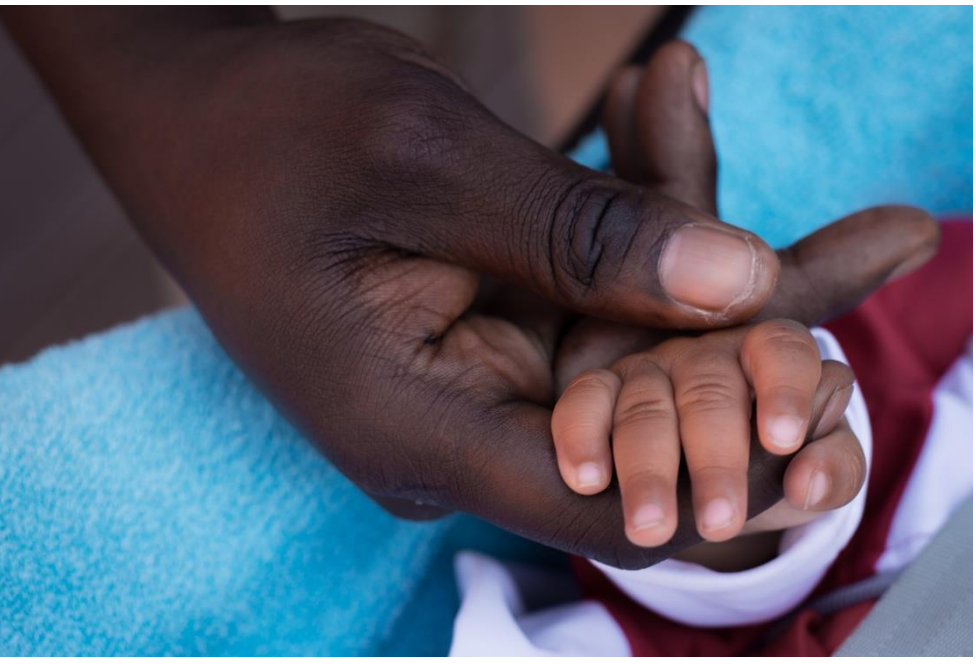
SECTION 1.3: SENSORY SYSTEM BASICS

WHAT IS THE SENSORY SYSTEM?[9]

The sensory system is a complex group of neurons (cells in the body), cell pathways and parts of the brain that work together to allow an individual to feel different sensations from the environment. There are eight senses that make up our sensory systems.

1. Seeing (Vision)
2. Hearing (Auditory)
3. Smelling (Olfactory)
4. Tasting (Gustatory)
5. Touching or Feeling (Tactile)
6. Joint and Muscle Awareness (Proprioceptive)
7. Balance and Movement (Vestibular)
8. Internal Body Awareness (Interoception)

Every child has a sensory system that is unique to him. It is the job of the caregiver to discover a child's sensory preferences (what sensations his body likes most and least) and any sensory challenges in order to make mealtimes (and all daily activities) more comfortable and manageable.



TYPES OF SENSES[9,10,11]

There are eight different senses that make up the sensory system of every single person.

SENSE	DESCRIPTION	EXAMPLE
Seeing (Vision) 	Information that comes to the body through the eyes *(*what one sees*)*	Bright lights, dim lights, colors, shapes, faces, fast- or slow- moving objects, distance to objects and faces (near or far), etc.
Hearing (Auditory) 	Information that comes to the body through the ears *(*what one hears*)*	Loud and soft noises, voices, music, high- and low-pitched sounds, etc.
Smelling (Olfactory) 	Information that comes to the body through the nose (what one smells)	Strong and light smells, unpleasant and pleasant smells, scents of people, places and foods/liquids, etc.
Tasting (Gustatory) 	Information that comes to the body through the tongue (what one tastes, eats or drinks*)*	Different flavors (sweet, sour, salty, bitter, etc.).
Touching (Tactile) 	Information that comes to the body through the skin and mouth (what one feels on the body)	Light touch, deep pressure touch, temperatures, pain, vibration, different textures (smooth, lumpy, crunchy, hard, etc.).
Balance and Movement (Vestibular) 	Information that comes to the body through different movements (what one feels when the body moves up, down, backward, forward, sideways, rotationally, etc.)	Rocking, swaying, swinging, turning, bouncing, spinning, standing up, sitting down, balancing, etc.
Joints and Muscle Awareness (Proprioception) 	Information that comes to the body through sensations felt in the joints and muscles (what one feels when their body is in different positions and in contact with objects such as people, chairs or the ground)	Sitting, walking, running, crawling, climbing, stomping feet, jumping, clapping hands, pushing and pulling heavy items, lifting and carrying items, etc.
Recognizing Sensations Inside the Body (Interoception) 	Information coming from within the body that relates to one's physical state or condition (what one senses from the organs)	Hunger, thirst, fullness, heart rate, breathing rate, temperature, bowel and bladder needs, etc.

All of these are examples of different types of sensory information we receive through our sensory systems. The information a child receives from the environment influences all of her daily activities, including mealtimes. For example:

MEALTIME SENSORY EXPERIENCES	SENSORY SYSTEM(S) INVOLVED
Bright lighting in a room. →	Seeing (Vision)
Food offered in a colored bowl. →	Seeing (Vision)
Loud noises from other children eating in a room. →	Hearing (Auditory)
How our bodies feel while seated in a chair or positioned for a meal. →	Touching/Feeling (Tactile) Joint and Muscle Awareness (Proprioceptive) Balance and Movement (Vestibular)
How our caregiver smiles while we eat together. →	Seeing (Vision)
Odor of food as it moves closer to our mouths. →	Smelling (Olfactory)
Flavors of food or liquids in our mouths. →	Tasting (Gustatory)
Textures of food in our mouths and on our hands when we feed ourselves. →	Touching/Feeling (Tactile)
How our stomachs feel empty at the start of a meal and full by the end. →	Internal Body Awareness (Interoception)

Eating is the most sensory rich activity a child will experience. This means that understanding how our sensory systems impact feeding development is very important.

WHAT IS THE IMPORTANCE OF THE SENSORY SYSTEM?

Every individual has a sensory system that is unique to them. The way a child's sensory system is made will impact the way he experiences the world, including feedings and mealtimes. For example, the different tastes and smells of a food can lead to a positive, enjoyable mealtime. However, if the tastes and smells are perceived as "bad," negative or unappetizing, this can lead to a stressful and unenjoyable feeding experience.

Sensory systems have a powerful impact on the success of mealtimes for our children.

BENEFITS OF THE SENSORY SYSTEM	DESCRIPTIONS (WHAT THIS LOOKS LIKE)
Learning and Developing in Daily Activities 	○ Teaches children about different kinds of sensory information that make up daily routines ○ Teaches children how to assess and respond to different sensory information ○ Teaches children about their own sensory systems (preferences, sensitivities, dislikes)
Developing A World View 	○ Provides children the chance to experience different types of sensory information that will help them thrive ○ Prepares children for a variety of sensory information they may encounter later on in life
Health and Well-being 	○ Allows children the chance to identify personal needs and to take care of themselves ○ Allows children more robust learning experiences ○ Supports children's total development

Children learn through their senses while they are growing in the womb and this learning continues the moment they are born.

SENSORY SENSITIVITIES: HYPERSENSITIVE AND HYPOSENSITIVE SENSORY SYSTEMS

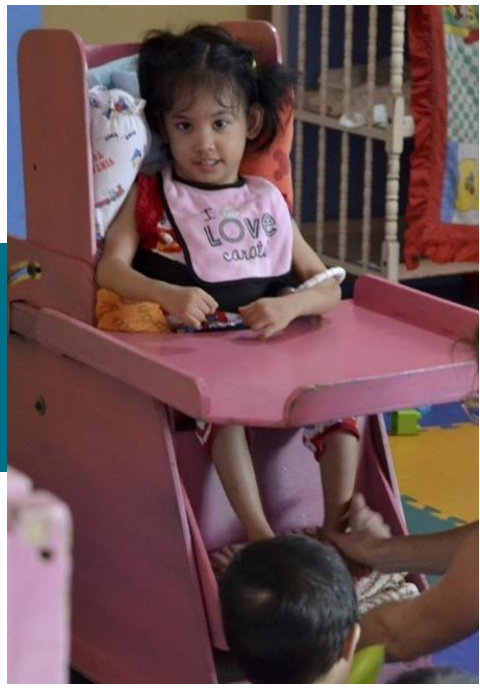
A child may have a hypersensitive sensory system or a hyposensitive sensory system. We call these "sensory sensitivities." Children may also be overstimulated or understimulated in their environments and when they encounter certain sensory information. Because sensory sensitivities can make feedings much more challenging, it is important that caregivers are able to identify when a child may be showing areas of concern and that they know how to help.

COMMON SIGNS A CHILD MIGHT HAVE A SENSORY SENSITIVITY:

- Coughing, choking, gagging, spitting, vomiting with foods or liquids (especially when introduced new flavors or textures)
- Difficulty transitioning to new food flavors and/or textures
- Flinching, facial grimacing or pulling away during feedings
- Avoiding certain food flavors, textures or liquid consistencies
- Oral aversions or "refusals" to eat or drink
- Unusually long meal times (more than 30-40 minutes per meal)
- Overstuffing mouth with food or giant gulps of liquids
- "Pocketing" or holding foods in mouth for longer than expected (and child unaware)
- Foods, liquids or saliva falling out of a child's mouth or on to face (and child unaware)
- Frequent crying, fussing or unhappiness at meal times
- Frequent falling asleep at meals
- Frequent need for physical contact (deep pressure touch)
- Frequent avoidance of physical contact (especially light touch)

Hypersensitive (Increased Sensitivity): When a child shows a strong reaction to a specific sensation or sensory information. This reaction is stronger than we would expect.

Children with cerebral palsy often have hypersensitive sensory systems.

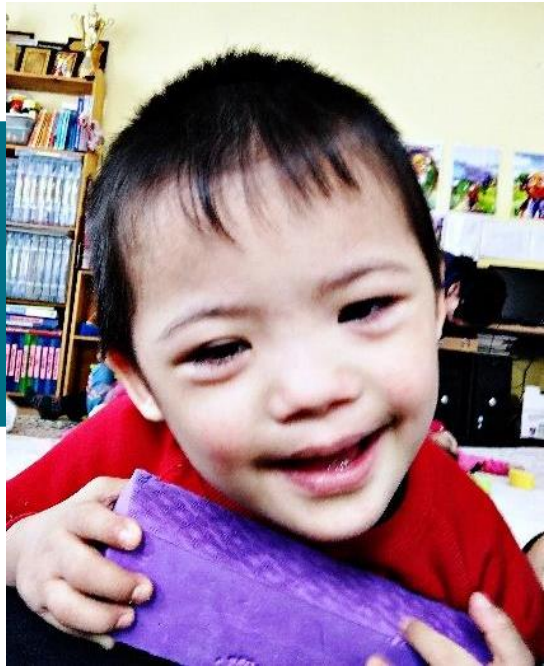


Common Examples of Hypersensitivity Reactions:

1. Frequently startled by noises or touch
2. Jerking, pulling away or withdrawing from touch (especially light or gentle touch)
3. Increased tightness in the body when fed by a caregiver
4. Covering ears in a noisy room
5. Closing eyes or falling asleep in loud or visually "busy" spaces
6. Preferring less food on a plate or tray at a time
7. Gagging on new food flavors or textures
8. Grimacing, gagging, vomiting or pulling away from certain foods
9. Shaking, rocking or banging body in loud or visually "busy" spaces
10. Low pain tolerance — may be easily hurt or in pain

Hyposensitive (Reduced Sensitivity): When a child shows a reduced reaction to a specific sensation or sensory information. This reaction is less than we would expect.

Children with Down syndrome often have hyposensitive sensory systems.



Common Examples of Hyposensitivity Reactions:

1. Less responsiveness to loud noises or light touch
2. Excessive need for deep pressure touch such as seeking out hugs and squeezes from caregivers, wanting rough and tumble play, crashing into objects and people, etc.
3. Stuffing mouth full of food sometimes causing gagging, vomiting or choking
4. Not noticing or sensing food, liquid or excessive saliva on the face or left in mouth
5. Preferring harder, crunchier textures to soft, smooth and wet textures
6. Preferring flavorful foods
7. High pain tolerance — may hurt self and not show any sense of pain or discomfort

Different sensory information can cause a child to have more hypersensitive and hyposensitive reactions or less hypersensitive and hyposensitive reactions. Understanding what a child may be reacting to in an environment, especially during mealtimes, can help caregivers limit a child's overstimulation or understimulation and make daily routines easier. Below are examples of common elements in our environments that provide sensory information that can help or hinder a child's development.

COMMON SENSORY INFORMATION	EXAMPLES
Lighting	Bright or dim, natural from outside, lamps, fluorescent lighting, etc.
Decorations in a Room	Painted walls, wallpaper, posters, pictures, windows, etc.
Noises	Music, voices, TV's, sounds from toys, street or city outside sounds, machine sounds, other children, etc.
Smells	Foods, liquids, perfume, soap, smoke, dirty diapers, trash, body odor, etc.
Touches	Holding, snuggling, diaper changing, dressing and undressing, face and hand wiping, crunchy food, etc.
Tastes	Food, liquid, spicy, sweet, sour, etc.
Movements	Rocking, swinging, crawling, walking, jumping, patting, bouncing, riding in a vehicle, being carried or held or picked up for diaper changes, etc.

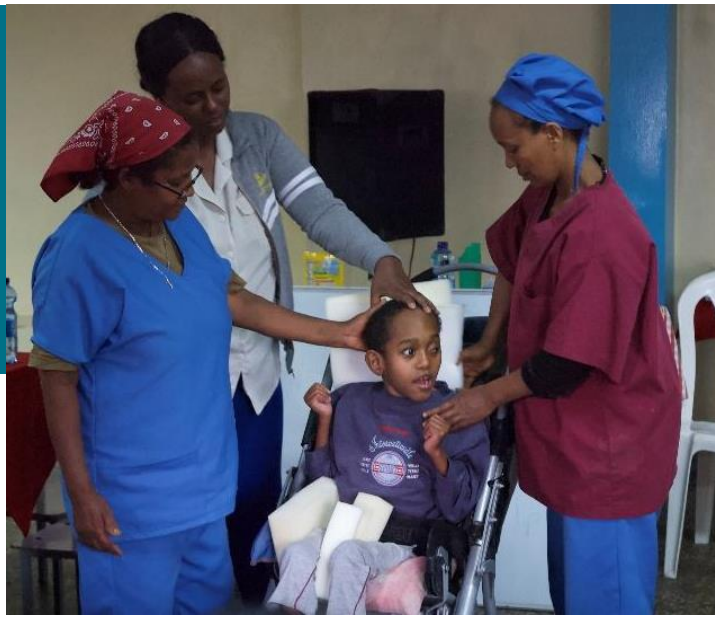
WHY MIGHT A CHILD HAVE A SENSORY SENSITIVITY?

There are many reasons why a child may have a sensitive sensory system. As caregivers, sometimes we know these reasons and sometimes we do not. However, as caregivers, we can be aware of potential reasons and signs by learning about a child, and noticing how they are reacting during feedings as well as during other activities and routines throughout the day.

Common reasons a child might have a sensory sensitivity:

- Medical conditions or frequent medical procedures or hospitalizations (autism, visual impairments, hearing impairments)
- Children born early (prematurity)
- Children born exposed to substances (drugs and/or alcohol)
- Structural differences (specific syndromes, cleft lip/palate)
- Neuromuscular disorders (cerebral palsy)
- Developmental disabilities (Down syndrome)
- Social-emotional or environmental factors (limited experience, stressful experiences, force feeding, no access to positive and optimal caregiving)
- Frequent nasal congestion (limits ability to smell and taste; can lead to food refusals or reduced intake)

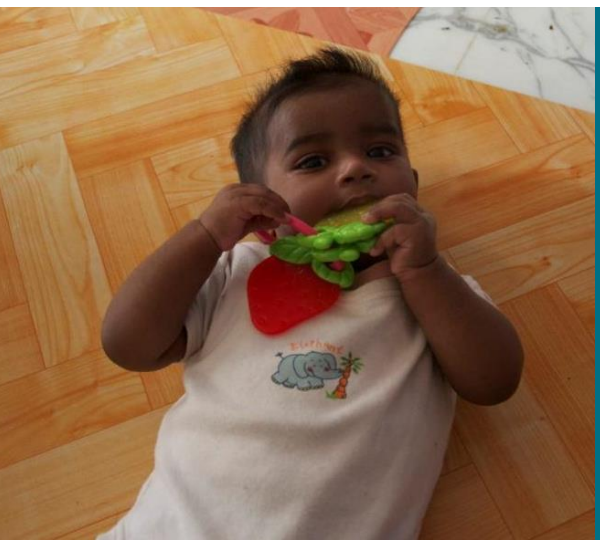
A child with cerebral palsy shows hypersensitivities to the touches he receives from his caregivers.



KEY ELEMENTS OF THE SENSORY SYSTEM[9]

KEY ELEMENTS	SENSORY SYSTEM CONSIDERATIONS
Listening to a Child	○ Notice what sensory preferences and needs a child displays during daily activities ○ Use a child's sensory preferences and needs to shape daily activities and make them more successful ○ Respect a child's signs when they are showing they are over or under stimulated by sensory information and provide necessary support, for example: • Change elements in activities based on a child's responses to sensory information (for example: feed a child in a quieter room after noticing she becomes frustrated and covers her ears in a noisy room)
Preparing the Environment	○ Make mealtime environments match the sensory needs of the child, for example: • Minimize distractions by changing (dimming) lights and (reducing) sounds in a room • Use soothing background music to support regulation (calming, body organization) and attention • Use lids to cover foods or liquids with strong smells • Offer utensils for children sensitive to touching foods with their hands • Face children away from "busy" rooms with lots of movement, colors, people and other visual distractions

Preparing the Child	○ Offer sensory based preparation activities that match a child's sensory needs before a meal, for example: • Let a child know that a mealtime is coming ("Five more minutes and then it's time to eat.") • "Wake-up" face and body activities (Refer to Appendix 9J) • Toothbrushing • Movement-based activities such as rocking, patting, bouncing or massage • Food exploration, including serving self and others foods
Preparing the Caregiver	○ Provide a comfortable position for the caregiver during feedings ○ Keep calm during feedings: Take deep breaths, play soothing music and talk quietly with the child ○ Understand that feeding a child with sensory sensitivities can be challenging and take time
Safe, Consistent and Comfortable	○ Limit frequent changes to mealtime routines–keeping the same feeder, chair, room, bowl, spoon, etc.–if change is necessary, make one change at a time ○ Show and tell a child what food/liquid he is being offered ○ Offer food or liquid slowly and never forcefully ○ Offer food or liquid first that are familiar to a child – then offer new flavors or textures



A young baby has a rich sensory experience mouthing on a bumpy baby chew toy while playing on his back. Early sensory experiences such as this build robust sensory systems.

SENSORY TIPS FOR EVERY CHILD[9]

TIP 1:	Listen to a child. A child will show you what his sensory preferences and needs are through his reactions and behaviors. Let a child show you what works best.
TIP 2:	Preparation is key. Preparing children before a meal is critical for a successful mealtime. Prepare the environment, the child's body and mind, and the caregiver.
TIP 3:	Preferences are different for everyone. Every child will have unique and different sensory preferences. These preferences can change often, too.
TIP 4:	Choose foods that are enjoyable. Offer items that a child can be successful eating and drinking and that will be enjoyable for her. Offer new items alongside these familiar items to increase a child's interest and comfort.
TIP 5:	Start with what is familiar. Children do best when consistent, familiar routines are used. Keep a schedule for meals, use the same feeder and feeding supplies, feed in the same chair and room and offer a child a familiar food/liquid first. Expand to new flavors and textures when a child is ready.
TIP 6:	Make changes one at a time. Children with sensitive sensory systems do well when changes are made one at a time versus all at once. Take your time when making changes to a mealtime, including offering a new flavor or texture.
TIP 7:	Offer lots of exploration time. Exploration of different non-food items and food items with different textures and flavors is a great way to support sensitive sensory systems. Let children explore items using all of their senses, but especially using their hands.
TIP 8:	Children learn best in the context of positive relationships. Offering positive interactions with a child during mealtimes (and beyond) is the best way to support this process.

FINAL THOUGHTS

All children have a sensory system that is special to them. These systems, whether highly sensitive or not, can impact mealtimes and feeding development. When caregivers discover how to best support a child's sensory preferences and needs, they allow children the chance to experience the world in a safer and more comfortable way. When met with sensory challenges, use this manual as a helpful resource along with seeking support from other caregivers.

For more information on different sensory strategies, refer to Appendix 9K and Appendix 9M.