Unraveling the biology of a mysterious condition: stuttering

February 20 2022, by Laura Ungar

Credit: Unsplash/CC0 Public Domain

Holly Nover grew up trying to hide her stutter.

"I was very self conscious," said the 40-year-old St. Johns, Florida mom, whose 10-year-old son Colton also has a speech impediment. "So I developed habits to switch my words so it wouldn't be noticed."

For centuries, people have feared being judged for stuttering, a condition often misunderstood as a psychological problem caused by things like bad parenting or emotional trauma. But research presented at a science conference on Saturday explores its biological underpinnings: genetics and brain differences.

"By understanding the biology, we're going to decrease the stigma. We're going to increase the acceptance," one of the speakers, Dr. Gerald Maguire, said in a recent interview with The Associated Press. He's a California psychiatrist who is involved in testing potential medications for stuttering based on the science.

Globally, 70 million people stutter, including President Joe Biden, who has spoken publicly about being mocked by classmates and a nun in Catholic school for his speech impediment. He said overcoming it was one of the hardest things he's ever done.

After a campaign event in 2020, his struggle came to the fore when he met a New Hampshire teen who also stuttered. Brayden Harrington said after his dad told him about Biden, he wanted to introduce himself and shake hands. They wound up talking for an hour.

Living with a stutter hasn't been easy, Brayden said, recalling a particularly difficult moment years ago when he got caught on words reciting the Gettysburg address in class, then went home and cried.

"I want to carry on what Joe Biden said to me," he said. "That this does not define you and that you can be much more than you see yourself as."

WHY DO PEOPLE STUTTER?

Stuttering has been documented as far back as ancient China, Greece and Rome. But no one really had any idea what caused it until modern

genetic science and brain imaging began providing clues.

Researchers identified the first genes strongly linked to stuttering more than a decade ago. Imaging studies peered into the brains of adults and older children, and in the last few years, University of Delaware speech disorder researcher Ho Ming Chow started looking at 3- to 5-year-olds. That's around the age many kids begin stuttering, with about 80% outgrowing it.

Chow said the imaging shows slight brain differences in young children who keep stuttering, compared with those who recover and those who never stuttered. He discussed his research Saturday at the American Association for the Advancement of Science conference.

For example, Chow and his colleagues found genetic mutations related to stuttering are associated with structural abnormalities in the corpus callosum, a bundle of fibers that connects the two hemispheres of the brain and ensures they can communicate; and the thalamus, a relay station that sorts sensory information to other parts of the brain. Past research has also linked stuttering to the basal ganglia, brain structures involved in the coordination of movement.

"We know stuttering has a really strong genetic component," Chow said. Though several genes may be involved and the exact genetic causes may vary by child, "they probably affect the brain in a similar way."

Chow's colleague Evan Usler stutters, and he likened it to "yips," or involuntary wrist spasms, during golf. He said the latest evidence shows it's a disorder of the cognitive control over speech.

Still, many people incorrectly believe people stutter because they are nervous, shy or suffered childhood adversity – and if they just tried harder, they could stop.

"We have a long way to go" to change such beliefs, said University of Maryland researcher Nan Bernstein Ratner. "There's still a lot of mythology out there."

MOVING AHEAD, WITH ACCEPTANCE

Speech therapy is the mainstay of stuttering treatment. But the medicines currently being tested could be approved for stuttering in the next few years, first for adults and later for kids, said Maguire, who has stuttered since childhood.

Studies have suggested that stuttering may be related to excess levels of a chemical messenger in the brain called dopamine, and some turn down dopamine activity or block its action in a particular way.

Nover, a speech pathologist active in the National Stuttering Association, said many people will surely be interested in trying stuttering medications – although not her. She is happy with her life as it is and has accepted her stuttering, she said. If Colton were struggling and wanted to try medication as a teen, however, she'd be open to the idea.

Brayden, now 14, wouldn't be.

Taking medicine is "just taking away a part of you…taking away part of your personality," he said.

Without his stutter, he said, he wouldn't have set his sights on being a speech and language pathologist when he grows up. He wouldn't have written a children's book to inspire others. And he wouldn't have overcome the challenges that made him brave.