

# Sensory Processing and Education

- ▶ Making sense of our senses to streamline education for all.

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# What is sensory processing?

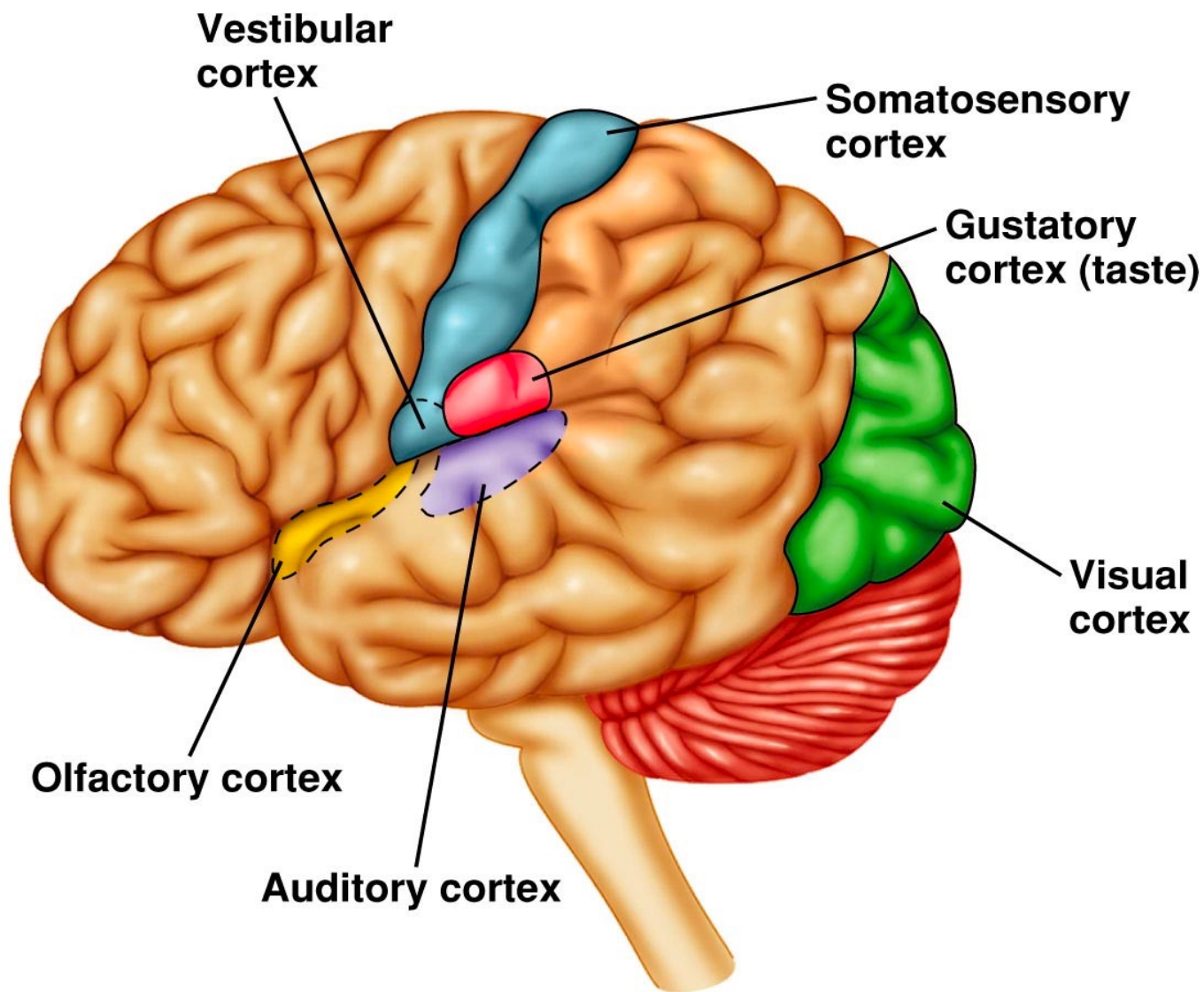
- Sensation: How we receive information from our environment.
- Processing: How we interpret data to make sense of it.
- Another term to consider – perception: Our subjective interpretation of what we are sensing, based on our thoughts, preferences, and attention.
- EG: What color is the dress? The shoe? Our differences from from our perception of the same sensory input.





# Our Senses - common names - organs

- Audition – sound – stereocilia inside our cochlea of our inner ear
- Visual – sight – photoreceptors (rods and cones) in our eyes
- Kinesthetic – body movement - motor neurons throughout the body
- Vestibular – balance – vestibular sacs in our inner ears
- Somatosensory – touch – sensory neurons throughout the body
- Olfactory – smell – olfactory receptors in our nasal cavity
- Gustatory – taste – taste receptor cells (buds)



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Where our senses are mostly processed in our brains. (McBride, 2015)

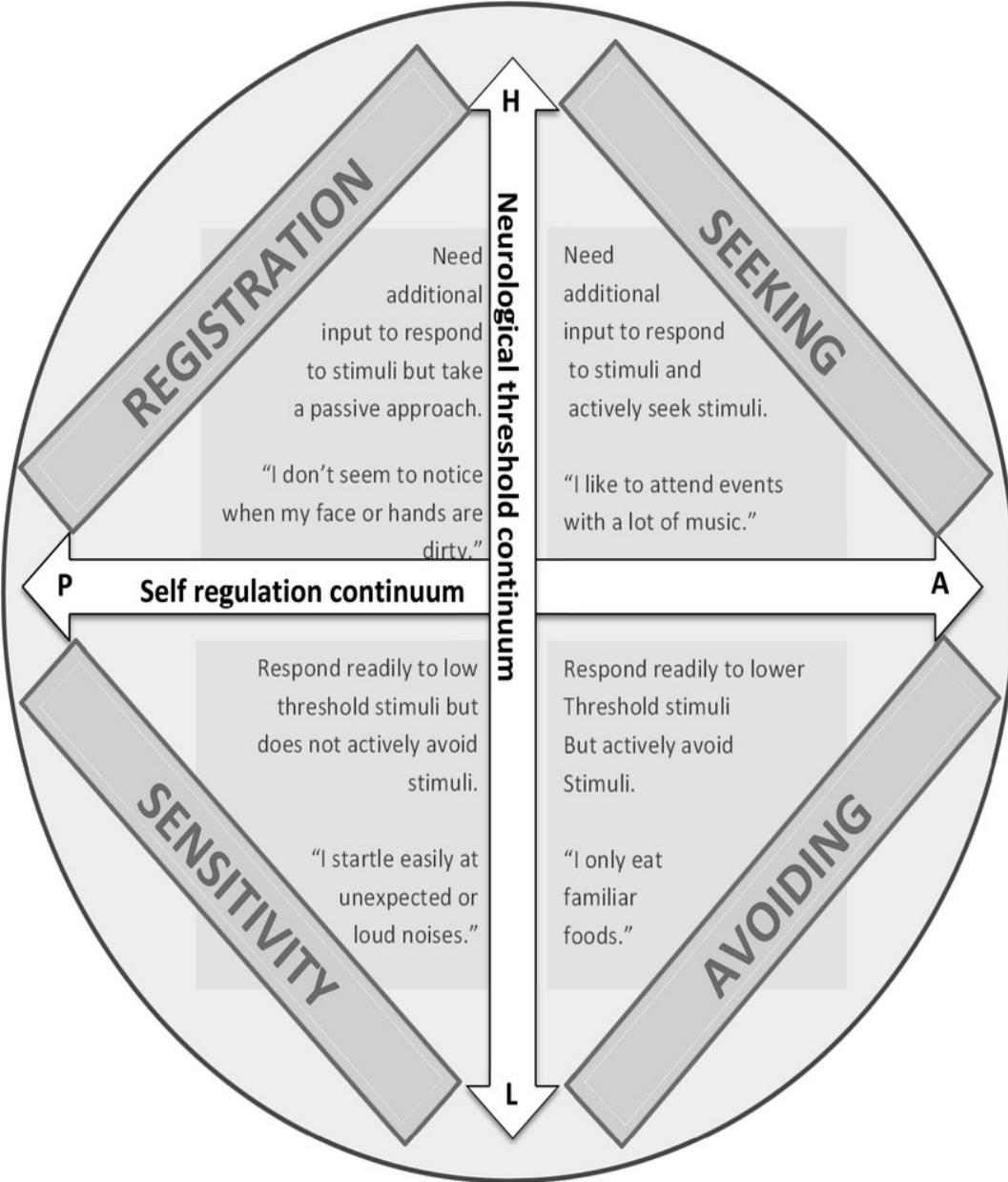


## Sensory Preferences

- People all develop preferences for high or low input, differing by sense.
- For example: I require high levels of input for my gustatory sense and I seek out extremely spicy food and strong flavors, as shown in my participation in the Beijinger's Spicy Food Festival's Hot Pepper Eating Contest. On the other hand, I am very sensitive to loud volume and often become irritated at loud music.



# Sensory Processing NT and ASD



Dunn's Sensory Processing Framework  
(1997)

- Our sensory preferences fall under four categories based on our self-control and our sensitivity to stimuli.
  - For example my hot sauce addiction would be considered as SEEKING, as I actively seek input for my gustatory sense, my sensitivity to loud noises would likely be considered AVOIDING as I anger my friends by lowering the volume at their houses.
- Unlike our preferences, individuals with ASD have more intense experiences on these patterns – so it is more important for us to know these in order to help them focus in class.
  - AVOIDING students could run out of the classroom at the sound of a fire engine down the street.
  - SEEKING students could get up and jump around during a lecture.
  - LOW REGISTRATION students could seem ignore everything around them.
  - SENSITIVE students could become irritable at the smell of sweat after P.E.

## ■ Sensory preferences DO NOT justify the widely discredited VAK Learning Styles notion

While it is true that we might enjoy learning more a particular way, and that senses that are working offer opportunities for all students to learn, learning styles is a particularly widespread falsehood. (Kirschner, 2017)

The Yale Poorvu Center for Teaching and Learning suggests that:

- How you like to learn the most and how you learn best are not always the same.
- Everyone benefits from multiple learning methods and sensory inputs. Lecture, visuals, group work, individual work, etc.
- Subjects and topics are often learnt best by different methods by the same individual. EG: History by reading and discussion, physics through practice and lab experiments.

The Onion (America's Finest News Source) also suggests another criticism of VAK Learning Styles... Where is the concern for our olfactory learners? <this is a joke!>

# My advice on “learning styles” as an teacher to second language speakers

- We shouldn't design visual, auditory, or kinesthetic LESSONS - but we should mix our methods, and try to appeal to multiple senses in both instruction and assessment when possible.
- This follows also helps us build multiple pathways to knowledge and to ensure that education has as many chances as possible for success.
- With ASD students we need to be careful not to overload students with avoidant or sensitive behaviors – so it is essential to know what their sensory needs are before planning!



## ■ The Intense World Hypothesis

- Hopf and Lowland (2016) suggest that sensory processing deficiencies are at the heart of the social deficiencies – that ASD children suffer from intense sensory experiences that distract from social learning.
  - They mention that one cause of this is an enlarged amygdala – our flight or fight center. A larger amygdala would create a more fearful, easier to angry individual.
  - They note that sensory pathways to the amygdala are hyperactive, suggesting sensitivity to visual, sound, and somatosensory input.
  - If the "intense world hypothesis" is true, we need to work on ways to make their world less intense in order to promote social learning, as early as possible by identifying stressors, sensitivities and preferences.

For example: “A Walk Down a Street”

- A YouTube video by Craig Thomson, an adult with ASD. Compares the experience NT vs. ASD using video editing.

■ Please Click Here  
to Watch the  
Video.

# Eye contact in an Intense World

Stuart (2000) suggest that our insistence on ASD individuals using eye contact as naïve and unproductive, they go on mention a few key findings that:

- For people with ASD, our insistence on eye contact is likely making that experience more intense and even distracting.
  - I would add that this insistence is also a cultural feature of American / Western society in general.
- Even for NT people – eye contact is very intimate and social. It is often the first cue we have in knowing someone enjoys or hates our company... and often our earliest memory of falling in love.
- For someone experience much more active visual input, it could be too much and forcing someone with ASD to focus visually is likely less important than ensuring that they are receiving input another fashion.

This follows on my advice on "learning styles", if multiple inputs are presented, and multiple outputs are allowed, students with unique needs will find greater opportunities to succeed in education.



## ■ Tips to Creating a Sensory Diet

- When increasing input methods is not enough or not effective for avoidant or sensitive sensory patterns, we must create a sensory diet.
- A sensory diet either increases or decreases the amount of sensory input so as to maximize the functioning of the ASD individual. This is necessary to considering the needs of our ASD students in the classroom and should be varied by an individualized education plan (IEP).
- We do sensory diets too! "Turn that music down I'm working on this assignment!"
- The following slides cover advice given in Kim Davis and Melissa Dubie's "Sensory Integration: Tips to Consider"

# Identifying Sensory Needs and Tips for Integration:

## Visual Input

- Stares at spinning objects.
- Spins their own bodies.
- Turns opposite direction from where teacher is lecturing.
- Demands to wear sunglasses indoors.
- Extremely organized or unorganized room (i.e. knows when an object has been slightly moved).
- Loses place when reading.
- Gives no eye contact or looks beyond person's face.
- Trouble locating desired toy on cluttered shelf.
- Turns or tilts head when reading across a page.
- Misjudges spatial relationships so bumps into people or things.

Davis & Dubie, (2004)

## Visual Ideas

- Limit the amount of visual material hanging from ceiling or walls.
- Store manipulatives inside containers.
- Organize and label all material to identify where they belong.
- Put pictures on containers for students with poor visual memory.
- Use picture templates of where items belong in places (i.e. desk, room).
- Tape a number or letter line onto student's desk.
- Provide primary lined paper or graph paper to help with spacing.
- Keep amount of visual information on worksheet to a minimum.
- Use a lamp instead of overhead fluorescent lighting.
- Use a touch screen instead of computer mouse.
- Use computer software to organize material.
- Allow student to sit with back to teacher (i.e. look at a solid wall).
- Have student write notes and use a peer's note as well.

# Identifying Sensory Needs and Tips for Integration:

## Auditory Input

- Covers ears for a fire drill or when class is loud.
- Runs from loud area.
- Complains of noises in room or outside of window (i.e. lawn mower, heat blower, insects on window, students writing on paper).
- Covers ears in the cafeteria or cannot go into the gym when there are many people in it.
- Demands that dad puts "Rain X" on the windows so won't have to use windshield wipers when it rains.
- Doesn't respond to verbal prompts when putting on noisy clothes (i.e. sweat pants).
- Hums or sings to self.
- Demands that only one person talks at the dinner table.
- Talks louder than anyone in the class.
- Prefers very loud music or none at all in the car.
- Runs out of restroom as toilet flushes.

Davis & Dubie, (2004)

## Auditory Ideas

- Minimize verbal directions.
- Use ear plugs or head phones.
- Allow time for student to listen to favorite music (i.e. classical, Dixie).
- Use more visuals with pictures or words.
- Use social stories about what might happen or sounds that can be heard in the room.
- Desensitize a student to an area by slowly integrating him or her on numerous visits.

Other input identifiers and ideas for vestibular, gustatory / olfactory, kinesthetic, and tactile input issues are available at:  
<https://www.iidc.indiana.edu/pages/Sensory-Integration-Tips-to-Consider>



# Concluding thoughts

- We must consider all of our students sensory processing patterns if we are to best differentiate our instruction. Students benefit from multiple inputs and multiple outputs, but most of all they need our understanding and patience. If you see an outburst in class that seems out of proportion to a sound, sight, or smell – consider that the students' sensory needs are not being met before thinking poorly of the student. Especially with ASD students we must consider how to maximize their productivity through sensory diets by implementing detailed IEPs and ensuring our classrooms are the right level of intense.

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