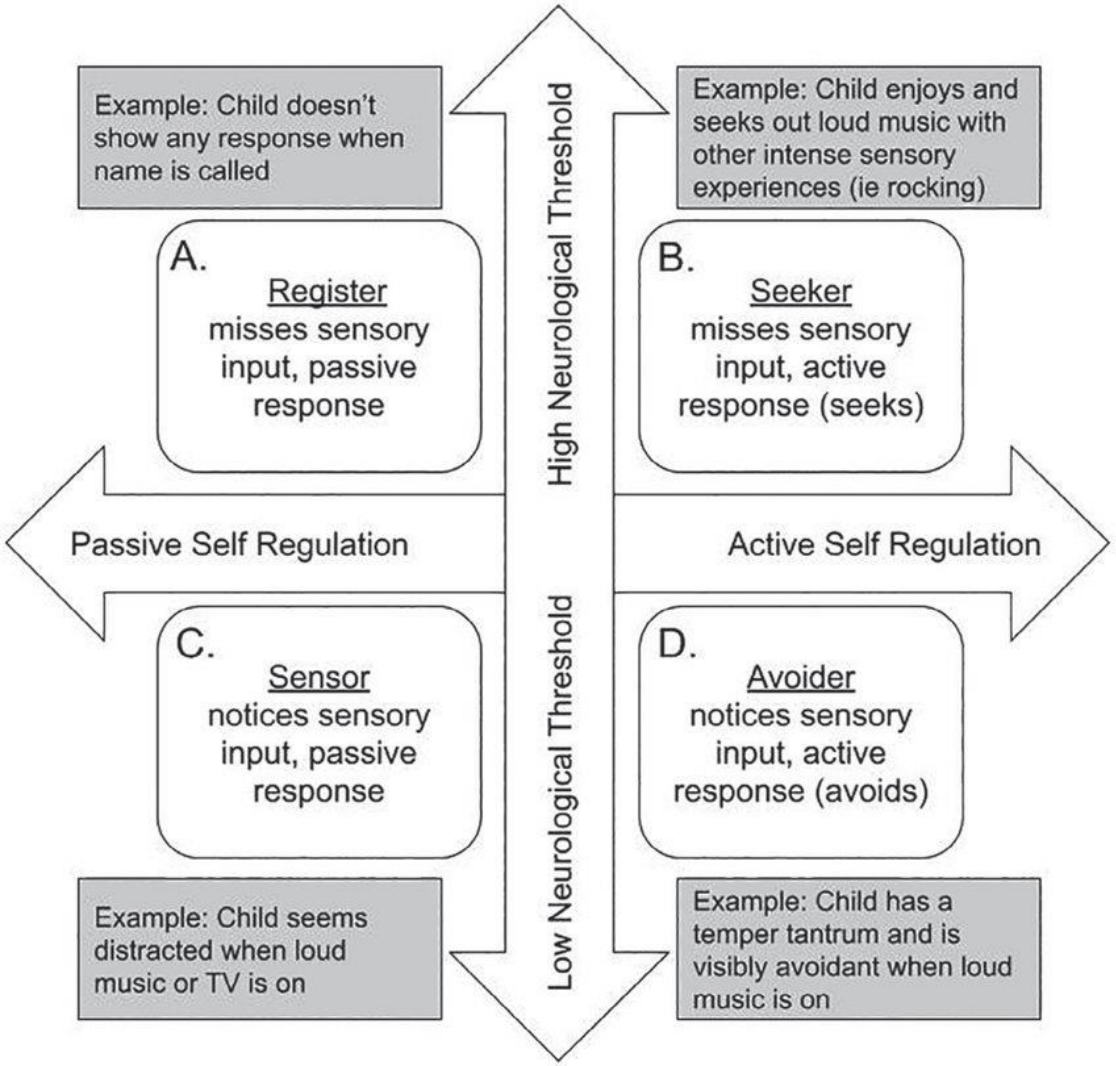
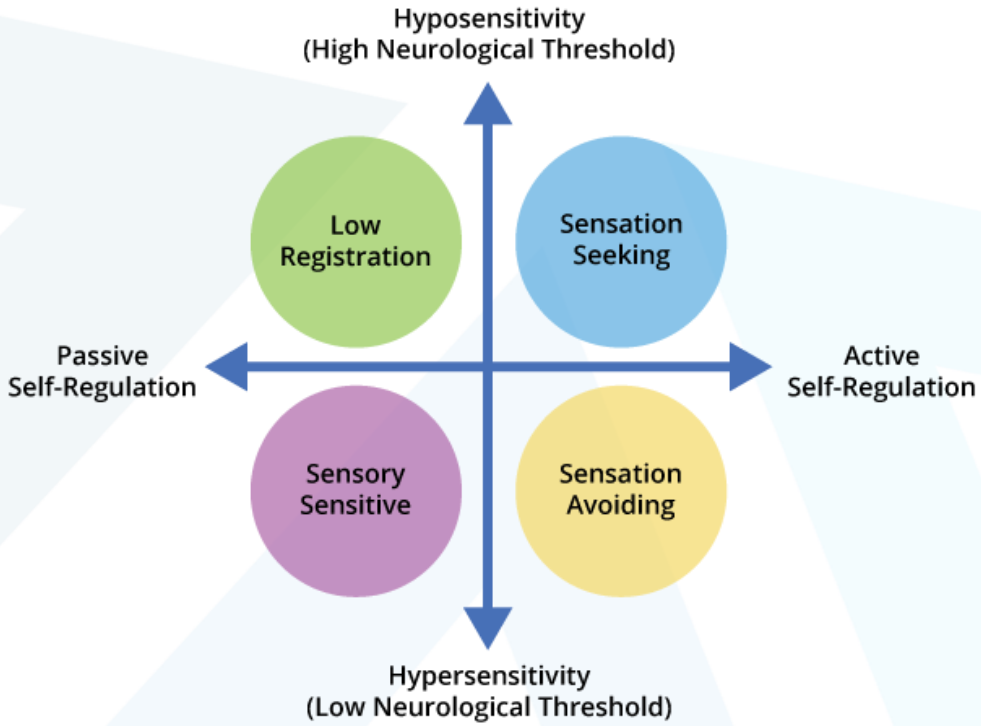
محاضرة 2

- Dunn's Sensory Profile (1999) described the neurological thresholds and how they contribute to modulation and behaviour. She also describes the four different sensory profiles that have emerged from her research, namely, low registration and sensory seeking (SS) (representative of high neurological thresholds) and sensory sensitive and sensory avoiding (representative of low neurological thresholds).

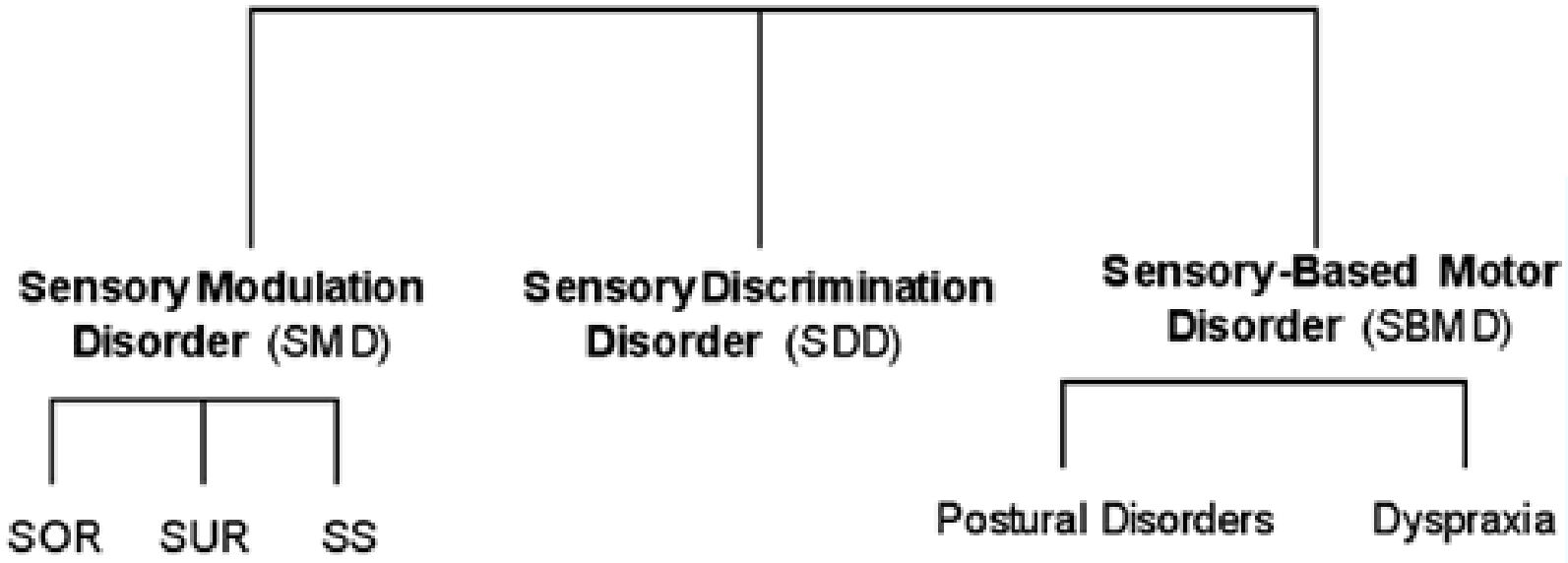

Example: Child doesn't show any response when name is called
Example: Child enjoys and seeks out loud music with other intense sensory experiences (ie rocking)
A.
Register
misses sensory input, passive response
B.
Seeker
misses sensory input, active response (seeks)
High Neurological Threshold
Passive Self Regulation
Active Self Regulation
Low Neurological Threshold
C.
Sensor
notices sensory input, passive response
D.
Avoider
notices sensory input, active response (avoids)
Example: Child seems distracted when loud music or TV is on
Example: Child has a temper tantrum and is visibly avoidant when loud music is on


Hyposensitivity
(High Neurological Threshold)
Low Registration
Sensation Seeking
Passive Self-Regulation
Active Self-Regulation
Sensory Sensitive
Sensation Avoiding
Hypersensitivity
(Low Neurological Threshold)

- The Sensory Processing Measure (SPM) is the other well-researched sensory processing measurement instrument that is used in practice (Parham et al. 2006). It measures sensory processing, praxis and social participation at home, school and community settings and is done according to structured and unstructured observations.
- Dysfunctions are described according to the work of Miller et al. (2007), namely, sensory over responsivity (SOR), sensory under-responsivity (SUR) and SS.

جَـامعة
المَـنارة

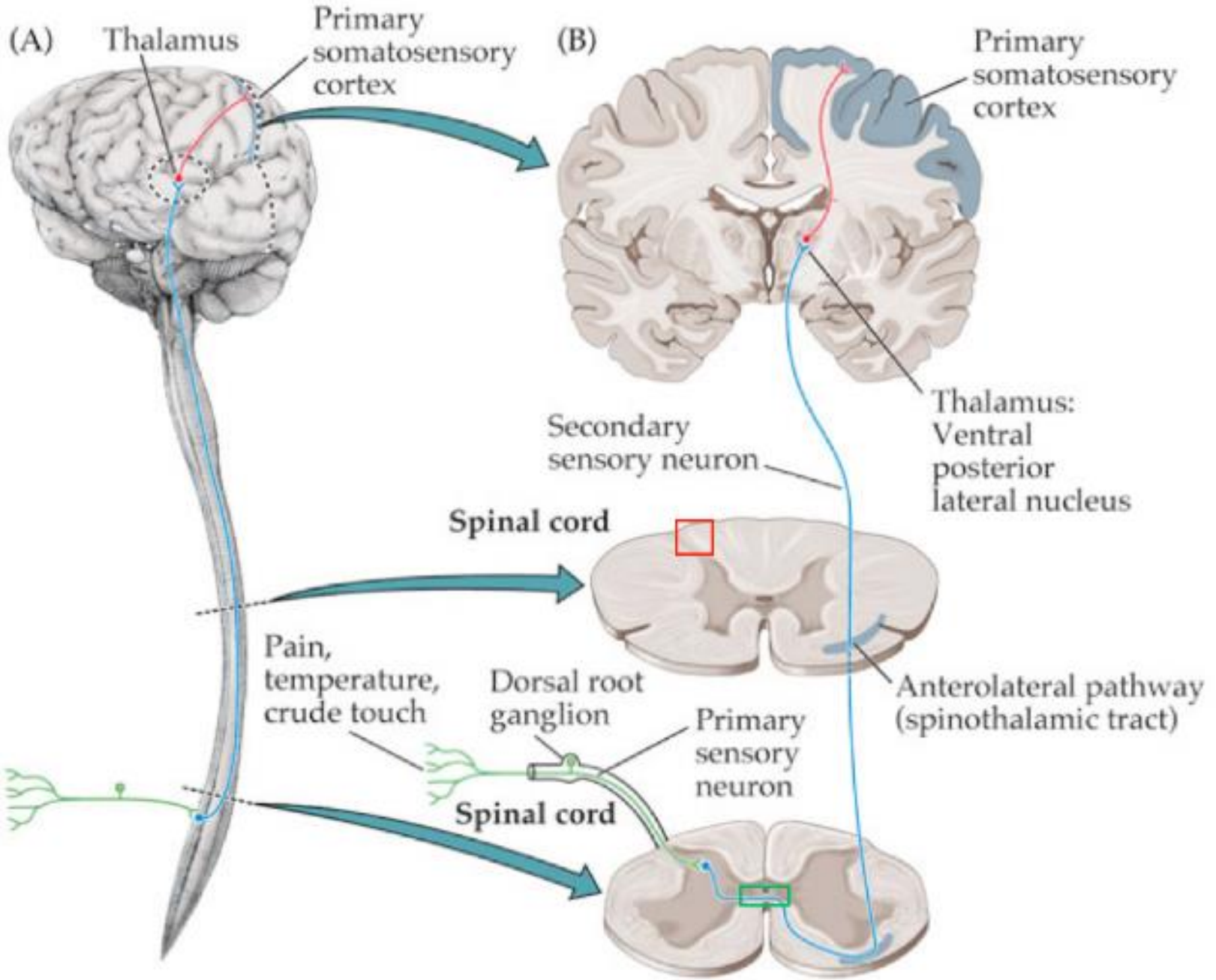
SENSORY PROCESSING DISORDER (SPD)

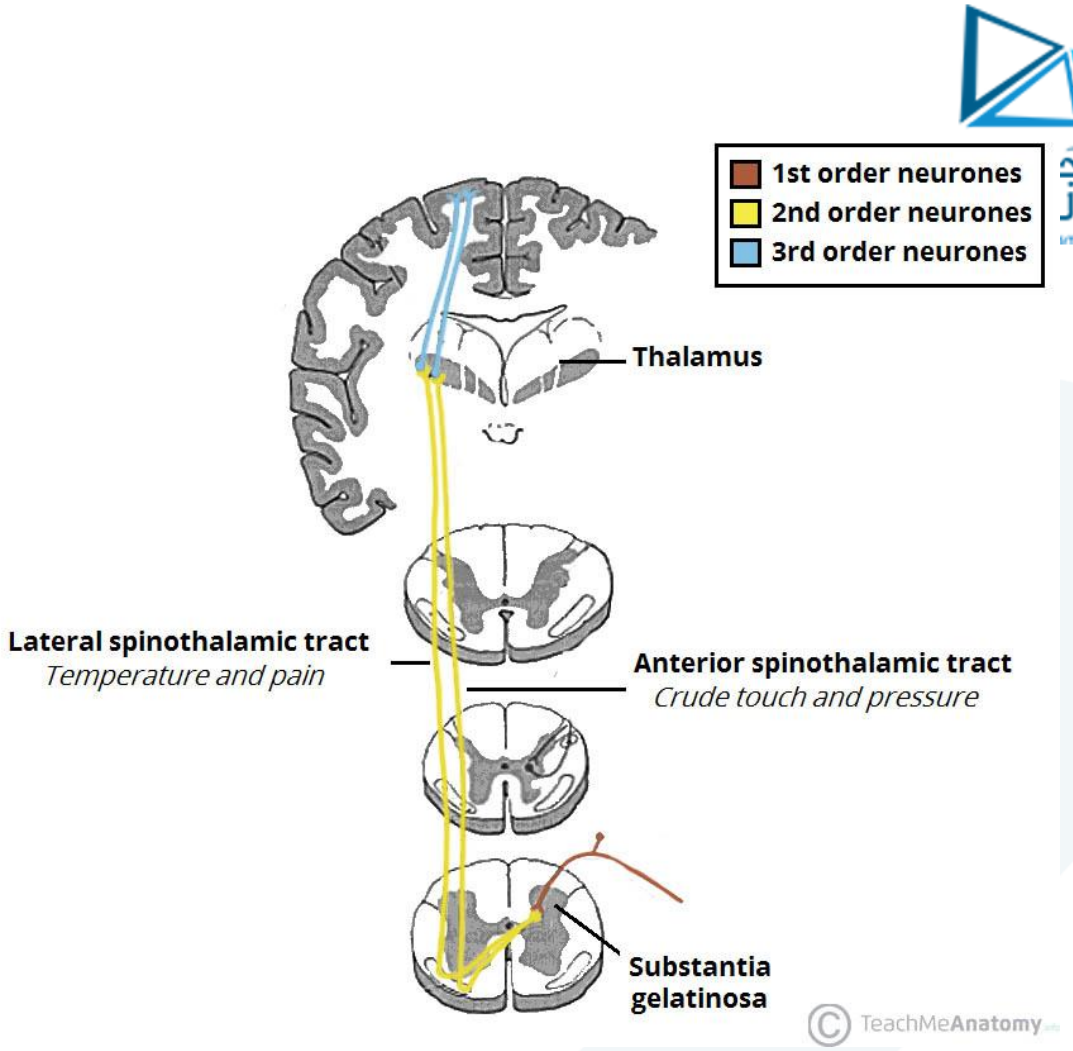


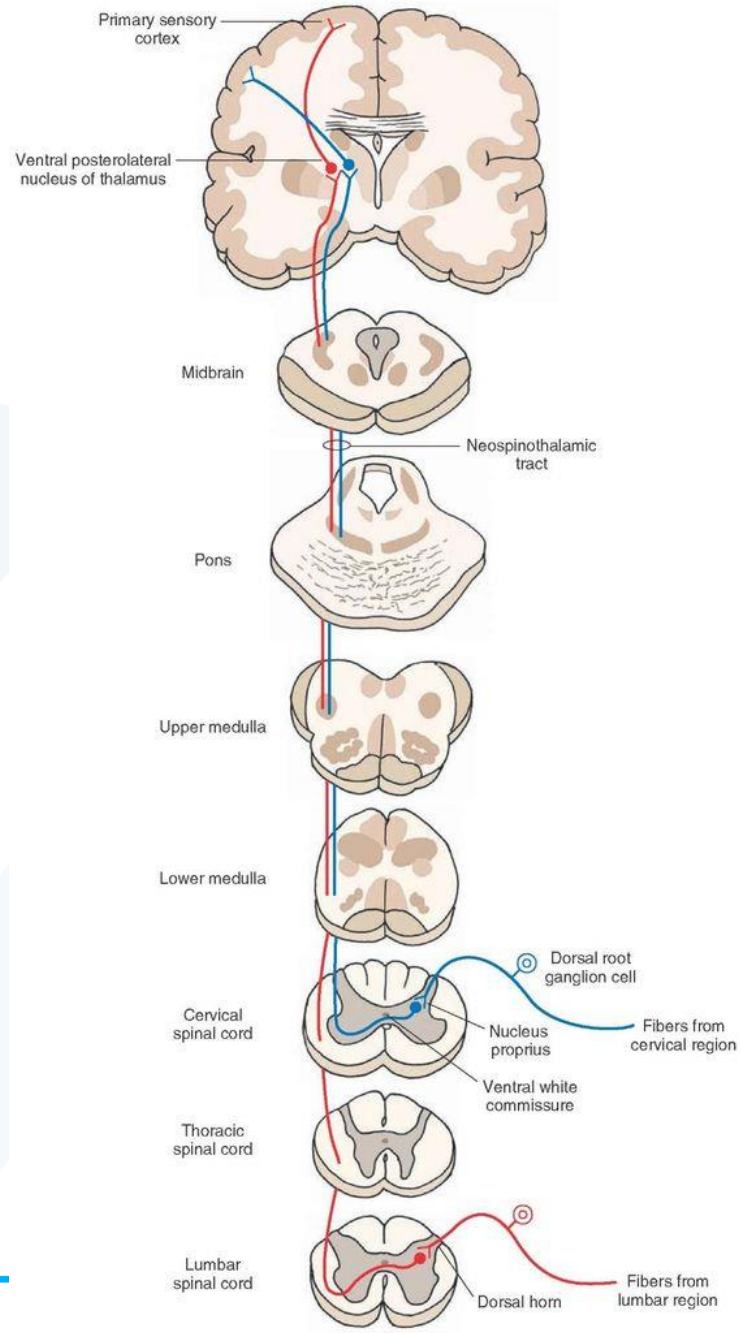
SOR = Sensory Over -Responsivity
SUR= Sensory Under -Responsivity
SS= Sensory Seeking / Craving

- Disorders in sensory modulation are reflected in behaviour. Disorders can be present in one or more of the sensory systems and can involve responses from internal or external sensations.
- The common grounds between the works of Dunn (1999) and Miller et al. (2007) are high neurological thresholds and under-responsivity and low neurological thresholds and over-responsivity. The ‘category’ of SS is described in the work of both authors and is seen by researchers as a need for sensory input that is much more than that of the typical child.

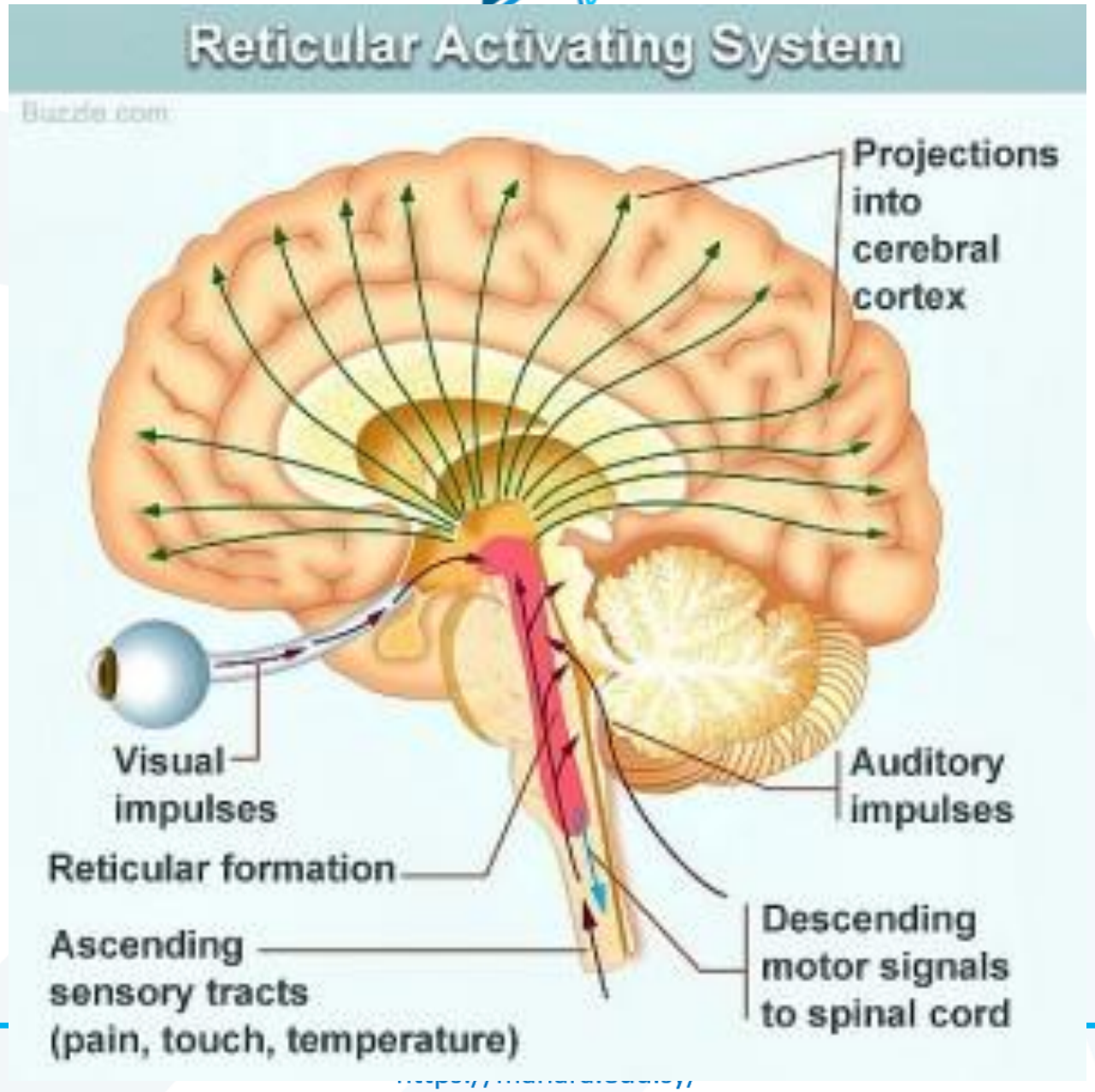
- Tactile defensiveness is linked to poor limbic or reticular processing within the brain and fight-or-flight reactions that are elicited by tactile sensation that others would consider non-noxious.
- This type of dysfunction is attributed to the anterolateral system of the central nervous system. This system is responsible for the mediation of pain, crude touch, light touch and temperature. Most of the fibres of the anterolateral system terminate in the reticular formation.




1st order neurones
2nd order neurones
3rd order neurones
Thalamus
Lateral spinothalamic tract
Temperature and pain
Anterior spinothalamic tract
Crude touch and pressure
Substantia gelatinosa
© TeachMeAnatomy

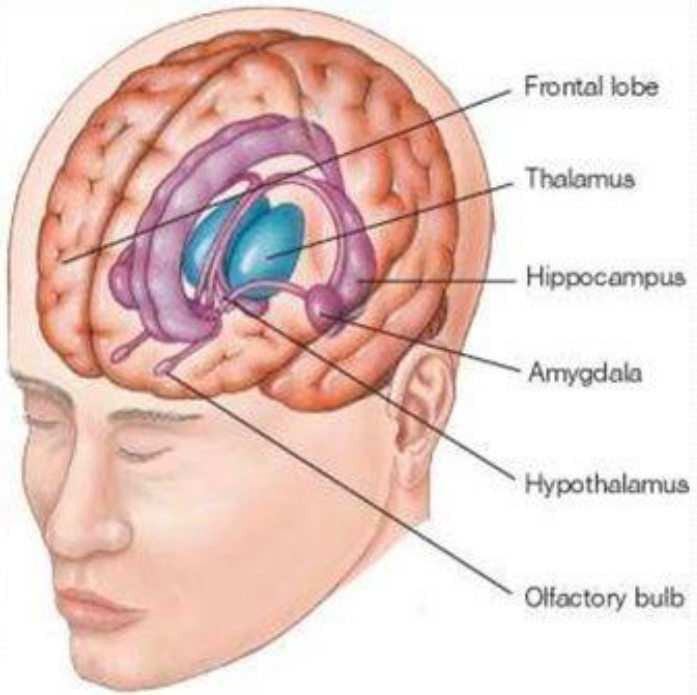

Primary sensory cortex
Ventral posterolateral nucleus of thalamus
Midbrain
Neospinothalamic tract
Pons
Upper medulla
Lower medulla
Dorsal root ganglion cell
Cervical spinal cord
Nucleus proprius
Fibers from cervical region
Ventral white commissure
Thoracic spinal cord
Lumbar spinal cord
Dorsal horn
Fibers from lumbar region

- The reticular formation is responsible for arousal, emotional tone and autonomic regulation. Projections are sent from the reticular formation to the thalamus. The thalamus is also an integrating centre that assists with the coordination of information.
- From there, information is relayed to the cortex and the limbic system. The limbic system is responsible for emotional tone and motivational aspects of behaviour, arousal, attention and regulation.


Reticular Activating System
Buzzle.com
Projections into cerebral cortex
Visual impulses
Auditory impulses
Reticular formation
Ascending sensory tracts (pain, touch, temperature)
Descending motor signals to spinal cord

LIMBIC SYSTEM

- **HIPPOCAMPUS** – plays an important role in emotion, learning and memory.
- **AMYGDALA** – plays role in aggression, eating, drinkin g and sexual behaviors.
- **HYPOTHALAMUS** – monitors blood levels of glucose, salt, blood pressure and hormones.



- **Defensiveness** can occur in any of the sensory systems, and sensory defensiveness is an overresponse to sensory stimulation causing the child to experience anxiety, fear and aggression. The sensory defensive child thus avoids these sensory stimulating activities.
- **Gravitational insecurity**: The child becomes fearful when their feet leave the ground or on an unstable, raised surface or when their head is tilted into 'unfamiliar' positions, especially into backward space.

- Another type of dysfunction, described by Ayres, is that of **intolerance to movement** where the child is disorganised by any movements that are unfamiliar.
- Although both dysfunctions are related to low neurological thresholds (over-responsivity) within the vestibular system, the difference is that the child that experiences problems with gravitational insecurity likes movement but his/her body needs to be secure in terms of gravitational pull. The child with aversion/intolerance to movement problems dislikes movement and is in general overwhelmed by movement.

- Children experiencing SMD can demonstrate hyper-responsivity, hypo-responsivity or fluctuations in response to sensory stimuli. Children with SMD are not only restricted in terms of processing sensory information but also in terms of their ability to attend and concentrate, their emotional control and activities of daily living such as toileting dressing, feeding, bathing and socialising.
- Their levels of arousal do not only impact on their ability to engage in occupations, but it also influences their emotions. Emotions that are seen include anxiety, lability, fear, aggression, depression and hostility.