

The New Science of Stuttering

Experts are reaching consensus on what the condition is. Now they're debating how best to treat it.

By Jack Tamisiea

Gerald Maguire always knew there was something different about his brain.

He remembers raising his hand in grade school to answer a question and struggling to say the words in his mind. Somewhere between his brain and his mouth, his words were diverted or damaged. The sounds that made it through were garbled and bracketed by extended bouts of strained silence.

His experience with stuttering eventually drove him to medical school, where he studied the neurological underpinnings of the speech disorder, which is marked by repetitions, prolonged sounds and silent blocks. Roughly 80 million people around the world stutter, but the causes remain poorly understood. For a long time, many medical experts perceived it as a behavioral quirk tied to nervousness, while others characterized it as a passing hiccup in language development that many children outgrow.

Over his career as a clinical psychiatrist, most recently at the University of California, Riverside, Dr. Maguire was surprised by the lack of attention the condition received. "I'm always shocked by how little physicians know about stuttering," he said.

To fill in these gaps, Dr. Maguire recently founded the Stuttering Treatment and Research Society, a nonprofit that aims to advance neuroscience research and therapy ap-

proaches for people who stutter. This year, he convened a panel of more than 30 researchers from around the world that included psychiatrists, neuroscientists, speech-language pathologists and people who stuttered to finally define what stuttering is and how best to treat it.

These meetings resulted in the first consensus medical guidelines on stuttering, published in August in *Psychiatric Times*. Nearly all of the panelists agreed that stuttering should be classified as a brain-based disorder that is related to psychiatric conditions like A.D.H.D. and Tourette syndrome. This conclusion was vindication for Dr. Maguire, who has searched for clues in the brain about stuttering for more than 20 years. "People would tell me that stuttering is all in my head and they were right, just not in the way they thought," he said.

Another near-unanimous conclusion from the panel: 90 percent of the participants rated current treatment for stuttering as only "fair" or "poor."

Traditional stuttering treatment typically involves speaking exercises with a speech language pathologist or speech therapist. Many experts argue these approaches are only somewhat effective and not in sync with the latest science.

But the best new strategies for treatment are still up for debate. Dr. Maguire and his team are experimenting with treating stuttering with psychiatric medications. Other scientists are exploring treatment

options as diverse as vitamin supplements and psychedelic mushrooms.

New scientific discoveries rarely translate to new treatments, according to Eric Jackson, a researcher at New York University who studies stuttering and deals with it personally, but was not involved in the new guidelines. "I would argue that the science on stuttering in the past 30 years has done very little, if anything, to improve speech therapy options for people who stutter," he said.

A Debate Over Treatment

As a person who stutters, I have tried for years to smooth out the rough contours of my speech. This has included several different types of speech therapy, support groups and a weeklong visit to a stuttering clinic where I broke down each word into monotone syllables that I stretched for seconds at a time (I found it difficult to use the technique in the real world). To decrease the tension I feel around my mouth while talking, I've listened to relaxation tapes, been hooked up to bio-feedback machines and practiced reciting poetry before presentations or job interviews.

Several of these approaches are aimed at decreasing what's known as disfluency, the snippets of stuttering that interrupt the flow of speech or block it entirely. Cutting down on disfluencies has been a focus of speech therapy for decades. Diane Paul, the director of clinical issues in speech-language pathology at the

American Speech-Language-Hearing Association, or ASHA, remembers learning early in her career to count disfluencies to help make a stutterer's speech more streamlined.

"When people have said that they've been frustrated by speech therapy over the years, it has usually been because they are focused solely on reducing disfluency," she said. "It turns speaking into an exhaustive process where you have to think about every word you want to say."

As a result, Dr. Paul said, many speech therapists now focus less on correcting disfluency and more on helping people work with their stutters to communicate more effectively and build confidence speaking.

The new stuttering guidelines concluded that focusing on limiting disfluency through speech therapy should no longer be the sole goal of stuttering treatment. Instead, the panel called for a more comprehensive approach that includes other kinds of health care professionals, like psychiatrists. Dr. Paul says ASHA supports an interdisciplinary strategy, but emphasizes the central role speech-language pathologists should continue to play.

Dr. Maguire has long been a proponent of treating the disorder like other psychiatric conditions. Over his career, he has led studies testing the benefits of several pharmaceutical medications on stuttering. These include drugs aimed at treating related conditions like A.D.H.D. and others designed for conditions including hypertension and PTSD. Several medications he has experimented with affect the brain's production of the hormone dopamine, a neurotransmitter that affects things like memory, mood and movements.

Over the past 30 years, Dr. Maguire and his colleagues have observed that some stutterers have higher levels of dopamine in their brains than people who don't stutter. But they are still trying to figure



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out how elevated dopamine levels affect speech formation in the brain. A main takeaway of the new guidelines is that medications that increase dopamine, such as A.D.H.D. stimulants, may make stuttering worse. The panel posited that drugs that lower dopamine, like the antipsychotic drug aripiprazole, which treats schizophrenia and Tourette's,

may be a better candidate.

Not all scientists are convinced that these medications can effectively treat stuttering. Dr. Jackson notes that the connection between dopamine and stuttering remains inconclusive and that most research on treating stuttering with psychiatric medication are small-scale studies conducted by Dr. Maguire's

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team. “It doesn’t mean that they’re bad studies,” Dr. Jackson said, “but they all come from the same place.”

There are currently no medications approved by the Food and Drug Administration for stuttering, though stutterers can take medications off-label. But fine-tuning a medication for stuttering may not be feasible from a pharmaceutical company’s perspective. While 80 million global stutterers sounds like a lot, it is only around 1 percent of the world’s total population, which is too small a consumer base for large pharmaceutical companies to market to, said Gregory Snyder, who researches stuttering at the University of Mississippi.

And even if stuttering medication were widely available, it’s not clear what successful treatment would ultimately look like, said Nan Bernstein Ratner, who researches stuttering at the University of Maryland. She thinks that any person hoping to use medication to avoid stuttering entirely would encounter difficulties because of the complexity of the condition. “We don’t have magic pills that cure diabetes or asthma,” she said. “We just manage the symptoms.”

Why One-Size-Fits-All Doesn’t Work

A lifelong stutterer himself, Dr. Snyder thinks that the odds of pinpointing the perfect treatment for stuttering are slim. The main prob-

lem is that there are multiple ways to stutter. “If you hear 25 different people who stutter, you could be listening to 25 different types of stuttering,” he said. “The idea that there’s going to be one treatment, one-size-fits-all is not going to work.”

There are several genetic subtypes of stuttering that affect speakers in different ways, Dr. Snyder said. While the symptoms look similar (such as repeated words or soundless blocks), the underlying genetic causes of the behavior can be vastly different, similar to how several different illnesses can spark a fever.

If the different genetic subtypes of stuttering can be identified, Dr. Snyder thinks it is plausible for researchers like Dr. Maguire to fine-tune medications geared to treat specific subsets of stuttering. Dr. Snyder recently participated in a study and found out his own genetic stuttering subtype also causes insomnia. He currently follows a regimen of supplements and vitamins that help him sleep better and decrease brain fog, which in turn often makes speaking easier.

In a similar vein, Dr. Jackson thinks that researchers will have more success trying to treat the cognitive processes around how stutterers perceive their speech. His lab is exploring the potential of treating stuttering with psilocybin, a psychedelic that has been used to treat

conditions like PTSD and depression. He thinks that the compound can help stutterers alter their way of thinking about their disfluency and become more comfortable speaking.

Whether stutterers are interested in trying psychiatrics or psychedelics, knowing the genetic blueprint of their stutter can be a crucial starting point. In recent years, researchers have pinpointed dozens of genes related to stuttering that are expressed not only in the brain but also in areas of the body like the microbiome of the gut. For example, the neurotransmitter serotonin, which regulates several functions including mood and sleep, is produced in the gut and may affect stuttering.

While researchers are still trying to grasp exactly how certain gene mutations and neurotransmitter levels cause stuttering, some, including Dr. Maguire, are hopeful that new research alliances and guidelines will help make stuttering a higher priority for scientific inquiry. This could in turn help stutterers be easier on themselves and understand that their condition is not just nervous energy or something to grow out of.

“I think knowledge is power because as we understand the neurology of our condition, the acceptance and the discrimination go down,” Dr. Maguire said. “There’s no more blame for ourselves because this is how we’re wired.”