What is Neurodiversity?

Neurodiversity refers to the idea that neurological differences, such as those seen in autism or ADHD, reflect normal variations in brain development. Neurodiversity is often contrasted with the "medical model," which views conditions like autism or ADHD as disorders to prevent, treat, or cure. There has been a push to move away from this idea of pathology and more toward a more nuanced perspective with variations of what is "normal."

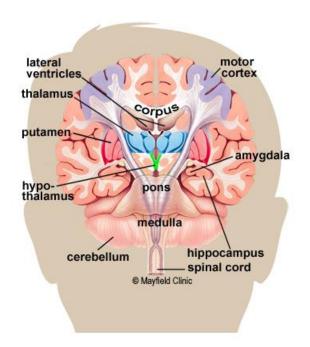
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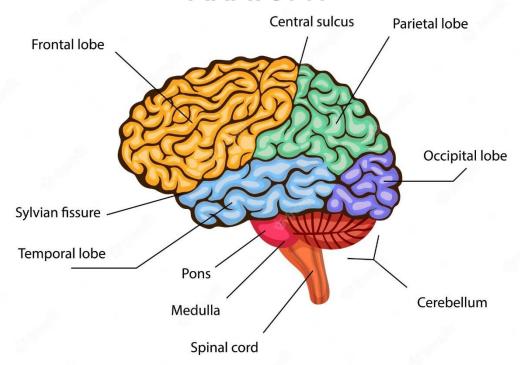
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HUMAN BRAIN ANATOMY



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Cerebrum:

Is the large "jello-like" part of the brain. This consists of the left and right hemisphere of the brain and performs higher functions like interpreting touch, vision, and hearing, as well as speech, reasoning, emotions, learning, and fine control of movement.

Cerebellum:

Located under the cerebrum, this piece coordinates muscle movement, maintaining posture, and balance.

Brain stem:

This is consumed by the pons and medulla, which act as a relay center connecting the cerebrum and cerebellum to the spinal cord. It performs many automatic functions such as breathing, heart rate, body temperature, wake and sleep cycles, digestion, sneezing, coughing, vomiting, and swallowing.

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https://studentnews.manchester.ac.uk/2023/03/13/successful-people-with-neurodivergent-disabilities/

Frontal Lobe:

- · Personality, behavior, emotions
- · Judgment, planning, problem solving
- Speech: speaking and writing (Broca's area)
- Body movement (motor strip)
- Intelligence, concentration, self awareness

Parietal Lobe:

- Interprets language, words
- Sense of touch, pain, temperature (sensory strip)
- Interprets signals from vision, hearing, motor, sensory and memory
- Spatial and visual perception

Occipital Lobe:

• Interprets vision (color, light, movement

Temporal Lobe:

- Understanding language (Wernicke's area)
- Memory
- Hearing

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Sequencing and organization

Pons:

As a part of your brainstem, this structure links your brain to your spinal cord. It handles unconscious processes and jobs, such as your sleepwake cycle and breathing. It also contains several junction points for nerves that control muscles and carry information from your senses in your head and face.

Medulla:

Is the bottom most part of your brain. Its location means it's where your brain and spinal cord connect, making it a key conduit for nerve signals to and from your body. It also helps control vital processes like your heartbeat, breathing, and blood pressure.

Hypothalamus:

Is located in the floor of the third ventricle and is the master control of the autonomic system. It plays a role in controlling behaviors such as hunger, thirst, sleep, and sexual response. It also regulates body temperature, blood pressure, emotions, and secretion of hormones.

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Thalamus:

Serves as a relay station for almost all information that comes and goes to the cortex. It plays a role in pain sensation, attention, alertness and memory.

Short-term memory,

also called working memory, occurs in the prefrontal cortex. It stores information for about one minute and its capacity is limited to about 7 items. For example, it enables you to dial a phone number someone just told you. It also intervenes during reading, to memorize the sentence you have just read, so that the next one makes sense.

Long-term memory

is processed in the hippocampus of the temporal lobe and is activated when you want to memorize something for a longer time. This memory has unlimited content and duration capacity. It contains personal memories as well as facts and figures.

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Skill memory

is processed in the cerebellum, which relays information to the basal ganglia. It stores automatic learned memories like tying a shoe, playing an instrument, or riding a bike.

Amygdala:

Your amygdala is a small part of your brain, but it has a big job. It's a major processing center for emotions. It also links your emotions to many other brain abilities, especially memories, learning, and your senses. When it doesn't work as it should, it can cause or contribute to disruptive feelings and symptoms.

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What do different brain scans look like with different conditions?

Compare to the parts of the brain to see which places it affects!

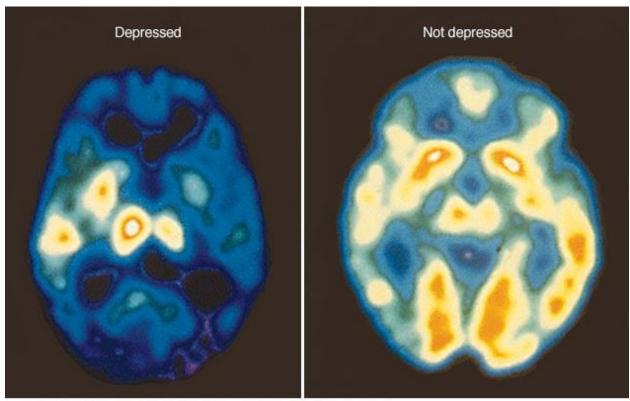
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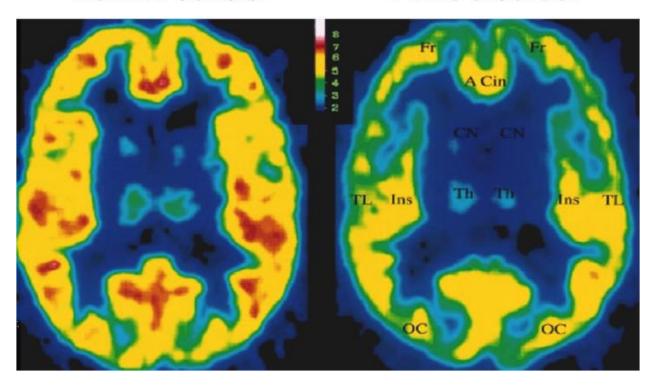
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Normal control

Panic disorder



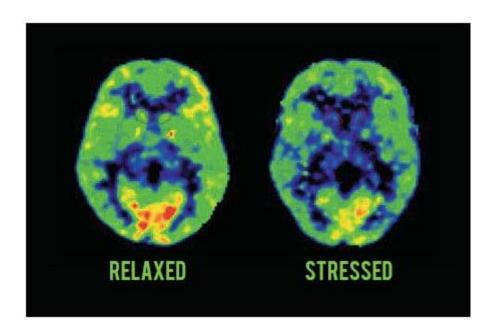
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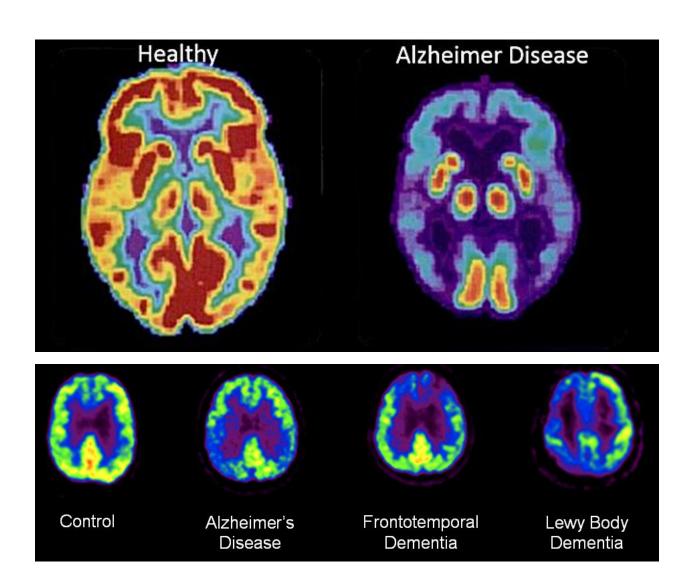
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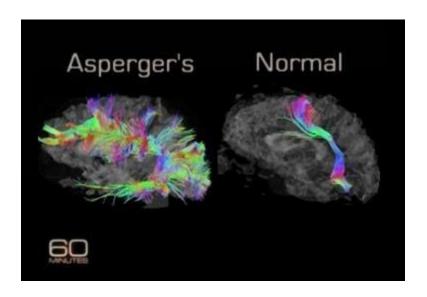


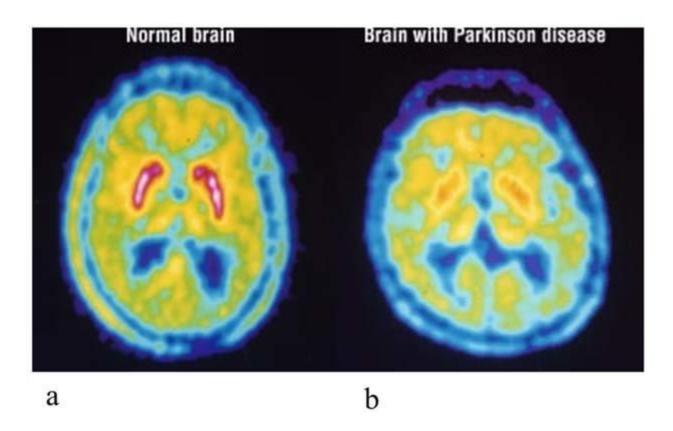
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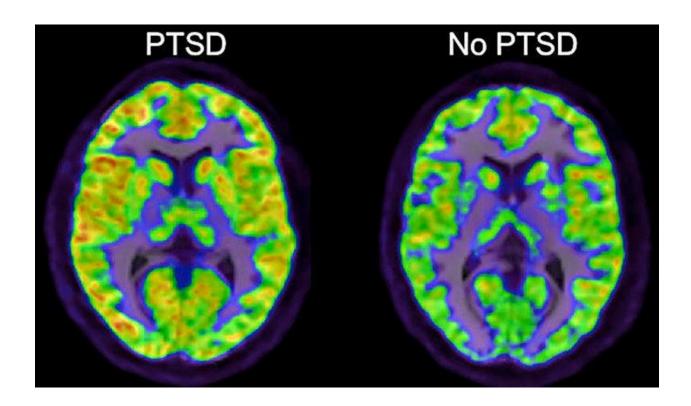


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Cognitive vs. Mental Health: Knowing the Differences

Cognitive:

https://www.psychologytoday.com/us/blog/seeing-what-others-dont/202307/cognitive-diversity-what-it-is-and-why-it-matters

Mental Health:

https://www.psychologytoday.com/gb/blog/pathways-progress/202108/is-there-link-between-neurodiversity-and-mental-health

These two articles provide good insight to both the cognitive aspect and the mental health aspect of neurodiversity!

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TED Talk:

"Neurodiversity: The New Normal - Cynthia Coupe"

Neurodiversity: The New Normal | Cynthia Coupé | TEDxOcala - YouTube

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Neurodivergent celebrities that you might have not known

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Temple Grandin-

Mary Temple Grandin is an autism and animal rights activist. She has earned multiple degrees, including a doctoral degree in animal science in 1989, and has taught the Graduate Animal Behavior and Welfare program at Colorado State University for 25 years.

Grandin did not speak until she was almost 4 years old and underwent speech therapy in kindergarten, but she was not formally diagnosed with autism until she was an adult. She has discussed social difficulties she faced in school, as well as the development of her special interest in cows when she was a teen on her aunt's farm.

In college, she developed the squeeze machine, or hug box, as a therapeutic device for herself after noticing the calming effect of squeeze chutes on cows. Therapy programs continue to use similar deep-pressure devices for people like Grandin who suffer from hypersensitivity, which can cause discomfort when receiving hugs from people.

Grandin went on to publish 14 books on both autism and animal science and is featured in multiple documentaries. She has been inducted into many prestigious organizations, including the Colorado Women's Hall of Fame and National Women's Hall of Fame.

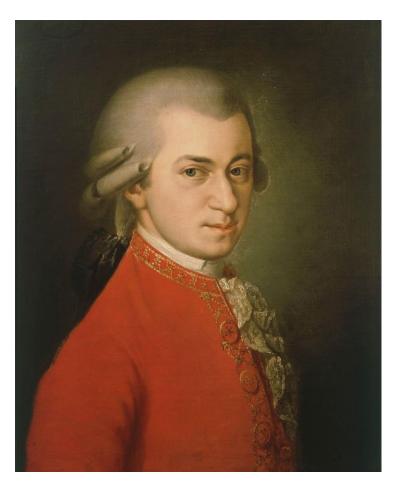
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Mozart-

Wolfgang Amadeus Mozart was a classical musician and composer whose work remains renowned centuries after his death. He composed more than 600 pieces of music, some of the best-known being "Eine kleine Nachtmusik" and his Symphony No. 40 in G Minor.

As a child, Mozart showed a prodigious talent for music and played alongside his sister at the imperial court in Vienna at the age of six. He displayed perfect pitch and musical memory, naturally coinciding with an extreme sensitivity to loud sounds.

Mozart was also known to fixate on vulgar language, experienced facial and motor tics, showed obsessive-compulsive tendencies and constantly fidgeted. This <u>2007 paper</u> speculated that his all-around "socially unusual behavior" and musical genius could be attributed to Tourette syndrome, ADHD or autism.

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Jennifer Aniston-

Jennifer Aniston is one of the highest paid actresses in Hollywood, and is best known for her role in Friends.

In a <u>2015 interview</u>, she revealed her struggle with dyslexia in an interview. She was diagnosed in her 20's, which only happened due to her getting prescription glasses.

"The only reason that I knew [that I had it] was because I went to get a prescription for glasses" she said. "I had to wear these Buddy Holly glasses. One had a blue lens and one had a red lens. And I had to read a paragraph, and they gave me a quiz, gave me 10 questions based on what I'd just read, and I think I got three right.

Then they put a computer on my eyes, showing where my eyes went when I read. My eyes would jump four words and go back two words, and I also had a little bit of a lazy eye, like a crossed eye, which they always have to correct in photos." Before being diagnosed, "I thought I wasn't smart. I just couldn't retain anything."

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Billie Eilish-

Billie Eilish is famous for her music and features in film soundtracks, such as James Bond No Time To Die. She was diagnosed with Tourettes when she was a child and exhibits physical tics.

She wrote on Instagram about it after fans published a <u>youtube video</u> of her tics. "I've never mentioned [my Tourette Syndrome] on the internet because nobody thinks I'm deadass," Eilish wrote on her Instagram story. "As well as the fact I've just never wanted people to think of tourettes every time they think of me."

She mentioned how the disorder has been a constant part of her life since she was a child.

"I've taught myself ways of suppressing my tics and certain techniques to help [reduce] them when I don't want to be distracting in certain situations," she wrote. "Wasn't planning on talking about this on here maybe ever, but it's gotten to a point."

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Simone Biles-

Simone Biles is an American gymnast who boasts 30 Olympic and World Championship medals. At a young age, she was diagnosed with ADHD.

She isn't ashamed of her ADHD, and tweeted that "Having ADHD, taking medicine for it is nothing to be ashamed of [and] nothing that I'm afraid to let people know"

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Cher-

Cher is an international pop star, actress, fashion icon and an author. As well as this, her life has been focused on campaigning, whether politically, to support animal liberation or helping disadvantaged people through the pandemic.

Cher has both dyscalculia and dyslexia. In school, she struggled with reading, numbers and calculation.

She said in her autobiography *The First Time* "I couldn't read quickly enough to get all my homework done and for me, math was like trying to understand Sanskrit".

"Almost everything I learned, I had to learn by listening. My report cards said that I was not living up to my potential".

When a fan asked, "If you could turn back time and change one thing, would it be to not have dyslexia?" Cher replied: "No! It caused pain, but it's me!"

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Bill Gates-

Bill Gates attended Harvard University, enrolled in pre-law and took multiple computer science and mathematics courses, but dropped out to co-found Microsoft; being the chairman, CEO, president and software architect. He is now one of the richest people in the world, and was listed in *Forbes* as the wealthiest person alive for 20 years in a row. He is now the fourth-richest person in the world, with a net worth of \$113 billion.

He has both dyslexia and ADHD and he has spoken openly about his struggles with mainstream education.

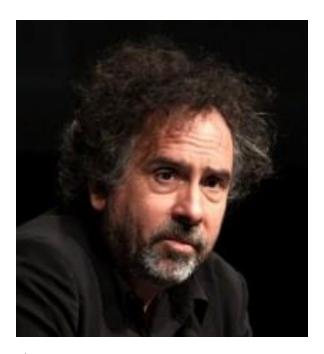
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Tim Burton-

Tim Burton is a filmmaker and screenwriter, known for his wacky and disturbing art. He began as an apprentice for Walt Disney Productions and then began making his own films. His famous works include Beetlejuice, Edward Scissorhands, The Nightmare Before Christmas, Sweeney Todd, Corpse Bride and recent series Wednesday. He has won an Emmy, a Golden Globe, and has been nominated for three BAFTA awards and two Academy Awards.

He also has autism and many attribute his creative genius directly to his autism.

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Steve Jobs-

Steve Jobs originally began his career as a technician, before developing the Apple enterprise. He started the operation from his bedroom and sold his car to fund the technology circuits. Apple now stands at a net worth of \$2.8 trillion, and Jobs was the co-founder, chairman and CEO of the company. At the time of his death, he held a net worth of \$10.2 billion.

Steve Jobs was diagnosed with dyslexia as a child and struggled severely in school, dropping out of college, arguing that mainstream education lacked practical application. Throughout his life, he remained an advocate for breaking away from conventional forms of learning and practice; 'you can't connect the dots looking forward, you can only connect them looking backwards.'

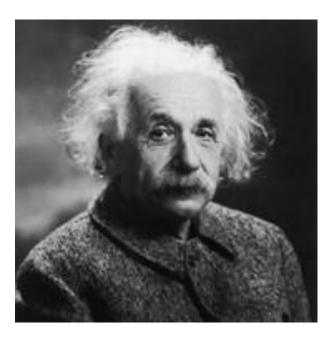
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Albert Einstein-

Albert Einstein was a theoretical physicist, acknowledged to be the greatest physicist of all time. He developed the theory of relativity and made large contributions to the theory of quantum mechanics. He also developed the E=M equation. He has been awarded the Nobel Prize in physics and had an element in the periodic table named after him (Einsteinium). Upon his death, his brain was removed and studied by neuroscientists for the source of his genius.

Whilst neurodivergent disabilities were not researched enough to be diagnosed during the life of Einstein, modern specialists researching him have diagnosed him with ADHD, dyslexia and autism.

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