina and anus; in muscles, tendons and joints; and in the inner ear (Tortora & Derrickson 2007 as cited in De Jager 2012).

Every hair on the skin has a nerve ending at its base that detects subtle simulation, such as sound waves, and movement as air waves (vibration), in the environment (internal and external). Neural impulses from the skin travel to the vestibular system in the inner ear. Hair on the inside of the vestibular apparatus (as well as the cochlea) bends when fluid move over these hair cells and sends electrical impulses along the vestibular nerve to the cerebellum informing it of the position of the head in space (Marieb 2000 as cited in De Jager 2012).

http://www.chsi.org/prdocs/prhearingmonth0411.php

The skin is grouped with the far senses, but note that the skin is also associated with the near senses of proprioception. Via the hair in the semi-circular canals and the cochlea, the skin is also associated with balance and hearing. The skin is the only sense that provides information from inside and outside the body (De Jager, 2012).

According to De Jager (2012), the two main functions therefore of the skin are for protection and discrimination but these two functions cannot work at the same time. For example, if the protective function is unable to go to rest due to the baby feeling unsafe, or if the baby experienced a difficult and unnatural birth, the baby may become tactile defensive and may withdraw from contact, clothing and activity. This may influence the Central Nervous System and hence he may exhibit allergies or allergic reactions to food and textures (e.g. allergies for specific milk products, eczema and reflux).

A child or adult may also respond in a similar way when he is in an overstimulated state and display SOS signals, alerting you to the possibility of an aberrant withdrawal reflex.

According to Christakis (2011), early childhood is critical for children’s development. Children need more real time play and less fast-paced media. “If you change the beginning,” Christakis says, “you change the whole story!
Mind Moves® to address over-stimulation

Here are a few very helpful Mind Moves from *Mind Moves – moves that mend the mind* by Dr. Melodie De Jager (2009) which will make a difference for an over-stimulated baby, child or adult:

- Tactile stimulation for a baby or a person without the ability to self-stimulate:
  - Gentle, slowly and rhythmically tap breastbone with two fingers.
  - Provide boundaries around the body (soft blanket rolled and shaped like an oval or cushions).
  - Deep pressure contact and massage is needed. Do the Mind Moves massage while the person is lying down or, if it is a baby, hold the baby in a hugging position against the bare chest. Kangaroo care as much as possible and stroke the head, body and limbs often while you talk in a soothing voice.
  - Cup the head, firmly trace the outline of the body and hold the feet.
  - Provide deep pressure on all joints.

🌟 Antennae Adjuster
  Massage both ear lobes simultaneously from top to bottom using circular movements. Repeat three times.

🌟 Mind Moves massage
  Child must stand upright and hold both arms 90° to the side of the body. Stand behind the child and firmly trace the outline of the body from head to toe. Hold the feet for 8 seconds before repeating three times.

🌟 Rise and shine
  Fling the arms wide open while breathing in deeply and slowly. Close the arms over the chest in a hug, exhaling deeply and slowly. The parent may simultaneously hug from behind. Repeat 3 times

🌟 Power ON
  Rub the indentation just below the collar bone in line with the left eye to re-establish the electrical flow via the Vagus nerve to the speech organs and stomach to help relax butterflies and talk with ease.
Bibliography:


