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Sensory strategies: Sanity Restoration for Family Life:

Part I

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Learning Objectives

At the end of this program, participants will….

1. *Recognize sensory pathways within the sensory nervous system*
2. *Identify patterns of sensory processing and associated behaviors*
3. *Describe the interplay between the sensory system and the internalizing and externalize behaviors that both promote and interrupt day to day engagement in occupation*

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Learning Objective 1

At the end of this program, participants will….

1. Recognize sensory pathways within the sensory nervous system

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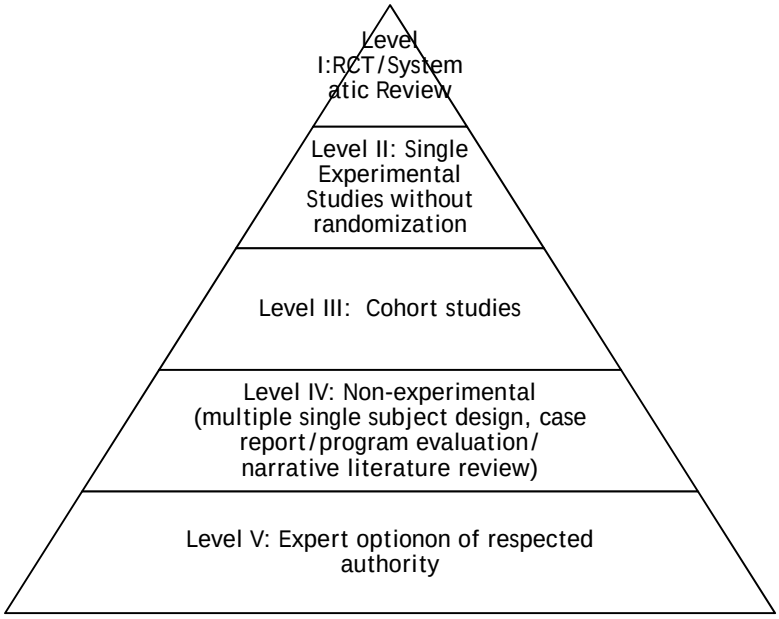
But there isn't any evidence!



6

Sensory 101: The Basics

My quick explanation of the Sensory Process!

7

All learning occurs

through the senses

8

Input ===> Learning ===> application

***

Sensory in ===> motor out

***

Faulty input in (distortion in sensory input)

===>

***

faulty motor out (demonstration of learning / work product)

***

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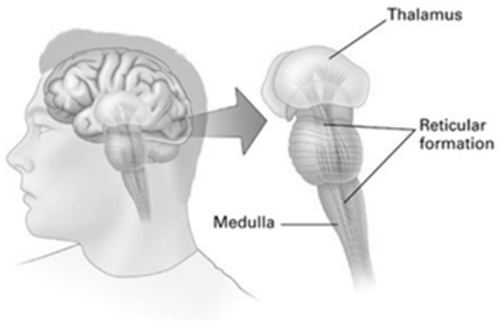
In **sensory processing disorders,**
the brain does not process or organize the flow of sensory impulses in a way that gives the individual accurate or precise information about him/herself and the world



Source: www.thebrainwiki.com/uploads/Hindbrain/RForm.jpg

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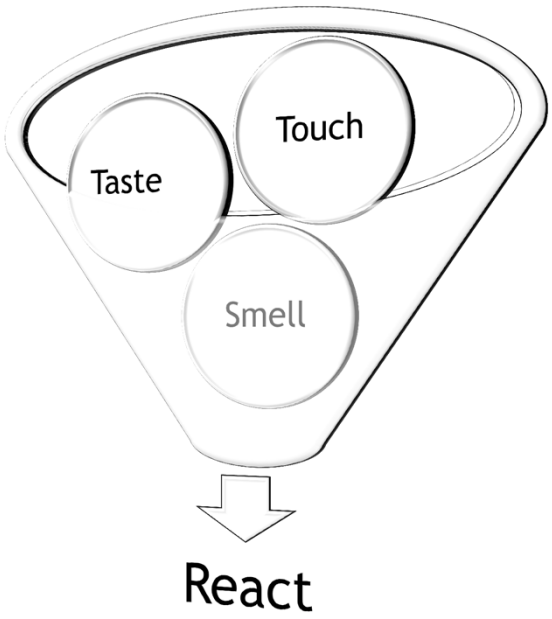

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Innate and learned opinions

Like

Dislike

12

The Five Senses + 3 + 1 nearly sense

- The five senses
  - Seeing (vision)
  - Hearing (auditory)
  - Touching (tactile)
  - Smelling (olfactory)
  - Tasting (gustatory)
- Plus three
  - Proprioception (position orientation)
  - Vestibular (spatial orientation)
  - Interoception (internal sense)

And adding one

- Praxis/Kinesthetic (movement orientation)

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Tactile System

The tactile system is the sense of touch. Our tactile system has 2 components to touch: protective touch and discriminative touch.

Protective touch (fight / flight / fright response) alerts us to when we are in possible danger.

Discriminative touch tells us about the quality of touch –

Light tickly touch (alert!) vs. deep pressure (relax)

Receptors: Skin

The Purpose of the Tactile System

- Protects our internal body from the outside environment
- Provides information about touch
- Provides information on pain and temperature.
- Feedback from the tactile system contributes to body awareness and pain and temperature.

– discriminative touch – gives us information about the quality and characteristics of what we're touching like texture, temperature, size/shape

Dysfunction: Hyper-vigilance, or lack of awareness

Connects us to mom and comfort

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Activities that provide supportive Tactile input:

- Rubbing
- Massage
- Bath/ water
- Warmth
- Cool packs
- Brushing
- Blankets

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Proprioception

The sense of body position in space.

The proprioceptive system detects information from muscles and joints and provides feedback to allow us to know where the body is, where it is moving, and how much force is being used.

Receptors: Joints and muscles

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The Purpose of the Proprioceptive System

Connects us to our physical selves

- know where each part of the body is and how it is moving without looking (creates body map).
- foundation for learning motor patterns, (skilled movements aka coordination).
- With vestibular system, creates balance
- dampening/calming mechanism in collaboration with tactile (deep pressure) system

Dysfunction -Lack of smooth pursuit, deficits in force and direction

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Activities that provide supportive proprioceptive input:

- Move heavy objects
- Play tug-of-war or arm wrestle
- Body Stretches
- Joint compressions (Don't forget the fingers)
- Resistive Fine Motor Activities
  - Clay, dough, or "theraputty", Legos, etc.
- Monkey Bars
- Precise pouring

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Vestibular (gravity/ mother earth)

Vestibular System

Detect the direction of movement.

Detects changes in gravity

Detects vibrations

Affects extension and tone

works together with visual and auditory

(V/V/V triad)

Connects us to Mother Earth

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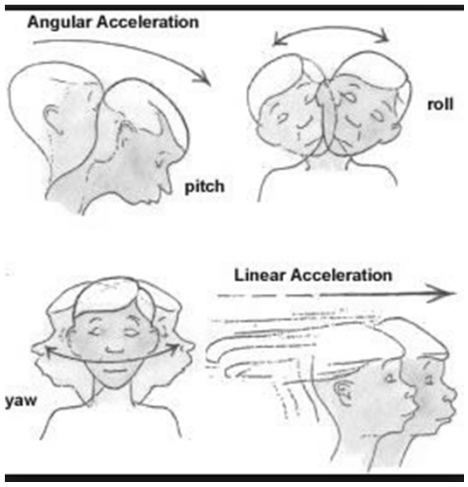

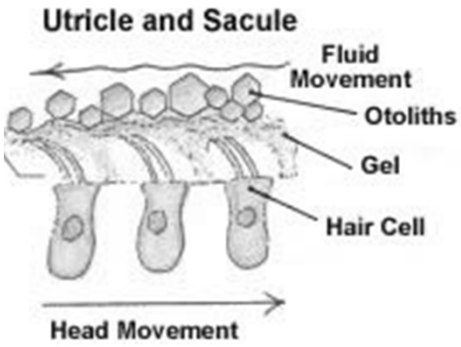

Look at post rotary nystagmus
https://www.youtube.com/watch?v=wic-Na-hIfE

Image from http://www.evolvemedia.com/docs/portfolio/cdrom/nasa/science/senses/info/teacher_info.html

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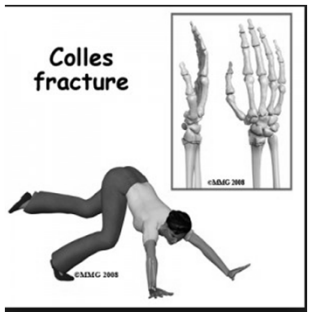
Vestibular system – connection to mother earth

Typical and atypical
https://www.youtube.com/watch?v=Lz1R1VpW79U



Gravity sensor
Protective system

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Activities that provide support to the Vestibular System

- Rocking in rocking chairs
- Swinging / Windmills
- Linear movement like sliding down
- Jumping up and down
- Watching bubbles float (increase challenge by placing child on uneven surface)
- Playing with a ball against the building or a balloon batted back and forth
- Yes/no games with head shakes

Q: What direction would your eyes move after a yes/no game? a) left to right b) right to left c) up and down?

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Did you know???

The vestibular system is the only sensory system with direct connections to the cerebellum?

The interconnections between the cerebellum and vestibular nuclei are important for ongoing control of eye and head movements?

The vestibular nuclei have direct connections with oculomotor nuclei for cranial nerves?

These connections serve to fix the eyes as head and body move, providing us with an ongoing stable visual image. This constitutes the vestibulo-ocular reflex?

Nystagmus is a specialized compensatory vestibulo-ocular movement?

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The often neglected, this sense detects internal sensations from the body – the Interoceptive system.

Interoceptive: "Sensory system of the internal organs (e.g., heart rate, hunger, thirst, digestion, state of arousal, mood, etc.).

- internal sensors
- what our internal organs are feeling
- guide regulation
- Contributes 'deeply' to subjective feelings, emotion and self-awareness.

CBT: Interoceptive desensitization therapy [for panic/anxiety/depression]

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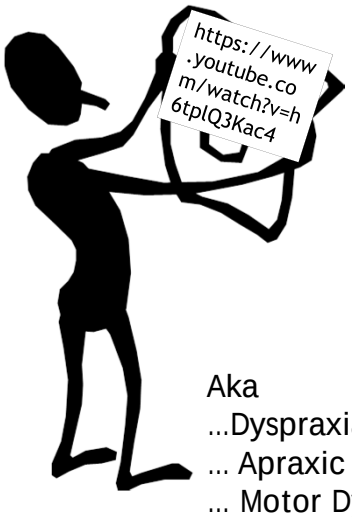
Praxis
(not a sense but part of the somatosensory system)

Praxis is the ability to use our hands and our bodies to do skilled tasks.

Praxis consists of

- Ideation (having the initial concept of how to do something),
- Motor planning the movement, and
- Executing the movement.



More info here…

Aka
…Dyspraxia
… Apraxic
… Motor Dyspraxia
… Developmental Coordination Disorder

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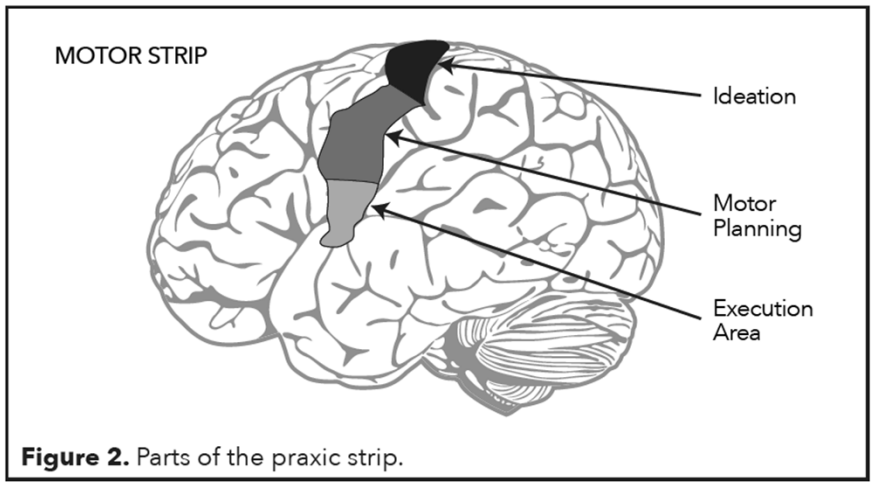

Figure 2. Parts of the praxic strip.

I have an idea (I want something)

I know how (my muscles remember)

I act (execution)

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Learning Objective 2

Identify patterns of sensory processing and associated behaviors

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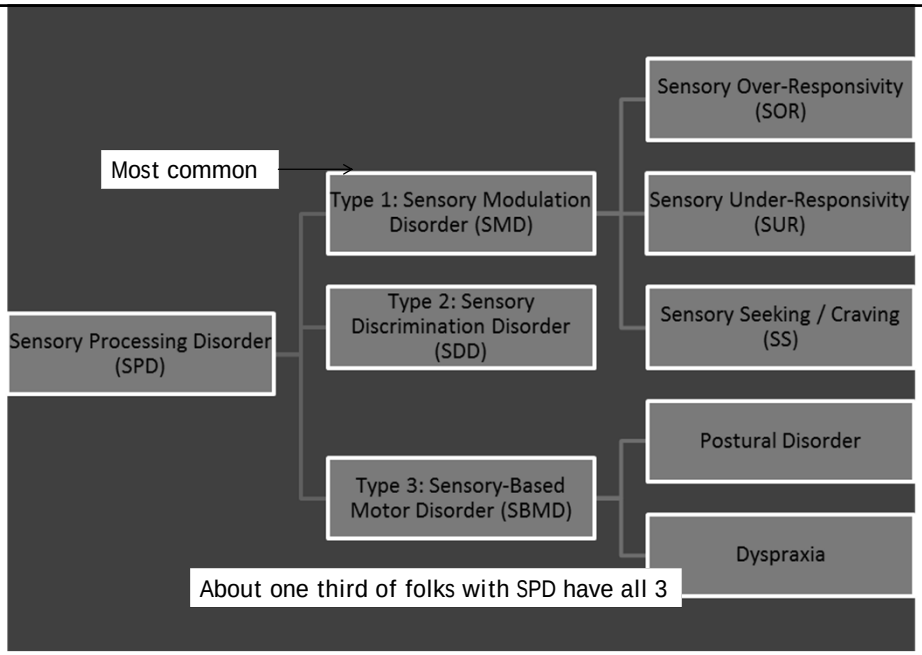

Based on information from SPD foundation
http://www.spdfoundation.net/about-sensory-processing-disorder/

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SPD Type II: Sensory discrimination

- Individual's ability to interpret and differentiate between the spatial and temporal aspects of sensory information
  - Where is it?
  - What is it?
  - When did it occur?

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Sensory discrimination

https://www.educationaltoysplanet.com/blog/scentsational-activities-to-develop-sense-of-smell/

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Sensory Discrimination Disorder:

Disorganized information relating to the sensory areas

- Gustatory: One has Difficulty distinguishing tastes, what you are eating, temperature of food
- Auditory: Difficulty distinguishing sounds, knowing where it's coming from, knowing what sounds to attend to, difficulty with multi-step commands
- Visual: Difficulty distinguishing shapes and objects, difficulty with figure ground, Difficulty with object/ figure completion, sloppy handwriting, poor r/l discrimination with writing, attending to relevant visual information.

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SPD Type III:
Sensory Based Motor Disorders:

Postural challenge Information Organized Incorrectly=>
Disorganized output

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- Postural: Balance and core stability; hypotonia and hypertonia affecting function, appropriate formation and integration of primitive reflexes responses
- Dyspraxia: Appropriate Praxis involves Ideation, motor planning, and executing
- DCD (Developmental Coordination Disorder) qualitative inferior motor behavior (output)

Note: Cerebellum, assist in smooth and coordinated movements. When there is an abundance of connections, that affects the motor output.

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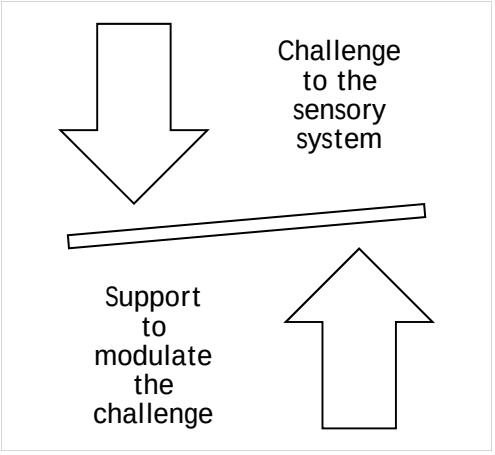
Types of Sensory Modulation Disorders (SPD Type I)

- Individual's ability to respond adaptively to sensation over a broad range of intensity and duration
- Supports optimal arousal, attention, and activity level to meet the demands of the environment



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Sensory modulation

- Individual's ability to respond adaptively to sensation over a broad range of intensity and duration
- Supports optimal arousal, attention, and activity level to meet the demands of the environment
- modulation appears to be altered by experience. The long-term neuronal function and behavioral response are synaptically mediated, though genetically encoded.

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A few facts

Researchers estimate 5% to 15% of children, within the general population, show signs of sensory modulation difficulties. (Ahn, Miller, Milberger, & McIntosh, 2004) impacting social participation, academic success, activities of daily living and family quality of life (Whitney, 2011).

There is a much higher prevalence of atypical sensory processing in clinical populations.

•In addition to core features of ASD, 95% of children with ASD also report atypical sensory processing (Tomchek & Dunn, 2007).
Sensory overresponsivity and ADHD are estimated at 69% (Parush , Sohmer, Steinbert, & Kaitz (2007)

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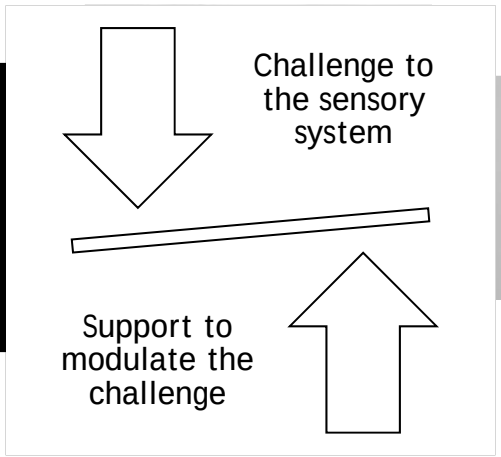
Sensory Over-responsivity
Sensory Under-responsivity
Sensory Seeking-Craving



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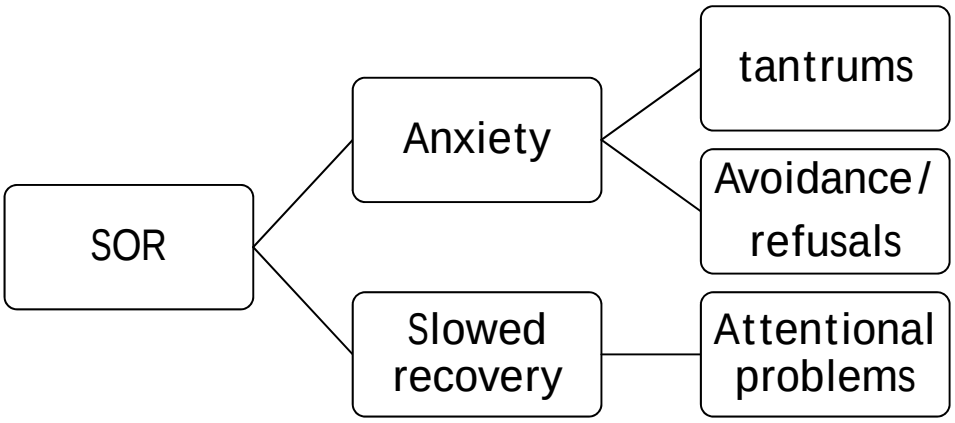

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Learning Objective 3

Describe the interplay between the sensory system and the internalizing and externalize behaviors that both promote and interrupt day to day engagement in occupation

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There is a strong relationship between sensory over responsivity [sensitivity/avoidance] and anxiety

There is also a strong relationship between hypo-responsiveness and depression with sensory over responsivity predicting later onset of anxiety.

Approximately 25% of children with ADHD have been found to also have anxiety disorders.

(Green & Ben-Sasson, 2010; Pfeiffer et al 2005; Reynolds & Lane, 2009)

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Think again about the Interoceptive system

Consider:

CBT Interoceptive desensitization therapy [for panic/anxiety/depression]

Think about:
Mindfulness
Deep breathing
Running
Swimming
…..

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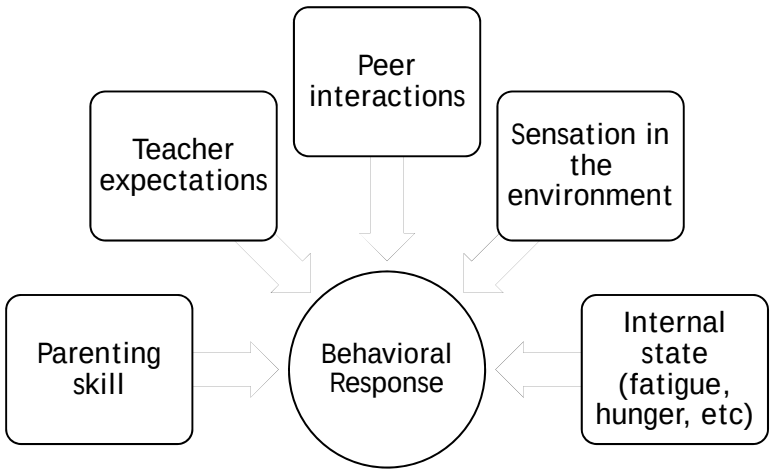
Modulation and behavior responses do not happen in isolation



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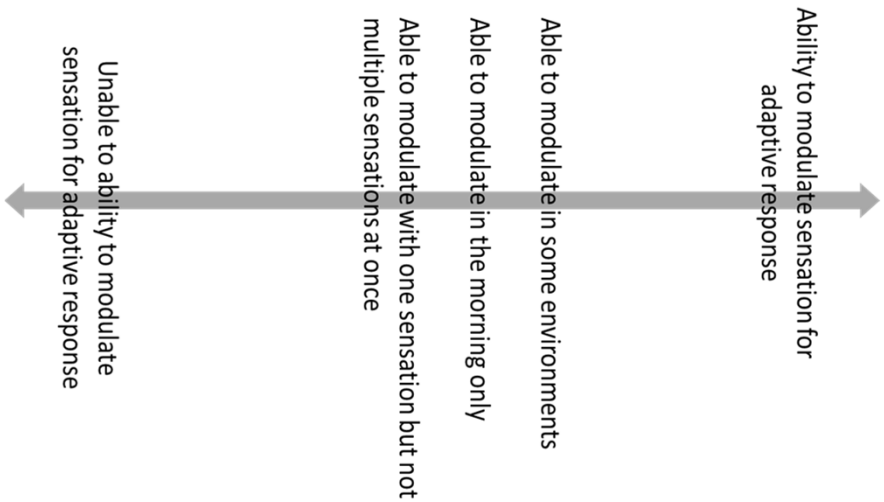
Think about it on a continuum



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Think about this!

Sensory Defensiveness:
connection with the Sympathetic Nervous system [The Fight, Flight, Freeze response is triggered.]
Noxious response to non-noxious input

SNS = physiological responses:
muscles tense, pupil dilation, muscles of the ear are hypotonic (ouch!)

The stimulus may actually HURT!

Limbic system holds onto those memories related to sensory stimuli. Even if habituation occurs we may have "Learned Behavior"

Response to the POTENTIAL of stimulation

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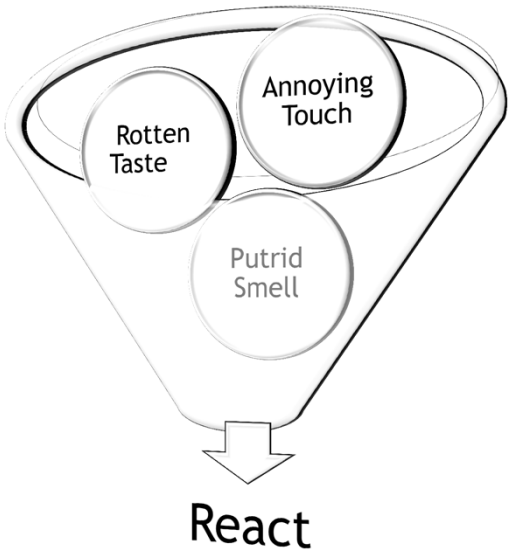

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What might be hiding in the background of school difficulties

- Hidden Curriculum
- Processing/missed cues
- Organization skills
- Immature interests
- Being rule-bound
- Reading comprehension
- Miscommunication
- Unrealistic expectations (just ask!)
- Lack of understanding about the environment or situation
- Previous negative experiences
- Insistence on routine/anxiety w/ change
- Difficulty with emotional self-regulation
- Lack of social opportunities

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DEEP BREATHING EXERCISES

Breathing Awareness and Deep Breathing

1. Lie down or sit in a comfortable chair, maintaining good posture. Your body should be as relaxed as possible. Close your eyes. Scan your body for tension.
2. Pay attention to your breathing. Place one hand on the part of your chest or abdomen that seems to rise and fall the most with each breath. If this spot is in your chest you are not utilizing the lower part of your lungs.
3. Place both hands on your abdomen and follow your breathing, noticing how your abdomen rises and falls.
4. Breathe through your nose.
5. Notice if your chest is moving in harmony with your abdomen.
6. Now place one hand on your abdomen and one on your chest.
7. Inhale deeply and slowly through your nose into your abdomen. You should feel your abdomen rise with this inhalation and your chest should move only a little.
8. Exhale through your mouth, keeping your mouth, tongue, and jaw relaxed.
9. Relax as you focus on the sound and feeling of long, slow, deep breaths.

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Complete Natural Breathing

1. Sit or stand with good posture.
2. Breathe through your nose.
3. Inhale, filling first the lower part of your lungs then the middle part, then the upper part.
4. Hold your breath for a few seconds.
5. Exhale slowly. Relax your abdomen and chest.

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Remember the interplay of internal and external factors when developing goals

Think about the desirable or adaptable outcomes of Adequate Sensory Integration

- Modulation, discrimination, and integration of sensory information across multiple contexts
- Ability to self-regulate
- Awareness of the interoceptive system improves self-awareness and promotes adaptive emotional responses
- Postural control and bilateral motor coordination
- Praxis (Want, plan, and do)
- Organize behavior needed for <u>developmentally appropriate</u> tasks and activities
- Self-esteem (I can succeed!)

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What clients care about:

[Outcomes of Adequate Sensory Integration (cont.)]

- Participation in self-care, leisure, academic, and social activities
  - Play
  - Academic skill
  - Social participation
  - Daily occupations

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Think about a SWOT Analysis

Strengths Dad is calm. Mom is creative. Uri is a good thinker, likes to solve puzzles.	**Weaknesses** Dad is gone in the mornings and not available to help. Uri wakes up grumpy, refuses to get dressed, says everything is "itchy."
Opportunities: Uri wants to get his green belt in karate, so maybe we can use karate moves to "wake up" our bodies before we have to get dressed? Maybe Uri can help us solve the problem.	**Threats** We seem to always be on a time crunch. Mom's temperament gets overstimulated when Uri screams.

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Scene I:

Joey wakes up and needs to get his clothes on but he screams and refuses to take off his pajamas. Mom is in a hurry: She has an important meeting at 9 a.m. and cannot be late, but Joey is having a tantrum. The morning is off to a rough start.

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Scene II:

Now imagine this:

Mom says, "Joey, time to rise and shine!" and turns on the iPod—the theme song from *Star Wars* blasts in the room, Joey sits up, and he smiles. Mom says, "We need to get dressed. Let's get your body ready!" and she and Joey begin to dance to the music, pumping their arms. When Joey's arms go up, the pajamas come off and a shirt replaces the top; the same routine happens with the bottoms and socks. Once he's dressed, Mom says, "Now who's ready for a power breakfast?" Mom serves crunchy cereal with apple chunks.

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Think about a SWOT Analysis

Strengths	**Weaknesses**
Opportunities	Threats

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Role of the Amygdala

The amygdala receives inputs from all senses and is very important in emotional learning.

Stimulation of the amygdala causes intense emotion, such as aggression or fear.

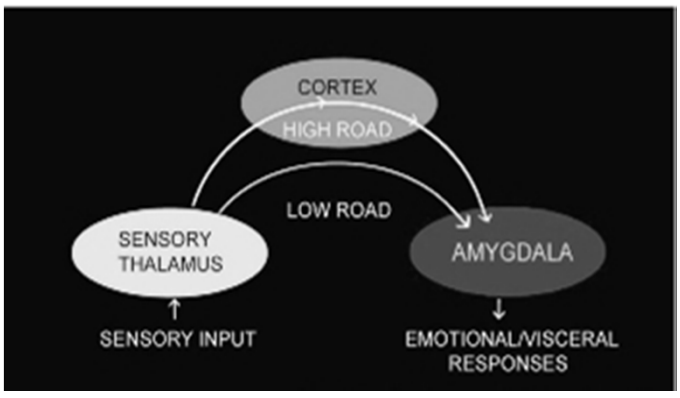

Image from: http://www.nimh.nih.gov/health/index.shtml

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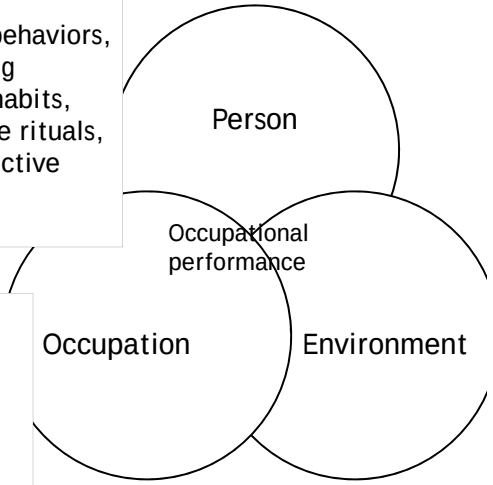
Consider the environment

Remediation of symptoms -- Reduce sensory seeking or avoiding behaviors, by creating enabling habits, restorative rituals, and productive routines



Be an expert in developmental readiness, look for and encourage strengths

Promote adaptions in the environment e.q. reduce sounds, visual input, smells.

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What is 'normal'?

- What will we do when the statistical 'norm' is autism? ADHD? Differently Abled?
- What will our communities and educational systems look like when the majority of children have ASD, ADHD or other related disorders?
- Keep in mind:

  51% of adults live with a chronic disability. Over 70% will experience mental health disorder in their lifetime.

Biology of Human Variation

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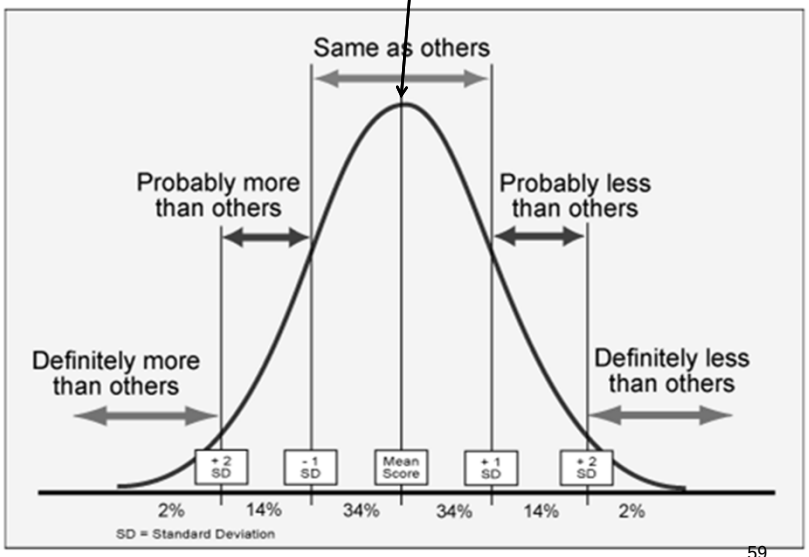
What is 'normal'?



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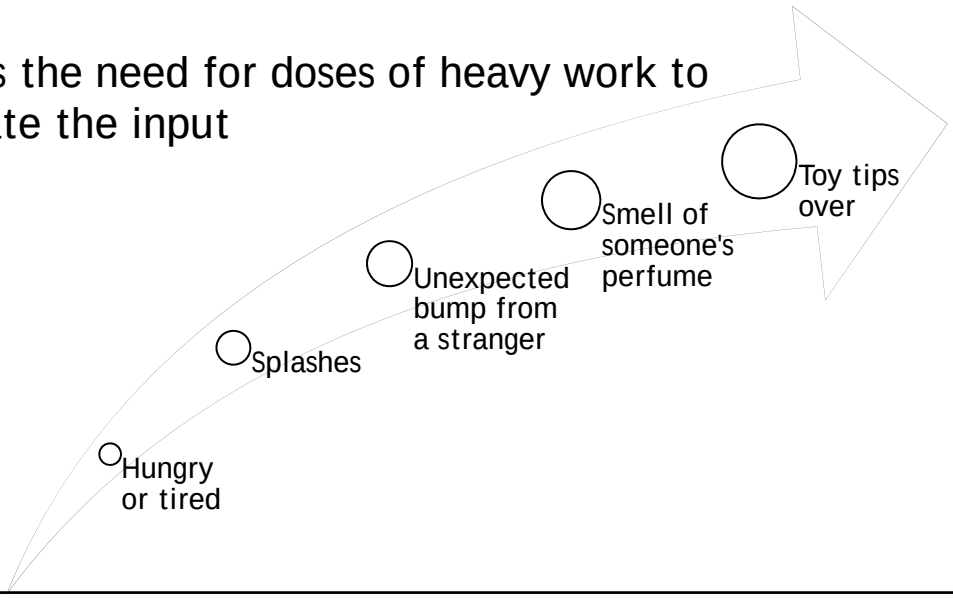
"Normal" is a stop along the way
Biology of Human Variation

Think about your day

there is the need for doses of heavy work to modulate the input



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Activities for heavy work (think chores)

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Heavy Work

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Heavy work Yoga and Pilates

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What to consider when developing a sensory diet

- Age
- Daily routines
- Access to resources
- Interests and motivations
- Involvement of family, friends and peers
- Safety and contraindications

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Principles of a sensory diet

- Type of sensory input (quality)
  - Facilitating
  - Inhibiting
  - Regulatory/modulating
- Power or intensity of activities
- Timing (frequency and duration)
- Self-initiated and self-administered
- Supports daily routines
- Includes play/supports engagement in occupation

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Goals of a sensory diet

- Improve ability to modulate sensory input (decrease sensory defensiveness) in order to allow participation in daily routines and support social engagement
- Improve sensory modulation and discrimination in order to support optimal arousal, self-regulation and behavioral organization for learning
- Improve sensory discrimination in order to enhance body awareness necessary for sense of self in one's environment and for perceived competence, self-esteem, and self-confidence

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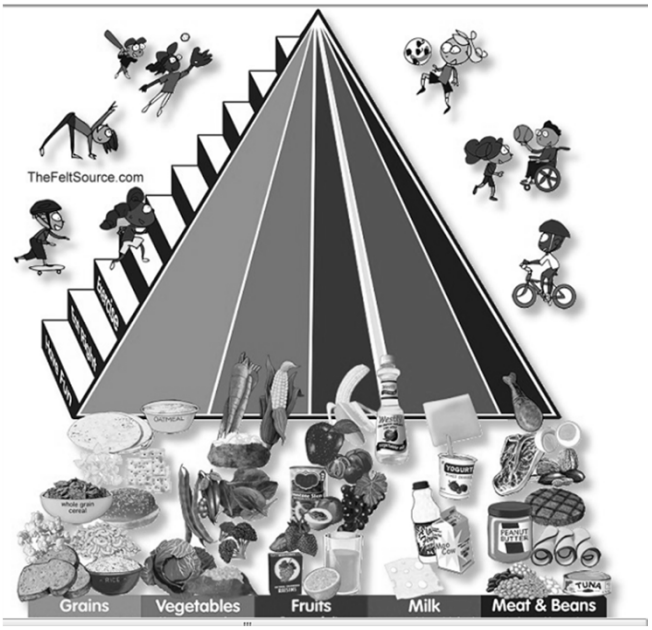
You can think about organizing a 'diet' in many different ways



http://www.thefeltsource.com/Food-Guide-Pyramid.html

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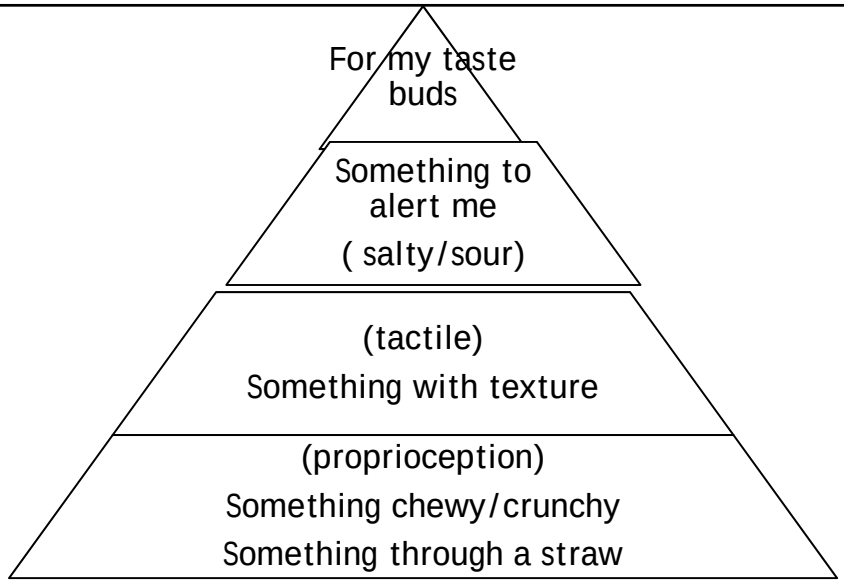

Using the food pyramid we're going to create a 'sensory diet' that we can use to pack a lunch

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Cognitive-Behavioral Techniques

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One minute of mindfulness

1. Breath quietly for one minute

2. Observe one object in the environment for one minute
3. Think of something you are grateful for --- a simple action for one minute
4. Listen for one minute
5. Take one minute to think about a question
6. Take one minute and experience your environment with each one of your senses
7. Before you get out of your car, before you eat your next meal, before you go to bed, before you get up, take one minute and be mindful

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Advance Organizers to smooth transition times

-Use a transitional object (a flag, a toy, a song)

-Use a phrase ("Be thinking of your answer, I will call on you next" or "VOLCANO")

-Practice and use the Stop/stop game

-Use music or sound

-Brownie Points

-Rocket Launchers

-Quiet voice/ eye contact

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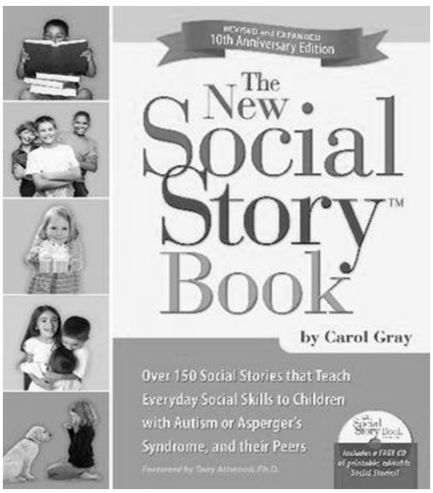
SOCIAL STORIES



Toward Assisted Authoring of Social Skill Scenarios for Young Adults with High Functioning Autism

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Abstract

Individuals with autism spectrum disorders (ASD) have very individualistic needs, abilities, and are surrounded by very different social contexts. Consequently, special education and therapeutic interventions often need to be adapted to a particular individual. We are interested in developing systems that can help adolescents with high-functioning ASD (HFASD) rehearse and learn social skills with reduced aide from parents, guardians, teachers, and

more help the individual learn a set of social skills that can be successfully generalized to the actual social setting?

We recognize, for the reasons stated above, that there is not a one-size-fits-all solution to social skills training for young adults with HFASD. Our challenge is to design and develop software systems that can automatically be adapted to the particular educational and therapeutic needs of individuals with ASD. Until that challenge is overcome, systems that can help individuals with autism rehearse and learn social skills must rely on human-authored material. This phenomenon is also prevalent in non-computational

http://www.cc.gatech.edu/~riedl/pubs/ijcai-ac09.pdf

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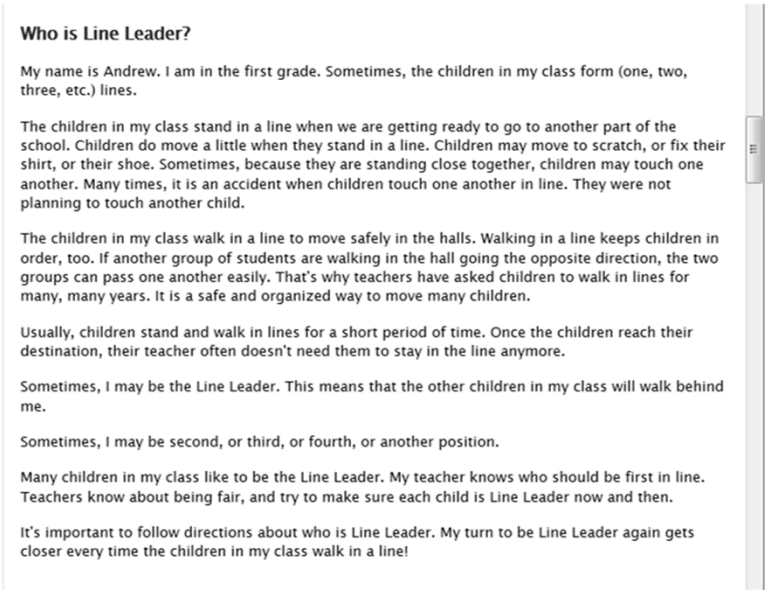
Example of a social story



Who is Line Leader?

My name is Andrew. I am in the first grade. Sometimes, the children in my class form (one, two, three, etc.) lines.

The children in my class stand in a line when we are getting ready to go to another part of the school. Children do move a little when they stand in a line. Children may move to scratch, or fix their shirt, or their shoe. Sometimes, because they are standing close together, children may touch one another. Many times, it is an accident when children touch one another in line. They were not planning to touch another child.

The children in my class walk in a line to move safely in the halls. Walking in a line keeps children in order, too. If another group of students are walking in the hall going the opposite direction, the two groups can pass one another easily. That's why teachers have asked children to walk in lines for many, many years. It is a safe and organized way to move many children.

Usually, children stand and walk in lines for a short period of time. Once the children reach their destination, their teacher often doesn't need them to stay in the line anymore.

Sometimes, I may be the Line Leader. This means that the other children in my class will walk behind me.

Sometimes, I may be second, or third, or fourth, or another position.

Many children in my class like to be the Line Leader. My teacher knows who should be first in line. Teachers know about being fair, and try to make sure each child is Line Leader now and then.

It's important to follow directions about who is Line Leader. My turn to be Line Leader again gets closer every time the children in my class walk in a line!

73 Retrieved from http://www.thegraycenter.org/social-stories/what-are-social-stories

John Ratey: ADHD and the importance of Exercise!

(hint: it will increase your levels of dopamine)

1) **Exercise** When you exercise your brain produces more dopamine. Find an exercise you love and do it every day.

2) **Take Omega 3** Omega 3 increases your levels of dopamine. Take a supplement as well as including more Omega 3 rich foods in your diet.

3) **Meditate/Practice Mindfulness** When you meditate you also increase your dopamine levels.

4) **Vitamin C** Include lots of Vitamin C in your diet. Vitamin C is very helpful in ensuring the dopamine synapses is working well.

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Primary Deficits	Secondary deficits	Tertiary deficits	Resulting in:	Academic Deficits	Play that fosters development in this area:
decreased proprioceptive awareness (force and direction)	tactile perception	tactile attention	tactile memory	graphomotor (handwriting) fine motor ability to parallel process	Pillow Fights, throwing balls, pouring from containers, Tree Climbing, Simon Says, Feely Boxes, Hand clapping games, Mixing activities
decreased vestibular function (movement)	visual perception visual-spatial-organizational	visual attention	visual memory	reading comprehension problems with gestalt problems with facial expression lose papers don't turn in assignments on time	Pin the Tail On Donkey, Bike Riding, Roller Blades, Skipping, Hopping, Hop Scotch, Pogo Stick Jump Rope, Rolling down hills in Tires or Barrels, Swinging
decreased vestibular proprioception pressure/touch	complex psychomotor deficits	exploratory behavior	concept formation	mathematics social competence smooth pursuit (clumsy) safety judgment	All the above plus: Digging in garden, Carrying Groceries, Chopping wood, Tug of War, Board Games (Twister, Checkers) Somersaults
decreased sense of self (where is my body in space and time?)	Problems with novel material Distorted sense of time	anxiety/ avoidance	problem solving	mathematics, science, emotional stability late for appointments out of sync withdraws from input	Board Games Gardening (waiting for and nurturing fruits of labor), Cooking Crawling through tunnels, Dress up play

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http://scholarworks.wmich.edu/ojot/vol1/iss1/7/

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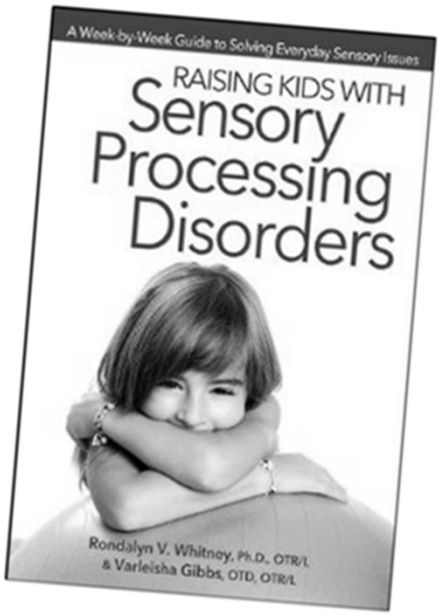
Additional Activities can be found HERE



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Questions?

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