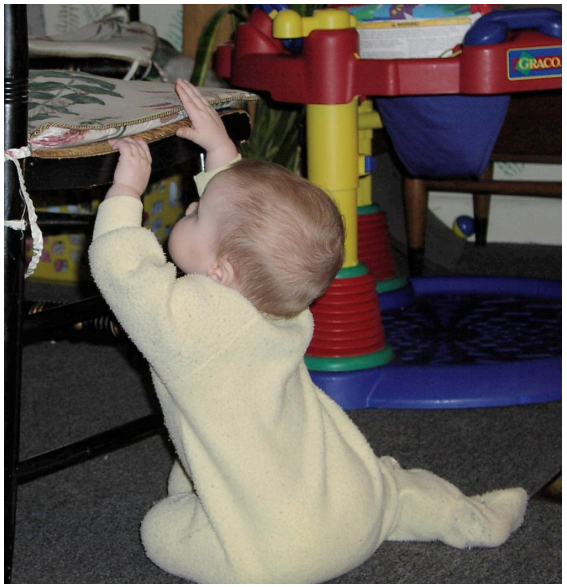
Driven to Distance
And
The Road Back

By Dr. Valerie Scaramella-Nowinski and Drina Madden

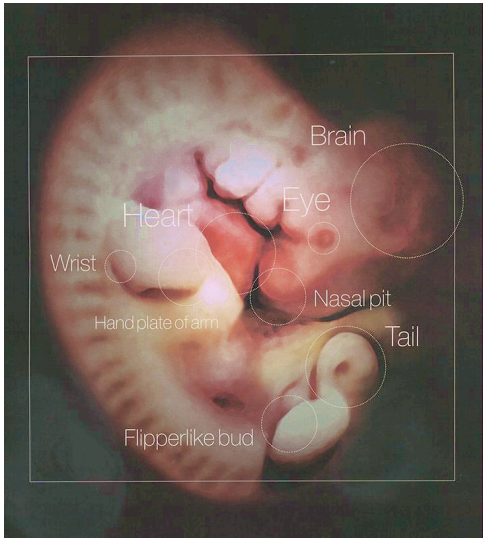
Awakening the Brain



Withdrawal Reaction

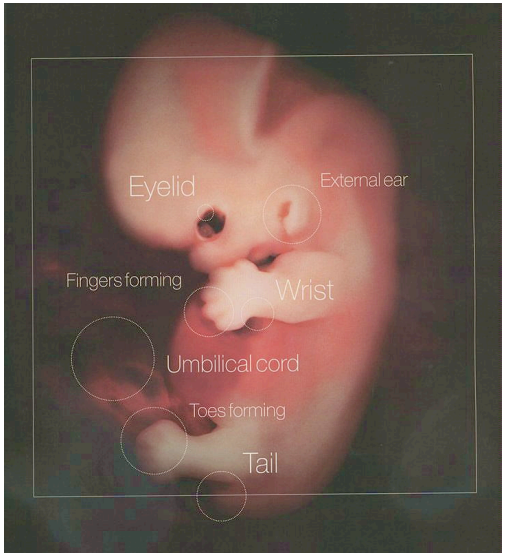
Five weeks after conception

- Embryo responds to experiences outside of itself
- Touch upper lip = withdrawal from stimulus



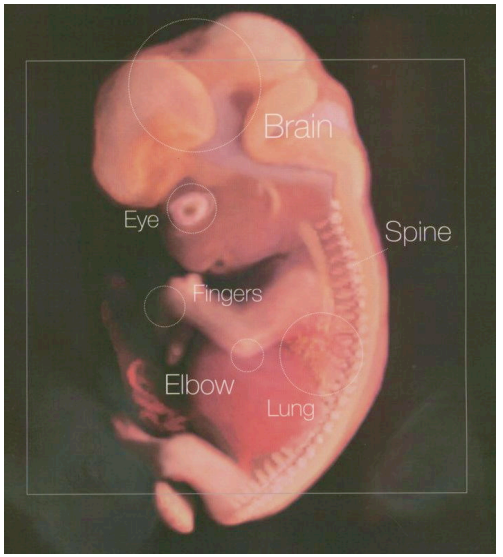
Withdrawal Reaction

- A few days later
  - Sensitive area has spread
    - Palms of hands
    - Soles of feet



- Eventually
  - Whole body is responsive to touch
  - Withdrawal reaction is a full body reaction

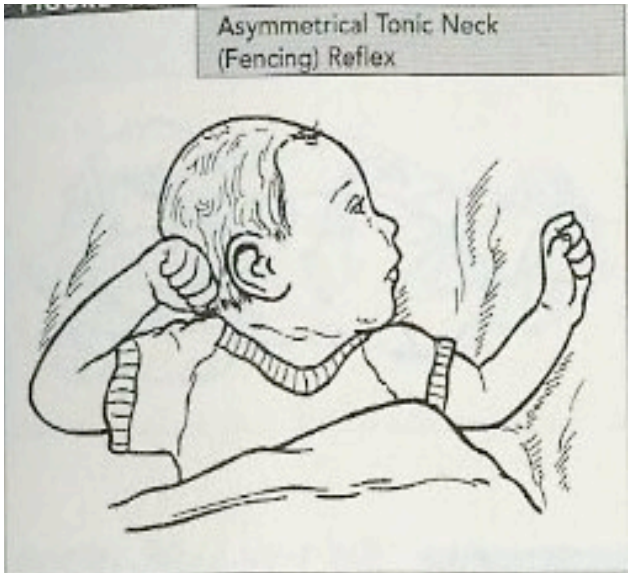
PRIMITIVE REFLEXES



- 9 weeks in utero
  - Withdrawal reactions disappear
  - Primitive reflexes begin to appear
  - They continue to develop through pregnancy

PRIMITIVE REFLEXES

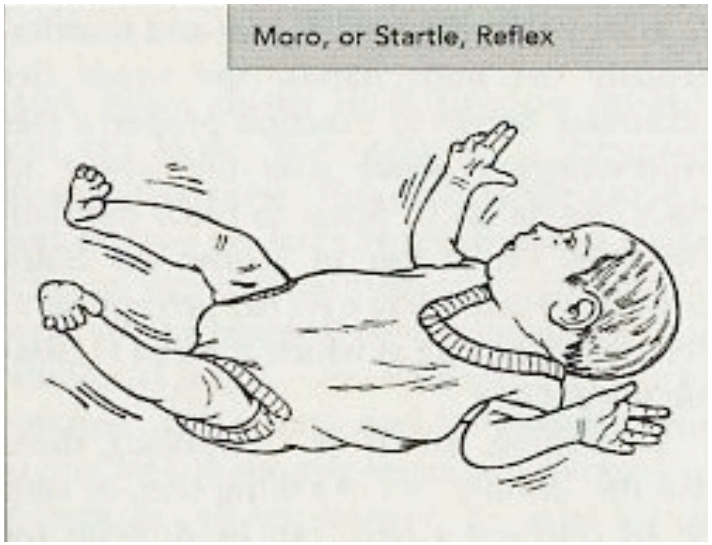
- Neural development determines arrival and inhibition of reflexes



- Awareness of reflexes and their inhibition helps caregivers to adjust environments

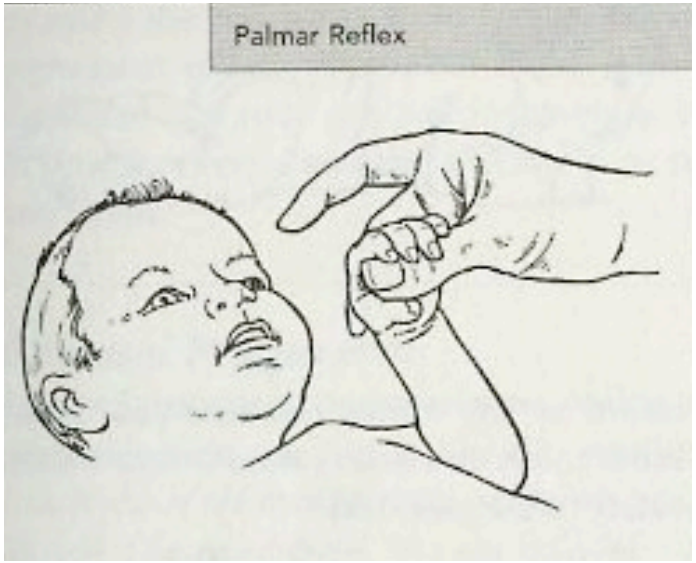
PRIMITIVE REFLEXES

- Reflexes
  - Insure protection for the embryo outside the womb
  - Support survival



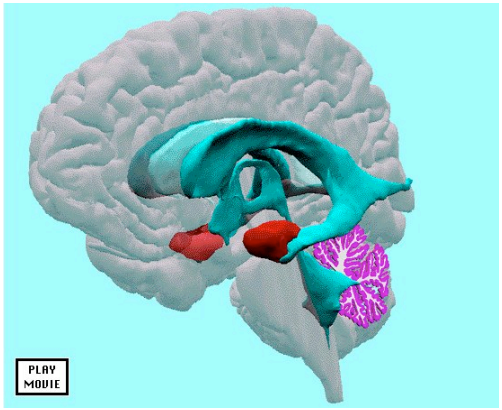
PRIMITIVE REFLEXES

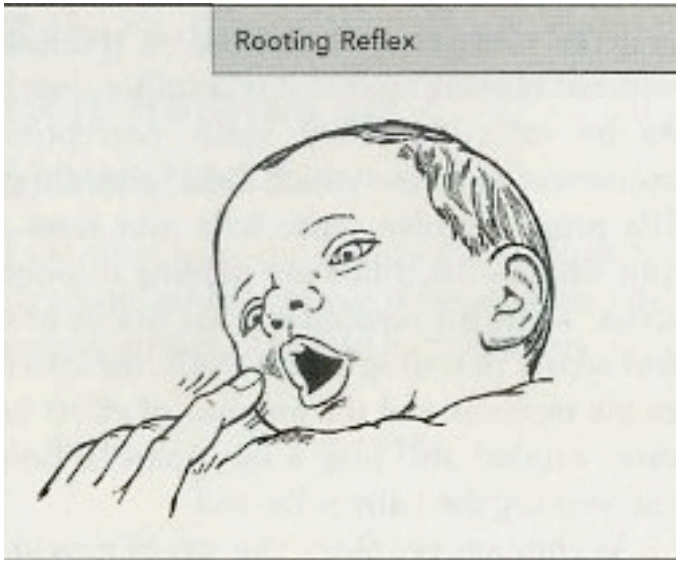
- Are automatic responses directed from the brain stem
- Cortex does not assist



PRIMITIVE REFLEXES

- Should only remain a few months

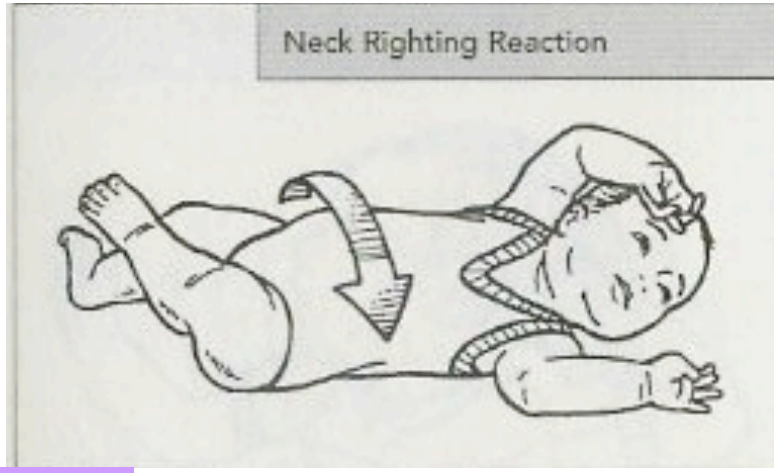


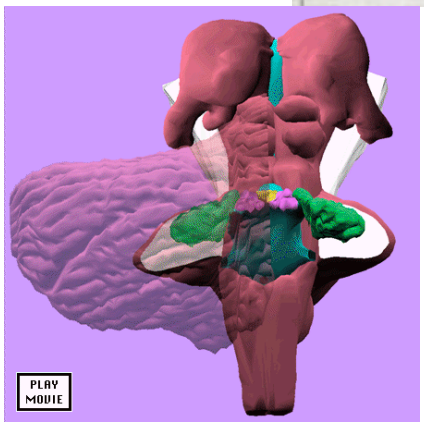


- Midbrain and cortex take over their roles as reflexes are inhibited

PRIMITIVE REFLEXES

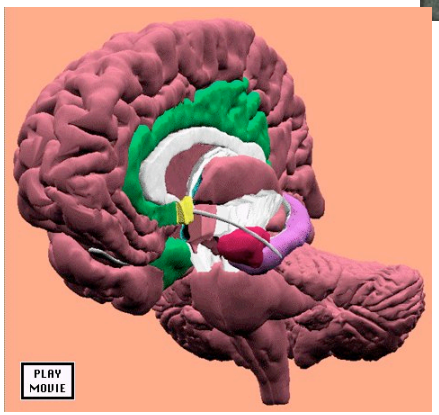
- Early weeks of life –
  - Brain stem dominates
  - Movements are
    - Basic head lifting
    - Squirming
    - Rolling



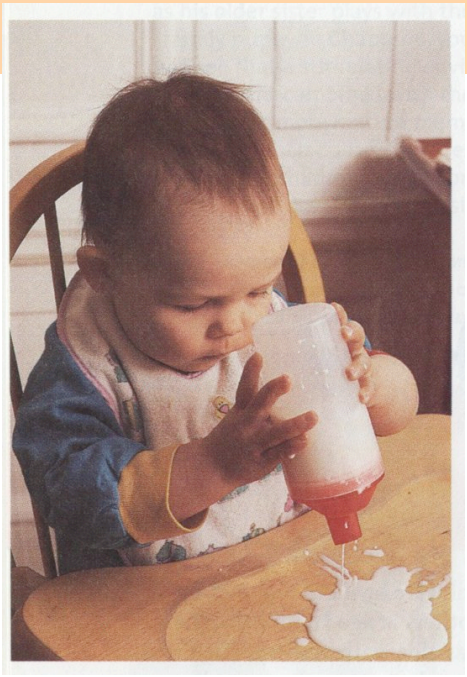


PRIMITIVE REFLEXES

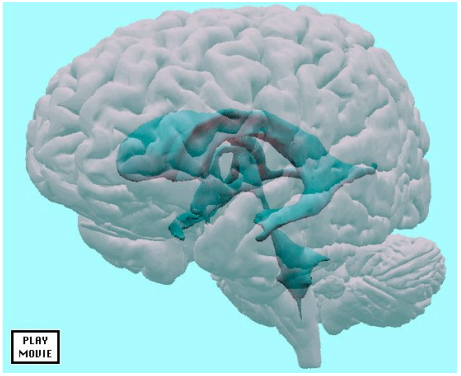
- From 6-9 months
  - Midbrain takes over
    - Rolling
    - Crawling
    - Sitting
    - Creeping
    - Standing



PRIMITIVE REFLEXES



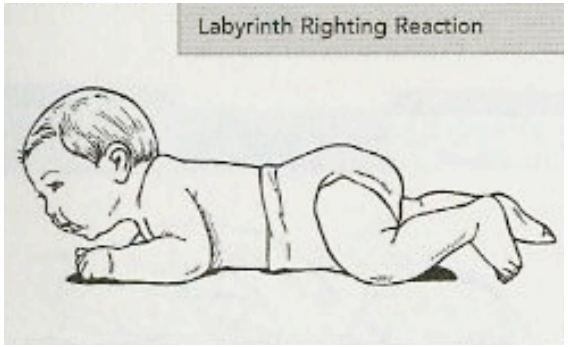
- 6-12 months
  - Cortex takes over



- Stand
- Move with independent use of hands
- Multisensory connections and full brain memories build
- Frontal lobe can reason and plan logically

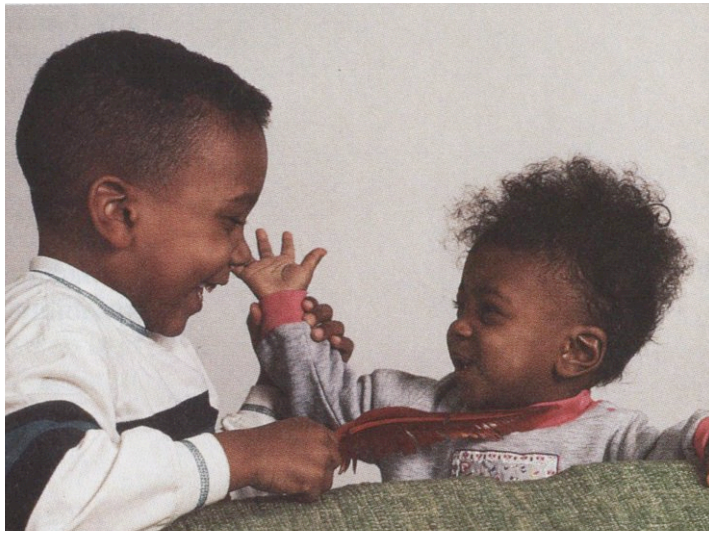
PRIMITIVE REFLEXES

- Reflexes that remain beyond 6-12 months of life indicate structural weakness or immaturity of the central nervous system



PRIMITIVE REFLEXES

- If remain to a great degree can negatively affect
  - Motor functioning
  - Sensory perception
  - Cognition
  - Means of expression/mood



PRIMITIVE REFLEXES

- Uninhibited reflexes
  - Visual sensitivity
  - Auditory sensitivity
  - Tactile sensitivity
  - Hyperactivity
  - Hypo activity
  - Brain's further development is slowed or sidetracked

PRIMITIVE REFLEXES

- By school age
  - Lower and Midbrain are more developed
  - Child can

- Receive information through word and action
- Process information through word and action
- Respond to information through word and action

An Environment That Fosters Reflex Inhibition

Auditory Assistance

- Music sharpens auditory discrimination and increases rhythmic skills. It opens memory and sequence routes
  - Encourage singing of nursery rhymes and sequences (days of the week, alphabet, etc.).
  - Encourage tapping of the rhythm using various sound making techniques.

An Environment That Fosters Reflex Inhibition

Auditory Assistance

- Listening exercises that cause the child to discriminate between which note is the higher of two notes.
  - Encourage the child to sing each note.
  - Record the child's voice on a tape recorder and then have him modify his singing after listening to the sound.

An Environment That Fosters Reflex Inhibition

Auditory Assistance

- A listening training program that focuses on inclusion and exclusion of specific sounds allowing full stimulation of the auditory system.

Tomatis and Samonas have presented systematic auditory training as well as Advanced Brain Technology through their Baby Listening - children birth to 3+) and The Listening Program (for children over 3 through to adults).

An Environment That Fosters Reflex Inhibition

Auditory Assistance

- The Language Tune-up Kit is a program that teaches the sound and letter combination necessary for the reading through listening and repetition of sound/symbol combinations. (School aged children)

An Environment That Fosters Reflex Inhibition

Visual Assistance

- Activities that emphasize:
  - **Eye movement**
  - Attention to visual detail from concrete to abstract
  - Visual/motor activities of a basic nature to enhance multisensory brain connections

An Environment That Fosters Reflex Inhibition

Visual Assistance

- Opportunities for seeing and saying in response to visual, auditory, kinesthetic and combined sensory activities
- Evaluation by a pediatric ophthalmologist to determine the health of the eye and a pediatric optometrist to determine the quality of eye movements and focusing

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Palmar reflex**
  - Clasping and unclasping the hand around an object
  - Independent thumb opposition and finger movements
  - Finger exercises with hands separately and then making different movements with hands together

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Moro reflex** - Create a relaxed but alert environment
  - Minimize external noises
  - Maximize visual focusing opportunities
  - Seat children with focusing difficulties in the least “busy” space possible

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Tonic Labyrinthine Reflex**
  - Well-ordered and precise information – one concept at a time with minimal interference
  - Much concrete experience
  - Stretching and flexion exercises on the stomach and on the back with eyes closed

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Asymmetrical Tonic Neck Reflex**
  - Extra space for activity completion due to awkwardness and need to follow through on movement
  - Individual work/learning space to assist concentration

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Asymmetrical Tonic Neck Reflex**
  - School aged children
    - By-pass fine motor responses
    - Maximize expression through their stronger modes.
    - Computers, tape recorders and reading guide cards can help many reflex issues.

An Environment That Fosters Reflex Inhibition

Kinesthetic

- **Symmetrical Tonic Neck Reflex**
  - Training program that emphasizes slow rocking on hands and knees in response to head movement and short periods of crawling and creeping can bring about positive changes in reflex inhibition

An Environment That Fosters Reflex Inhibition

Kinesthetic

– **Symmetrical Tonic Neck Reflex**

- Posture while working may be difficult to maintain. Adjust the placement of activities so the child is free to use his hands and eye movement while learning

An Environment That Fosters Reflex Inhibition

Kinesthetic

- Other exercises
  - Rolling body with eyes closed – then open initiating movement from one part of the body
  - Creeping on a slanted board
  - Scooter or wobble board first lying, then sitting, to kneeling, standing and use of a mini-trampoline
  - Swings – spinning and regular
  - Slides, climbers and tunnels
  - Feldenkrais

The Senses

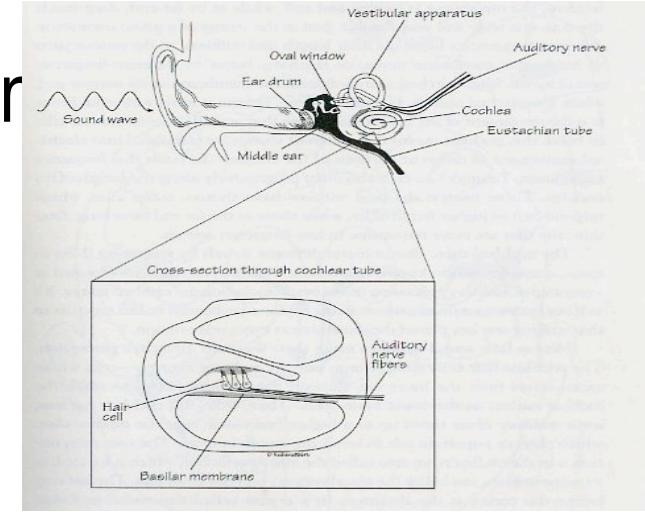
The Senses

- Senses have separate organs for reception
- Thalamus – "the sensory gate" – controls the synchrony of all sensations readying the child to receive through all senses
- Experiences are stored in sensory specific parts of the brain

The Senses

- **DEPEND ON EACH OTHER FOR MUCH OF THEIR FUNCTIONING**

- Vision and hearing both deper (vestibular system)
  - Awareness of body in space
  - Location of sights/sounds



The Senses

- Touch and sight often share the same moments

- Hearing joins in
- When we see – we often smell and/or taste
- We must smell to experience flavor

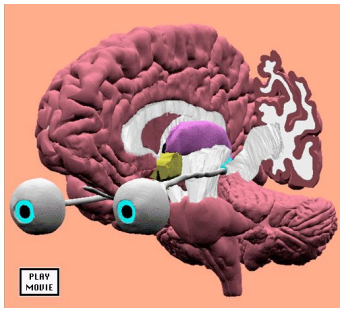
The Senses

- Sensory experiences rely on
  - Clear impressions from the sense organ
  - Clear information processing

For appropriate response

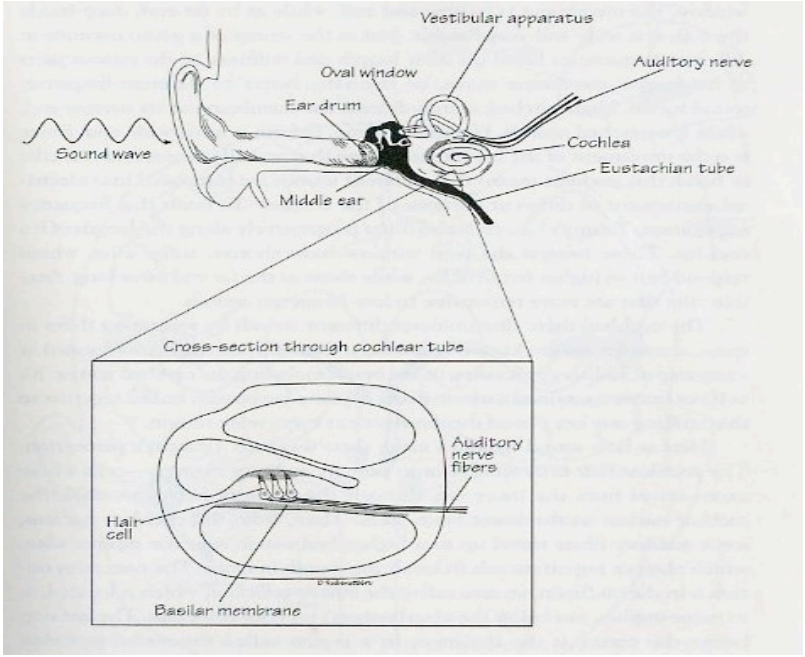
The Senses

- Problem with one sense organ can have major impact on reception of other sensory experience
- Overloading one system can cause another to shut down



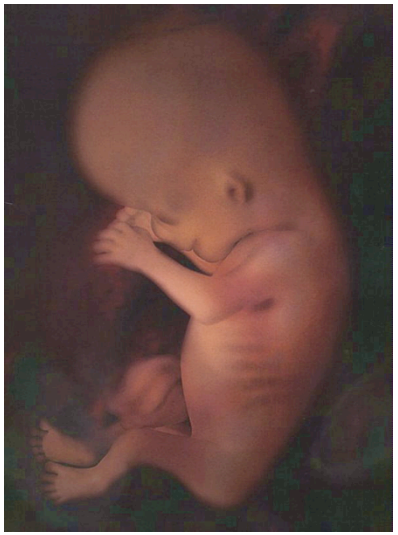
The Senses

- Balance and vestibular



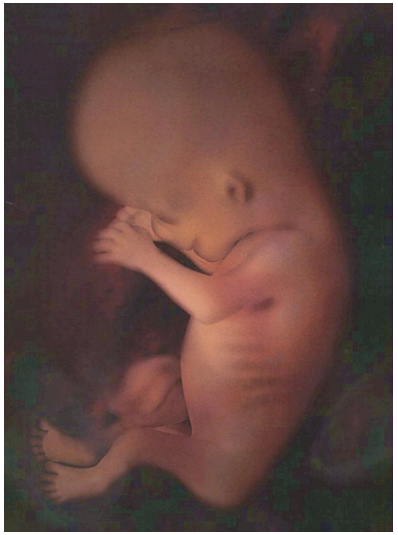
The Senses

- Balance and vestibular
  - Balance is the core of sensory functioning
  - First system fully developed
    - Begins 16th week in utero
    - Myelinated at birth



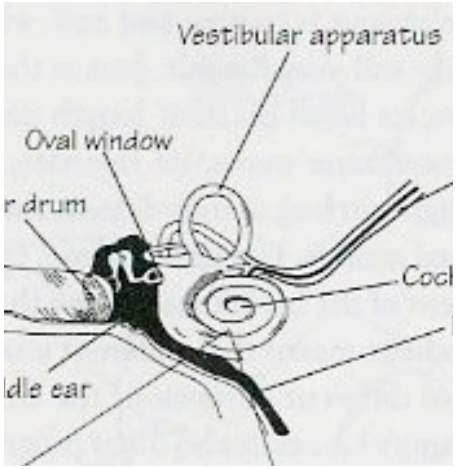
The Senses

- Balance and vestibular
  - Function
    - Allows a sense of direction and orientation in utero
    - Helps cope with gravity



The Senses

- Balance and vestibular
  - Brain areas
    - Inner ear – Semicircular canals and cochlea
      - Fluid and hairs provide information regarding
        - » Direction
        - » Angle
        - » Extent of movement



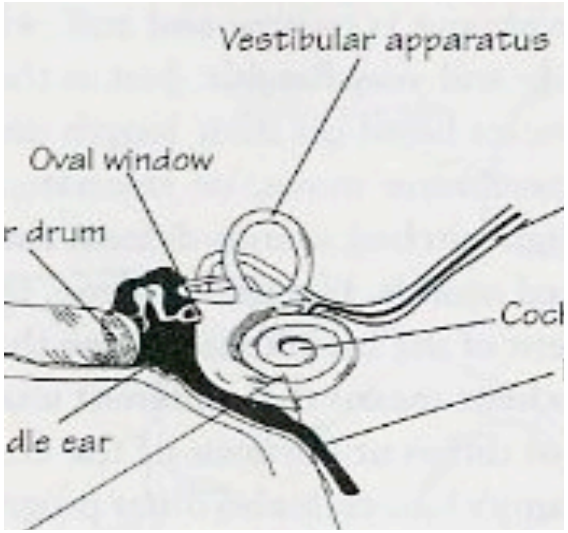
      - Passed to brain stem level for transmission to cerebellum

The Senses

- Balance and vestibular
  - Hearing is affected by vestibular and Vestibular affects hearing
  - Vestibular and reflex system are bound to visual system
    - Eye motor
    - Visual perception
    - Balance
    - Eye tracking
    - Motor planning

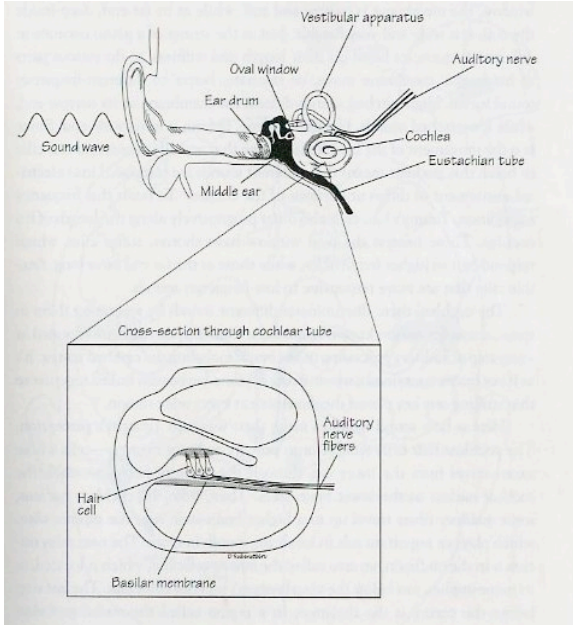
The Senses

- Balance and vestibular
  - Inappropriate vestibular signals causes REFLEX reactions to occur



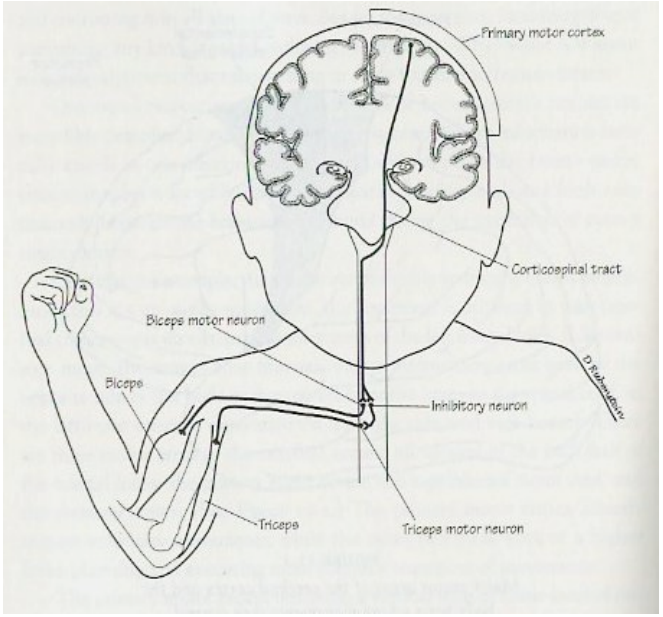
The Senses

- Balance and Vestibular
  - Uninhibited reflex activity will slow down vestibular function
    - Balance problems
    - Motion sickness
    - Dislike of heights, swings, carousels
    - Disorientation
    - Difficulty sitting still
    - Eye-motor dysfunction
    - Visual perception difficulties
    - Directional awareness problems
    - Spatial perception difficulties
    - Organizational problems



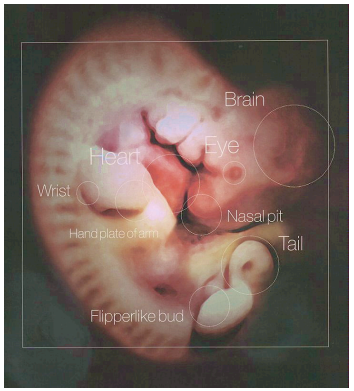
The Senses

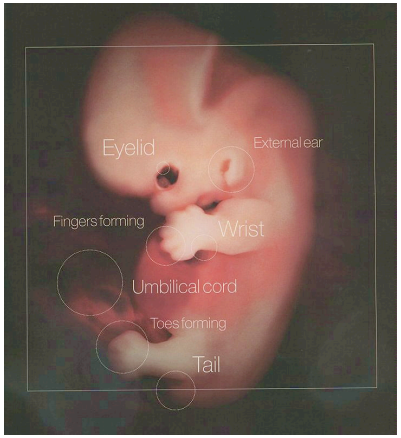
- Tactile
  - Our first source of contact with the world



The Senses

- Tactile
  - 5 weeks after conception
    - Withdrawal reaction
    - Defensive response

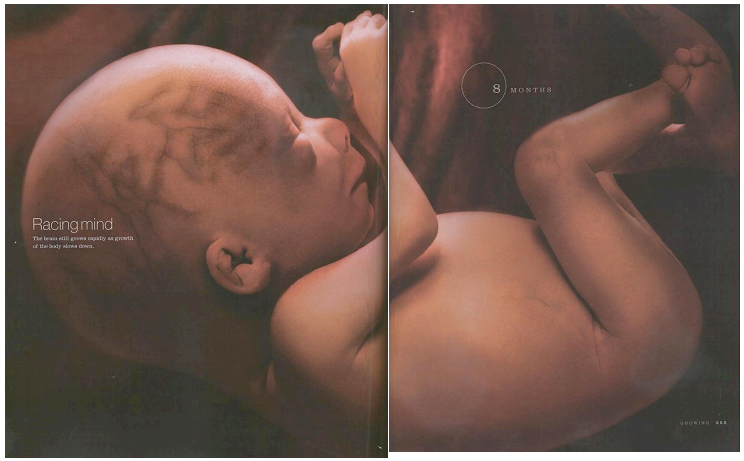




  - 4 weeks later
    - Whole region of face, palms, soles, then whole body

The Senses

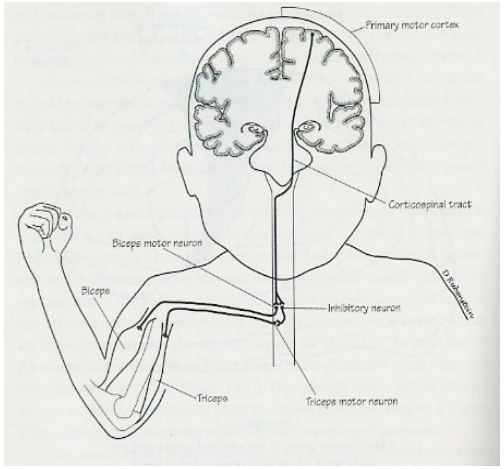
- Tactile
  - 2nd-3rd Trimester – allows grasping reflexes



  - Birth = security, feeding, comfort, exploration

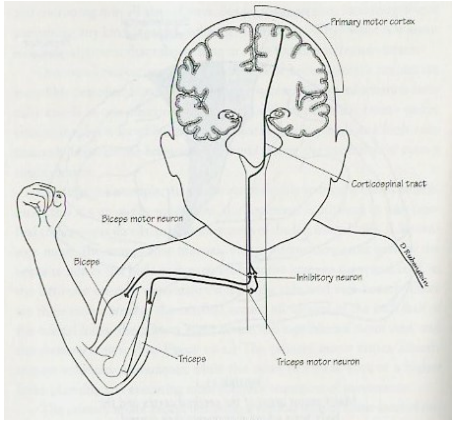
The Senses

- Tactile
  - Precedes hearing and vision as primary learning channels
  - Registers
    - Heat
    - Cold
    - Pain
    - Body position



The Senses

- Tactile
  - Over-active protective subsystem
    - Touch is not comforting
    - Touch cannot send information
    - Withdrawal results
      - Certain clothes
      - Contact sports
      - Poor body image
      - Sense of self in space
    - Extreme withdrawal = anorexia (poor body image)



The Senses

- Tactile
  - Good development
    - Better immune system
    - Better infant weight gain
  - Poor development
    - Much self stimulation/rocking
    - 15 minute massage daily can make a change

The Senses

- Tactile
  - Uninhibited
    - Hypersensitive
      - Not like being touched
      - Allergic skin reactions
      - Poor temperature control
      - Low external pain threshhold
      - Anorexia
      - Dislike of sports

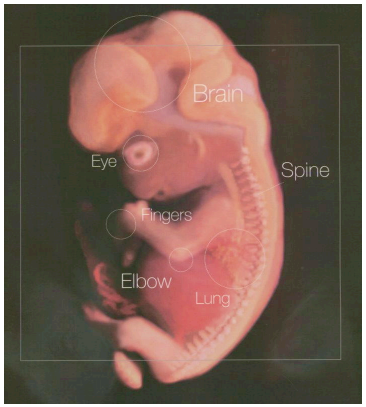
The Senses

- Tactile
  - Uninhibited
    - Hyposensitive
      - High pain threshhold
      - Crave contact sports
      - Provoke rough and tumble play
      - Compulsive need to touch
      - “Bull in China Shop”

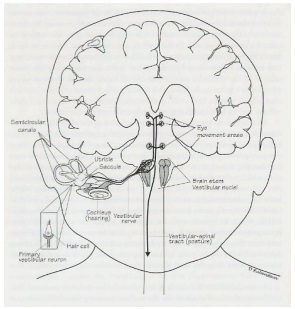
The Senses

- Tactile
  - Uninhibited
    - Lack of discriminative system
      - Dare devil
      - Not sense danger
      - Oblivious to injury
      - Cannot read body language

The Senses

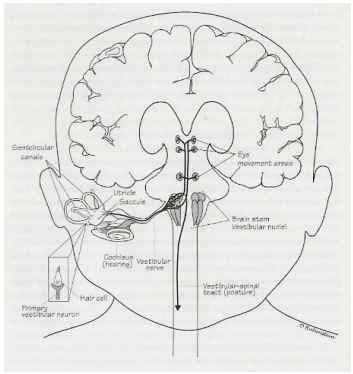


- Auditory
  - Formation
    - 2nd ½ of mid embryonic life (4 – 8 weeks)
    - Myelination occurs 24th – 28 weeks
    - Able to hear internal and external sound



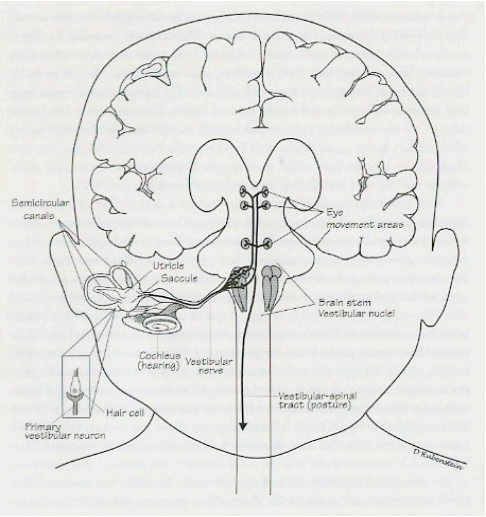
The Senses

- Auditory
  - First three years
    - Picks up the sound of own language
    - After 3 – more difficult to learn a new language



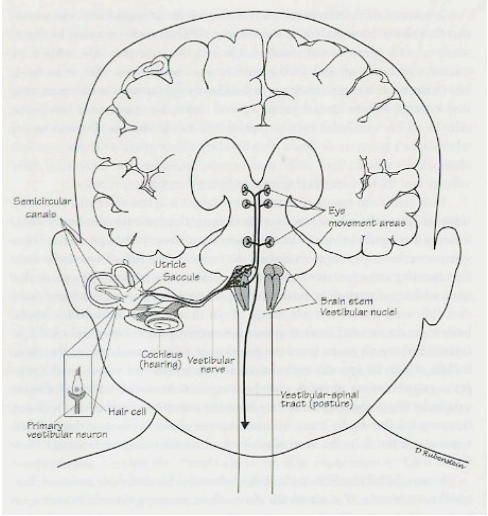
The Senses

- Auditory
  - Hearing loss can cause
    - Hearing discrimination difficulties
      - /ch/ and /sh/
      - /th/ and /f/
      - /p/ and /b/
  - Poor filter
    - Poor listening skills
    - Communication difficulties
    - Behavior problems



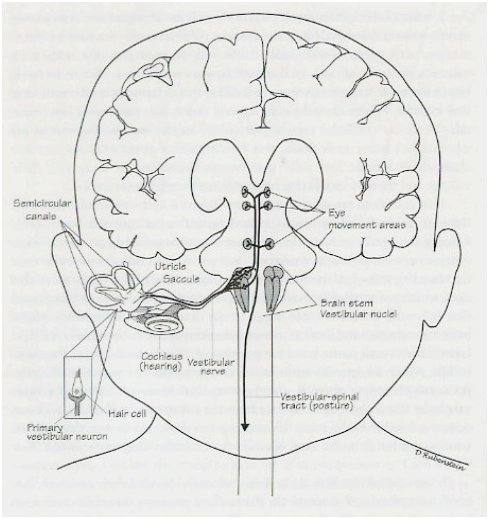
The Senses

- Auditory
  - Poor filter
    - Hyperacuity
      - Hear too much
      - Affects concentration
      - Causes speech difficulties
      - Problems with socialization
      - Hyperactivity when hypersensitive to HIGH, energetic sounds



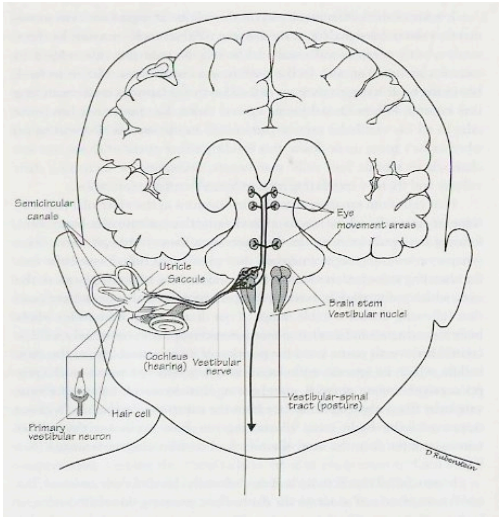
The Senses

- Auditory
  - Poor filter
    - Short attention
    - Distractibility
    - Hypersensitivity to sound
    - Misinterpretation of directions
    - Confusion of similar sounding words
    - Hesitant speech



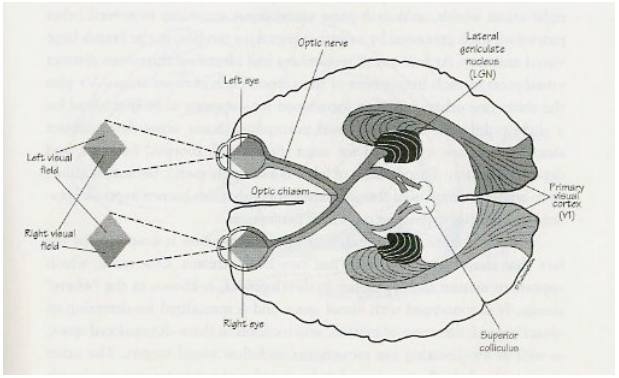
The Senses

- Auditory
  - Poor filter
    - Weak vocabulary
    - Poor sentence structure
    - Can’t sing in tune
    - Confusion or reversal of letters
    - Reading comprehension



The Senses

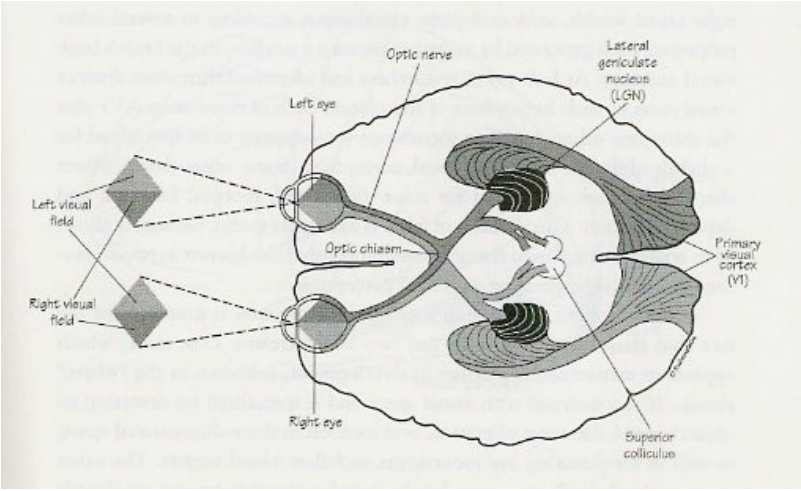
- Visual
  - Eyes must work together
  - Distance of focusing must be adjusted



  - Scanning/tracking must be smooth and even
  - Good directional awareness needs vestibular connection

The Senses

- Visual
  - Perception is decreased if reflexes not inhibited
  - During first year of life – eye/brain/body connect



The Senses

- Visual
  - Problems with reflex inhibition
    - Poor posture
    - Clumsy
    - Difficulty playing ball games
    - Fatigue when using eyes
    - Concentration is down
    - Work close to work surface

The Senses

- Visual
  - Problems with reflex inhibition
    - Poor spacing
    - Crooked handwriting
    - Misread words
    - Miss or repeat words while reading
    - Slow reading
    - Use finger when reading
    - Can't remember what they read

The Senses

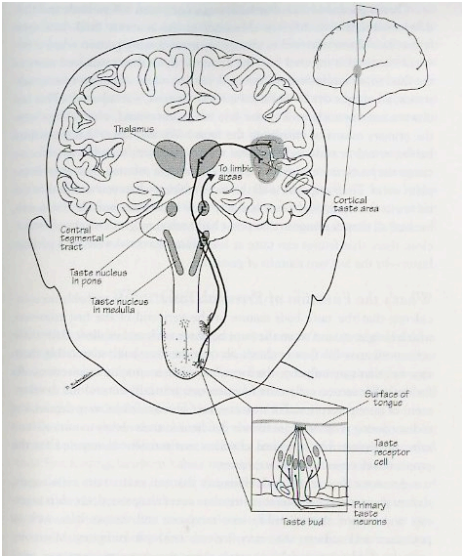
- Proprioceptive
  - Know where body parts are at any given moment
  - Receptors are in joints, tendons, and muscles

The Senses

- Proprioceptive
  - Difficulties with reflex inhibition
    - Need to move constantly to get spatial feedback
    - Inconsistent performance
    - Poor posture
    - Fidget
    - Excessive desire to be held
    - Provoke fights
    - Visual problems

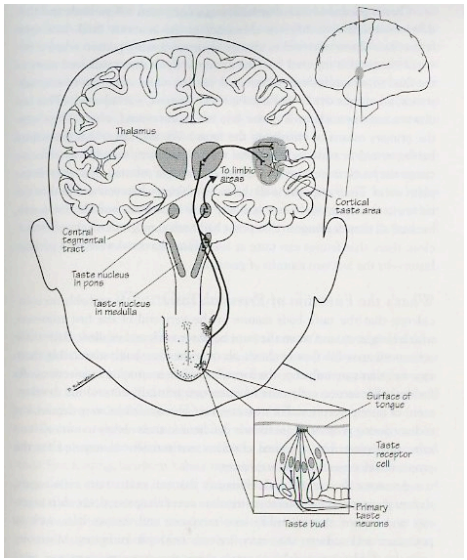
The Senses

- Taste/smell
  - Smell goes directly to olfactory bulb for storage
  - Smell is the source of flavors



The Senses

- Taste/smell
  - Hypersensitivity
    - Avoid bathrooms due to smell
    - Avoid other children due to smells
    - Misbehave after some smell exposure
    - Avoid cafeteria and strong food smells
    - Not want to be near others
  - Hyposensitivity – eat indiscriminately



The Senses

- Sensory experiences rely on
  - Clear impressions from the sense organ
  - Clear information processing

For appropriate response

AWAKENING THE BRAIN

- NeuroSystems Therapy
  - From Brain Stem to Cortex
  - Excitation-Inhibition Methods (consolidation efficient memory traces)

AWAKENING THE BRAIN

- Relaxed alertness: mood regulation
- Reflex modulation: i.e. Feldenkrais
- Sensory modulation:auditory (auditory training, Tomatis…) ,visual (optic motor therapy, colored lenses…), tactile therapy (brushing, deep pressure…)
- Language: external speech to internal speech
  - Use with visual stimuli and movement (I.e. Picture Exchange Program, Carol Gray Social Stories)

AWAKENING THE BRAIN

- Use Repetition, Recollection and Reflection
- Leads to self-direction executive function (development of self and relationship with others)