Gustatory System

& Oral Motor Input

THE RECEPTORS FOR THE GUSTATORY SYSTEM ARE LOCATED ON THE TONGUE. THESE ARE CHEMICAL RECEPTORS AND ARE IMPORTANT FOR OUR AWARENESS OF THE ENVIRONMENT AND OUR BASIC SURVIVAL. ORAL MOTOR SENSORY INPUT OFTEN PLAYS A SIGNIFICANT ROLE IN MAINTAINING OUR AROUSAL LEVELS THROUGHOUT ALL STAGES OF LIFE.

Using the Gustatory System/Oral Motor Input to Change Levels of

From the time we are born, we instinctively know how to use oral motor input to calm us and to learn about our environment. Babies are quickly comforted by sucking on a pacifier. Small children often put objects in their mouths and explore them with their tongues. As we grow older, we learn to drink a soda during a long meeting, suck on lemon drops, or eat while we write a report. While our actions become more subtle as we age, the need for oral motor input appears to be a strong influence throughout our lives. Qualities such as texture, temperature, action or generally tend to be more alerting. Chewing or sucking on objects or food can also be very calming. Many age appropriate oral motor activities can easily be included into daily routines, including lunch time, snack time

Alerting Activities

- Eat crunchy foods like pretzels, ice, carrots, celery, apples
- Eating chewy foods like licorice, taffy, beef jerky, gum
- Blowing whistles, bubbles, feathers, balloons, cotton balls etc. THIS ACTIVITY ALSO HELPS CALM AND ORGANIZE STUDENTS FOR ACADEMIC TASKS
- Eating sour foods like lemon drops, sweet tarts, shock tarts, tear jerkers
- Eating cold ice or Pop-

Calming Activities

- Chewing or sucking on mild flavors (suckers, chew toys or thera-tubing)
- Sucking thick liquids through a straw
- Drink from a sport water bottle
- Chew/suck on a key chain, necklace or medallion
- Chew/suck on a pen/pen top
- Play a musical instrument
- Blowing whistles, bubbles, feathers, balloons, cotton balls etc.—THIS ACTIVITY ALSO HELPS CALM AND ORGANIZE STUDENTS FOR ACADEMIC TASKS
- Drink warm liquids such as hot chocolate, cider or soup.

Hints for Gustatory / Oral Motor Input

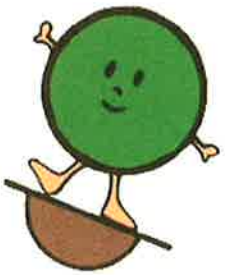
* Crunchy, sour, chewy, salty or cold foods are ALERTING
* Warm, sweet or chewy foods a re CALMING
* Chewing, sucking, blowing activities can calm or alert
* Blowing activities paired with eye-tracking tasks (blow ping pong ball with a straw) can help organize and calm students in preparation for learning

VESTIBULAR SYSTEM

THE RECEPTORS FOR THE VESTIBULAR SYSTEM ARE LOCATED IN THE INNER EAR, AND ARE STIMULATED BY MOVEMENT OF THE HEAD AND INPUT FROM OTHER SENSES. THIS SYSTEM TELLS US WHERE OUR BODY IS IN SPACE. IT LETS US KNOW THE QUALITY OF OUR MOVEMENTS, AND TELLS US IF ITS OUR BODY OR THE ENVIRONMENT THAT IS MOVING

Using the Vestibular System to Change Levels of Arousal

The vestibular system plays a very important part in our ability to interact with the environment. It tells us how and where we are moving. This system is responsible for letting us know if our movements are up, down, fast, slow, angular or circular. Think about times when you have been dizzy, and the whole room seemed to be spinning— now imagine trying to negotiate a crowded hallway when you are dizzy and unable to accurately perceive the information about your own movement. Similar to other senses, people can be over or under reactive to vestibular input. A hypersensitive person might avoid any type of movement that accentuates input, while a hyposensitive person might try dare-devil movements to increase input. Generally, slow, rhythmic back and forth or up and down movements are more calming. Quick, unpredictable, or circular movements are more alerting. Difficulty accurately registering vestibular input can affect activities such as walking in the hallway, sitting in your chair, participating in PE, attending to and completing classwork or joining games at recess. Children who seek vestibular input are often more easily visible in the classroom setting. Frequent opportunities for sensory input helps them organize and prepare



Alerting Activities

- Jumping on a trampoline or doing jumping jacks
- Hanging upside down by the knees on the jungle gym
- Riding a scooter down a ramp
- Sitting and bouncing on a therapy ball
- Standing and twirling in a circle
- Bending over with head between legs
- Changing positions
- Doing somersaults and cartwheels

Calming Activities

- Jumping on a trampoline or doing jumping jacks
- Swinging on a playground swing
- Rocking in a rocking chair
- Sitting on a teeter-totter
- Rolling slowly back and forth in a barrel
- Take a break to do an errand for the teacher
- Swinging in a hammock

Hints for Vestibular Sensory Input

- Fast, unpredictable movement is ALERTING
- Slower, rhythmic movement is CALMING
- The need for vestibular movement is unique to each individual
- Honor each individual's need to seek or avoid vestibular input

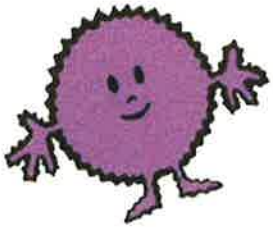
Compiled by Bohl, L. & Miller, N., 1995

TACTILE SYSTEM

THE RECEPTORS FOR THE TACTILE SYSTEM ARE LOCATED IN THE SKIN, AND PROVIDE INFORMATION ABOUT OUR ENVIRONMENT. THIS SYSTEM ACTS TO DISCRIMINATE AND PROVIDE INFORMATION ABOUT THE QUALITY OF OBJECTS IN THE ENVIRONMENT, AS WELL AS SERVES TO PROTECT US BY ALERTING US TO DANGER

Using the Tactile System to Change Arousal Levels

The tactile system is one of the largest sensory systems in our bodies, and plays an important role in our ability to interact with the environment around us. The tactile system is responsible for our ability to recognize the qualities of objects, such as hard, soft, sharp, dull, rough, smooth, etc. Imagine trying to find the light switch in a dark room without the ability to define which object is a smooth, plastic, rectangle. The tactile system also provides us with information about the quality of touch we are receiving. Variables such as temperature, pressure, and texture help us determine what we are touching and how we should respond to it. What would happen if you were unable to determine whether or not your finger was being pinched in a door? Imagine not being able to tell whether or not the food you're eating is too hot. Some people are hypersensitive, and over react to tactile input. Other people are hyposensitive, and underreact to tactile input. Both types of poor registration can lead to difficulty manipulating objects and interacting effectively within our environment. Overly sensitive people might not want to touch objects necessary for completing tasks. Under sensitive people may break materials by touching them too hard. In general, light tactile touch tends to be alerting, while deep pressure touch is calming. Planned tactile activities can be used to calm or alert students, and prepare them for learning and doing in the home and school setting. Many tactile experiences can be incorporated within daily activities and academic tasks.



Alerting Activities

- Provide light touch to the palm
- Hold something cold
- Gently and quickly rub the skin
- Take a cool shower or wash face with cool washcloth
- Provide a light back scratch
- Have a tickle fight
- Pet a dog or cat
- Provide fidget items to hold in hands

Calming Activities

- Provide fidget items to hold in hands
- Provide a quiet spot with lots of pillows or blankets
- Have the child wear spandex shorts and shirt for increased deep pressure input
- Give bear hugs
- Take a warm bath
- Provide weighted vests or ankle weights — CHECK WITH THERAPISTS FOR SAFETY PRECAUTIONS AND PROPER USE
- Snuggle under blankets
- Play with resistive putty

Hints for Tactile Sensory Input

- Light, cold, or rough touch is ALERTING
- Heavy, deep, warm or soft touch is CALMING
- Carefully examine the environment for uncomfortable tactile input
- Honor each individual's need to seek or avoid tactile input

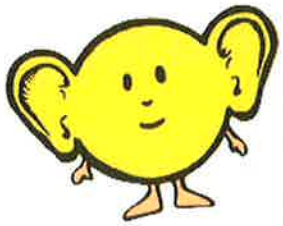
Compiled by Bohl, L. & Miller, N., 1995

AUDITORY SYSTEM

THE RECEPTORS FOR THE AUDITORY SYSTEM ARE LOCATED IN THE INNER EAR. THESE RECEPTORS ARE STIMUATED BY AIR WAVES. THEY SEND INFORMATION ABOUT SOUNDS IN THE ENVIRONMENT TO THE BRAIN FOR INTERPRETATION.

Using the Auditory System to Change Arousal Levels

Just as with any other sensory system, the auditory system can be used as a means to change one's level of arousal. Auditory sensations can have an alerting or calming effect. Loud, quick, unpredictable noises tend to be more alerting. Slow, rhythmic noises tend to be calming. Think about those long driving trips in which you might turn on loud rock and roll music to stay awake. The quick beat and loud noise are much more alerting than the quiet, rhythmic sounds of classical music. On the other hand, think of putting a baby to sleep — a softly repeated lullaby often does the trick. Planned auditory input can have an effect on a child's performance in the classroom or home setting. Playing classical music during study hall or homework time may provide the auditory input needed to complete a math assignment. Listening to a quietly read story may prepare a young child for bedtime. Headphone might provide a quiet environment for completing class work. By examining the environment, auditory input can be planned and used to help maintain an effective arousal level for learning and doing.



Alerting Activities

- Provide music with varied pitch, sound, loudness or uneven/fast beat
- Speak with animated, high and low voice
- Provide frequent opportunities to examine novel sound producing toys — rain stick, squeeze toys, electronic toys, musical instruments, whistles
- Utilize sound producing materials to complete classroom projects — talking calculator, books on tape, or "Yak-Back" for verbal directions

Calming Activities

- ♪ provide quiet music with slow, even beat
- ♪ speak in a monotone voice or whisper
- ♪ sing or hum softly to the student
- ♪ provide a quiet work environment
- ♪ Allow the student to cover ears with hands when confronted with a loud or unexpected noise
- ♪ Utilize headphones or ear plugs to shield from background noises or distracting sounds

Hints for Auditory Sensory Input

- ♫ Prepare in advance for loud/strange noises
- ♫ Quick, loud sound is ALERTING
- ♫ Slow, rhythmic sound is CALMING
- ♫ Examine the environment for sounds that may be distracting

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Gustatory System

& Oral Motor Input

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Olfactory System

THE RECEPTORS FOR THE OLFACTORY SYSTEM ARE LOCATED IN THE NASAL STRUCTURE. THESE ARE CHEMICAL RECEPTORS, AND ARE IMPORTANT FOR OUR AWARENESS OF THE ENVIRONMENT AND OUR BASIC SURVIVAL. NEGATIVE RESPONSES TO OLFACTORY SENSATIONS CAN IMPACT BEHAVIOR, SOCIAL INTERACTION, OBJECT MANIPULATION, MOVEMENT, AND SELF CARE.

Using the Olfactory System

The olfactory system is one of man's oldest and most basic sensory systems. Olfactory input can evoke memories, make a situation more pleasant, or quickly bring a situation to an abrupt halt. Think about the first time you smelled your favorite cologne or perfume. What does the smell of coffee make you think of? What does the cafeteria smell like during lunch at school? Imagine sitting next to a smelly trashcan while you try to concentrate on work. The added sensation of smell can entice participation in an activity or quickly make a student refuse to complete the project. For many people, smells that are sweet tend to be more calming— cinnamon rolls or vanilla. Scents that are more acrid tend to be more alerting - smoke or skunk. Not everyone perceives every scent in the same manner. A pleasant smell for one person may be intolerable for the next. A careful examination of the school or home environment can reveal hidden olfactory triggers that can significantly influence a student's participation. Planning for olfactory activities can reduce negative stress.

Alerting Activities

- Allow the use of scented markers or Crayons
- Allow frequent use of scented lotion or soap between activities
- Spray a citrus room deodorizer before an academic task
- Include scented materials within Projects, science project including cit-

Calming Activities

- Burn a vanilla scented candle during academic tasks
- Place potpourri in the classroom
- Consider classroom arrangement in relation to the trashcan, bathroom or cafeteria
- Consider whether perfumes, lotions, deodorants, shampoos, etc. are bothersome to students
- Include preferred scents within academic tasks - science experiments with perfumes, completing writing assignments with a scented pen

Hints for Olfactory Sensory Input

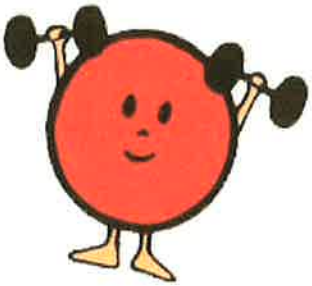
- Acrid scents are ALERTING
- Sweet scents are CALMING
- The same scent can have different meanings for different people
- Examine the environment and activities closely for sensory input

PROPRIOCEPTIVE SYSTEM

THE RECEPTORS FOR THE PROPRIOCEPTIVE SYSTEM ARE LOCATED IN THE MUSCLES AND JOINTS. THIS SYSTEM TELLS US WHERE OUR BODY PARTS ARE AND WHAT THEY ARE DOING. INPUT FROM THE PROPRIOCEPTIVE SYSTEM HELPS US MOVE AND MANIPULATE OBJECTS WITHOUT HAVING TO LOOK AT EACH BODY PART WHILE IT MOVES.

Using the Proprioceptive System to Change Arousal Levels

The proprioceptive sensory system is yet another important part of man's ability to move and do thinkgs independently. The information gained from this sensory system allows us to move freely and without great concern for where our body parts are in relation to objects in the environment. It tells us how hard or soft we are manipulating objects. Imagine trying to drive if you had to constantly look at your foot to make sure it is pressing on the gas pedal. What if you couldn't judge how hard you were pressing the gas pedal. Difficulty accurately registering proprioceptive input can be seen in over and under reactive responses. A hypersensitive person might appear to have weak strength, or not like to participate in heavy work tasks. A hyposensitive person may bump and crash into objects, or take risks with movements that allows for intense sensory input. An interesting fact about proprioception, is that the sensory input gained from this system can be used to both alert and calm. Heavy work tasks and movement work to alert low arousal children and at the same time will calm a highly aroused child. Input through the proprioceptive system can have quick and long-acting results. Opportunities to gain proprioceptive input can be both CALMING and ALERTING



Hints for Proprioceptive Sensory Input

- Proprioceptive input can be both CALMING and ALERTING
- Heavy work sends sensory input to the muscles, tendons and joints
- Proprioceptive input provides quick, long-lasting results
- Bumping into things is a way to receive proprioceptive input

Alerting Activities

- Jumping on a trampoline or doing jumping jacks
- Climbing on and hanging on the jungle gym
- Swing
- Sit on a therapy ball or cushion to do classwork
- Do "chair push-ups" or "wall push-ups"
- Allow the student to help by passing out papers, erasing the board, or deliver a message
- Exercise, dance, wiggle

Calming Activities

- Pushing heavy furniture
- Pushing a heavy cart to deliver library books or retrieve lunch trays
- Carry boxes, laundry basket, or unload groceries
- Vacuum the floor
- Carry a weighted backpack or fanny pack
- Jumping into and being squished by a big pile of pillows
- "Wheelbarrow" walk on outstretched arms

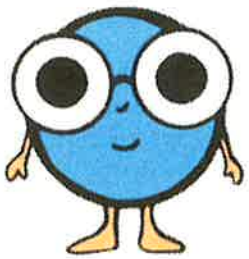
Compiled by Bohl, L. & Miller, N., 1995

VISUAL SYSTEM

THE RECEPTORS FOR THE VISUAL SYSTEM ARE LOCATED IN THE RETINA OF THE EYE. THESE RECEPTORS ARE STIMULATED BY LIGHT. THEY SEND INFORMATION TO THE BRAIN ABOUT OBJECTS OR PEOPLE IN THE ENVIRONMENT, HELP US DEFINE OUR BOUNDARIES, DEFINE OUR LOCATION IN THE ENVIRONMENT, AND DEFINE THE WAY WE MOVE THROUGH TIME AND SPACE.

Using the Visual System to Change Arousal Levels

Surprisingly, the visual system can play a part in determining an individual's arousal level. Visual input can have both alerting and calming effects. Variations in light, color, and number of visual distractions can contribute to attention level and project completion. Soft, natural lighting can be very calming, while bright, focused light tends to be more alerting. Bright colors tend to be more alerting, in comparison to more calming pastels. A visually cluttered room is more distracting than a sparsely decorated room. Think about how relaxing it is to sit in a sun-filled window, watch fish swimming in a tank, or play with oil and water toys. Now imagine the stress of trying to take notes from a cluttered chalkboard, or pay attention to the teacher as art projects dangle from the ceiling. Planning to decrease visual input during academic activities can increase attention level. Reading areas painted in pastel colors with soft lighting can be used to calm overly excited students. Increasing or de-



ALERTING ACTIVITIES

* Use bright lights in the classroom
* Use a flashlight to gain attention or highlight important material on the board
* Use brightly colored paint on the walls or bright colors for the bulletin board
* Use a highlighter marker to underline important text
* Use colored chalk
* Use a slantboard to place materials at an angle

Calming Activities

- Dim or turn off the lights in the classroom
- Block distractions using a screen, room divider, study carrel, or paper over the door
- Allow the child to wear sunglasses
- Provide visual materials such as a glitter wand, oil and water toys or a fish tank
- Provide colored overlays for reading materials
- Clear distractions from desk area
- Look at picture books or

HINTS FOR VISUAL SENSORY INPUT

☼ Bright lights or bright colors are ALERTING

☼ Soft or limited light and pastel colors are CALMING

☼ Natural light is more calming than artificial lighting

☼ Examine the environment for visual distractions

Compiled by Bohl, L. & Miller, N., 1995

Sensory Types

UNDER RESPONSIVE

Low registration refers to a pattern of sensory processing that is characterized by high sensory thresholds and a passive self regulation strategy (Dunn, 1997). The Low Registration continuum refers to the amount that a person notices stimuli in their environment. When people obtain a 'more than others' score [i.e., they MISS more than others], they notice sensory stimuli much less than others, and seem uninterested, self absorbed and sometimes dull in affect. They do not notice what is going on around them, and miss cues that might guide their behaviors. When people obtain a 'less than others' score, they miss less, or notice more things in their environment, but they may remain passive about the things they notice.

Avoider

Sensation Avoiding refers to a pattern of sensory processing that is characterized by low sensory thresholds and an active self regulation strategy (Dunn, 1997). The Sensation Avoiding continuum refers to the amount that stimuli bothers the person. When people obtain a 'more than others' score, they are more bothered by input than others; they tend to be rule bound, ritual driven and may seem uncooperative [ritualistic behaviors provide a high rate of familiar sensory input, while simultaneously limiting the possibility of unfamiliar input, and so can be seen as 'adaptive']. When people obtain a 'less than others' score, they are less bothered by input than others; they are not likely to withdraw from situations.

SEEKER

Sensation Seeking refers to a pattern of sensory processing that is characterized by high sensory thresholds and an active self regulation strategy (Dunn, 1997). The Sensation Seeking continuum refers to the amount that a person pursues sensory stimuli in their environment. When people obtain a 'more than others' score they create opportunities to add sensory input to their activities; they enjoy extra sensory input and may be active, continuously engaging and excitable. When people obtain a 'less than others' score, they do not create opportunities to add sensory input to situations.

'Just Right'

Sensory sensitivity refers to a pattern of sensory processing that is characterized by low sensory thresholds and a passive self regulation strategy (Dunn, 1997). The Sensory Sensitivity continuum refers to the amount of detection people use to keep track of stimuli around them. When people obtain a 'more than others' score, they detect more sensory stimuli than others; therefore, they can be distractible, hyperactive and may complain. When people obtain a 'less than others' score, they detect less stimuli than others; they may seem less aware than other children.

Sensory Integration Foundations for Learning and Behaviour

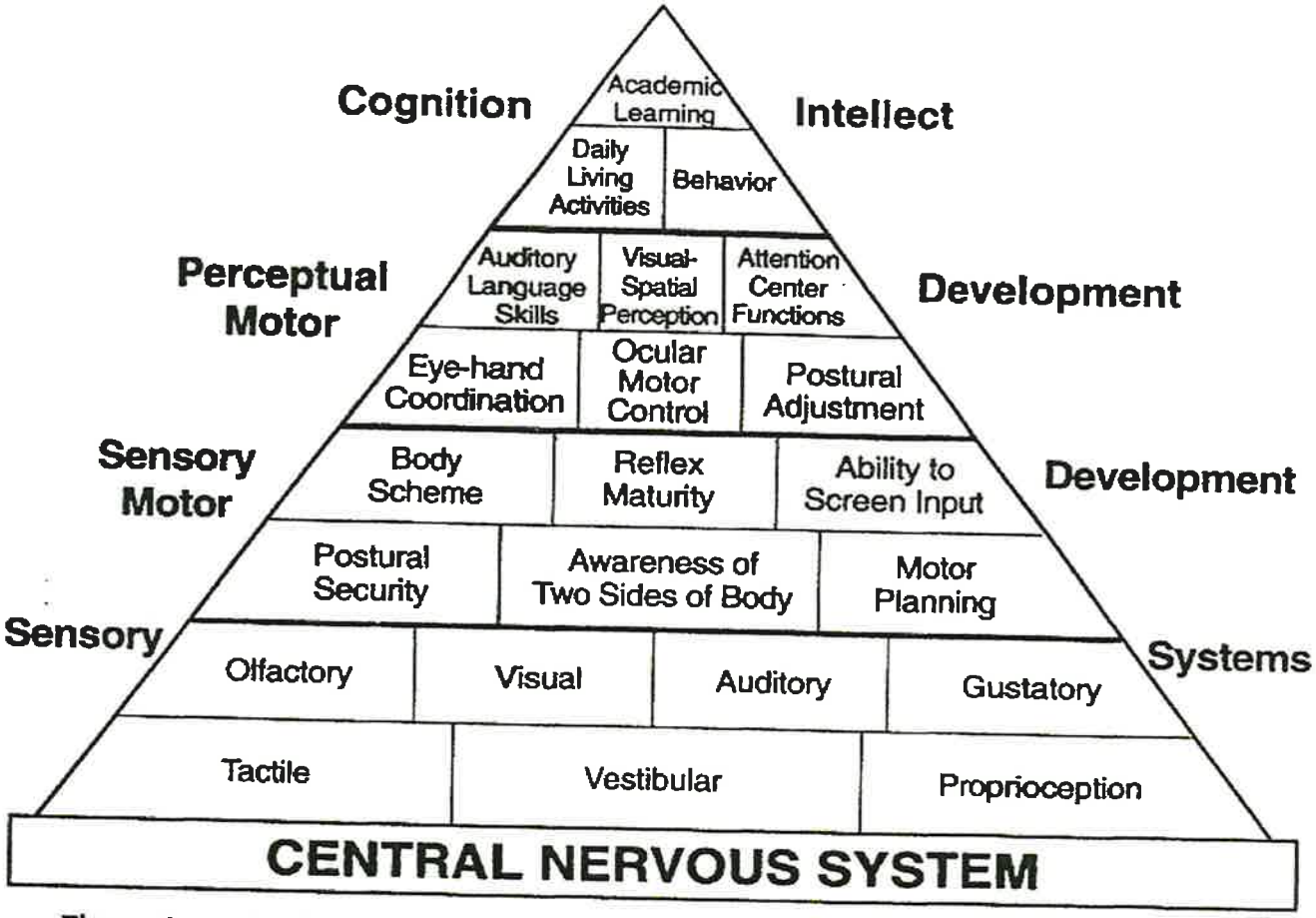


Figure 1-3. Printed with permission. © Taylor/Trott 1991

1-4 "How does your engine run?"

South Warwickshire NHS NHS Foundation Trust

Warwickshire Educational Psychology Service

Warwickshire County Council