Encourage Nature Play for Healthy Child Development

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Sensory development plays a major role in children's physical and behavioral health, and growing numbers of children experience sensorimotor deficits. As research sheds new light on the ways time in nature can support overall health, we explore ways to engage children in sensory-rich, nature-based experiences to holistically support their development.

A newborn drinks a simple diet of milk. As she uses more energy, her digestive system matures and she eats a wider range of foods.

It turns out an infant's nervous system develops in a similar way. As infants grow into toddlers, they watch, suckle, touch, chew, startle, roll, creep, and crawl. Each action is repeated, helping build new nerve cells and neural networks.

As children age, they experience more complex sensory inputs; if you think about it, walking upright is very complex! It takes time to learn how to coordinate all these sensations at once. They build nervous systems equipped to navigate complex physical and social environments and learn novel tasks.

Many children don't get the opportunity to experience the play and activities needed to develop a healthy nervous system. As a result, many exhibit sensorimotor deficits, struggling with physical, social, and sensory challenges of school, childcare, and everyday life. They miss chances to build important foundations to coordinate and regulate their emotions, behavior and movement. Often, they exhibit behaviors that can result in negative labels, expectations, or worse.

When children participate in daily activities that promote creativity, exploration, and social skills, they are more likely to develop appropriate posture, build strength and endurance, enhance balance, refine coordination, expand range of movement, and grow physical and mental agility. They are more likely to achieve important physical, socio-emotional, and sensorimotor milestones.

A child needs diverse sensory experiences to grow a healthy nervous system. This will help her self-regulate and succeed in daily tasks. Nature provides an ideal environment.

Understanding sensory processing

We usually think of five senses: sight, smell, hearing, taste, and touch. But two more "hidden" senses play vital roles in everyday functioning.

Our *vestibular* sense helps us balance and orient ourselves. Newborn and young children have not yet fully developed this sense. Infants and toddlers struggle and strive each day to develop good vestibular functioning. They learn a lot about balance through trial and error!

Proprioception is our sense of knowing where our bodies are in space, especially in relation to the pull of gravity. (Close your eyes. Notice your hands. With your eyes closed, how do you know that you even *have* hands? That's proprioception!).

Babies learning to sit up and toddlers learning to walk topple over many times before they get it right. All the while, they strengthen muscles and grow new nerve cells while practicing their vestibular sense and proprioception.

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Indoors, sight distance is limited, and artificial light is more even. Outside, a child senses many variations in texture, temperature, and shadow. Unexpected events are more common, subtle, and complex.

Nature offers an ideal environment for children to use all their senses. Think of a toddler playing in a sandbox for the first time. She sees brightly colored cups and shovels in front of her. Balancing as she squats down, she digs her hands into the cold, grainy sand. She feels a cool breeze on her face and hair, and she hears crows calling loudly at one another. Following their voices with her eyes, she twists around to look up. She sees their black bodies perched above her on a leafy green branch, and her ears, eyes and brain differentiate colors, sound, distance, and objects in her peripheral vision.

Straining to follow the crows as they take off raucously, she loses her balance and topples sideways into the sand. Startled, she looks at her older sister, who laughs reassuringly and helps her up. Even though it scared her and hurt her shoulder a little, her sister's laugh sends the social message that it was funny. She giggles and goes back to playing, looking up once more to see the crows gone.

The girl's body and brain are making sense of what all this sensory input means. To complete tasks, her nervous system coordinates all these inputs, which tend to offer a richer array of sensory experiences. This is called *sensory processing.* Putting it all together is called *sensory integration.*

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By using all their senses, children develop more complex neural systems they need to balance, interact socially, and play in their environments. Offering experiences that stimulate multiple senses allows a child's nervous system to develop in healthy ways.

How can we promote healthy sensory development?

Kids do as well as they can in the environments where they are. Kids benefit when adults guide them toward environments that provide diverse sensory experiences. They also benefit when adults "read" the behavioral signals that indicate sensory needs.

If a child struggles to sit still in school, follow rules, or achieve appropriate milestones, he or she risks being identified as "difficult," "challenged," or "different." At the same time, parents and teachers can feel overwhelmed. When behaviors worsen, many children receive clinical diagnoses and are referred for treatment. The reasons underlying these behaviors can prove complex, but many behaviors have roots in sensorimotor functioning.*

Treatment for these sensorimotor deficits or delays increasingly includes medications, structured activities, and indoor, synthetic sensory experiences (i.e. sensory bins, ball pits, etc.). Although well intentioned and often helpful, these activities may not provide the full depth of sensory experience required for a child to develop a healthy nervous system.

Children's nervous systems are unique and not yet fully developed. As a result, one type of sensory input can over-stimulate some children and under-stimulate others. In response to the stimulus, children often behave in ways that allow them to increase or decrease sensory input. To adults, this may look like "acting out" or "naughty" or "unexpected" behavior, but frequently the child is simply trying to regulate his nervous system.

*Note that behaviors arise because of complex factors; some are linked to sensory processing. If you observe significant dysregulation, the child and family may benefit by consulting with an occupational therapist.

A fence or screen with a peek hole allows children participate from a distance.

In short, the child's behavior represents an attempt to communicate or meet a need. Many children do not have words to express their needs. They cannot say why they want to change their level of input. Adults can "play detective," observing what happened before, during, and after the behavior. What elements in the environment offer clues? Parents and caregivers can also ask what other activities could help the child "regulate" his or her behavior. Once these patterns become clearer, adults can guide children toward experiences they need to self-regulate.

How do we help children develop healthy nervous systems so they can respond to sensations presented in their daily lives? Adults can set clear limits before nature-based activities, let them know about upcoming transitions, and open and close activities with a clear process to check in and check out. This includes processing with kids the activity itself, as well as hearing the fears and lessons they experience.

Adults can also recognize the benefits they receive by taking some time outside. Calm, responsive adults interact better with children. What if all children experienced daily opportunities of outdoor, nature-based play, movement, exploration, and awe? As you work with young children, use the questions on the next page to fine-tune your "sleuthing" skills. Chances are you'll discover creative ways to help children get the experiences they need.

Ideas for Low-Cost Outdoor Sensory Play

Spending quality time in nature doesn't require a field trip. These ideas can happen right outside your door. Share these ideas with families, too.

Sand play promotes visual discernment, touch (texture and temperature), "heavy work" to fill and lift containers, and balancing on uneven surfaces.

Step stones or "wooden cookies" (thin, flat slices of a tree trunk or branch) promote balance and coordination. Kids learn social skills while arranging them into paths.

Building fairy houses requires fine motor skills, visual discernment, and imaginary play. Supply materials like maple seeds (the ones with "wings"), sticks, bark, pebbles, pine cones, nuts, acorns, and colorful yarn. Kids will take care of the rest.

Outdoor water painting require children to use hand-eye coordination along with creative expression. Just use water—no paint necessary! The motion of the arm crossing the midline of the body while using a paintbrush (try a figure-eight pattern!) can help integrate sensory input.

Cairn building (stacking rocks of different sizes and textures) exposes children to textures, weight, balance, and creativity. Talk about the ancient history of using cairns to mark trails and paths.

Container plants allow children to carry water, look for insects, and examine plant growth. Children who grow their own food are more likely to eat fresh fruits and vegetables.

A hula-hoop tunnel promotes gross motor work and sensory input across the front of the body (when children crawl across the ground). Kids can also grow bean or flower vines up the sides of the tunnel.

A fence or screen with a peek hole allows children with sensory differences participate from a distance.

A "sleuth's" guide to discovering children's sensory needs

Behaviors that can communicate a sensory and/or emotional need (the two are often linked)	What those behaviors might tell you*	Questions to consider
Over aroused: • Hyper verbal (talking a lot and can't seem to stop) • Fidgeting • Impulsivity • Running into things • Silliness (cannot seem to stop) • Irritability • "Meltdowns" • Refusals • Flight/fight/freeze • Aggressive toward self/others • Destroying property **Under aroused:** • Avoidant (often perceived as "not listening") • Quiet • Pre-emptive rejection	I am frustrated by this difficult task This is too hard or too intense I'm scared I'm uncomfortable I'm overwhelmed I can't control myself I can't trust you I'm a bad kid	What feelings might the child experience right now? What feelings are you (the adult) having right now? Are you feeling stressed because of other life issues? Are you able to take a moment to take a few deep breaths and refocus? What are the sensory qualities of the environment? What sights, sounds, smells, touch sensations, and physical demands are present? Is the child able to meet these demands and tolerate the sensory components? • Is the child registering these sensory inputs? • Is the child over- or under-sensitive to these inputs? • What does the child do to have sensory needs met? (e.g., slam door, punch pillow, flee) What are the demands or attributes of the **task** that might elicit this response? Does the child have the motor skills to meet the demands?
"Aggressive" • Hard playing, physical	Where's my body? I need more input to feel regulated/calm.	Is the child under-registering proprioceptive input? That is, does the child know where his or her body is in space? Is the child trying to mitigate another sensory difference, such as over- or under-sensitivity to light, sound, touch, crowds or strong smells?
"Holds it together" in the school or after-school environment but behaviors emerge when at home or in a different environment (e.g., less structured, more comfortable, with distinct inputs than the more structured environment)	I have used a lot of energy and have met the demands of school, but I have met my limit. I am now struggling to self-regulate in a space I consider safe and less structured (e.g., home).	What are the demands the child is meeting during the day? What level of effort does this take for *this* child? What is the level of structure (routines and rituals) in the environment outside of school or after-school? Are there clear limits and expectations? Examples of questions to explore: • How well and how long did the child sleep last night? • When is the last time he/she ate? Was there a lot of sugar? • How recently has the child had physical activity? • Has the child spent a lot of time watching TV or on electronic devices?

*Note that this set of behaviors and possible questions is meant as a simple guide to behaviors that are commonly linked to sensory processing. If you observe significant dysregulation, the child and family may benefit by consulting with an occupational therapist.

Madison, Wisconsin is one of seven US cities participating in an initiative to provide all children with opportunities to spend time in nature. Sponsors include Public Health Madison & Dane County; Madison Parks; the Children and Nature Network; the National League of Cities | Institute for Youth, Education & Families; and the Wisconsin Department of Health Services.

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