Effective Interprofessional Treatment for Sensory Processing Disorder in Children

Course description: Comprehensive care is essential for strong health outcomes across the lifespan. With more early detection efforts and greater awareness, conditions such as Sensory Processing Disorder are becoming more manageable for children and parents alike. This is due in large part to the efforts of various rehabilitation professionals, including occupational therapists, physical therapists, speech-language pathologists, and behavior therapists. All providers should be aware of best practices to effectively evaluate sensory concerns, provide sensory integration treatment, and train/educate parents and teachers.

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Introduction

The effects of sensory processing impairments are becoming more well-known, as students with these concerns are likely to struggle in academic, social, and extracurricular settings. Sensory concerns themselves are also becoming more recognizable, especially as awareness and screening efforts for conditions such as autism spectrum disorder have increased. There are also a host of distinct considerations to keep in mind for the treatment of sensory processing disorder (SPD). While many people informally assume this treatment falls under an occupational therapist's scope of practice, the reality is several rehabilitation and allied health professionals are responsible for helping manage SPD concerns in the children they treat.

This course aims to provide information about SPD, including prevalence and main symptomatology, as this education is helpful in treating this population as well as when training parents, caregivers, teachers, and others. In addition, this course will offer considerations for various members of the interprofessional team to keep in mind when treating children with this condition. We will also discuss activities that may be implemented by professionals (regardless of discipline) in an effort to address sensory needs as well as improve learning and motivation.

The prevalence of sensory processing disorder is around 5 to 16% among children and adolescents in the United States. These numbers are much lower in the general population, coming in between 1 and 3%. However, due to the neurobiology of the condition, SPD is far more common in certain populations. For example, up to 80% of children with autism spectrum disorder are also living with SPD. Around 60% of all children with attention-deficit/hyperactivity disorder (ADHD) have sensory processing disorder. There isn't quite as much research on this condition being comorbid in other diagnostic groups, but there is evidence to suggest a link between this condition and down syndrome, Fragile X syndrome, learning disorders such as dyslexia, and anxiety disorders. In fact, early research even suggests SPD may be linked to asthma, with some evidence showing a connection in neuroinflammatory markers.

Despite research regarding the adverse functional effects of sensory dysfunction and evidence showing its connection to other chronic conditions, there are still mixed degrees of SPD

progress to speak of. On one hand, there is greater public awareness of sensory processing disorder than there ever has been – likely due in part to greater awareness of neurodevelopmental conditions as a whole, such as autism spectrum disorder. However, healthcare providers and families of children with SPD continue to experience bureaucratic barriers to diagnosis and treatment. One major reason for this is because sensory processing disorder is yet to be officially recognized by the most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) as well as the International Classification of Diseases (ICD-10-CM). This has led to coverage issues, as many insurance companies will not reimburse for sensory integration therapy and similar CPT codes due to some schools of thought that such services are experimental and still not truly evidence-based. Rehabilitation professionals can use more general ICD-10 codes such as F88, which represents other disorders of psychological development and R62, which is used for a lack of expected normal physiological development. This helps with reimbursement, though providers will especially need to ensure their documentation is accurate and detailed enough to convey a child's sensory concerns and related deficits. Regardless, providers are urged to use ICD and CPT codes that reflect skills such as communication, behavior, motor function, and social function regardless of whether or not sensory concerns are what underlie these concerns. Many allied health professionals are equipped to address these skills in varying degrees, which makes them a better fit for their scopes of practice. And, since functional performance is the aim of many rehabilitation disciplines, these codes tend to be more appropriate as the overarching focus as opposed to solely sensory integration.

A similar trend of hesitancy can be seen in referring providers. Some primary care physicians and pediatricians may decline to refer patients to providers who offer sensory integration therapy. A big argument for such providers is their view that sensory concerns only exist as a result of other conditions and should be treated accordingly rather than as a distinct diagnosis. Regardless of what the source is, children with sensory concerns require some form of management to prevent adverse effects. And, while this debate can (and may) be continued for years to come, it can prove counterproductive if it prevents or delays access to proper treatment and negatively affects a child's development.

Therefore, professionals of any discipline should understand the barriers they may face in both the payer and provider arenas and be prepared to put on their advocacy 'hats.' This advocacy should not only be for their services and any related outcomes, but also for children who often display functional deficits as a result of not receiving treatment. While many professions have advocacy intertwined in the fabric of the work they do, other providers may need to strengthen their skills in this area. Either way, advocacy is an essential part of interprofessional treatment for sensory processing disorder as well as other lesser-known or controversial health conditions.

Advocacy is far from the only way service providers can assist with the management of sensory processing disorder. Accurate education about the condition is crucial in order for professionals to use their skills to properly assist. A set of best practices is also helpful to guide all providers as they treat children with these concerns. This is essential because the debate regarding diagnosis has undoubtedly also extended to SPD treatment.

Best Practices for SPD Assessment & Education

Each discipline has varying best practices in their assessment process, which are important to follow. However, it is also important to take the diagnoses of the person you are working with into consideration, as that may warrant making some modifications to your processes or the environment. While we will not go into the discipline-specific assessment processes in this course, we will offer relevant information that clinicians should know during the assessment process with someone who has SPD.

Firstly, we will discuss the types of assessments. In many cases, providers will use caregiver or teacher questionnaires and self-report assessments to determine areas of concern for children with SPD. For healthcare providers such as PTs, OTs, and SLPs, these tests are commonly used alongside function- and performance-based assessments. While the latter typically offer more insight into skill deficits and strengths, the former sheds valuable information that can assist with structuring treatments to encourage participation and greater motivation. Therefore, it is important to use outcome measures in more than one of these categories for the most comprehensive view into a child's areas of need.

There are several reasons for this. While tangible skills are the focus of fields such as PT, OT, SLP, and even ABA, it is important to recognize the specific sensory stimuli that a child may struggle to process. Sensory concerns may be associated with attention deficits, cognitive processing impairments, communication delays, and other concerns that may lead a child to struggle with more traditional testing methods. Caregiver interviews and checklists at least partly remove the need for verbal communication and metacognition on behalf of the child.

There are two schools of thought on this. One is that such a "modification" allows a truer understanding of someone's sensory skills in isolation. The other is that a provider will then need to supplement information from checklists and interviews with that gleaned from more structured and measurable tools focused on communication and cognitive skills such as attention. That being said, it is still important for a provider to determine a baseline cognitive level (including skills such as attention, judgment, awareness, and others that play an intrinsic role in sensory modulation and processing) for a child to discern what assessment measures the child may participate in. In the same vein, professionals must also understand what behaviors, sensory reactions, and more are typical and age-appropriate for both the child's chronological and developmental ages. For example, let's say a 2-year-old child screams in response to vestibular stimulation such as swinging. In addition to looking at whether or not the child is functionally impaired as a result of this reaction, professionals should probe more. Does the child scream in a way that suggests they are in danger and distressed or is the scream in a playful way? Have you observed this scream both indoors and outdoors? This is important because one is considered more appropriate than the other, as children are often taught to use their indoor voices when in classrooms and at home. Is the child reacting this way in response to slight swinging motions such as when their parents move them back and forth while on their lap? This may point toward sensitivity stemming from minor, natural vestibular changes that arise throughout their day. Is this response elicited mostly or more predominantly from swinging on a traditional playset? This gives context and is viewed as more age-appropriate. Does the child appear to be seeking out the type of swinging they respond this way to (e.g. leaning into

the up swings and down swings) or does the response arise from any swinging movements prompted by a caregiver? This process may be slightly different for those working with older children. For example, let's say a 10-year-old child has selective eating habits that their teachers believe is attributed to sensory concerns. What is the child's medical standing – does their doctor feel they are underweight for their age or undernourished? Does the child's response to eating impact their ability to integrate in the school cafeteria during meals and/or classroom during snacks and socialize with their peers? Is the child experiencing disruptions in any of their routines, other self-care abilities, or their academic performance? Does the child display any eating habits that are similar to those of their typically developing peers? Does the child demonstrate these same behaviors at home when with siblings and parents and at school with their peers? All of this not only adds context to a child's responses, but helps determine if they are age-appropriate and where (if at all) they fall on the spectrum of sensory concerns.

Professionals may also use experiential demonstrations and tasks as a large part of their assessment of a child's sensory processing skills. While experiential assessments are typically placed in high regard for their functional purposes, they come along with their own sets of limitations. Chiefly, issues may arise if this method of testing is combined with caregiver reports. If a caregiver is asked to observe a child completing a specific task and report back on task factors such as how that child behaves, whether or not they complete the task, and if they ask for help, the average caregiver is unlikely to know the inner workings of what made a child respond in the way they did. A trained professional can use their background knowledge and discipline-related judgment along with the results of other evaluation components to determine what the root cause of a child's behavior is.

> Clinician consideration:
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> Sensory concerns can be misdiagnosed and mistaken for behavioral concerns. This is possible when providers do not have the full scope of information available to them or choose to only look at one portion of a child's experiences. Unfortunately, this can also result from limited access to specialists. If you suspect a child may have received an incorrect diagnosis as a result of missing information, it is important to disclose the information to all parties in their treatment team. Providers should also do their best to remove barriers to care, which can assist with proper and timely diagnosis.

Providers should also take heed of other factors that influence self-report assessment data. For example, checklists, questionnaires, and interviews may allow someone insight into sociocultural, contextual, and relational factors that affect a child's behavior. This can be seen when children demonstrate different behaviors in different places. If an only child has an orderly, predictable, and relatively stress-free home environment, it is very possible that parent(s) may report little to no sensory concerns at home. However, the child's teacher may give a different account since classrooms and schools tend to be busier by default. In the same vein, cultural differences can affect sensory presentations. Some cultures may have a stronger preference for and more frequent use of spicy foods, which may lead a child to become acclimated to those foods at an earlier age. Similarly, smells such as incense or candles used in a religious context

can be associated with familiarity and even pleasant reactions in some children, but negative in others who do not have the same emotional connection.

Social bonds can also affect sensory presentations. An adult can create a more stable and predictable relationship with a child by establishing a sense of trust, setting healthy boundaries, using effective communication skills, treating them with respect, and taking the time to understand their values. This can have a major effect on a child's responses to sensory input and even how the adult assists the child with sensory difficulties. There are several more factors that can have a similar impact on a child's sensory development as well as their sensory processing skills at any given time. While specific assessment measures may not be sensitive to these factors, it is the duty of someone working with a child to understand their background, as it gives important information into their lives. A child may even be incorrectly typecast into having certain difficulties if someone is not looking at their behavior and functioning from a multi-faceted perspective.

The best way to avoid such errors is to utilize long-term assessments, and this is another reason questionnaires and interviews are so useful. However, it's important to keep in mind that these tools are most effective when performed with the assistance of someone who has an intimate knowledge of the child. Ideally, such parts of the evaluation will take place with multiple people who know the child well, such as parents, teachers, grandparents, coaches, and other similar figures. In the grand scheme of the evaluation setting, some may view these accounts of a child's functioning as potentially more reliable and profound than single, relatively brief encounters from an evaluating provider.

Regardless of the benefits associated with self-report style assessments, providers must remember it is still important to use psychometrically sound tools and recognize the limitations that are present even with evidence-based tools. Tools should be rated as having strong validity and reliability. If a tool has strong validity, it should offer a measurement of what it says it measures. While there are several different forms of validity, you can determine this in the sensory realm if an assessment gives a complete picture of a child's sensory processing skills. More specifically, if an assessment has good content validity, it will look into each of the seven sensory systems. In the case of construct validity for sensory assessments, an outcome measure should stand out as a good indicator of sensory skills when compared to an esteemed sensory tool. Reliability warrants that an assessment is consistent in the results it produces. Test-retest reliability states that a test will yield the same results when administered to the same group of people at different times. Internal consistency shows that all of a test's components mesh well together and contribute to the overarching purpose of the assessment. It is not your responsibility to "test" the reliability and validity of outcome measures, as these rankings have already been determined in the early days of a measure's development. However, it is important for providers to research a test's psychometric properties before using it.

Apart from assessments themselves, providers should also understand the factors that can impact a child's sensory presentation and overall performance. These factors must be assessed just as the child's skills are, as they can skew the results of the evaluation. We mentioned

before that, while evaluations are intended to be comprehensive, they are still just brief encounters in comparison to the time a child spends on other activities. Therefore, the results of the evaluation (e.g. interpreted as needing XYZ services in XYZ skill areas) may be somewhat inaccurate if providers are only looking at the evaluation results in isolation.

Movement and physical activity is one important area that can influence a child's sensory skills at any point in time. It is common for children with sensory concerns to experience varying degrees of motor skills. Some children may be overly active and motivated for exercise and activity in high amounts while other kids may be lower energy or struggle with movement-based activities. Regardless of what category a child falls into, they may display mood and behavior changes if they are not able to move around in the way they prefer or need to. This can easily affect assessment results if a child, for example, completes a school-based evaluation during the time when they are usually at recess with their peers. This not only takes away from social interaction but also somewhat limits the amount of movement they get that day. If a child hasn't had the proper time to freely and creatively play or explore their environment, this can lead to similar difficulties. Lastly, the same concerns may arise if a child has difficulty moving around and an evaluating provider has them assume various positions or practice gross/fine motor skills they are not used to doing. It is possible for high sets of motor demands (along with demands in other skill areas) to contribute to overstimulation and sensory dysregulation.

Providers should take all of this into account when scheduling an evaluation with a child – not only to decrease the amount of changes to that child's schedule, but also to allow them to perform as best they can. This may be difficult to do within the school setting, as there are only so many times during which evaluations can be completed. However, it is possible for providers to break evaluations into smaller sessions that can more smoothly be integrated into a child's day. In outpatient settings, providers should strive to complete evaluations as conveniently as possible for the child. Again, there are only so many working hours in this setting, but it may be better for a child's performance if their evaluation was completed during traditional school hours. It would be most ideal to find a day when school is not in session, but even scheduling it so they leave school slightly early can allow them to have more energy and perform better. It may not be beneficial to schedule an evaluation after school or in the evening, as these hours are usually reserved for dinner, free play, homework, and - depending on the child's age - naptime, which can similarly affect their performance.

It may be easier for providers to plan an evaluation at the appropriate time when they see children within their homes. In these instances, a child is in their natural context, which offers a wealth of information as to how they function in their own space. We mentioned earlier how a lack of "free time" can skew results. However, the home usually offers flexibility around this area. If a parent/caregiver reports their child didn't get the opportunity for free play, it might be appropriate for the provider to begin the evaluation with some of that. This also allows providers to gain valuable insight into how the child plays without direction, including what they avoid, prefer, do on their own without help, etc. Providers can even pair this with a brief interview or discussion with parents.

Food is another hot button area when working with children who have sensory concerns. Many children with sensory concerns have difficulty with feeding, though food can also present itself as an obstacle to their performance. If a child is hungry because they missed a previously planned mealtime or it has been longer than usual since they last ate, this can contribute to performance issues. The same problem may occur if a child is generally undernourished, as their energy can fluctuate in a way that makes the evaluation difficult. This is another instance where major shifts in routine can impact evaluation results. Let's say a parent, teacher, or caregiver feeds a child (either a full meal or a snack) shortly before their evaluation in an attempt to ensure the child has *something* to prepare them for the process. If this child has food aversions or sensitivities, this can lead them to enter the evaluation in a poor mood or dysregulated. This may also occur if the child felt rushed or pressured during this time. Some ways a provider can sidestep these issues include incorporating meals into the evaluation time. Depending on their discipline, this may take various forms. For example, behavior therapists may want to use snacks as motivation for completing certain tasks. Physical therapists can look at skills such as range of motion, strength, balance, and coordination while observing a child eat. Occupational therapists can use a snack or meal as an opportunity to assess fine motor skills, utensil use, problem solving, motor planning, and identify sensory concerns that may arise in various self-feeding steps. Speech-language pathologists can determine a child's safety while eating to rule out the possibility of dysphagia or mechanical concerns that may contribute to sensory concerns. Based on the child's age and communication skills, SLPs (and other professionals) can assess a child's joint attention through their ability to safely and effectively hold a conversation while eating. Real-time tasks such as eating can offer a great deal of insight into a child's skills.

Going back to the core problem of a child's hunger or eating difficulties impacting their evaluation, it is clear that these circumstances aren't always ideal. Yet, providers can use them as a springboard for many parts of the evaluation. For instance, providers may take the time to discuss the child's mealtimes and eating habits with parents or caregivers. Depending on their scope of practice, providers can use this time to explore areas such as whether or not a child is using utensils, what foods the child likes and dislikes, what their reactions are to disliked foods, what meals the parent has tried to feed the child, and foods or meals the child used to eat but no longer likes. In addition, providers can explore a child's safety skills during mealtime, the role that play has in mealtime (if any), what mealtime routines and rituals are present in home and at school, if the child sits at the table to eat (and, if so, for how long), and any other questions that may help them understand the full scope of a child's needs – related to sensory processing and beyond.

Sleep is another major (but certainly not the only other) factor that can contribute to a child performing poorly during an evaluation. In addition, sleep quantity and quality can both have a significant impact on a child's sensory presentation. We discussed alertness before in reference to movement and physical activity, but sleep is also a major determinant of a child's level of arousal. Providers should aim to make assessments at a time when the child is at their peak alertness. This may be determined by discussing timing with parents. Providers may wish to ask parents about a child's naps (if they are still taking naps) as well as preferred activities in the

morning and preferred activities in the evening, since that information can tell a provider when a child's energy may be building up or tapering down. Providers should also take care to ensure a child has been up for a couple of hours by the time of the evaluation, which means the time may vary based on the child's typical waking hour. As we mentioned earlier, it's not always possible to have the *perfect* conditions for an evaluation.

> Clinician consideration:
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> There are no medications recommended for the treatment of sensory processing disorder. However, it is possible that children with this condition (and other co-occurring conditions) may take medications to manage certain symptoms such as insomnia and aggression. If this is the case, providers should be aware of what effect the medication should have on the child and what, if any, side effects they notice.

However, if a child had a very bad night's sleep prior to an evaluation, it may be in the parent, provider, and child's best interest to reschedule. Again, this isn't always feasible and certainly isn't advised in the event of more minor sleep difficulties. If the evaluation continues as planned, providers should at the very least ask how the child slept the night before and note this in the evaluation to give context to the results. Furthermore, function in the area of sleep is an important skill, as sleep/wake cycles are closely related to sensory alertness and regulation. This presents providers with the opportunity to transition from questions like, "How is Jenny feeling today?" and "How did Jenny sleep last night?" to more general, routine-based questions such as, "Is that different from how she usually sleeps? How much sleep does she get on a typical night?"

Sensory System Functions & Development

In addition to understanding best practices and nuances related to the assessment of a child with sensory concerns, professionals should also have a clearer picture of how the sensory systems of the body operate. As we will discuss under each section, sensory input from each system is most often processed alongside other types of information. This is what leads us to adopt a certain understanding of objects, experiences, and people over time. The following sensory systems are the most pertinent to treatment:

Proprioception

Proprioception is a sense that processes positional data about the body (which tells the body what it is doing at any moment in time) and its relation to the environment. The sensory receptors responsible for receiving and processing proprioceptive input are located in the muscles and joints of the body. While proprioception is not mature until adolescence, this sensory system develops in leaps and bounds during the early years of a child's life:

- Between 0 and 3 months of age, babies begin to imitate facial expressions, which demonstrates a very rudimentary sense of proprioception.

- Between 3 and 6 months of age, babies begin to use both sides of their body together to get tasks done, which helps further their motor skills and body awareness. They may push and pull objects and begin to understand how that changes their body position.
- Between 6 and 9 months of age, babies begin experimenting with the amount of force they need to interact with various objects such as toys and their bottle. This gives them a greater sense of the relationship between their body and the environment.
- Between 9 and 12 months of age, a baby's curiosity allows them to be more active and confident in their bodily movements.

Vestibular

The vestibular system processes input that is somewhat similar to proprioception. However, vestibular input relates more predominantly to the position, speed, and direction of head movement against gravity as well as balance. The sensory receptors responsible for receiving and processing vestibular input are located in the innermost parts of the ear. As with the proprioceptive system, the vestibular system does not mature until adolescence (between the ages of 11 and 15). However, this sensory system develops quite a bit during infancy and the toddler years:

- Between 0 and 3 months of age, a baby will begin to demonstrate reflexes that influence vestibular-based movements.
- Between 3 and 6 months of age, babies begin to assume various positions, most of which involve them experimenting with movement against gravity. By 6 months old, babies should have a better understanding of how exactly they can maneuver their bodies in order to sit up independently against gravity.
- Between 6 and 9 months of age, babies demonstrate more freedom and flexibility moving in various planes and positions such as rocking and bouncing.
- Between 9 and 12 months of age, babies are more eager to move against gravity as they develop strength.

Interoception

Interoception is a sense responsible for input related to the body's internal functions. This includes the intestines (regarding defecation), the stomach (regarding hunger), the bladder (regarding urination), the heart and lungs (regarding stress), and the throat and mouth (regarding thirst). Since interoception has such a far-reaching effect across the body, the sensory receptors responsible for receiving and processing interoceptive input are located in the organs mentioned above as well as the skin, muscles, and bones.

Interoception is a bit more nuanced than other sensory systems, meaning someone doesn't necessarily fully develop this skill by a certain age. Interoception is heavily reliant on metacognitive abilities or "higher level thinking" including self-awareness along with critical planning and learning. It can take longer for some people to develop metacognition, which

means the skill of interoception can grow across the lifespan. In the early years of life, interoception can develop in some of the following ways:

- Between 0 and 3 months old, babies display reactions to interoception including having a dirty diaper, being hungry, and being tired. These are some of the most common ways to soothe a baby since they are most frequently the reason for their discomfort early in life.
- Between 3 and 6 months of age, babies develop patterns to their needs related to feeding and napping, leading parents to develop more routines surrounding these activities. Babies become sensitive to changes in these routines and become fussy when changes result.
- Between 6 and 9 months of age, babies express discomfort due to teething. They can better tolerate time between meals containing solid foods due to increased feelings of fullness from eating.
- Between 9 and 12 months of age, babies go through teething and sense pain from that. Their expression of this sense comes through most often by crying, as they still cannot quite understand how to manage it. Since their diet is also expanding more, they may experience new internal reactions such as constipation, diarrhea, nausea, loud grumbling, etc. Babies still won't have much ability to self-soothe so these digestive changes may lead to some strong reactions they showed earlier in their life.

Self-Assessment Question 1

Interoception is a sense that is difficult for some providers to understand and, therefore, address. What is a phrase a provider may use with children to encourage exploration of this sense?

a. "When I feel anxious, it feels like an elephant on my chest. Do you ever feel like that?"
b. "My pain is in my head. Tell me where your pain is."
c. "Who made you feel like that and what did you do about it?"
d. "What do you like to do to feel better when your stomach hurts?

The correct answer is A.

Rationale: Using analogies is a great way to help children learn about difficult topics. This includes a statement that describes what anxiety can feel like and where it can feel that way. This is made even more impactful with a question that gets the child to think about how it feels in their body.

Vision

The visual system processes input related to light and color. This information is sent to the brain and combined with our memories, other senses (touch, feel, etc.), and what we know about an object's standard properties. From this, our brains form a fuller picture of what is around us. The sensory receptors responsible for receiving and processing visual input are located in a part of the eye called the retina. In the early years of life, the visual system develops quite a bit:

- Between 0 and 3 months of age, babies can only see black and white as well as human faces. After a month, they can focus on objects around 1 foot from them. After 2 months, they're able to follow objects such as toys when they are close to their faces. They may begin or attempt to make eye contact at this time, but their coordination is still developing, often leading to a cross-eyed position.
- Between 3 and 6 months of age, babies start to see all colors, which helps with tracking objects and people. They can do this between 3 and 6 feet from their faces.
- Between 6 and 9 months of age, babies are able to focus on people and objects when both distant and close to their face.
- Between 9 and 12 months of age, babies have better depth perception and use these skills to more deeply explore objects around them. This also helps them as they begin to move more readily about.

Audition

The auditory system processes input related to sound – specifically noise from our environment that allows us to build context around situations or sense potential danger and the language people use to communicate with us. The auditory system also processes sound qualities such as priority, distance from us, location of origin, and more. As with visual input, our brains combine auditory information with other types of data to help us understand the world around us. The sensory receptors responsible for receiving and processing auditory input are located on microscopic hairs in the ear. The auditory structures are considered fully developed at birth, though the system still sees gains during a child's early years:

- Between 0 and 3 months of age, babies learn to be calmed by soothing, soft voices and prefer the sound of human voices. Newborns may begin crying or become startled at the sound of loud noises. Their ability to recognize sounds leads to early babbling as they experiment with their own voice.
- Between 3 and 6 months of age, babies develop different cries based on their needs, which become more recognizable. Babies have increased alertness to certain sounds and will begin to mimic them over time. They babble even more during this time.
- Between 6 and 9 months of age, babies begin to search for the locations of sounds as well as recognize familiar voices and even words from people.
- Between 9 and 12 months of age, babies have a wider understanding of words and may attempt to use these words (or similar utterances) to express their needs. These may take the form of gestures as their speech skills aren't there just yet.

Tactition

The tactile system processes input related to touch through object properties such as texture, temperature, shape, size, and firmness as well as vibration and pressure, which pertain more to sensing touch from other people. This input helps us discern what objects are without necessarily needing to look at them, though this information is often combined with other types of input. The sensory receptors responsible for receiving and processing tactile input are located all over the skin. The tactile system functions quite well at birth, though a child's tactition will continue to develop in the first few years of their life:

- Between 0 and 3 months of age, babies prefer gentle and soft input in this area.
- Between 3 and 6 months of age, babies use their tactile senses to explore objects around them such as by bringing objects to their mouths and touching them with their hands.
- Between 6 and 9 months of age, babies further explore object properties such as texture, shape, and size. This exploration continues with the mouth and the hands.
- Between 9 and 12 months of age, babies have a finer grasp pattern on objects they want to manipulate.

Olfaction

The olfactory system processes input related to smell, including what smells are, where they are coming from, what they mean for us, and whether they are safe or not. The sensory receptors responsible for receiving and processing olfactory input are located in the thin skin of the nasal cavities. The olfactory system is fully developed at birth, though babies develop a range of skills related to this sense over time:

- Between 0 and 3 months of age, babies turn toward food sources both reflexively and due to their smells. Babies also begin to develop preferences for what their mother ate during the pregnancy as well as pleasant smells.
- Between 3 and 6 months of age, babies develop stronger reactions to bad odors and become more drawn to familiar and good smells.
- Between 6 and 9 months of age, babies' interest for good smells and reactions to bad smells both grow during this time. As their motor skills also develop, babies begin to reach toward good smells and push away or grimace in response to bad smells.
- Between 9 and 12 months of age, a baby's sense of smell continues to develop at this time, allowing them to exhibit a wider range of preference for objects and food.

Gustation

The gustatory system processes input related to taste and is closely connected with the olfactory system. A big part of this includes various types of taste including bitter, umami, sweet, salty, and sour. The sensory receptors responsible for receiving and processing gustatory input are located mostly on the tongue but can also be found on the hard and soft palates (under the

tongue and on the roof of the mouth, respectively) and in the upper part of the throat. A child's gustatory system develops in some of the following ways during their first year of life:

- Between 0 and 3 months of age, babies begin to anticipate feeding times due to remembering familiar tastes. They tend toward sweet tastes – most commonly breast milk and, shortly after, this also includes fruits and similar tastes. Babies also dislike and actively avoid bitter or sour foods.
- Between 3 and 6 months of age, babies find salty flavors more appealing. They also become interested in other peoples' foods.
- Between 6 and 9 months of age, there isn't much more development in this area, at least not markers that are distinct from the olfactory system.
- Between 9 and 12 months of age, a baby's sense of taste continues to develop at this time, allowing them to exhibit a wider range of preference for objects/food/etc.

Sensory Presentations

Now that you have an idea of how each sensory system operates and the role it plays in our lives, we will explore the various sensory presentations that dictate *what* sensory concerns look like in practice. As with many conditions, there is no one clear indication that a child has sensory difficulties, especially considering how many sensory systems there are in the body. A child will present in various ways depending on the type sensory input they have difficulty processing as well as the sensory skills they possess, lack, or need strengthening in. As we review the below sensory presentations, keep in mind that not all criteria will apply to all children with sensory seeking behaviors, for instance.

It is of note that there is overlap between the criteria as part of some sensory presentations. We have placed a star next to these bullets and will provide some elaboration at the end of each section so you can more clearly understand why this occurs and what it can be attributed to.

<u>Sensory seeking</u>

Children who are classified as sensory seeking (sometimes informally referred to as 'sensory craving') tend to seek out various types of input that stimulate their sensory system(s). Sensory seeking children have a higher tolerance and need for certain kinds of input compared to typically developing children. This is due to a much higher neurological threshold that increases their 'appetite' for sensory input. When thinking of this in simpler terms, you may consider a child with a regular threshold for sensory input as having a small bucket to fill with sensory input. A child with a higher threshold may have a bucket two, three, or even four times the size, metaphorically speaking. As a result, the latter child is often looking to fill that bucket, meaning their behaviors and habits tend to be more overwhelmingly focused on that goal.

Again, children who present as sensory seeking don't necessarily crave and seek out all kinds of sensory input. They may have other concerns related to different sensory systems or possibly even present without any concerns in those areas. A child who presents as sensory seeking may demonstrate some of the following behaviors or habits:

- Watching people as they move around the room or around them
- Preferring bright colors, flashy patterns, lights, and similar types of visual input (this may apply to what a child watches, what they wear, art they make, etc.)
- Inspecting both ordinary and novel objects for details that are often minute or overlooked by other people
- Demonstrating a preference for objects that move in a rhythmic way, which may include fans, wheels, pendulums, lights flashing, waves, etc.
- Excessively touching objects or people in an attempt to explore and understand them more thoroughly (when the touching pertains to people, it is common for them to report being uncomfortable or bothered by it)
- Having difficulty wearing socks and shoes*
- Displaying a constant need for movement, which most often interferes with their ability to perform academically, socially, and functionally; this often presents as excessive fidgeting, jumping, rocking, swinging, tapping their feet or hands on surfaces, sometimes to the point where they are unable to sit down
- Whether standing or sitting, tending to rock (this may be done by rocking their upper body back and forth in their chair, tipping their chair back on two legs to create a more pronounced rocking movement, or using their feet to rock their whole body as they stand)
- Becoming overly excited during any active or passive movement-based activities, which may involve shrieking, screaming, laughing, or otherwise reacting strongly
- Engaging in various types of movement that are often considered unsafe by parents, caregivers, and onlookers (including tugging on heavy or fragile objects; climbing trees and furniture; jumping on unstable surfaces; crashing on couches, beds, and trampolines; etc.)
- Looking for contextual opportunities to increase their movement experiences, such as by gaining momentum to speed up their motion, gaining height to fall or crash off of something, using certain aspects of their environment or an object as makeshift steps to climb something, etc.
- Putting various non-food items in their mouth (they may do this briefly and in an exploratory way when they first encounter new objects or for more prolonged periods to suck on or bite in an attempt to seek oral stimulation)
- Engaging in risk-taking behaviors in obvious or more passive ways such as climbing high objects such as trees, finding tall pieces of furniture to jump off of or climb down from
- Presenting as much more active or risky than most kids their age
- Appearing to enjoy and seek out the sensation of falling, either organically or in traditional methods such as when using a trampoline

Of note:

*Some children who have difficulty wearing socks and/or shoes may strongly prefer the feeling of their bare feet on the ground. This is common with children who have sensory seeking

behaviors, specifically those who prefer proprioceptive input. However, there are other instances where difficulty wearing socks and shoes stems from hypersensitivity to tactile input.

Self-Assessment Question 2

How might you tell the difference between a child who dislikes socks and shoes due to sensory seeking behaviors and a child who dislikes socks and shoes due to being over-responsive?

a. A child who dislikes socks and shoes due to sensory seeking behaviors may have difficulty focusing during dressing tasks due to their sensory concerns.
b. A child who dislikes socks and shoes due to being over-responsive is also likely to demonstrate other signs of hypersensitivity to tactile input.
c. A child who dislikes socks and shoes due to sensory seeking behaviors may yell, cry, and be vocal if they are asked to wear them or socks/shoes are put on them.
d. A child who dislikes socks and shoes due to being over-responsive almost always prefers to deeply feel and explore objects to learn about them.

The correct answer is B.

Rationale: Children who are hypersensitive to tactile input may dislike wearing socks and shoes because they cannot tolerate the feeling of clothing on their body. Sometimes this is due to the material, while other times it may be due to not wanting anything covering some or all body parts. Either way, this points toward difficulty with tactile input, meaning there may be other signs of this difficulty.

Sensory over-responsive

This category is for children who are considered over-responsive (or hypersensitive) to various types of sensory input. Children who are sensory over-responsive have a lower tolerance and need for certain kinds of input compared to typically developing children. This is due to having a much lower neurological threshold. Children who are over-responsive may react to undesirable sensory input in strong ways, such as by screaming, kicking, and crying in an attempt to convey what they may have difficulty verbally expressing. Children with more developed communication skills may convey their feelings about input they are sensitive to with statements such as, “It felt like bugs were crawling on me,” and “The light makes the room so bright and shiny.”

As with sensory seeking children, children who are termed over-responsive do not necessarily have sensitivities in response to all kinds of sensory input. A child who presents as over-responsive may demonstrate some of the following behaviors or habits:

- Gagging when eating foods with certain tastes or textures
- Having strong reactions to certain textures when feeling materials with their fingers, wearing certain clothes, or having clothing tags rub up against their skin
- Displaying strong reactions to touch (especially light touch) from other people, bright lights, loud noises (such as alarms, fireworks, and sirens), background noises that typically blend in for other people (such as the whirring of a fan or the hum of a refrigerator), or sudden and unpredictable movements
- Becoming distracted, overly aroused, agitated, or aggressive when there is a lot of noise around them
- Having difficulty getting things done or focusing on a specific task with the sound of music, television, or conversations nearby
- Preferring to work, play, or simply spend time in rooms with low or no lighting (especially artificial lights)
- Having more difficulty with bright lights than peers
- Demonstrating strong reactions during grooming tasks, including teeth brushing, hair brushing, hair styling, nail cutting, face washing, and hair washing
- Scratching, rubbing, or hitting a body part that was recently touched, specifically lightly touched
- Acting in an overly sensitive way in response to postural changes, which may lead them to hesitate on stairs, jungle gyms, when stepping on and off curbs; children may be overly slow and cautious when moving in these spaces or they may stop often, leading to choppy movements
- Suddenly losing balance when walking on slightly uneven or forgiving surfaces; when outdoors, this may include gravel, grass, or sand; when indoors, this may include stepping or walking on couches, beds, or play mats
- Refusing to eat certain foods based on how they taste or smell, even when it's a typical food for kids their age
- Limiting their diet to food with certain textures, such as foods that are all or mostly soft
- Having been labeled a "picky eater" or "selective" with most foods
- Gagging when eating utensils or toothbrushes are placed in their mouth; this may also occur when parents place their fingers in the child's mouth to explore tooth pain or when a healthcare provider uses a tongue depressor to test their reflexes

Sensory under-responsive

This category is for children who are considered under-responsive (or hyposensitive) to various types of sensory input. Children who are sensory under-responsive have a higher tolerance and need for certain kinds of input compared to typically developing children. This is due to having a much higher neurological threshold. Children who are under-responsive often present similarly to those with sensory seeking behaviors, though these children do so because their sensory systems have difficulty registering the input in smaller "doses." Children who are under-responsive may be described as inattentive or "in their own world" by others who are not aware of their sensory concerns.

Children who are considered under-responsive do not necessarily display these behaviors in response to all kinds of sensory input. A child who presents as under-responsive may demonstrate some of the following behaviors or habits:

- Bumping into things like furniture as they walk; this may lead a child to get called clumsy by others
- Bumping into people as they walk or otherwise move about
- Standing too close to others while in line or playing very close to other people; this may be mistaken for having a lack of personal space, but such behaviors come from poor body awareness and difficulty with spatial awareness
- Needing to touch or mouth things, especially when they are new to them and they are exploring them; for example, a child with an under-responsive visual system may touch things to get a better understanding of them while a child with an under-responsive tactile system may use their mouth instead of their hands to explore an object
- Failing to hear their name when called or other prompts to get their attention despite passing all hearing tests
- Tuning someone out when they are talking directly to them
- Seemingly being unaware of temperature changes (to water in the bath or when cooking, etc.) and injuries they just sustained
- Reacts minimally, if at all, to ordinarily painful injuries that would elicit a response from other children their age
- Being unaware when their face, hands, or other obvious parts of the body get dirty
- Not being bothered by messiness, either on their person or in their environment
- Having difficulty noticing obstacles, objects, or people that may be in their way as they walk or otherwise move
- Walking and moving more stiffly than they should
- Fatiguing quickly, especially when asked to hold certain positions for a period of time without moving
- Demonstrating generally poor muscle strength
- Propping oneself up in some way or another; they may place their head in their hands, lean on a wall or a piece of furniture, or hang onto another person for stability
- Stomping or dragging their feet as they walk
- Unintentionally biting their lips, tongue, or inside of their cheeks while eating, drinking, or during the course of the day when bored or unoccupied
- Having difficulty interpreting facial expressions or non-verbal communication from others
- Tending to be more vulnerable than other kids their age; others may describe the child as helpless or defenseless in a physical or emotional sense
- Getting lost easily

Sensory avoidant

This category is for children who are avoidant of various types of sensory input. Children who are sensory avoidant have a lower tolerance and need for certain kinds of input compared to

typically developing children. Children who are sensory avoidant may respond to undesirable sensory input in much the same way as children who are hyper-sensitive would – by screaming, kicking, and crying. However, as these children become older, their avoidant tendencies become more clear since their assumed increase in independence allows them to more actively avoid this type of input altogether.

Again, children who are considered avoidant do not necessarily display these behaviors in response to all kinds of sensory input. A child who presents as avoidance may demonstrate some of the following behaviors or habits:

- Becoming unproductive when there is background noise
- Placing hands over ears or wincing in response to noises of varying volumes
- Closing curtains or shielding their eyes in response to bright lights, even if it's bright natural light such as sun coming through house or car window at a certain angle
- Having a strong reaction to being touched; children may become overly emotional or even aggressive
- Presenting as uncooperative or stubborn, especially during activities they are especially averse to, such as toileting or eating
- Having frequent temper tantrums; parents and others close to the child may pick up on patterns regarding what causes these temper tantrums, but some tantrum sources may be less obvious if they are related to lesser known stimuli a child has difficulty with
- Resisting eye contact with others regardless of if they are familiar or unfamiliar to the child
- Having difficulty returning to a difficult situation or task without positive support and encouragement
- Reacting sensitively to rejection, criticism, or feelings of being a failure
- Having very clear, obvious fears that limit their ability to function and follow or form routines
- Verbalizing feeling like a failure; sometimes this may be connected to tasks that parents or educators can recognize, but the source may not always be clear
- Acting too serious in situations where others (peers or adults) are more light-hearted
- Having a behavioral outburst when they can't complete a task
- Appearing to get frustrated easily
- Becoming distressed or even agitated in response to changes of any kind, which may include when new expectations are set, when they experience disruptions in their routines, or set plans have been changed
- Interacting with peers in group settings less than other kids their age
- Having difficulty either making or keeping friends and engaging in simple interactions with peers

Self-Assessment Question 3

A child becomes distracted when they are in a loud room and asked to complete an assignment at school. Their teacher has also observed that they try to find enclosed

areas within the classroom where there is less light. These are signs of what category of sensory concerns?

e. Discrimination concerns
f. Under-responsive
g. Over-responsive
h. Sensory seeking

The correct answer is C.

Rationale: Being distracted in a loud room could point toward attentional concerns or even other types of sensory concerns. However, in combination with shying away from bright lights, this points toward the child being over-responsive – specifically to auditory (sound) and visual (sight) input.

Best Practices for SPD Treatment

Providers should keep in mind that no two children with sensory difficulties are the same. While this goes for any condition, this is especially true of SPD for several reasons. Firstly, there are multiple sensory systems that all develop at different rates. Secondly, it is common for children to have intense difficulties with some forms of sensory input and no concerns at all related to others. Lastly, many people (even providers) tend to view sensory concerns as part of another condition rather than distinct concerns that need to be addressed on their own.

Each of these problems can make it difficult for providers to determine and implement a singular set of best practices to guide their treatment, all while staying within their own scope of practice. Many providers may seek more specific guidance to address this difficult treatment area, though general advice in this area is more common. There are certainly tangible gaps in research on sensory integration, though so-called “subjective” research gaps may be even more prominent. The latter of these may arise from providers not feeling as if the existing research is sufficient enough compared to the magnitude of this specialty area.

We have compiled a list of best practices that can be used in the classroom, therapy clinic, or at home to assist children with a range of sensory needs. These best practices not only include tips and tricks that can make children more comfortable, but they also list activities that can strengthen a child’s skills in each area. Since sensory concerns differ based on the type of input a child has difficulty processing, we created lists for each type of stimuli:

<u>General best practices for children with sensory concerns</u>
-Use visual aids and timers to emphasize when breaks begin and end.
-Create and offer choice boards to give children the opportunity to choose the type of sensory activity they want in the outlined time.

-Integrate self-regulation opportunities into curriculum and treatment whenever possible, though recognize that this is not necessarily a substitute for sensory integration treatment.

Clinician consideration:

In order for any sensory integration treatment or modification to be the most effective, providers and parents must be on the same page. This may mean implementing some of the same strategies at home, at school, and in the community. However, there may be slight variations to ensure strategies are the most effective. It is important that providers collaborate with one another as well as parents for proper implementation and carryover.

Best practices for children with difficulty processing visual stimuli

- Limit decorations and other materials hanging from walls or ceilings.
- Store manipulatives and other small objects in containers with clear labels.
    - It's also good to have text and picture labels to accommodate various learners. This will help with ease of access for children who have limited visual memory.
- Create picture templates to help learners understand where certain items "live" and should be returned to after use. This may go beyond simply categorizing items by size.
- Offer lined paper or graph paper to assist with spacing and sizing issues when writing.
- Use the minimum amount of text and other visual info on worksheets whenever possible.
- Take advantage of lamps and other forms of task lighting in lieu of overhead or fluorescent lighting.
- Offer the opportunity to adjust natural lighting in rooms with little to no other alternatives using blinds or curtains. If rooms have an excess of natural light, room darkening panels may be helpful.
- Consider the availability of touch screen devices such as tablets as well as traditional desktop computers with mice, as these may help decrease visual demand.
- Explore various types of software to help with organization when using electronic devices for learning. It can be more overwhelming to switch between several types of software or use various ones with children, so try them beforehand to ensure they are suitable for children.
- Allow preferred seating options. Spots closer to the board can be good for copying, but some students may benefit from sitting facing a solid colored wall or in cubicle-style seating when working on individual assignments.
- Ask students to write their own notes, but tell them they can use a peer's notes as a back-up copy to fact-check their own in case there are any gaps.
- Modify any overly busy worksheets to be laid out better as well as ensuring they have a neutral background with black text.
- Modify powerpoint and other presentation layouts to be less visually overwhelming with thoughtful consideration given to graphics.
- Use dimmable lights when overhead lights are needed.

Activity recommendations:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of the visual system.

-Allow access to toys and books with simple black-and-white patterns during the first few months of life.
-Place mobiles and overhead gyms in areas where babies are laying on their back.
-Make eye contact with your babies often to encourage them to visually fixate on faces and eyes.
-Carry babies in positions where they are upright so they can look around them. As they get older, this can be paired with pointing to and naming various objects so they also get auditory input to assist with object recognition and other forms of learning.
-Hold babies close to your face so they can better observe the details of your facial expressions.
-Peek-a-boo can help with visual stimulation once your baby is old enough to participate in this game. Babies may enjoy this game at as young as 3 months old, but they will be more active in the process by 9 months old.
-When your baby reaches around 9 months old, start pointing out where objects “live” so they can learn to locate them for use and return them when they are done. This also builds independence and organization skills.
-Teach your baby how to look at themselves in the mirror and point to various body parts as you name them aloud.
-Look through familiar books, TV shows, and games while pointing out pictures.
-Play simple eye-spy games.
-Name various objects as you go for a walk around the house, down the street, or within nature.

<u>Best practices for children with difficulty processing auditory stimuli</u>

- Use as few verbal instructions as possible and cater directions to the student’s learning style. This often means content rich with visuals or using a combination of pictures and text.
- Create social stories to prepare students for certain sounds or sound-related events.
- Slowly integrate students into some noisier areas, particularly common spaces such as halls, the playground, and the lunchroom. Do this by making several shorter visits to the space in question before the student needs to be in that space.
- Allow for breaks where the student can listen to preferred music as well as use ear plugs or headphones for a certain period.

<u>Activity recommendations</u>:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of the auditory system.

-Dance and sing with babies and infants along to music, making cooing sounds.
-Use toys that make noise.

-Imitate the baby's sounds as they make them to offer auditory stimulation beyond what they receive from their own babbling.
-Play a wide range of music for your baby to increase the variety of sounds they are exposed to.
-Use any opportunity you can to talk to your baby about what you are doing. This can be as simple as talking to yourself as you go about your daily routine or speaking words of affirmation (which have many benefits on their own).
-Take turns with various forms of 2-way communication such as singing, playing simple games, talking, and more. This offers different types of auditory stimulation and teaches your child how to get this type of input functionally.
-Play games that test your child's knowledge of certain sounds in an age-appropriate way, such as making animal noises and pretending to be certain vehicles.

> Clinician consideration:
>
> You may hear the term 'sensory diet' used in the treatment of sensory processing disorders. This simply refers to a collection of activities intended to target and engage one (or more) of a child's senses. Sensory diets are often formed by occupational therapists and provided to parents for implementation at home. Occupational therapists add activities depending on what they have determined is enjoyable and beneficial to a child from the evaluation and treatment processes. Sensory diets may be recommended for transitioning periods or times of difficulty. For children who have difficulty dressing or eating, this may be in the morning while getting ready for school. For children who have difficulty remaining seated for learning activities, this may be in the afternoon. The provider recommends activities for certain times to produce certain effects (e.g. alerting or calming).

<u>Best practices for children with difficulty processing tactile stimuli</u>

- Acknowledge a student's pain or discomfort whenever it occurs.
- Look for signs of input being uncomfortable such as grimacing, wincing, pulling away, rubbing the area that was just touched.
- Experiment with various clothing textures that are comfortable to the child. Most often, kids have success with cotton or terrycloth clothing that has been washed a few times and had all tags removed.
- Allow students access to bean bag chairs and alternative seating as well as small hand tolerance fidgets. The most appropriate fidget options are those that are soft, squishy, or textured, but you can also use chewable or edible jewelry.
- Equipment such as skin brushing protocols, weighted vests, weighted blankets, and weighted utensils for feeding or writing can all be helpful, but typically are not recommended until an OT evaluation has been completed.
- Allow children to stand at the front of the line to avoid being bumped by others.
- Allow for early or secluded transitions to avoid crowded hallways.
- Use a vibrating toothbrush and unflavored toothpaste to help make teethbrushing less stressful.

- As your baby touches various toys and objects, say the objects properties aloud to help them gain a better understanding of those objects. You can use descriptors like soft, hard, bumpy, smooth, flat, curved, and more.

Activity recommendations:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of the tactile system.

-Practice kangaroo care (skin-to-skin contact) with babies between 0 and 3 months of age to encourage bonding as well as offer tactile stimulation
-Expose babies to a wide variety of textures in their day-to-day activities to acclimate them to this type of input. This is good practice from birth through the first year of life. Based on how your child responds to each type of tactile input, use this to inform future routines and sensory opportunities.
-Provide daily gentle massages to desensitize babies to light touch.
-Incorporate gentle touch into self-care activities (such as dressing, diaper changes, and bath time) on a routine basis to offer predictable input.
-Water play activities offer a greater range of tactile stimulation. For younger children, this can be done in the bathtub or in the sink. For older children, this can be done in the pool or in the backyard.
-Around the ages of 6 to 9 months, encourage your baby to self-feed with their hands, which helps them get used to various textures.
-Make use of various age-appropriate activities as a way to explore more textures. This can include blowing bubbles and having your baby chase, catch, and pop them in certain ways that you demonstrate. You can also have them use their fingers to draw in shaving cream on a flat surface. Adding food coloring can stimulate the visual system at the same time!
-Make a rudimentary sensory bin by placing toys of various colors, sizes, shapes, textures in a bin and having your baby pull them out one by one and explore at their own pace.

Best practices for children with difficulty processing gustatory/olfactory stimuli

- If rewarding a student with any food or the ability to cook something with assistance, be sure to use ingredients and/or foods they are known to like.
- Use nutritionists to assist with certain dietary recommendations if a child with gustatory and/or olfactory defensiveness is not growing at the rate they should.
- Scented objects (including soap, lotion, candles, markers, stickers, lamps, etc.) can all be used with preferred scents to calm students, but be sure to only use one at a time and start with low exposure for each as this can easily be overwhelming.
- Have facial tissues available in all spaces.
- Don’t wear cologne or perfume and aim for unscented laundry products, bar soap, etc.
- Wear a sweatband or wristlet with a small drop of their preferred smell and allow them or help them to refresh this throughout the day as needed.

- Encourage food play for children who have difficulty with meal time stemming from dysfunction in this area. This and other strategies can be used to lessen the fear of food especially during mealtimes.
- Introduce new smells through foods between 3 and 6 months of age while paying close attention to your baby's reactions. Do this slowly and gradually so as not to overwhelm them. Notice which reactions may be due to texture and which may be due to smell and taste.
- If your baby has strong reactions to certain tastes or smells during mealtime, don't take those ingredients or foods away. Instead, pair them with preferred tastes, smells, and textures so they are less noticeable.

Activity recommendations:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of the gustatory and olfactory systems.

-Use familiar smells to instill a sense of calm. With babies and toddlers, this may include giving them a blanket that smells like their parents and caregivers or allowing a baby to smell breast milk before giving it to them.

Best practices for children with proprioception-related concerns

- Linear movements up and down can encourage alertness. This may include jumping rope, jumping on a trampoline, bouncing a ball, doing lunges, and more.
- Back and forth motions can encourage calmness. This may include swinging gently and slowly, and rocking in a chair.
- Offer fidget toys, theraputty, stress balls, and play-doh. There are various play-doh activities that require strength and offer proprioceptive input (such as power rolls and finger presses). This should be encouraged more than gentle play with this medium.
- Eating crunchy or chewy foods (such as bubble gum, pretzels, fruit leather, beef jerky, apple slices, licorice, and carrots) can help with alertness and body awareness.
- Delineate certain areas within a larger space for activities such as pacing or stomping feet, if needed.
- Do not take recess or gym away from students as a punishment, since this offers quite a bit of opportunity for deep pressure through sports, running, etc. This tends to send a message that this sort of activity is not good for them when, in fact, it can help manage sensory concerns and overload if used appropriately.
- Wearing lycra undergarments or using weighted lap pads and weighted stuffed animals can offer calming deep pressure throughout the day.

Activity recommendations:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of interoception and proprioception.

-Promptly attend to your child's physical needs, especially when they express them, as this allows them to learn cause and effect and how internal/personal needs should be dealt with in time.
-Adjust the child's environment to help their internal processes assist with routines and activity demands. For example, you can set out child-friendly utensils for mealtime, if you are serving something that requires utensil use.
-Parents and siblings can play gentle tug of war with babies using blankets as well as engaging them in clapping games, pat-a-cake, and similar activities. All of these encourage body awareness as well as motor skills involving the simultaneous use of both sides of the body, which helps integrate the senses.
-Change your baby's diaper in a timely fashion during the 3-6-month age range, as their olfactory systems are becoming more sensitive during this time and the smell may cause more distress than it did when they were younger.
-Parents should ensure the environment is sufficiently safe to support their baby's continuing motor skills and encourage continued engagement that supports body awareness.
-As babies reach the 12 month mark, parents should encourage a greater variety of movement and activity exploration such as climbing, jumping, sliding, and more. They should still offer supervision during this time for safety and to monitor their child's response, but this is a good opportunity for more experience in this area.
-The use of push-and-pull toys can offer proprioceptive stimulation and teach kids more independence in meeting these needs without their parents. Some examples include corn popper, lawn mower, or construction vehicle toys that babies push along using extended handles as well as toys joined together by a string that babies pull behind them as they walk.
-Use teethers, chew toys, gum massage, ice binkies, and similar objects to assist with discomfort due to teething. Encourage your baby to point to or ask for these items to better overcome their discomfort.
-Dance to the beat of music and try to mimic the rhythm while having your baby follow the same cadence.
-Have babies push weighted toys, boxes, full laundry bins, and similar objects to offer added body awareness and strength training while challenging their balance as they walk.
-Introduce babies to a variety of balls and show them various activities to do with them, such as throwing, catching, and kicking.
-Singing and dancing to songs such as "head, shoulders, knees, and toes" can strengthen body awareness.
-Use verbal cues to encourage self-soothing behaviors. When your child is visibly upset, ask something like, "Do you want a hug?," offer their favorite toy or blanket, direct them to some water or food, etc. This helps them make the connection between things that make them upset and things that make them feel better.
-March and clap to the beat of certain music. Parents can clap their hands, then clap their baby's hands together, then have their baby do it on their own.
-Set aside some time each day for quiet to help with processing and calmness.

Self-Assessment Question 4

What is NOT a beneficial way to adjust a child's environment to prepare them for bedtime?

e. Dim the lights and adjust the room temperature
f. Take away electronic devices
g. Play calming music
h. Set out their preferred toys

The correct answer is D.

Rationale: Setting out a child's preferred toys may send the message that it's playtime, which contradicts the other practices and may discourage sleepiness.

Best practices for children with difficulty processing vestibular stimuli

- Offer slow transitions or other forms of assistance between extreme positions such as going from sitting on the floor to standing up or lying down to sitting up.
- Slow down most regular movements to allow more predictability.
- Offer alternative seating options such as wiggle cushions and exercise balls to provide more gradual vestibular movements.
- Jumping on the trampoline can help with alertness.
- Encourage practice of games with rhythmic and/or alternating movements. Simon Says and some other common children's games can be modified to fit this criteria.
- Encourage participation in games that involve hanging upside down. This may include using the monkey bars, slides, and other features of the jungle gym; sledding; roller coasters; merry-go-rounds; spinning tea cup rides; and team sports such as swimming. If a child is particularly sensitive to vestibular input and expresses interest in some of these activities, offer assistance but do not push them to participate.
- The use of push-and-pull toys can offer vestibular stimulation and teach kids more independence in meeting these needs without their parents. Some examples include corn popper, lawn mower, or construction vehicle toys that babies push along using extended handles as well as toys joined together by a string that babies pull behind them as they walk.

Activity recommendations:

Educators and clinicians can educate parents on some of the following activity recommendations to encourage the development of the vestibular system.

-Place babies in a variety of positions. Rocking and swaying are the most relevant and appropriate, especially during the first 3-4 months of life. But assuming other positions slowly and predictably can help acclimate them to this type of input.

-Some of the more calming movements that can soothe babies before bedtime include being lifted up and down, being gently but slowly swung from side to side, and slowly rocking from side to side.
-Some of the more alerting movements that can increase energy and attention in the morning and throughout the day include more vigorous swinging, as long as proper support is given to all parts of the body. The exact way this presents varies based on the child's age. For babies, this may include being in a swinging device that provides steady and continuous rocking while in common spaces with loved ones. For other children, this type of input can come from playground swings, porch swings, lycra swings (made of body sock material), and similar sources.
-Make simple obstacle courses that your baby can move through to place their body in various positions (e.g. lying down, rolling, crawling, walking, etc.).
-Use push-pull toys that require more force to manipulate than what your child is used to. For example, add weight to toys that your child moves or have them play tug-of-war with an older sibling who can provide a fair deal of resistance while still being safe.
-Encourage some degree of "rough housing" that throws off your child's base of support. This can include riding on a parent or sibling's back while they walk through the room on all fours or dancing with larger and more exaggerated movements.
-Teach your baby how to slowly swing with guided movements aided by others. For example, tuck them in a blanket held by someone at each end as they rock it back and forth. A hammock and large swing can serve this same purpose for children as they get older. This encourages postural adjustment to keep themselves upright and in control of the movement.

Variations in Approaches to Assist with SPD Management

Many disciplines have what are called top-down and bottom-up treatment approaches. While both approaches can improve a child's participation and engagement, some are more effective than others. The approach that is best depends on the environment as well as the child's needs and abilities. Top-down approaches aimed at addressing sensory concerns tend to focus on their effect on a child's self-care and functional abilities. As such, top-down approaches are those that emphasize skill-building and environmental support to improve performance. In many cases, top-down approaches provide adaptations, modifications, and other adjustments from a compensatory lens. Some examples of top-down approaches include those that focus on the environment. Within the occupational therapy field, this includes Occupational Adaptation and the Canadian Model of Occupational Performance. Some examples of top-down approaches used in practice include lessening visual stimuli in the room to improve attention and seated activity tolerance during a session.

Bottom-up approaches, on the other hand, locate the root cause(s) of sensory concerns by addressing foundational skills. Ayres Sensory Integration (ASI), which is the leading framework for the treatment of sensory concerns and disorders, is one of the most prevalent bottom-up approaches. In the physical and occupational therapy fields, other bottom-up approaches include Neurodevelopmental Treatment (NDT), Brunnstrom Movement Therapy, and Proprioceptive Neuromuscular Facilitation (PNF), all of which are used with individuals who have neurological disorders that may also lead to sensory concerns. The biomechanical frame

of reference is another bottom-up approach that focuses on skills such as strength, range of motion, endurance, and the use of proper body mechanics.

As you can imagine, there are benefits and drawbacks to each of these approaches, which is what prompts a professional to utilize one over the other depending on the circumstances.

The universality of bottom-up approaches is a major part of their appeal, as they can be suitable for a great variety of patients (particularly those who may have more complex needs such as limited communication skills or problem solving abilities). The nature of these approaches allows professionals to promptly respond to urgent concerns as they arise. This blends into the next advantage of these approaches, which is that they mesh well with care provided in traditional settings such as hospitals. Providers from all disciplines can use these approaches to simply and efficiently track the progress of those they work with since sessions are structured in a way that highlights outcomes.

Self-Assessment Question 5

What is an example of using a bottom-up treatment approach to assess a child with sensory concerns?

a. Watching how the child performs in the classroom and at home
b. Interviewing the child's teacher, parents, and coaches about their performance and sensory concerns
c. Giving a child noise-cancelling headphones to improve ability to complete school assignments
d. Telling a child to enter noisy classrooms as often as possible to overcome their difficulty with auditory input

The correct answer is C.

Rationale: Giving a child noise-cancelling headphones is a compensatory strategy, which addresses sensory concerns and helps them perform academically.

This brings us to the disadvantages of such approaches. Bottom-up approaches draw heavily from other professions in terms of the theoretical foundations, models, and frameworks it utilizes. While this results in a blended, interprofessional methodology, some professionals may have difficulty justifying their use of such approaches to third-party payers and other governing bodies. This can especially be difficult for newly graduated professionals who are just getting a grasp on their field of practice. Lastly, bottom-up approaches focus on improving participation and not achieving full independence in a given task. This may be frowned upon by some individuals, such as parents who have an unrealistic expectation for their child. This may also appear problematic for professionals in disciplines such as occupational therapy, which have a heavy emphasis on independence.

Many occupational therapists view top-down approaches in high esteem, as they are so consistent with their profession. However, this may not be a benefit to other professionals who operate within a different set of responsibilities and duties. Top-down approaches are also lauded for their holistic nature. In addition, top-down approaches are a good fit for services provided in schools and similar settings where individuals treated may have performance issues that have arisen in the absence of medical conditions or other more obvious causes.

In terms of disadvantages, assessments used as part of top-down approaches have been criticized for not always being objective. As we mentioned earlier, sensory assessments are often self-report and interview style, meaning they may receive some of the same criticisms despite gathering valuable perspectives. Lastly, providers may have difficulty applying top-down treatment principles in a practical way, as there are many theories governing these approaches but not much applicable information to help in using them.

Interprofessional Roles in Managing Sensory Concerns

We have discussed the various ways to assist with sensory concerns, but it's also important for various professionals to understand the roles others around them play in the management of sensory concerns.

Occupational therapists

As we mentioned, occupational therapists (OTs) are some of the chief providers treating individuals with sensory impairments. OTs help people of all ages build skills in occupations (which is defined as any meaningful activity). This means, depending on the setting they are in, occupational therapists can address nearly any functional concerns someone has. In many cases, this includes self-care abilities (toileting, dressing, eating, bathing, and grooming/hygiene) but can also extend to various fine motor tasks in the school system such as handwriting, scissor skills, block stacking, bead stringing, and more. Specifically, OTs help children with sensory processing disorders to build skills or learn compensatory strategies to manage their specific concerns.

Physical therapists

Physical therapists (PTs) address a variety of fundamental skills that children with sensory processing disorder may be delayed in. These skills include balance, range-of-motion, coordination, strength, endurance, coordination, and body awareness. PTs may engage children in obstacle courses and various other play-based interventions to improve their confidence and ability to move. Depending on the child's age, physical therapists may address skills such as bending, climbing stairs, jumping, swinging, hopping, skipping, riding a bike, and more.

Psychologists

Psychologists can help older children and adolescents manage emotional and behavioral concerns that may arise from sensory challenges. Child psychologists may also be called in to assist with younger children who have more severe behavioral difficulties – either those that stem from sensory concerns or other sources.

Clinician consideration:

Psychologists may use modalities such as Cognitive Behavioral Therapy (CBT) with older children who have sensory concerns. This modality can help them understand their emotions related to certain situations, sensory input, and more. Once a child can identify their emotions, they can use CBT to form better responses to situations. This leads to the development of healthier habits such as coping mechanisms and relaxation techniques.

Speech-language pathologists

Speech-language pathologists (SLPs) offer feeding therapy to assist with some sensory concerns that cause oral motor weakness or defensiveness. SLPs may also use a variety of other techniques to manage auditory processing and discrimination difficulties, which can in turn increase verbal comprehension abilities and communication skills. These therapists may also offer graded amounts of sensory input (via exercises or other techniques) to assist with improving skills such as articulation of words. Some SLP activities may also develop non-verbal communication skills (such as pointing at items or using a picture communication board) for children who have not yet developed the ability to express their needs, both sensory and otherwise.

Applied Behavior Analysts

Applied behavior analysts (ABAs) teach children a range of techniques to manage their responses to sensory input. These techniques include healthy coping mechanisms, gradual desensitization, environmental modifications, and various types of reinforcement. It is common for ABAs to collaborate with OT and education professionals to provide treatment for children with SPD. ABA professionals may treat children with SPD in traditional school settings or in clinic settings where alternative education services may or may not be provided.

Conclusion

Sensory processing disorder is a complex condition and providers face a range of barriers in helping children manage its effects. Due to a lack of recognition as a medical condition and difficulty connecting children with specialists, it is common for children with SPD to see delays in treatment. Providers are responsible for working with one another to provide comprehensive treatment for children in school, at home, and in the community. It is important for providers to educate themselves about the development of various sensory systems during a child's formative years, the four major types of sensory presentations, and the signs that indicate potential sensory concerns. This not only allows for proper management within your own scope of practice, but also ensures that children are referred to other specialists, if needed.

Case Study #1: Addison

Instructions: Spend 5-10 minutes reviewing the case study below and answer the questions that follow.

Addison is a 4-year-old girl who received occupational therapy, physical therapy, and speech-language pathology for several years as part of early intervention. She began attending preschool at the start of this school year and, last month, she was diagnosed with sensory

processing disorder (SPD). This diagnosis was made after her parents expressed many concerns about her difficulties with dressing (due to being over-sensitive to textures), transitioning between tasks, and being in public spaces. She tends to display aggressive behaviors when she is overstimulated and did so often at school, which led her to exit the program. The school district is currently trying to secure an alternative placement for her, as her aggressive behaviors prevent her from being in a traditional classroom since it places other students at risk.

Questions:

1. What information would be needed to determine if Addison continues to qualify for occupational therapy, physical therapy, and speech-language pathology in the preschool setting?
2. What types of environmental support might Addison benefit from to make self-care tasks easier?
3. What types of environmental support might Addison benefit from to make transitions easier?
4. What types of environmental support might Addison benefit from to make being in public spaces easier?
5. Would Addison benefit more from services in her new preschool classroom or at an outpatient clinic?

Discussion:

1. Since occupational therapy focuses on fine motor skills and self-care skills as they pertain to academic performance, Addison would need to demonstrate difficulties with any of the following tasks: letter identification, handwriting (specifically, letter formation and pencil grasp), scissor use, backpack management during morning and afternoon transitions, and clothing management during toileting. While sensory concerns can extend far beyond this, these are some of the biggest ways they may impact integration in a school setting.

   In order to qualify for physical therapy, Addison would need to demonstrate difficulties with walking throughout the school, climbing stairs and using a railing at school, and completing various exercises and activities during recess/gym class (jumping, hopping, skipping, engaging in team sports and individual exercises). If these difficulties get in the way of Addison's ability to participate in recess and gym class and properly move throughout the school to attend classes, then she would likely qualify for physical therapy in this setting.

   In order to qualify for speech-language pathology, Addison would need to demonstrate difficulties verbalizing her needs to teachers, interacting with peers, or difficulty with feeding during snack and lunchtime. If these difficulties get in the way of Addison's ability to participate in mealtimes and perform academically, then she would likely qualify for speech-language pathology in this setting.

2. Since Addison has difficulty with textures during dressing, she could benefit from tagless clothing made of natural materials and receiving deep pressure immediately before dressing.

3. Visual timers and verbal prompting during times of transition can also help with the shift between preferred and non-preferred tasks (or any two tasks).

4. She may benefit from noise-cancelling headphones along with social stories and conversations that help prepare her for time spent in public spaces.

5. Addison demonstrates difficulty with academic performance as a result of sensory difficulties, so it appears she would benefit from services in the school setting. Her parents also report difficulties in the home setting, so it's likely that outpatient services would also help her. There is no need to determine what service location she would benefit more from, as children can receive both at once as long as they demonstrate a need for assistance at school and home.

Case Study #2: Demetri

Instructions: Spend 5-10 minutes reviewing the case study below and answer the questions that follow.

Demetri, a 10-year-old boy with Sensory Processing Disorder and Attention-Deficit/Hyperactivity Disorder (ADHD), attends a traditional school where he receives special education services. Demetri tends to be over-sensitive to visual input. He has a new teacher for the upcoming school year who does not have experience working with individuals who have these conditions. This teacher wants to ensure they use the proper techniques and structure the classroom in a way that is inclusive of Demetri's needs while still benefitting other students.

Questions:

1. What are some ways the teacher can adjust the classroom to make it less visually demanding?
2. Should Demetri's teacher work with his provider to learn other ways to accommodate Demetri's learning needs?

Discussion:

1. The teacher should limit classroom decorations, especially those that hang. All materials in the classroom that students have access to should be clearly labeled (ideally with pictures and text) and organized neatly for optimal access. The teacher should have various types of paper available for certain tasks – lined paper for writing, graph paper for math assignments, and construction paper for crafting. When giving worksheets to students, the teacher should adapt them to present clean, using minimal graphics and as little text as is needed. Tablets and user-friendly software can help older students who use devices more frequently for learning purposes. Preferred seating arrangements and simplified presentations can also help.

2. Yes, it is any professional's duty to understand the scope of concerns affecting the children they work with. If Demetri is receiving occupational therapy, physical therapy, speech-language pathology, ABA, psychology, or any other service, it is important for his teacher to consult with them. This will allow the teacher to provide more effective instruction and benefit Demetri in many ways.

Post-test

1. Sensory processing disorder is not currently a recognized medical condition. Which of the following is not a negative effect that has resulted from this?
    a. Lack of insurance coverage for certain sensory integration treatments
    b. Lack of awareness of this condition
    c. More funding for SPD research
    d. Difficulty getting referrals for treatment
2. What is the most common type of assessment used to evaluate children with sensory processing disorder?
    a. Gross motor and fine motor tests
    b. Interviews and self-report questionnaires
    c. Intelligence tests
    d. Emotion regulation tests
3. Why should providers aim to use more than one type of assessment when testing a child with sensory processing disorder?
    a. Functional tests should be paired with self-reports so providers can learn what skills and behaviors are most delayed.
    b. Self-reports are not considered reputable and almost always lead to poorer treatment outcomes if used in isolation.
    c. Interviews do not give enough information on their own to structure a treatment plan.
    d. Intelligence tests should be paired with self-reports so providers know how to cater treatment to a child's learning style.
4. When treating a child with sensory concerns, who should a provider aim to speak with first?
    a. Their pediatrician and church members
    b. Their teachers and their parents
    c. Community members who have interacted with them
    d. Extended family members
5. Which factor does not necessarily have a big influence on how a child performs during their evaluation?
    a. How they slept the night before
    b. If they had a meal recently
    c. The speaking voice of the evaluator
    d. If the child is sick or recovering from illness
6. What two sensory systems are considered fully developed at birth?
    a. Visual and auditory
    b. Tactile and auditory
    c. Tactile and olfactory

    d. Auditory and olfactory
7. How do motor skills impact a child's tactile development in the first 6 months of life?
    a. Babies begin to bring objects to their mouth between 3 and 6 months of age, which allows them to explore various textures.
    b. Babies reach for objects during the 4- to 6-month range but cannot grasp them, so parents give them objects to mouth and further explore.
    c. Babies' motor skills do not impact their tactile development until after the age of 1.
    d. During this time, babies use both hands to touch objects, which allows for more sensory exploration.
8. If a parent is taught to promptly change their child's diaper, what sensory system does this benefit the most?
    a. Gustatory
    b. Visual
    c. Auditory
    d. Interoception
9. Which two sensory systems are closely related in terms of function and development?
    a. Olfactory and tactile
    b. Olfactory and gustatory
    c. Gustatory and visual
    d. Auditory and visual
10. What is a potential sign of sensory seeking behavior?
    a. Getting overly excited during movement of any kind
    b. Disliking the taste of spicy foods
    c. Not hearing when their name is called
    d. Being very cautious when moving around
11. What is a potential sign of being under-responsive to sensory input?
    a. Disliking the taste of spicy foods
    b. Walking very stiffly
    c. Running away from undesirable input
    d. Watching people as they walk around the room
12. What is not a sign of a child who is sensory avoidant?
    a. Being stubborn or uncooperative during tasks
    b. Having difficulty returning to a task without extra support
    c. Getting lost easily
    d. Running away from their parent who is trying to put clothes on them
13. What is not considered a way to develop a baby's tactile system?
    a. Practice kangaroo care
    b. Provide daily gentle massages
    c. Engage them in bathtub water play
    d. Give them mobiles
14. A child with sensory concerns related to what system might benefit from touch screen devices as opposed to laptops or desktop computers?
    a. Tactile system

b. Visual system
c. Auditory system
d. Olfactory system

15. Singing and acting out the song, “Head, shoulders, knees, and toes,” can benefit what two sensory systems?
    a. Vestibular and proprioceptive
    b. Auditory and visual
    c. Tactile and auditory
    d. Tactile and visual
16. Which of the following is not a general best practice for children with sensory concerns?
    a. Using visual aids and timers
    b. Integrating self-regulation activities into treatment and curriculum
    c. Referring all children with sensory concerns to occupational therapy
    d. Offering choice boards for sensory activities
17. What is a disadvantage of bottom-up approaches for sensory concerns, which remedy sensory concerns by addressing foundational skills?
    a. They are time-sensitive
    b. They don’t help track progress
    c. They don’t help providers put the approach into practice
    d. They don’t pair well with other approaches
18. What is an example of a top-down approach for sensory concerns?
    a. Using lined paper to help a child with visual concerns build handwriting skills
    b. Turning all classroom lights off to increase time successfully spent in class
    c. Adding a sticker chart to the morning routine
    d. Using a visual timer to go between tasks
19. Which provider may help children with sensory processing disorder learn skills such as hopping, jumping, climbing stairs, and riding a bike?
    a. Occupational therapist
    b. Physical therapist
    c. Speech-language pathologist
    d. Behavior therapist
20. Which provider might use Cognitive Behavioral Therapy to help a teenager better manage sensory processing concerns?
    a. Behavior therapist
    b. Occupational therapist
    c. Psychologist
    d. Social worker

Post-test Answer Key

1. Answer letter: C

   Rationale: A lack of recognition would lead to more difficulty searching funding for research on this condition.

2. Answer letter: B

   Rationale: Interviews and self-report questionnaires allow for a more comprehensive view of a child's sensory processing skills.

3. Answer letter: A

   Rationale: Functional tests are one of the best supplements to less structured evaluations such as questionnaires and interviews because they show the child's skills in a range of areas.

4. Answer letter: B

   Rationale: While multiple individuals who know the child can shed light on their behaviors and habits, providers should prioritize speaking with their parents and teachers. This gives a good look into their function at school and home, which are contexts of most concern.

5. Answer letter: C

   Rationale: There is no evidence to show the speaking voice of the evaluator has a major effect on the evaluation itself.

6. Answer letter: D

   Rationale: The auditory and olfactory system structures are fully developed at the time of birth, though these systems' ability to function will grow as a child does.

7. Answer letter: A

   Rationale: Children mouth objects a lot during this time, which helps them explore object properties and develop their tactile system.

8. Answer letter: D

   Rationale: Prompt diaper changes chiefly help a child recognize their bodily functions and discomfort that might stem from them, which is a function of interoception.

9. Answer letter: B

   Rationale: Our sense of smell and taste are closely intertwined, making the olfactory and gustatory systems develop at a similar rate.

10. Answer letter: A

    Rationale: A child who is seeking sensory input is likely to get excited during any movement activities.

11. Answer letter: B

    Rationale: Children who are under-responsive to information from movement may walk very stiffly because of poor body awareness.

12. Answer letter: C

    Rationale: A child who gets lost easily is more likely to be sensory under-responsive, as they may not pick up on navigational cues around them.

13. Answer letter: D

    Rationale: When hung over their crib, mobiles primarily assist with visual system development, not tactile system development.

14. Answer letter: B

    Rationale: Touch screens may be easier for children with visual concerns to navigate since laptops and desktops can provide added activity demands.

15. Answer letter: A

    Rationale: Pointing out each of these body parts requires a child to move in various planes, which stimulates the vestibular system. Naming body parts encourages body awareness and improved proprioception.

16. Answer letter: C

    Rationale: While occupational therapists can help manage effects of sensory concerns, children only need this service if their sensory concerns affect their performance.

17. Answer letter: C

    Rationale: Since bottom-up approaches heavily rely on theoretical foundations, they don’t always help providers in a practical sense.

18. Answer letter: A

    Rationale: Lined paper can help a child with difficulty processing visual input to more easily write. This helps build the skill of handwriting, making it a top-down approach.

19. Answer letter: B

    Rationale: These actions (along with others) fall under the scope of a physical therapist.

20. Answer letter: C

Rationale: A psychologist can help children identify their emotions related to sensory concerns and develop healthier responses to them. Cognitive Behavioral Therapy is just one approach psychologists use to do this.

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