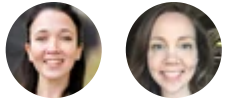




## Sensory Integration: How the Brain Processes Your Senses, and Why Some People Struggle With It

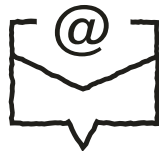


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### Key takeaways:

- Sensory integration (also called sensory processing) is how we identify information coming in from our senses, organize it, and respond. It helps us understand how to act in specific situations.
- Some people struggle with sensory processing. They may be hypersensitive to stimulation or have a sensory processing disorder.
- Self-regulation strategies — such as identifying overwhelming sensations and accommodating our space or habits to ease them — can help address sensory



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Imagine you're in a familiar room, talking with a friend. You sit in a comfortable chair. You're not hungry. It's quiet. And you're not in a rush to leave.

Now imagine the same conversation in a crowded room. Loud music plays. You shift your body as other people move around you. You're hungry and a bit late to the next place you have to be.

Carrying the conversation is more challenging, right? But if you can still hear your friend, focus on the conversation, and move your body without overwhelm, you're doing so because of *sensory integration*.

## How does sensory integration work?

[Sensory integration](#) (or sensory processing) is how our brain identifies information from our senses, organizes it, and reacts. It helps us filter out unnecessary information. And it helps us appropriately respond to the people and things around us.

Our senses constantly scan the world around us:

- **Smell:** The olfactory bulb [in our nose](#) transmits odors to the frontal cortex in our brain.
- **Sight:** The retinas in our eyes send visual information [across the visual cortex](#).
- **Hearing:** The [auditory cortex](#) absorbs sound from our ears.
- **Taste:** Taste buds in your mouth sense flavors.
- **Touch:** Sensors in your skin tell you about textures, temperature, and pressure.
- **Vestibular:** This is your sense of movement and balance. It tells you where you are in space and allows you to move smoothly.
- **Proprioception:** This sense tells you where your body parts are in relation to each other.

- **Internal senses (interoception):** The sense of what's going on inside of your body, like whether you are hungry, thirsty, or need to go to the bathroom.

[Your brain](#) takes in all of this complex information and organizes it. This helps you know what needs your attention and what you can ignore. It also alerts our central nervous system if a stimulant needs attention. And it triggers our autonomic nervous system's [fight-or-flight response](#) when necessary.

With the help of sensory integration, we understand how to respond to the scenario in front of us. It also helps us experience the world as a whole rather than as thousands of unique sensations.

## What are examples of sensory integration?

Sensory integration is a complex neurological process. And it happens every second we're alive.

Here are some examples of how sensory processing helps us function:

- We're standing on a sidewalk when a bicycle speeds in our direction. Our brain processes the distance and speed of the bike and where our body is on the sidewalk. If we recognize danger, we jump out of the way.
- We're concentrating on a task when someone taps us on the shoulder. We sense that the touch is gentle and are not afraid as we turn to see who's there.
- We sit in a garden, talking with a friend. We see the greenery around us as one unit rather than as individual flowers, leaves, and blades of grass. Because of this, we can focus on looking at our friend.
- We're walking down a hallway with a colleague. We're aware of those working around us. And so, we speak at a low volume our colleague can still hear.

Our response to a situation is even more accurate when many of our senses work together. For example, we're much [more likely](#) to run for shelter from an earthquake when we both hear and feel its rumbles.

## Why do some people have a hard time with sensory integration?

We don't know for sure. There's evidence that up to [16% of the general population](#) have challenges with sensory processing. When these challenges get in the way of taking an active part in the world, it's sometimes called a [sensory processing disorder](#) (SPD).

People with [sensory processing disorder](#) have significant problems with sensory integration — to the point where it affects their ability to function. Though experts don't know for sure what causes SPD, there's evidence that it could be [related to](#):

- Genetics
- Premature birth or mild brain damage during the birth process
- Environmental factors
- Lack of stimulation in infancy and early childhood

Other [studies suggest](#) that central and autonomic nervous system impairments may play a big part. This means that people with certain mental and physical health conditions might be more likely to have trouble with sensory integration. Examples include:

- **Autism:** Over [90% of children](#) and [95% of adults](#) with autism report at least one sensory processing issue. Having too big — or too little — reactions to sensory input is one of the many [diagnostic symptoms for autism](#).
- **Attention-deficit hyperactivity disorder (ADHD):** Sensory integration issues are [common](#) among children with ADHD.
- **Autonomic nervous system disorders:** Autonomic syndromes, like [postural orthostatic tachycardia syndrome](#) (POTS) and [autonomic neuropathy](#), disrupt sensory integration. Sometimes, [autoimmune diseases](#), cancers, Parkinson's disease, and diabetes may also trigger sensory dysregulation.
- **Mental health disorders:** [Anxiety disorders](#) and [post-traumatic stress disorder \(PTSD\)](#) sometimes involve hypervigilance, when you're overly tuned into your surroundings. This can make sensory integration more challenging.

## What does it look like when someone has problems with sensory integration?

Sensory integration problems aren't one size fits all. Experiences differ from person to person.

But someone who has difficulty with sensory integration may:

- Be particularly sensitive to light, noise, or movement
- Not notice common levels of touch, sound, and other stimuli, or may need a high level of stimulation to recognize them
- Crave stimulation, or be unsatisfied by the level of sensory activity around them
- Have trouble identifying specific stimuli, like the different sounds in “bat” and “cat” or the intensity of a touch
- Have poor balance or coordination, especially when learning new things
- React strongly to sudden changes in their environment
- Have behavior problems, or trouble functioning at work, school, or home

## Can therapy help with sensory integration?

Possibly. There’s some evidence that [sensory integration therapy](#) may be helpful for people with SPD.

Therapy may be able to help you:

- Spot sensory triggers
- Find changes you can make to your environment
- Learn strategies for calming yourself when you are overwhelmed

Sensory integration therapy also usually includes physical tasks and exercises that help your brain practice sensory integration. For example, your therapist might expose you to different sensations in a controlled, supportive way.

Over time, it’s possible that these practices can encourage your brain to adapt and grow — and get better at sensory integration. If you think you may have a sensory processing disorder, consider reaching out to your healthcare provider. They can help diagnose and point you toward effective integration strategies to suit your needs.

# What are some ideas for sensory self-regulation?

Self-regulation is your ability to control your actions or change your mood and energy level. Sensory self-regulation strategies are specific to each person. A licensed occupational therapist can offer personalized treatment for those with SPDs.

But these steps can help improve sensory integration:

- **Find patterns:** Do you often feel overwhelmed by your senses? Or need a lot of stimulation to focus? Does it take a while for you to notice activity? Or are you always looking for something to hold your attention? Find patterns in your sensory processing issues. Then, adopt new strategies to counter them.
- **Reconsider your space:** What changes to your home, school, or workplace will help ease those identified sensory patterns? Can you change the light, noise, smell, or textiles around you to energize or calm your senses?
- **Try sensory processing activities:** A [long list](#) of fun and dynamic activities can help encourage sensory integration. For example, you can reorganize stimulating spaces to encourage focus, try new physical activities to release excess energy, or practice breathing and meditation to help calm sensory overwhelm.
- **Find adaptive tools:** Sensory integration products (like fidget spinners, weighted blankets, earmuffs, and light filters) can stimulate or soothe your senses. They can be especially beneficial during sleep so that your body gets the rest it needs.

## The bottom line

Sensory integration is a complex process where your brain takes in sensory information and organizes it — so that you can react appropriately to the environment around you. But problems with sensory integration can make it hard to focus, communicate, or take part in the world.

If you struggle with sensory processing, there are ways to find and adjust your space and patterns. And if you have a sensory processing disorder, an occupational therapist can help you with coping strategies.

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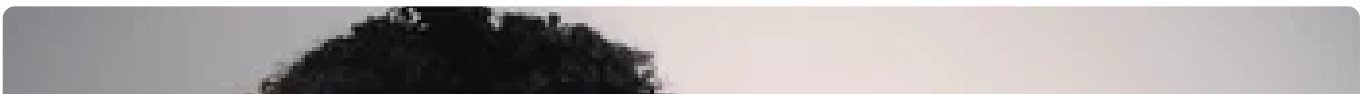
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