



Sensory Enrichment Therapy™
Certification Course

Brain Map - Part 2



Sensory processing

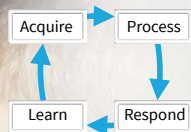
- Information about the environment is:
 - Captured
 - Translated
 - Organized
- Multisensory integration forms coherent perceptions very fast.

- Vision
- Hearing
- Touch
- Smell
- Taste
- Vestibular
(motion, balance and spatial orientation)
- Interoception
(conditions inside the body)
- Proprioception
(position of the body in space)

 mendability

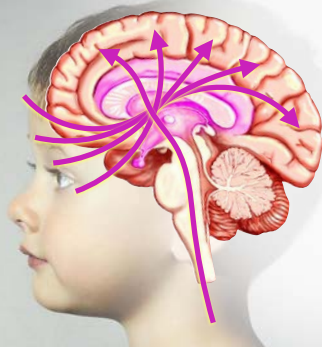
 mendability

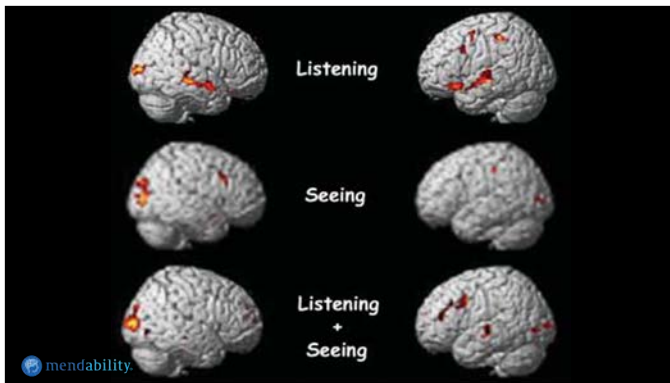
- Vision >
- Hearing >
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- Smell >
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- Proprioception >



 mendability

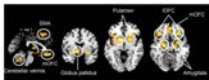
- Vision >
- Hearing >
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- Proprioception >






Beauty

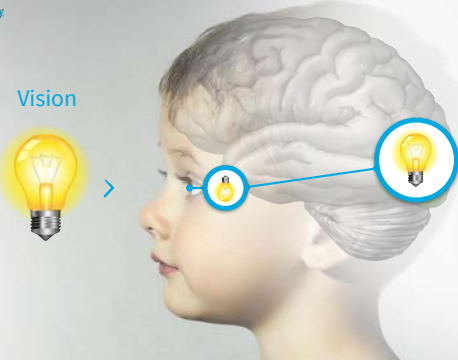
- New factor being measured that impacts the brain



Areas active during aesthetic judgment alone.


- Beautiful art activates visual centers and "beauty" center
- Beautiful music activates auditory centers and "beauty" center



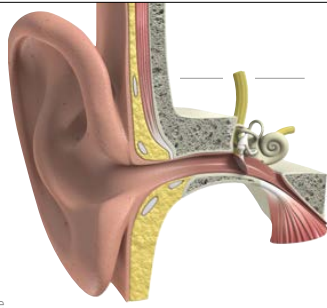
Vision

- Shape
- Color
- Straight lines
- Curves
- Movement
- Depth
- Perspective
- Shading



Hearing

- Our auditory system helps us to:
 - Understand speech. (*words, intent, emotions, tone of voice, etc.*)
 - Adapt our own voice, tone, pronunciation, as we formulate speech.
 - Appreciate sounds that please us.
 - Recognize changes in the audible space around us and warn us of possible danger.
- Neurodevelopmental disorders may include auditory processing difficulties.



Taste

- Tongue covered with papillae, each covered by 1,000's of taste buds
- 5 basic known tastes:
 - Sweet
 - Sour
 - Salty
 - Bitter
 - Savory
 - Fatty
 - Calcium



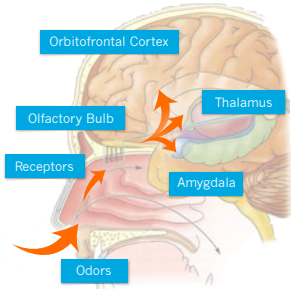
Taste

- Tongue covered with papillae, each covered by 1,000's of taste buds
- 5 basic known tastes
- Food aversions: taste vs. texture and color
- Feeding is an area where parents and caregivers report substantial improvements with Sensory Enrichment Therapy™.



Smell

- Olfactory bulb translates odors and sends information to:
 - Amygdala (*memory and emotions*)
 - Orbitofrontal Cortex (*cognitive perception, decision making*)
 - Thalamus (*relays sensory and motor signals to the cerebral cortex*)



Smell

- All senses **except smell** go through the thalamus first
- Linked to emotions and memory
- Delayed sniff developmental deficit
- Quality of the sense of smell as predictor of Alzheimer's and Parkinson's diseases



Touch

For the purposes of this training, we will focus on the system that monitors changes on the surface of the body:

- Tactile receptors:
 - Free nerve: Temperature, pain
 - Pacinian: Vibration, pressure
 - Ruffini and Merkel: Stretch
 - Meissner: Light touch, texture
- Proprioceptors
 - Monitor muscle and joint positions



Emphasis on smell and touch

- First to develop in utero
- Remain operational well after the other senses have been incapacitated
- Most documented by research for their impact on brain development and neurochemistry
- Combining smell + touch triggers a spike in norepinephrine, promoting brain plasticity



Motor skills

Independence



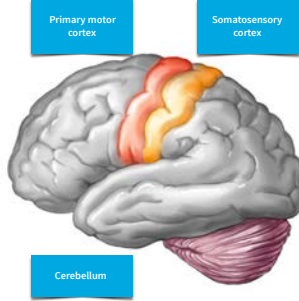
Motor skills

- Fine motor
 - Delicate, coordinated with eye movement
 - E.g.: Buttoning a shirt, speaking
- Gross motor
 - Whole body movements
 - E.g.: head control, standing up



Motor skills

- Controlled by the primary motor cortex and the cerebellum
- Learning new actions requires higher functions and often the collaboration of the senses
- Many actions require the involvement of deeper brain areas such as the basal ganglia for initiating and regulating motor commands



Feeding

Provide energy and nutrients to our body and brain



Feeding

- Involves many brain functions:
 - Fine motor
 - Taste
 - Smell
 - Memory
 - Mental image
 - Digestion
 - Vision
 - Touch
 - Mood, etc.
- Eating is one of the top areas where Mendability helps



Sleep



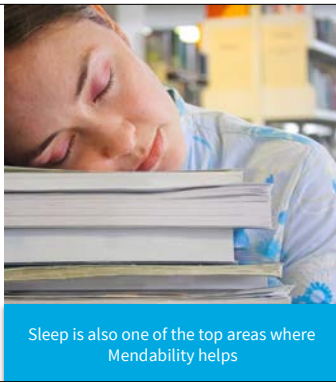
Sleep

- Regulated by:
 - Sleep/Wake homeostasis
 - After we have been awake for some time, brain chemistry "tells us" that it is time to sleep
 - Maintains enough sleep to make up for wake hours
 - Body clock



Sleep

- The Serotonin factor
 - Wakefulness/Sleep
 - Dreams
 - Insomnia
- Other factors
 - Daylight exposure
 - Exercise
- Movement
- Sensory processing
- Diet



Sleep is also one of the top areas where Mendability helps

Memory and learning



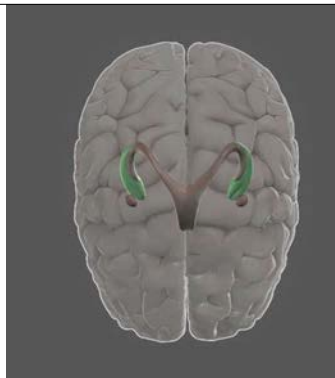
Memory and learning

- More strongly rooted when attached to sensory inputs and emotional context
- Learning abilities depend strongly on the brain's other functions
- Learn by combining new information to data we have already stored
- Consolidated through repetition
- Part of brain plasticity



Hippocampus

- Part of the limbic system
- Plays important role in:
 - Forming new memories
 - Connecting memories to emotions and senses
 - Sending memories to the right part of the cortex for long-term storage
- Emotional responses
- Spatial orientation



Example protocol

- Scents + Colors + Photos + Objects
+ Sounds + Textures + Letters
- Not a standard memorization exercise
- Stimulates activity in the hippocampus



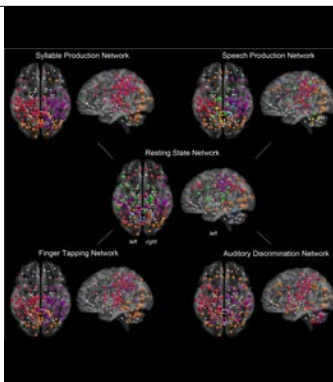
Speech

Oral, written and body language



Speech

- Communicate *and* understand needs, wants, thoughts and emotions
- One of the most complex processes in the brain:
 - Auditory processing
 - Fine motor
 - Visual processing
 - Emotion
 - Mental image
 - Memory



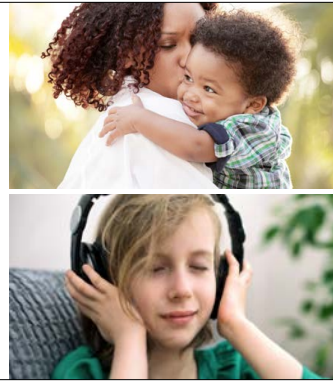
Emotions

Fear, anger, pleasure, etc.



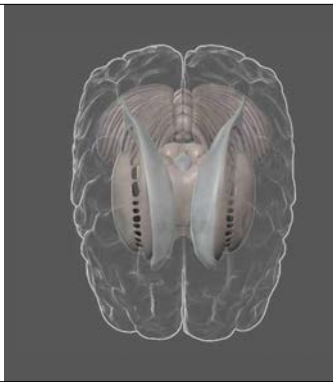
Emotions

- Instantaneous neurological reactions with physiological changes:
- Changes in heart rate and blood flow (blushing or turning pale)
- Piloerection (goosebumps)
- Sweating
- Gastrointestinal motility
- Coordinated by the amygdala



Amygdala

- Part of the limbic system
- Sends signals to coordinate very quickly a "fight or flight" state:
 - Olfactory system • Hypothalamus
 - Frontal lobe • Brain stem
- Involved in:
 - Fear conditioning
 - Anxiety



Emotions and smell

- Anatomical connection:
 - Primary olfactory cortex projects directly to the amygdala
 - Amygdala increases its firing during a smell activity
- Technique to use when a child breaks down emotionally



The Brain

- Affects every aspect of our lives
- Sensory Enrichment Therapy™ is based on a scientific understanding of how the brain functions

