

# HYPOTHALAMIC NEWSLETTER

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## *Prosopagnosia; Face Blindness*

Prosopagnosia or face blindness is a type of brain disorder that is characterized by the inability to recognize faces. The term itself comes from the Greek words for “face” and “lack of knowledge.” Historically, the disorder was thought to be rare, but because of more recent research, it was found that it can affect as many as one in fifty people. Many sources also say that it is estimated to affect about two percent of the population.

### **Causes**

Many things can cause prosopagnosia, some of which include traumatic brain injury, stroke, or certain neurodegenerative diseases. It can also stem from

abnormalities or damage in the right fusiform gyrus which is a part of the temporal lobe that correlates neural systems that control memory and perception. In other words, it is the part responsible for our ability to recognize our friends, family, and past acquaintances.

### **Manifestations**

Prosopagnosia can manifest itself in various ways in various people. Depending on the degree it affects them, some people with prosopagnosia may only have difficulty recognizing a familiar face. Other people might not be able to distinguish between the faces of strangers, while some

people may not even be able to differentiate a face from an object. Some people with the disorder are not even able to recognize their own face.

Prosopagnosia itself, however, is not related to memory issues, impaired vision, or learning disabilities. In many cases it is a congenital disorder that a person is born with without any brain damage. This type of face blindness runs in families and is likely a result of a genetic mutation. Some degree of prosopagnosia is also often present in children with autism or Asperger's which is usually one of the causes of the impaired social development in these children.

### **Effects of Prosopagnosia on People and Treatment**

As one can likely guess, face blindness can be socially crippling. There is also no cure to the disorder. Since most people with prosopagnosia often can't fully recognize family members and close friends, they often use other ways to identify them. For one, they can rely on voice and differentiate between

As one can likely guess, face blindness can be socially crippling.

There is also no cure to the disorder. Since most people with prosopagnosia often can't fully recognize family members and close friends, they often use other ways to identify them. For one, they can rely on voice and differentiate between the pitches and sounds of people's voices, especially those they know fairly well.

They can also take clothing or unique physical qualities of different people into account. These are, however, not as effective as recognizing a face would be. For example, children who are born with prosopagnosia have never had a time when they could recognize faces which makes it more difficult for them in the long run. The focus of almost all treatments for people with facial blindness is focused on helping the individual develop strategies and clues to use to recognize people.

The social implications of the disorder themselves, however, can be terrifying for affected individuals.

A person with facial blindness may avoid social interaction and develop social anxiety disorder or even an overwhelming fear of social situations. Many also have difficulties in forming relationships and for some the disorder can cause problems with their career and day to day life. Feelings of depression are also common.

### **Living with Prosopagnosia and Ways to Cope**

As mentioned before, prosopagnosia can have a severe impact on everyday life. Though there's no specific treatment for prosopagnosia, researchers are still continuing to investigate what causes the condition, and develop training programmes for the affected individuals that help them develop workarounds.

## *Speed of Information Transmission in the Brain*

Neurons send messages electrochemically. This means that chemicals in the body cause an electrical signal. Electrically-charged chemicals, also called ions, are essential to the nervous system as they ensure that nerve impulses can be sent in the body. To understand how fast nerve impulses are transmitted in our nervous system, we need to find out how fast these ions move from one neuron to the other.

The speed at which an electrochemical impulse propagates down a neural pathway is also known as the nerve's Conduction Velocity (CV).

Ultimately, the conduction velocities of neurons are specific to each individual and depend largely on an individual's axon diameter and the degree to which that axon is myelinated, but the measurement of

these values typically fall within defined ranges across individuals.

Normal impulses in peripheral nerves of the legs travel at 40–45 m/s, and 50–65 m/s in peripheral nerves of the arms. Largely generalized, normal conduction velocities for any given nerve should fall in the range of 50–60 m/s.

Nerve impulses are extremely slow compared to the speed of electricity, where the electric field can propagate with a speed on the order of 50–99% of the speed of light. However compared to the speed of blood flow, nerve impulses are extremely fast with some myelinated neurons conducting nerve impulses at speeds up to 120 m/s (432 km/h or 275 mph).

Still, conduction velocities are affected by a wide array of factors, which include; age, sex, and various medical conditions. The ability to predict normal values in the context of an individual's anthropometric characteristics increases the sensitivities and specificities of electrodiagnostic procedures.

Normal 'adult' values for conduction velocities are typically reached by age 4. Conduction velocities in newborns and toddlers tend to be about half the adult values. Tall individuals also tend to have lower conduction velocities.

It is important to know and study the speed of nerve impulses in different individuals and social groups. This allow for better diagnoses of various neuropathies, especially demyelinating diseases which may reduced or completely cut off conduction velocities.

## *Photographic Memories*

Have you ever wished you had a photographic memory? A lot of people would love to possess the ability to be able to remember details as accurately as possible. Although scientists have not gathered enough evidence to fully prove that photographic memories

exist, they still hypothesize that they can theoretically be possible.

A type of memory that we all have is called eidetic memory. It is basically a precursor to your short-term memory. When you make a new memory, it is temporarily an eidetic memory where it is stored for only a couple of seconds before transferring into short-term memory. From there the memory can be stored for a while before becoming a long-term memory. The thing with eidetic memories is that they are not stored as actual pictures but as information. This is why there are discrepancies when trying to remember something. Since the picture that your eyes capture disappear as quick as a blink of the eye, user collection of these memories are hazy to many people.

Eidetic memories contrast from photographic ones since photographic memories are stored as pictures in either the short or long-term memory and not just information. That is where the term photographic memory comes from; the individual

can recall information just as they saw it initially instead of vaguely remembering something.

However, there are still debates among the scientific community about the validity of photographic memories. Some people are skeptical about them since there is not enough evidence to prove them. In fact, when some people who think they have photographic memories were asked to recite a couple lines of text they were shown in reverse order, they were not able to complete the task.

This should have been easy and quick if they truly had photographic memories, however there was hesitation and they participants had to thoroughly think about the text they were shown to determine the reverse of it. This shows how photographic memories might not truly be real. Despite that however, people can still work on improving their regular eidetic memory in various ways.

During a DBS procedure, they insert neurotransmitters which send electricity to different parts of the brain. Another implant called Stentrode is a nano electronic strand of electrodes that first start off as a liquid and then progressively hardens into a substance.

Stentrodes are inserted in the blood vessels and with the use of catheter angiography, these make it a lot more low risk and don't need a full open skull surgery. These tiny devices can track the state of neurons wirelessly and these devices are very common in many patients who are paralyzed. The last implant is called a bioresorbable implant are very thin electric sensors that can melt away and be absorbed by the body. These electric sensors can track the state of the skull and brain after surgery or injury and can also frequently monitor temperature and pressure.

This makes it a lot easier so there's no need to have more surgeries to remove it when it naturally goes away.

Brain Implants might work for some people, might not work for others. This can come down to many factors: cost, procedure, side effects, etc.

Some pros of Neural Implants are how they can help minimize your symptoms, treatment, and have a very high rate of success after the procedure. Neuro Implants can help decrease your need for medication and many people who get it tend to have lived their best lifestyle and increase their energy.

Neural Implants aren't that common amongst people due to cost, surgery process, prognosis, and the multiple side effects. These implants can be crazy expensive, even with insurance help, it can still range from a few thousand up to 100,000. Even with patients having the cost covered the actual surgery can be frightening due to the patient being conscious during the procedure as they make incisions in the scalp. In every surgery there's always risks.



Even with the high success rate, the complexity of the brain can cause many complications. These complications can go from bleeding, stroke, and can gather fluid in the brain. After the device has been placed in the brain, overtime the implant can end up having a malfunction or in need of a replacement in battery.

To prevent this, these implants need to be monitored regularly. There are many positives and negatives when it comes to brain stimulation so it can ultimately be a tough decision for the patient.

All of these brain implants have definitely made an impact on many people's lives and each of them serve a purpose to help fight back and challenge all sorts of neurological conditions.

## *What is Chronic Fatigue Syndrome?*

Chronic Fatigue Syndrome (CFS), which is sometimes referred to as Myalgic Encephalomyelitis (ME), or

more recently Systemic Exertional Intolerance Disease (SEID) is described as a complicated disorder. As its name states, it involves extreme fatigue, however, this type of fatigue lasts for at least six months and can not be explained by any underlying medical condition. Even more bizarre is the fact that this tiredness gets worse with physical or mental activeness but can't be improved with rest.

The condition affects multiple body systems, including the nervous system, the immune system, and how the body produces energy. CFS mostly impacts young adults between the ages of 20 to 40 years old. It affects females more than males at a 4 to 1 ratio, however, this ratio could also be due to the fact that women are more likely to inform their doctor of their symptoms. What causes Chronic Fatigue Syndrome is not known but many theories have been placed forth. Some have observed patients developing the syndrome following viral infections. Leading them to believe that viruses

such as the Epstein-Barr virus and the Human Herpes Virus 6 may trigger the condition.

Other experts also view hormonal imbalances as a trigger. This is because they have observed patients with the syndrome sometimes have blood levels with abnormal hormone levels originating from the hypothalamus, the pituitary glands, or the adrenal glands. However, how significant these hormone irregularities are in connection to the disorder is unknown. Others also believe that physical or emotional trauma which is experienced in some patients shortly before their symptoms begin is a trigger. Then there are also the experts who believe that the disorder is caused by a combination of different factors.

To diagnose a person with the syndrome, multiple medical tests need to be performed which work to rule out different health problems with similar symptoms. CFS has differing symptoms depending on the person affected, and how severe they are expressed varies from day to day.

The most obvious symptom of the condition is fatigue. Other symptoms include issues with one's memory or concentration, headaches and sore throats, muscle or joint pain that is unexplained, sleep that leaves one unrefreshed, and, intense exhaustion following mental or physical activeness. As previously notes, people with the condition have serious fatigue and sleep problems. Their condition worsens as that affected try to do as much as they can or need to do. The name for this symptom is post-exertional malaise or PEM. Hence the alternative name for the condition Exertional Intolerance Disease

CSF leads to many complications. Some of these complications include lifestyle restrictions. Most people affected by the disorder will be bedridden due to their tiredness. Thus leading to other complications such as increased absences from work, becoming socially isolated, which then ultimately leads to depression.

With all that has been said, there is,



unfortunately, no cure for this condition. Treatment generally focuses on relieving the patient of their symptoms. There are some things that a patient could do to aid in their short-term recovery. This included cutting back on one's responsibilities, eating well, drinking enough water, taking multivitamins, and utilizing relaxation techniques such as yoga or meditation.

## Sources

Centers for Disease Control and Prevention. (n.d.). Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS). CDC. Retrieved May, 2022, from <https://www.cdc.gov/me-cfs/index.html>

Eidetic Memory Vs. Photographic Memory. (n.d.). BetterHelp. Retrieved May, 2022, from <https://www.betterhelp.com/advice/memory/difference-between-eidetic-memory-and-photographic-memory/>

*How to Get a Photographic Memory: Is It Even Possible?* (2020, February 27). Healthline. Retrieved May, 2022, from <https://www.healthline.com/health/mental-health/how-to-get-a-photographic-memory#how-it-works>

*Nerve conduction velocity.* (n.d.). Wikipedia. Retrieved May, 2022, from [https://en.m.wikipedia.org/wiki/Nerve\\_conduction\\_velocity](https://en.m.wikipedia.org/wiki/Nerve_conduction_velocity)

NHA. (n.d.). *Prosopagnosia (face blindness)*. NHS. Retrieved May, 2022, from <https://www.nhs.uk/conditions/face-blindness/>

Squire, L. (2013, April 17). Is photographic memory real? If so, how does it work? BrainFacts. Retrieved May, 2022, from <http://www.brainfacts.org/Ask-an-Expert/Is-photographic-memory-real>

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