

# From Neurological to Genetic Factors: The Science Behind Sensory Hypersensitivity

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## ABOUT THE STUDY

Sensory hypersensitivity refers to an increased sensitivity to sensory stimuli, such as light, sound, touch, or taste. Individuals with sensory hypersensitivity may experience discomfort or even pain when exposed to sensory inputs that most people would find tolerable. This condition is commonly seen in several neurological and psychological disorders and understanding its primary causes can help improve the management and treatment of affected individuals.

### Primary causes of sensory hypersensitivity

**Neurological disorders:** Many neurological conditions are associated with sensory hypersensitivity. One of the most common is Autism Spectrum Disorder (ASD). Individuals with ASD often have heightened sensitivity to sensory inputs. This hypersensitivity is believed to be due to differences in how their brain processes sensory information, possibly caused by atypical development in brain areas responsible for sensory integration.

Sensory Processing Disorder (SPD) is another condition that results in sensory hypersensitivity. Individuals with SPD have difficulty processing and responding to sensory information in a way that is typical for most people. This can cause them to be overly sensitive to certain sensations or, conversely, to seek out additional sensory input in an attempt to self-regulate.

**Trauma and stress:** Exposure to traumatic events or chronic stress can lead to an increased sensitivity to sensory stimuli. The body's response to stress involves the activation of the Sympathetic Nervous System (SNS), also known as the "fight or flight" response. In individuals with a history of trauma or ongoing stress, this system may remain hyperactive, making them more sensitive to sensory inputs.

Post-Traumatic Stress Disorder (PTSD) is an example of a condition where trauma can lead to sensory hypersensitivity. In this condition, individuals may experience heightened sensitivity to sounds, lights, or even touch due to the brain's altered response to stress and danger cues.

**Chronic pain conditions:** Conditions that involve chronic pain, such as fibromyalgia or migraines, are often associated with sensory hypersensitivity. In these conditions, the body's pain processing system becomes overly sensitive, and even non-painful stimuli, like light or sound, may cause discomfort. This phenomenon is called central sensitization, where the nervous system becomes more responsive to stimuli over time. As a result, individuals with chronic pain conditions may experience sensory hypersensitivity as part of their overall condition.

**Genetic factors:** There is evidence to suggest that genetic predispositions can play a role in the development of sensory hypersensitivity. Some individuals may have inherited variations in sensory processing pathways, making them more susceptible to heightened sensory responses. For example, certain gene mutations can affect the way sensory information is transmitted and processed in the brain, contributing to sensory hypersensitivity.

**Medication side effects:** Certain medications, especially those that affect the nervous system, may contribute to sensory hypersensitivity. For example, antidepressants and antipsychotics, as well as opioid medications, can alter sensory perception in some individuals. These medications can affect the way the brain processes pain, light, sound and touch, leading to heightened sensitivity.

**Sensory overload:** Sensory overload occurs when there is an overwhelming amount of sensory input that the brain cannot process effectively. While this is not a primary cause of sensory hypersensitivity on its own, it can exacerbate the condition in individuals who are already prone to heightened sensitivity. Environments with excessive noise, bright lights, or strong smells can trigger sensory overload, leading to feelings of distress and discomfort.

Sensory hypersensitivity is a condition that can arise from a variety of causes, including neurological disorders, trauma, chronic pain conditions, genetic factors, medication side effects and sensory overload. Each of these factors can alter how the brain processes and responds to sensory input, leading to an

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exaggerated response to stimuli. Understanding the primary causes of sensory hypersensitivity is necessary for developing effective management strategies and improving the quality of life

for affected individuals. With proper support and treatment, individuals with sensory hypersensitivity can better cope with their heightened sensitivities and lead fulfilling lives.