SENSORY PROCESSING DIFFERENCES AND HIGH LEARNING POTENTIAL

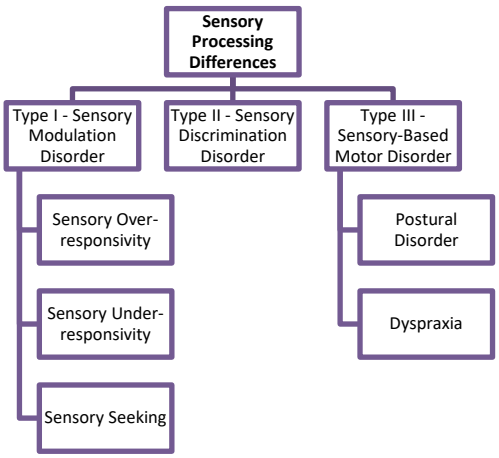
Summary
Sensory processing differences affect how a child interprets, organises, and responds to the information they receive through their eight senses. In cases that require high levels of support, such differences can significantly affect participation in activities of daily life. There is no single set of symptoms. Sensory processing differences an umbrella term for a variety of neurological, sensory-based disorders including dyspraxia.[i] A common characteristic of high learning potential (HLP) children is a heightened sensory perceptiveness.[ii] This fact sheet discusses the symptoms associated with sensory processing differences and outlines pathways to diagnosis and support for parents, carers or teachers of children with sensory processing differences and high learning potential.

What are Sensory Processing Differences?

Every child has a unique sensory processing profile in terms of how they interpret, regulate and respond to sensory experiences. How a child processes and reacts to different sensations varies.[iii] However, for children with sensory processing differences, their sensory integration issues are extreme enough to significantly interfere with daily functioning.

There are considered to be *eight* senses. As well as the five external senses of touch, sight, sound, taste and smell, there are three internal senses: movement and balance / spatial orientation (vestibular), awareness of body positioning and muscle control (proprioception), and internal feelings originating inside the body (interoception). Sensory processing differences can affect any or all of these eight senses.[iv]

Categories and Subtypes of Sensory Processing Difference[v]:



The taxonomy of sensory processing differences identifies these main categories and subtypes[vi]:

- *Sensory Modulation Disorder* (Type I) – difficulty in grading or regulating responses to sensory stimulus. Three subtypes: over-/under-responsiveness to sensation and actively seeking it out.
- *Sensory Discrimination Disorder* (Type II) – difficulty interpreting the specific characteristics of sensory stimuli, for example, speed, flavours, intensity, duration and/or timing.
- *Sensory-Based Motor Disorder* (Type III) – difficulty with movement: postural disorder (distorted balance and/or core stability) and dyspraxia (sequencing, motor-planning and organisation).

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How to Recognise Sensory Processing Differences

When a child appears to overreact, under-respond or go out of their way to seek out certain sensations, this may be an indicator of sensory processing differences. Integrating sensory information in an inconsistent or unusual manner, they cannot rely on their senses to plan and carry out actions appropriately. Thus, sensory processing differences can create barriers to building skills, honing adaptive behaviours, motor learning and academic growth.

A child with sensory processing differences will show a variety of symptoms that fall into one or more areas of category and subtype. These are described in the tables below[vii]:

Sensory Modulation Disorder			
Sensations	Over-responsive Child	Under-responsive Child	Sensory-Seeking Child
Touch	• Avoids touching or being touched by objects and people • Reacts with a 'fight or flight' response to getting dirty, to certain textures of clothing and food and to light, unexpected touch	• Is unaware of their messy face, hands or clothes • May not know whether they have been touched • Does not notice how things feel and often drops items • Lacks 'inner drive' to handle toys	• Wallows in mud • Empties out boxes of toys and rummages through them apparently purposelessly • Chews on inedible objects such as shirt cuffs • Rubs against walls or furniture • Bumps into people
Movement and Balance (Vestibular)	• Avoids moving or being unexpectedly moved • Is insecure and anxious about falling or being off balance • Keeps feet on the ground • Has motion/travel sickness	• Does not notice or object to being moved • Is unaware of falling and protects self poorly • Self-starts rarely, but once on a swing, continues for long spells without dizziness	• Craves fast and spinning movement; may not get dizzy • Moves constantly, fidgets • Gets into upside-down positions • Is a daredevil and takes bold risks physically
Body Position and Muscle Control (Proprioception)	• May be rigid and uncoordinated • Avoids playground activities that bring strong sensory input to their muscles	• Lacks motivation to move for play • Becomes more alert after actively pushing, pulling, lifting or carrying heavy loads	• Craves bear hugs and being squeezed and pressed • Seeks 'heavy work' and more vigorous playground activities than others
Sight	• Gets overstimulated when there is too much to look at (words, toys or people) • Covers eyes, has poor eye contact • Is inattentive to desk work • Overreacts to bright light • Is ever alert and watchful	• Responds slowly to approaching objects • May not turn away from bright light • Stares at and looks right through faces and objects	• Is attracted to shiny, spinning objects • Drawn to bright, flickering light such as strobe lights or sunlight streaming through blinds
Sound	• Covers ears to close out sounds or voices • Complains about noises that don't bother others, such as vacuum cleaners or hand dryers	• Ignores ordinary sounds and voices • May 'turn on' to exaggerated musical beats or extremely loud, close or sudden sounds	• Welcomes loud noises and TV volume • Loves crowds and places with noisy action • May speak in a booming voice
Smell	• Objects to everyday odours, such as a ripe banana, that others do not notice	• May be unaware of unpleasant odours and unable to smell food	• Seeks out strong odours, even objectionable ones • Sniffs food, people and objects
Taste	• Strongly objects to certain textures and temperatures of foods • Frequently gags while eating	• May be able to eat very spicy food without reacting	• Licks or tastes inedible objects, such as playdough and toys • Prefers very spicy or very hot foods

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Sensory Discrimination Disorder		
Touch	• Poor body awareness and 'out of touch' with their hands and feet • Cannot tell where on their body something has touched them • Unable to distinguish objects by feel alone (without seeing) • A sloppy dresser, unusually awkward with buttons	• Handles eating utensils and classroom tools inefficiently • May have difficulty processing sensations of pain and temperature, e.g., whether a pain is better or worse or whether they are hot or cold
Movement and Balance (Vestibular)	• Cannot discern that they are falling, especially when their eyes are closed • May be unable to tell when they have had enough movement	• Becomes easily confused when turning, changing directions, or getting into an unusual stance
Body Position and Muscle Control (Proprioception)	• May be unfamiliar with their own body, lacking 'internal eyes' • Clumsy and can have difficulty positioning limbs for getting dressed or pedalling a bike • May bump, crash and 'dive bomb' into others in interactions	• Cannot grade movements smoothly, using too much or not enough force for handling pencils and toys or pushing open doors and kicking balls
Sight	• If the problem is caused by sensory processing problems, (and not shortsightedness, for example), they may confuse likenesses and differences in pictures, written words, objects and faces • In social interactions, may miss people's expressions and gestures	• Difficulty with visual tasks, such as lining up columns of numbers, judging where things are in space or how to move to avoid bumping into objects
Sound	• If the problem is caused by sensory processing difficulties (and not due to ear infections or dyslexia, for example), they may have difficulty recognising the differences between sounds, especially consonants at the ends of words • Cannot repeat or make up rhymes	• Sings out of tune • Looks to others for cues, as verbal instructions may be confusing • Poor auditory skills, e.g., picking out a teacher's voice from a noisy background or paying attention to one sound without being distracted by others
Smell	• Cannot distinguish distinct smells such as lemons, vinegar or soap	• May choose or reject food based on the way it looks (rather than smells)
Taste	• May choose or reject food based on the way it looks (rather than tastes)	• Cannot distinguish tastes or tell when food is too spicy, salty or sweet

Sensory-Based Motor Disorder		
Postural Disorder		
Components of Movement	• May be tense or have 'loose and floppy' muscle tone, a weak grasp on objects and difficulty getting into and maintaining a stable position • Problems fully flexing and extending their limbs	• Slouches and sprawls • Has difficulty shifting their weight to crawl and rotating their body to throw a ball
Balance	• Loses balance easily when walking or changing positions	• Seems to trip over thin air
Bilateral Coordination	• Has difficulty using both sides of the body together for jumping symmetrically, catching balls, clapping, holding swing chains, etc.	• Struggles to use one hand to assist the other, for example when steadying a piece of paper while cutting it or holding a cup while pouring into it
Unilateral Coordination	• May not have a definite hand preference • Might use either hand to reach for an object or to use tools such as pens and forks	• May switch objects from the right to left hand when handling them, eat with one hand but draw with the other or manipulate scissors using both hands
Crossing the Midline	• Difficulty using a hand, foot or eye on the opposite side of the body, such as using only one hand to paint a large picture or reading a long line across full-width paper	

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Sensory-Based Motor Disorder (continued)		
Dyspraxia		
Components of Praxis	• Difficulty: 1) conceiving of a new, complex action, 2) sequencing steps and organising body movements to do it and 3) carrying out this multiple-step physical plan	• Awkward, clumsy or apparently careless (even when trying to be careful) • Accident prone
Gross Motor Planning	• Poor physical ('motor') coordination and clumsy when moving around furniture, in a crowded room or on a busy playground • Ability to learn new motor skills (e.g., skipping) may develop noticeably later than others	• Problems with stairs, obstacles courses, playground equipment and large muscle activities, such as walking, marching, crawling and rolling
Fine Motor Planning: Hands	• Problems with manual tasks, e.g., drawing, writing, buttoning, jigsaw puzzles, opening snack packets, using eating utensils, playing with Lego, and tidying up small toys	
Fine Motor Planning: Eyes	• Difficulty using both eyes together, tracking moving objects, focusing or shifting their gaze from a far to a near point • Struggles to copy from the blackboard, keep their place in a book or organise desk space	• Sloppy handwriting and poor hand-eye coordination when drawing, creating art projects, building with blocks or tying shoelaces
Fine Motor Planning: Mouth	• Difficulties such as: sucking through a straw; eating, chewing & swallowing; blowing bubbles & breathing; holding their mouth closed • May drool excessively	• Possible problems articulating speech sounds and speaking clearly enough to be understood (by the age of three)

How Common are Sensory Processing Differences?
Studies show[viii] that between 5% and 15% of all children have some sensory processing differences. Some research even indicates that as many as 16% of children aged 7-11 experience sensory symptoms significant enough to affect aspects of how they function in everyday life[ix]. 40% to 85% of children with diagnoses including Attention Deficit Hyperactivity Disorder (ADHD) or Autism will experience sensory processing problems as well.

Sensory processing differences affect people of all ages. Sometimes noticeable even as a baby, the effects of sensory processing differences are seen in young children, through the adolescent and young adult years[x] and into adulthood. The causes of sensory processing differences have not yet been established, although there are some indications that possible causes include heredity, prenatal conditions, birth trauma and environmental factors.

How Sensory Processing Differences Relate to High Learning Potential
Children identified as having high learning potential are more likely to show symptoms of sensory processing differences, according to a research review. [xi] As many as 17% to 35% of high learning potential children in different studies exhibited symptoms at a level that might be "significantly impacting quality of life", compared to only 5% of the general population as recorded in pilot studies.

Sensory Modulation Disorder, (Type I), was the most frequently found type of sensory processing differences amongst high learning potential children, although many were also diagnosed with dyspraxia, (Sensory-Based Motor Disorder; Type III).[xii] Extreme sensitivity to various kinds of sensory stimuli is relatively common among children with high learning potential[xiii], as is a heightened awareness of, and response to, sensory stimulation.[xiv] Furthermore, the higher the level of ability, the more likely that an increased responsivity to pain, sound, touch and smell will be linked to being an introvert[xv].

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Intervention, Observation and Diagnosis of Sensory Processing Differences
If a child's multisensory integration appears to be having a negative impact on their daily functioning, learning or development, parents should consider intervention and seeking a possible sensory processing differences diagnosis. Persistent inexplicable or apparently careless errors and skill deficits in HLP children should be carefully observed and evaluated for sensory processing inconsistencies or other neurological problems.[xvi]

In her book, *The Out-of-Sync Child*, Carol Stock Kranowitz recommends considering the following three questions to determine whether to seek help for a child with sensory processing differences:

1. Does the sensory experience get in the child's way?
2. Does the child's sensory experience get in other people's way?
3. Has a friend or teacher suggested exploring additional support?

If so, observations can be noted down or a formal checklist used to build a sensory portrait of that unique child, (for example, see Biel & Peske (2005), *Raising a Sensory Smart Child*, p52). This sensory portrait will not only help parents and carers but will also allow teachers and healthcare professionals to quickly gain an insight into that child's individual sensitivities, triggers and patterns of behaviour.

Documenting real-life observations and incidents relating to a child's sensory differences alongside any approaches tried, will help to identify and address that child's needs and track their progress. Furthermore, *early* intervention will allow a young person to learn and develop optimally.[xvii]

Occupational therapists, doctors and psychologists diagnose sensory processing differences by using similar observation forms completed by those close to the child, as well as by evaluating the child in person.[xviii] Such professionals are increasingly working together for maximum clinical benefit[xix] and anecdotal evidence suggests that diagnosis is becoming gradually more common.

Therapies and Sources of Help for Sensory Processing Differences
The NHS is cautious to acknowledge sensory processing differences. However, many regional NHS Trusts do actively support carers, schools and occupational therapists. This can include extensive, freely available background information, intervention plans and resources for home and/or school use.[xx]

Dyspraxia is openly recognised and supported by the NHS; it is often termed 'Developmental Co-ordination Disorder (DCD)'.[xxi]

Following a diagnosis of sensory processing differences, parents and teachers generally understand that there is a need for educational accommodation and therapeutic treatments for the child.[xxii] Potential Plus UK regularly supports families going through this process with their child with high learning potential.

How to support any one child's sensory processing differences will depend on their personal sensory profile and the needs of that individual; however, occupational therapy using a combination of cognitive and sensory-based strategies are regarded as highly beneficial.[xxiii]

Many children, as well as their carers, report being helped by the Developmental, Individual Difference, Relationship (DIR) model; its 'floor-time' method is built on a strong research base.[xxiv]

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A qualified Paediatric Occupational Therapist should be consulted. They may suggest such sensory-based therapy approaches or DIR; however, other therapies known to be beneficial with sensory processing differences include:

- Physiotherapy
- Speech and Language Therapy
- Vision Therapy
- Auditory Training
- Chiropractic Therapy
- Hippotherapy / Equine-assisted Therapy (EAT)
- Martial Arts
- Nutritional Therapy
- Perceptual Motor Therapy

Parenting a High Learning Potential Child with Sensory Processing Differences
Parenting a child with both high learning potential and sensory processing differences can be frustrating and exhausting. Social contact, family ties and parental self-esteem are frequently affected – with or without a formal diagnosis. Parents of children with lower sensory profile scores tend to misjudge their parenting competence as being correspondingly low. This negative self-assessment particularly applies if the child's challenging behaviour falls into areas felt to reflect socially unacceptable behaviour.[xxv]

The combination of high learning potential and a learning difference, disability or mental health condition is referred to as being Dual or Multiple Exceptional (DME). Ideally, parents of DME children who experience sensory processing differences alongside high learning potential will need to plan ahead, organise time well and have even more patience than other parents. It is also beneficial to be creative to cater for their child's sensory needs.[xxvi]

Parents and carers can improve their child's "sensory diet" by providing planned activities to meet the unique needs of their nervous system. Sensory diets can help children to be more able to regulate and focus, be adaptable and skilful.[xxvii] Occupational therapists can help parents to draw up a corresponding activities plan for use at home (and at school).

As many children with high learning potential experience over-responsive to sensory input, it can help[xxviii] for parents and carers to:

- **Calm them down** – don't rush them. Encourage relaxation techniques. Allowing children the time to become calm will allow them to rationalise and give a more appropriate response.
- **Anticipate environments and reactions** – an awareness of what might happen is halfway to dealing with it.
- **Be prepared** – have a collection of 'sensory tools' such as chewing gum, a stress ball or earplugs that can help calm the nervous system's response.
- **Plan a graceful exit** – when children overreact, removing them from the immediate environment may provide enough of a break to calm down and deal with things a little later.
- **Only enforce consequences if negative behaviour was a choice** – reactions might be largely unavoidable if they are due to a child's neurological reaction to sensory stimuli.
- **Remain calm** – use a relaxed voice when talking to children and avoid discussing issues until everyone is calm.

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High Learning Potential Children with Symptoms of Sensory Processing Differences in the Classroom

Both school and home education environments can be adapted to support your child. Depending on their particular sensory issues, HLP children with sensory processing differences need[xxix]:

- Good communication
- A controlled environment to reduce sensory overload
- Consistent routines
- Carefully planned transitions
- Scheduled movement breaks
- Multisensory lessons
- Encouragement to be active learners (rather than passive learners)
- Time for sensory processing
- Simplified instructions
- Alternative choices
- A choice of writing implements
- Low teacher voices
- Realistic expectations according to their abilities
- Appropriate physical feedback and refocusing methods

In addition, these children need respect and understanding of their needs and behaviours. Teachers should impose consequences for behavioural issues only in situations where unacceptable behaviour is a choice. Negative consequences should not be imposed following a child reacting to the kinds of sensory input they are known to be struggling to assimilate due to their sensory processing differences.[xxx]

Conclusion

There is no single combination of symptoms to describe the sensory discrimination, sensory modulation and/or sensory-based motor disorders that are present in children with sensory processing differences. With support and therapeutic intervention, high learning potential children with sensory processing differences can learn strategies for modulating their unique responses to sensory input and ways in which to respond more appropriately to the information coming in through their eight senses. Parents, carers and teachers can work together and with healthcare professionals to gain understanding and reduce a child's sensory burden, whilst maintaining a supportive environment and an appropriate sensory diet.

Further Reading

- PA317 Sensory Input for Sensory Seekers
- PA318 Proprioception Activities
- Biel, L., & Peske, N. (2005). *Raising a Sensory Smart Child: The Definitive Handbook for Helping Your Child with Sensory Processing Issues*. Penguin Random House
- Kranowitz, C. S. (2018). *The Out-of-Sync Child: Recognizing and Coping with Sensory Processing Disorder*. Perigee Books

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