Speech-Language Pathology

Stuttering

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Introduction

I stuttered severely. I needed an hour to say what a non-stutterer could say in five minutes. I could block on a word for five or ten minutes.

My speech wasn't just slow. I jerked my head, rolled my eyes, and my body shook in spasms. Some listeners asked if I needed medical attention. More often they laughed at me.

Worst, my speech was incomprehensible. Listeners guessed what I was trying to say, usually wrong. Or they ignored me and walked away.

I'm now forty-three. People ask me to speak at events. I do acting and stand-up comedy. In stressful conversations I sound confident and relaxed. And I still stutter.

Wait a minute! How can I stutter and have listeners say that it's a pleasure to hear me speak? Before I answer that question, let me tell you about some other stutterers.

Demosthenes stuttered, and became the greatest orator of ancient Greece. Winston Churchill and Aneurin Bevan were the best orators in the British Parliament in the 1930s and 1940s. Both men stuttered.

James Earl Jones, John Stossel, Bruce Willis, Nicholas Brendon, Mel Tillis, Carly Simon, and hundreds of other actors, singers, politicians, and business leaders have stuttered.

Not many paraplegics win marathons. Few blind persons become famous painters. Not a lot of deaf persons are great musicians.

But stuttering is a different kind of disability. Treating stuttering trains you to improve your speech. You'll learn to handle stressful situations calmly. You'll learn to relax your breathing and your voice. Years after reading this book, you'll look back over many life successes and say that stuttering was a gift.

Whose Fault Is It?

"Yeah, right," you're thinking skeptically. "I've gone to speech therapy and I still stutter!"

It's not your fault that you still stutter. And it's likely not the fault of your speech-language pathologist. Most speech-language pathologists treat a wide range of communication disorders. Their knowledge is broad but not deep.

Blame the experts. Stuttering, like many fields of knowledge, is a mixture of observable and unobservable phenomena. The observable parts of stuttering?e.g., laryngeal blocks?are taught and studied as science. But much of stuttering is unobservable, such as your feelings and attitudes, or whether you talk fluently after you leave a speech clinic. These unobservable areas are taught and studied more like mythology. There's nothing wrong with mythology, except when it's confused with science. Blame the stuttering experts who present myths as science.

False Optimism

You can also blame the media: newspapers, magazines, and especially television.

Television producers love stuttering because it's the only disability that can be instantly cured in a television studio. A severe stutterer tries to speak and makes only inarticulate gurglings, while his face jerks in uncontrollable spasms. Then an expert shows him a breathing technique, or puts a small device in his ear, or utters a few sage words about visualization. The stutterer opens his mouth again, and mellifluous speech flows like a mountain brook! The television talk show host proclaims, "It's a miracle cure!"

A speech-language pathologist told me how one such television show worked, and the effect on a boy she was treating. She said that the producers invited stutterers to try a new treatment for stuttering. Each stutterer was videotaped answering two questions: "How has stuttering utterly and completely ruined your life and made you a miserable wretch?" and "When we cure you and you talk 100% fluently and never, ever stutter again in your life, which will be joyous and blissful from this day forward, how will you feel?"

OK, I may have paraphrased those two questions. The expert who had invented the new treatment did his stuff. The treatment had no effect on the boy. The expert said that the boy had brain damage and would never be able speak fluently. The producers told the boy to leave, and brought in the next stutterer.

Eventually they found a stutterer for whom the new treatment worked. I suspect that this required post-production editing. The three-minute segment was broadcast. Here's the best part: the segment won an award for "best investigative reporting" story of the year!

And here's the worst part. The boy didn't have brain damage. He'd been making progress in speech therapy. But he believed the expert that he'd never be able to speak fluently. He didn't want to do speech therapy any more. His speech regressed, losing the progress he'd made. For the next year his speech-language pathologist had to focus on undoing the emotional trauma the boy had suffered.

False Pessimism

Such "miracle cures" are false optimism. Equally unhelpful is false pessimism.

A Ph.D. speech-language pathologist, who'd written her dissertation about stuttering, treated me for six weeks. Every week she'd ask me about my speech goals. Every week I'd say that I'd learned to speak fluently in another speech clinic. Not just fluently?I'd learned to speak beautifully, with a relaxed, confident voice, better than most non-stutterers. But I couldn't talk like that outside of the speech clinic. I'd say that my goal was to use this beautiful speech anywhere, and even do public speaking to audiences.

Then, for the rest of hour, this speech-language pathologist lectured me that I was an extremely severe stutterer, I was mistaken that I'd ever spoken fluently in a speech clinic, I'd never be able

to speak fluently anywhere, and I'd better make some "realistic" goals.

After six weeks I figured out that this speech-language pathologist wasn't going to ever do speech therapy with me. Or, rather, this "psychological" therapy was the only stuttering treatment she knew how to do. I found a new speech-language pathologist.

Here's another example of false pessimism. An expert wrote in a national magazine, "achieving fluency…is nearly impossible" and "stuttering is a physical impediment for which little can be done."[1]

Reality is somewhere between these extremes of false optimism and false pessimism. Nothing is going to instantly, effortlessly, 100% cure you. But with hard work and perseverance you can improve your speech.

And no one speaks perfectly. Almost everyone talks too fast or too slow, or interjects "um" or "ah," or goes on and on and on until listeners are bored, or is shy about speaking to strangers, or has other disfluent speech behaviors. I'm can't promise you a miracle cure, but I can promise that you can learn to communicate what you need to say, in ways that make people want to listen to you.

References

Yeoman, Barry. **Wrestling with Words**, *Psychology Today*, November/December, 1998.

Overview of Factors that Contribute to Stuttering

The experts each say that one thing causes stuttering. They don't agree what that one thing is, but they all insist that their one thing is the only thing that causes stuttering. And each insists that his therapy program is the only effective treatment for stuttering.

But at least six factors contribute to stuttering. No single stuttering therapy is a "miracle cure." Treating stuttering requires a *multifactoral* approach?different treatments for each of the six factors:

Developmental Disorder

Stuttering is a developmental disorder. In other words, if you're an adult stutterer, the primary reason that you stutter is that you stuttered as a child. That may seem obvious, but the implications are important, as you'll see in the chapter Childhood Stuttering.

Auditory Processing Underactivity

Brain scans have found that the auditory processing area is underactive during stuttering. It appears that stutterers can't integrate what we hear ourselves saying with how we feel our muscles moving. Electronic *altered auditory feedback* devices appear to correct this neurological abnormality. This factor is presented in the chapter Auditory Processing.

Speech Motor Control Overactivity

Brain scans have also found that stutterers' speech motor (muscle) control area is overactive. Stutterers overtense their respiration (breathing); vocal folds; and lips, jaws, and tongues (articulators). These overtense muscles lock up or fail to coordinate, making speech impossible. *Fluency shaping therapy* trains stutterers to speak with relaxed speech production muscles. This factor is presented in the chapter Speech Motor Learning and Control.

Response Selection to Stress

Most stutterers speak fluently when relaxed, but stutter under stress. *Personal construct therapy* trains stutterers to handle stress in ways that result in fluent speech. This factor is presented in the chapter Response Selection Under Stress.

Genes and Neurotransmitter

Another neurological abnormality associated with stuttering involves too-high levels of the neurotransmitter *dopamine* in the left caudate nucleus speech motor control area. This appears to contribute to speech motor (muscle) overactivity. *Dopamine antagonist medications* treat

this abnormality. This factor is presented in the chapter Genes and Neurotransmitters.

Psychological Effects

Stuttering causes psychological fears and anxieties. For some individuals, these fears and anxieties are more disabling than their physical stuttering. Some individuals use stuttering as an excuse for deeper problems, such as inability to maintain relationships. Some individuals obsessively try to hide their stuttering, e.g., counterproductively refusing to go to speech therapy for fear that someone may see them entering the speech clinic. These individuals may need treatment with a psychologist in addition to speech therapy. This factor is presented in the chapter Psychological Issues.

Multifactoral Treatment

Most stutterers have one or two factors strongly. The other factors may be less significant. You might find a speech clinic that treats you successfully, especially if the speech clinic combines two or more therapies.

But a speech-language pathologist can treat at most three of the six factors. Electronic devices can treat one or two factors. Medications treat one factor. You may have to go to see several speech-language pathologists, and possibly buy an electronic device or get a medication prescription, to treat all of the factors that contribute to your stuttering.

Additional Factors

I have no doubt that additional stuttering factors will be discovered. Likely other genes contribute to stuttering. The neurotransmitter acetylcholine might play a role.[2]

Some advances in stuttering will be treatments for co-existing conditions. In the future children (and adults) will be tested for a variety of disorders, and treatment designed accordingly. E.g., a child with stuttering and phonological dysfunction will be treated differently than a child with stuttering and ADHD. An adult with stuttering and social phobia will be treated differently from an outgoing mentally retarded adult who stutters.

References

1. Pharmacist and stutterer Richard Harkness believes: "My long-held hunch, based on my understanding of Parkinson's disease, is that the neurotransmitter acetylcholine (Ach) might be a key player in stuttering. Parkinson's disease is commonly described as a condition of relative imbalance between dopamine (DA) and Ach (low DA/high Ach). Hypothetically at this point, stuttering might be thought of as just the opposite (high DA/low Ach). Research in schizophrenia indicates that a decrease in striatal DA levels is accompanied by an increase in Ach levels. Thus, the tx condition brought about by D2 inhibitors (antipsychotics)?less dopaminergic activity?might result in a relative increase in Ach activity?in effect, could it be that antipsychotic-induced fluency improvement is actually due to increased Ach activity? One problem is that current Ach agonists tend to cause intolerable side effects. But there is ongoing

research on Ach agonists/antagonists, primarily for drugs aimed at schizophrenia. There's much more to be learned."

What Is Stuttering?

Speech begins with breathing, also called *respiration*. Your lungs fill with air, more air than you would inhale if you weren't talking. You expand your upper chest and your diaphragm (belly) to get all this air in. Your lung pressure and respiration muscle tension increase.

Next, you release air through your throat, past your vocal folds (also called *vocal cords*). Your vocal folds are a pair of small muscles in your larynx. If you tense these muscles slightly, and release a little air, your vocal folds vibrate. This is called *phonation*. It's also called the *fundamental frequency* of your voice. If you place your fingers across the front of your throat, then hum or talk, you can feel your vocal folds vibrating.

Adult men vibrate their vocal folds about 125 Hz (125 times per second). Women vibrate their vocal folds about 200 Hz. Children's voices are even higher. This is too fast for your brain to control. Vocal fold vibration is the only muscle activity that your brain doesn't directly control. Instead, phonation results from the coordination of respiration muscles with slight tensing of your vocal fold muscles.

The key word in that last sentence was *coordination*. Stuttering is largely a disorder of poorly coordinated speech production muscles.

If you tense your vocal folds too much, you block off your throat and stop air from escaping your lungs. This is a good when lifting heavy weights. By blocking your larynx muscles, you increase lung pressure, which strengthens your chest and you can lift more weight. Similarly, tires inflated to high pressure can carry a heavier car. But that's what stutterers do when they talk, and it's not a good idea.

The space in your throat above your larynx is called the *pharynx*. Above your pharanx are your oral and nasal cavities. These spaces create vocal resonation. This is like the echoing of a cathedral or tunnel. The unique shape of these spaces makes each of our voices sound unique.

Your jaws and lips, collectively called the *articulation muscles*, modify your voice into intelligible speech.

Vowels and *voiced* consonants (such as /b/ and /d/) are produced by your vocal folds, and modified by your articulation muscles (jaw, lips, tongue).

Other consonants are *voiceless*, such as /p/ and /t/, produced by your articulation muscles modifying airflow, without your vocal folds vibrating. When you whisper, you don't vibrate your vocal folds. You just modify airflow with your articulation muscles.

Speech requires coordination of over 100 muscles. The average person speaks about 150 words per minute. Each word requires a different configuration of most of those muscles. Speech is our most complex, balanced neuromuscular activity.

Core Behaviors

Core stuttering behaviors include:

- Disordered vocal folds, including high levels of muscle activity or muscle tension; poor laryngeal too late or holding tension too long; and poor coordination of laryngeal muscles, e.g., incompatible contractions of opposing muscles.
- Disordered breathing, including antagonism between abdominal (belly) and thoracic (upper chest) respiratory muscles; complete cessation of breathing, and interrupting exhalation with inhalation.
- Disordered articulation, including dysfunctions of the lips, jaw, and tongue in stuttering. In general, stutterers place their articulators in the right positions (in contrast to other speech disorders such as lisping, in which individuals form incorrect sounds), but time the movements wrong.
- Low-frequency tremors in the neck, jaw, and lip muscles of adult stutterers. These are found to a lesser extent in older children, and not found in young children who stutter.

Secondary Behaviors

Secondary stuttering behaviors are unrelated to speech production:

- Physical movements such as eye-blinking, forehead wrinkling, sudden exhaustion of breath, frowning, or nostril quivering.
- Gross (large) muscle movements such as head jerks or slapping one's thigh in an attempt to release a vocal fold block or other overtense speech-production muscle.
- Avoidance of feared words, such as substitution of another word.
- Postponement of a feared word, with pauses or filler words.
- Interjected "starter" sounds and words, such as "um," "ah," "you know," or "in other words."
- Repeating a sentence or phrase "to get a running start."
- Vocal abnormalities to prevent stuttering, such as speaking in a rapid monotone, affecting an accent, or using odd inflections.
- Looking away from the listener, not maintaining eye contact.
- Articulating an unrelated sound, e.g., forming a /t/ sound when trying to say /s/.

Secondary behaviors may help you get around stuttering at first, but then lose their effectiveness. The secondary behavior is then retained out of habit.

Incidence and Prevalence

About 2.5% of preschool children stutter.[3] This prevalence of preschool stuttering is less important then the incidence figure, which is about 5%. I.e., about 5% of children stutter at some point, and about 2.5% of children stutter now.

Less than 1% of adults stutter. 0.73%, or about one in 135 adults, was the figure found in a recent study.[4] That suggests that about two million Americans stutter. But this seems high. The the number of adults who?tm)ve sought treatment is somewhere around 25,000.[5] How many stutterers have you met, outside of speech clinics and support groups? You likely hear 135 people talking every week. Do you hear someone stutter every week?

Extensive publicity for several anti-stuttering devices was seen by over 100 million people, yet only about 2500 devices of each device were sold. The membership figures for the National Stuttering Association are similar.

This suggests that stuttering is either relatively common, but unimportant to 90% to 99% of the people who stutter; or that stuttering is a rarer disorder than the non-profit organizations say in their fundraising letters.

References

1. Proctor A., Duff, M.. and Yairi, E. (2002). "Early childhood stuttering: African Americans and European Americans." *ASHA Leader*, 4:15, p.102.

2. Craig. A, Hancock K, Tran. Y, Craig. M, & Peters, K. (2002). "Epidemiology of stuttering in the communication across the entire life span." *Journal of Speech Language Hearing Research*, 45:1097-1105.

3. The National Center for Stuttering and the Hollins Communications Research Institute have each treated around 5,000 stutterers. Most of the other three hundred Fluency Specialists have treated a few dozen stutterers.

Self-Awareness of Stuttering Behaviors

I was unaware that I stuttered severely until I saw myself on video, when I was 22. I couldn't change behaviors that I was unaware of. I wasn't motivated to do speech therapy. I didn't realize the importance of improving my speech.

Self-awareness of stuttering behaviors is the foundation of stuttering therapy. Have a friend or your speech-language pathologist videotape you speaking. Watch the video. For some stutterers, watching that video will be the hardest thing you?tm)ve ever done.

Transcribe Your Speech

If your ego can handle more difficult homework, have someone videotape you in a stressful speaking situation. The tape should have you talking for at least three minutes.

Now play the tape back, and transcribe what you said. Count the syllables.

Watch the tape again, counting your dysfluencies. Calculate your stuttering rate. 2% or fewer dysfluent syllables is normal speech. 3-5% dysfluent syllables is mild stuttering. 6-10% is moderate stuttering. More than 10% dysfluent syllables is severe stuttering.

Watch the tape again, measuring your speaking time. Calculate your speaking rate in syllables per second. Non-stutterers can speak about five syllables per second, or three hundred syllables per minute.

Watch the tape again. Mark each dysfluent syllable in your written transcript.

Watch the tape again. Note each *type* of dysfluency:

- For repetitions, write down every repetition, e.g., "b-b-baseball."
- For prolongations, underline the prolonged sound.
- For silent blocks, write "<block>".

Watch the tape again. Pick out your three longest dysfluencies and time each. Write the times on your transcript.

Watch the tape again. Note your secondary symptoms. Write down every head jerk, facial grimace, eye blink, etc.

When you're finished, read aloud your transcription. Perform your stuttering exactly as did on the tape.

Give your script to your speech-language pathologist. Ask her to perform your script, modeling you.

Your Stuttering Autobiography

You read mine in the introductory chapter. Write your own stuttering autobiography.

Describe how stuttering affected your childhood, teenage years, and adult life. Describe your inner, emotional experience of stuttering. Describe each therapy program you've done, and the results.

Over- or Underaware of Stuttering?

Mild stutterers typically think their speech is worse than it is. A mild stutterer has one little block on *baseball* and panics. He thinks, "Did the listener notice? I should have been paying attention and seen that a *b* was coming up. Next time I'll say 'the great American pastime' instead. Or better yet, I'll keep his mouth shut for the rest of the day…"

Severe stutterers typically think that their speech is better than it is. Listeners impassively pretend not notice. During severe blocks, time stops for the stutterer. If you'd asked me how long a dysfluency had been, I would've said a second or two?even when it was actually five minutes or more.

Paradoxically, severe stutterers can be mentally healthier than mild stutterers. I couldn't hide my severe stuttering. Severe stutterers can be willing to work hard at speech therapy. Fluent speech motor exercises, even at two-second stretch, get words out faster than severe stuttering. When severe stutterers learn to talk fluently, they often (not always) easily develop normal professional and personal relationships. They're like the children with [[Speech-Language Pathology/Stuttering/Childhood Stuttering/Pre-School Stuttering#Language-Learning Impairment">language-learning disorder who, after treatment, jump four reading grade levels in six months. These individuals are among the happiest, best-balanced people I've known (see the section Famous People Who Stutter).

- In contrast, mild stutterers, who can hide stuttering, often have more severe psychological disabilities. They're hesitant to do speech therapy. Using therapy skills (e.g., slow speech, or voluntary stuttering) alerts listeners that the individual stutters. Even if they successfully complete a speech therapy program and can talk fluently, they think their new fluent speech sounds "weird" and prefer their old speech (even after they hear themselves on tape and admit that their new speech sounds normal). Fluency shaping speech therapy can be a breeze for mild stutterers, because their brains don't need much rewiring. But their psychological disabilities can keep them from talking for years.

Development of Stuttering

Pre-School Stuttering

Stuttering isn't a physical disorder. It's not a psychological disorder. Stuttering is a *developmental disorder*.

Children grow up in a certain order. They crawl before they walk. They walk before they run. They run before they ride bicycles. They ride bicycles before they borrow your car keys.

Usually. Some children walk before they crawl. My three-year-old nephew borrows my car all the time. Just joking. I don't own a car.

At each stage of physical development, a child's brain develops too. E.g., crawling helps the child develop communication between the left and right hemispheres of his brain. If all goes well, the child's physical, neurological, and psychological systems develop together.

A small, sometimes imperceptible, developmental misstep in early childhood can nudge a child off the normal developmental track. The child then grows on an abnormal developmental track. A minor problem can develop into a major disability as the child grows up.

Language-Learning Impairment

Some children can't hear the difference between short duration speech sounds. The difference between /b/ and /d/ sounds occurs within a few milliseconds (thousands of a second). Some children's brains' auditory processing isn't fast enough to hear fast speech sounds. To these kids, "bad" and "dad" are the same word, "bug" and "dug" are the same, and so are "buck" and "duck." (This is a form of *central auditory processing disorder*, or CAPD).

You'd think this would be a minor problem. After all, you know the difference between "sew" and "so." But it's not a minor problem. These children develop speech slower than other children. Slow speech development causes them to miss other developmental stages. Their grammar develops poorly. Listeners have difficulty understanding these children's speech. These children understand the difference between boys and girls, but interchange "he" and "she." They mix up past, present, and future tense.

Then these children are labeled mentally retarded, even though they're normal or even excel at non-language activities (e.g., building with Legos). They're put into special ed classes, with children who really are mentally retarded.

The children miss more developmental stages. As adults, these individuals may be unable to read, or have poor social skills, or be unable to work at more than menial jobs.

This disorder is called *language-learning impairment* (LLI). In the last ten years a treatment has been developed. These children can distinguish /b/ from /d/ if the words are slowed down. Children with LLI now play a computer game that trains them to hear the difference between

short-duration speech sounds.[6]

When their auditory dysfunction is corrected, the children develop normally. The children usually catch up with their peers, e.g., advancing four reading grade levels in six months.

Analogously, children's brains are like a railroad going from New York to Los Angeles. A little dysfunction can bump a child onto a sidetrack. The sidetrack may start out only a few feet from the main track, but twenty years later he's lost somewhere in South America.

Treatment is like giving the child a shove back onto the main railroad track. The child then zooms ahead to catch up with his peers.

(Brain scans show that adult stutterers have a different form of CAPD, which may affect how we hear our own voices or feel our speech-production muscles moving. No researchers have investigated whether children who stutter also have this form of CAPD, or if treating this form of CAPD stops stuttering from developing.)

Early Intervention Is Best

Stuttering is similar to LLI, in that something small nudges a child off the normal developmental track at the age of two or three. This small nudge causes the child to grow on an abnormal developmental path. By adulthood, the stutterer has developed a variety of core symptoms, secondary behaviors, and psychological problems.

The average age of stuttering onset is 30 months.[7] I.e., two-and-half-years-old is the typical age that children begin to stutter. Stuttering rarely begins after age six.

65% of preschoolers who stutter spontaneously recover, in their first two years of stuttering.[8] These children grow up to have normal speech.[9] Some pediatricians tell parents to "wait and see" if a child outgrows stuttering on his own. But this advice is wrong. Children who stutter should be treated by a speech-language pathologist as soon as possible. (Schools provide free speech therapy to children as young as three years old.)

However, children who stutter longer are less likely to recover without treatment. Only 18% of children who stutter five years recover spontaneously.[10]

The peak age of recovery is 3.5 years old. By age six, a child is unlikely to recover without speech therapy.

I.e., if your child stutters at two or three, and you get the child into speech therapy right away, you can expect a full recovery, within months, without relapses. A small nudge will get your child back onto the normal development track.

If your child is in grade school and has stuttered for five years, he or she will need a bigger shove to get back onto the normal development track.

Critical Ages in Stuttering Development

At two or three years old, children are quickly developing communication skills. Their brains are growing rapidly. A child's language skills may develop faster than his speech skills. He wants to communicate but can't easily and freely generate speech.

The child interjects "uh" and "um." He repeats words. He has silent pauses. He revises what he's saying in the middle of sentences, or leaves sentences incomplete. He's most dysfluent with long sentences, when interrupting or being interrupted, or during stressful periods, such as a divorce, the birth of a sibling, or moving to a new home.

Those are *normal dysfluencies*. All children have normal dysfluencies. Normal dysfluencies aren't stuttering.

The "experts" say that some children move from normal dysfluencies into stuttering. These children's frustration trying to talk leads them to push out words. The children tense their breathing, their vocal folds, and their lips, jaws, and tongues. The children struggle to talk, getting into longer repetitions, prolongations, and silent blocks.

Recognizing which behaviors are normal dysfluencies and which behaviors are stuttering is a key issue. The Stuttering Foundation of America has a videotape to help parents differentiate normal dysfluencies from stuttering.

Because children's brains are growing at this time, their stuttering behavior becomes hardwired. Their brains shift onto an abnormal development path. The "experts" have identified five stages children go through as stuttering develops, over months and years.

Or are the "experts" wrong? Some parents report that their children woke up one morning stuttering severely. These children went from normal dysfluencies to severe stuttering overnight. The children skipped the development stages in between.

In a later chapter, you'll learn that a disorder similar to stuttering is triggered by a streptococcal infection causing a child's immune system to attack his or her brain's putamen motor control area. It's possible that a similar autoimmune dysfunction could attack a child's left caudate nucleus speech motor control area, causing severe stuttering to develop overnight.

You'll also learn that three genes are linked to stuttering. These genes affect the neurotransmitter dopamine, which functions abnormally in adult stutterers. I.e., some children are genetically predisposed to a class of disorders that includes stuttering.

You'll also learn that adult stutterers have abnormal auditory processing. (This abnormality is different from the auditory processing abnormality that causes language-learning impairment.)

These questions are important because they affect what therapy should be effective for children. If the "experts" are right that stuttering develops in five stages, beginning with normal dysfluencies, then early intervention is paramount, but the therapy can be a gentle nudge (e.g., telling the parents not to interrupt when the child is speaking).

But if the "experts" are wrong, and some children develop severe stuttering without going through intermediate stages, then therapy should start with a big shove back onto the normal developmental track. This important issue is called *direct* vs. *indirect therapy*.

Direct and Indirect Therapy with Preschoolers

If you're an adult stutterer reading this book to learn about adult stuttering therapy, you can skip the rest of this chapter. The following sections are about treating children who stutter.

Indirect therapy is a "gentle nudge." Indirect therapy changes the *parents'* speech and behaviors. The speech-language pathologist trains the parents to slow down and use simple vocabulary, and not criticize the child, to not put pressure on the child (e.g., don't demand that the child confess guilt), to wait two seconds after the child finishes speaking before answering the child, and to give the child lots of hugs.

Indirect therapy is ineffective. A literature review found

> …little convincing evidence…that parents of children who stutter differ from parents of children who do not stutter in the way they talk with their children. Similarly, there is little objective support…that parents' speech behaviors contribute to children's stuttering or that modifying parents' speech behaviors facilitates children's fluency.[11]

More than a dozen studies found no evidence that altering parental behavior changed children's speech. These studies found no differences for positive statements (praise, encouragement, agreement), negative statements (criticism, reprimands), questions, topic initiations and terminations[12]; conversational assertiveness and responsiveness[13]; response time latency or the time between one person finishing speaking, and the other person beginning speaking[14]; "formal" style vs. a "casual" style[15]; or illocution.[16]

The studies I really liked found the opposite of what the "experts" have been telling parents for 75 years:

- A study found that mothers interrupt their child after dysfluencies, not before.[17] This suggests that *not* interrupting causes children to stutter!
- A study found that when mothers spoke faster their children spoke *slower*.[18] Another study trained parents to slow their speaking rates. The children's speaking rate *increased*.[19] This suggests that parents talking *slowly* causes their children to stutter!
- Parents of children who stutter produced more positive statements (e.g., praise, encouragement) and fewer negative statements (e.g. criticisms, disparaging remarks) than parents of children who didn't stutter.[20] This suggests that parents' praise and encouragement *causes* children to stutter!
- A multiyear study followed 93 preschool children. At the start, none of the children stuttered. One year later, 26 of the children stuttered. The researchers compared the speech behaviors of the two groups of mothers, before their children started stuttering. No differences were found,

except that mothers of children who would stutter had shorter, less complex utterances.[21] This contradicts the "capacities and demands model" of childhood stuttering.

More generally, some psychologists now discount the role of parents in the development of children's character and personality. About 50% of the personality differences are attributable to our genes, and the rest due to the child's peers: "…what parents do seems to be nearly irrelevant."[22]

Direct Therapy with Preschoolers

In contrast, *direct therapy* changes the child's speech and behaviors. Direct therapy can be more of a big shove, rather than a gentle nudge. It may include:

- Games to encourage speaking.
- Games to train specific speech skills, similar to adult fluency shaping therapy.
- Modeling the child's speech and/or behaviors.

A child's first therapy session may just be playing a game to encourage the child to talk. E.g., the speech-language pathologist and child silently play with separate boxes of trucks, on opposite sides of the room. The speech-language pathologist begins making engine sounds. She then gradually moves to the center of the room, and her trucks interact with the child's trucks.

"Say the Magic Word" is another game to encourage talking. You can play this while looking through a picture book, or while driving. The parent says she sees something. The child guesses what the parent sees. When the child says the "magic word," the parent rings a bell or gives the child a peanut. No particular word is magic?the child is rewarded for fluent words.

A frequency-shifted auditory feedback (FAF) device makes shy children want to talk. They're fascinated to hear their voices sounding like a "little kid" (frequency upshift) or a "monster" (frequency downshift).

Some games teach speech skills. In "Can't Catch Me," one person gets a peanut when the other person asks a question. You then quietly eat your peanut before answering the question. If you answer the question before eating your peanut, you must put your peanut back. The parent should lose more peanuts than the child, by answering too quickly. This reduces the time pressure the child feels about quickly answering questions.

A turtle hand puppet can teach slow speech with stretched vowels. When the child uses the target speech skills, the turtle slowly walks. When the child speaks fast, the turtle retreats into her shell.

Super Duper has other games for stuttering therapy.

Modeling

Caitlyn, a four-year-old female who began to stutter in the midst of her parents' divorce,

was exhibiting significant struggle and tension behavior as well as secondary behaviors. Of most concern was her head-banging behavior during difficult moments of stuttering. After many sessions in which I attempted to eliminate this behavior through fluency-shaping principles, I saw no change. One day, shortly after Caitlyn banged her forehead on the table to interrupt a block, I modeled the same behavior. Caitlyn was shocked and ignored me. After I did this several times she asked me, "Why did you do that? Didn't that hurt?" I responded, "I don't know why I did it. But it sure didn't help me get my word out!" Caitlyn never again banged her head to help her talk. She has been out of therapy for six years and remains fluent.[23]

This speech-language pathologist's *modeling* of Caitlyn's behavior was radically different from conventional stuttering therapy practices. The speech-language pathologist improved the child's awareness of her stuttering. In contrast, most "experts" would have pretended not to notice Caitlyn's head-banging behavior. They would have predicted that making Caitlyn aware of her head-banging would have caused emotional trauma and made her stuttering worse.

Imagine that a teenage brother and sister use profanity at the family dinner table. Should the parents act horrified and tell their children never to use such language? Should they refuse to allow dessert or television for the teenagers?

You know that won't work. The teenagers will use profanity at the next opportunity, just for the amusement of horrifying their parents. Instead, the parents should immediately use twice as much profanity. Dad should say, "#$%^, this is best *&^% meatloaf in the whole @#$% world!"

Mom should then respond, "Oh, you big !@#$, you're so &^%$ cool and #$%^ sexy and when you talk%$#!"

I guaranty that the teenagers will turn red with embarrassment, and never use profanity again in front of their parents.

In a psychology class about traumatized children we saw a video of a ten-year-old boy destroying a psychologist's office. The boy threw every object he could throw, and smashed everything else. The psychologist sat there calmly telling the boy not to destroy the office. He finally grabbed the boy and hugged him. To me it looked like a full body restraint but the instructor said it was a hug, and that was what the boy really needed. I asked what would have happened if the psychologist had modeled the boy's behavior. E.g., the psychologist could have thrown and smashed stuff. The instructor said that was the worst idea she'd ever heard. But I think the boy would have stopped, watched in amazement as the psychologist destroyed his own office, and then asked, "Why did you do that?" The boy and the psychologist could then have started talking, with understanding of what the boy was feeling, which is what I think the boy needed.

The purpose of modeling is to improve the subject's awareness of his or her behaviors. Stutterers are largely unaware of their stuttering, or at least what they do when they stutter. Everyone else can see the stuttering but the stutterer can't. Combining video and modeling can help a stutterer improve self-awareness.

Modeling also dispels a person's mistaken view that a behavior is invisible, or it's acceptable, or everyone does it. If everyone ignores undesirable behavior then the person may think it's OK.

Modeling only works when the modeler or the modelee knows how to replace the undesirable behavior with a target behavior. E.g., it's OK for your speech-language pathologist to model your stuttering because she can show you how to speak fluently. It was OK for my Romantic Disaster of 1996 to make me aware that I was stuttering, because I knew what to do to talk fluently. It's not OK to point out a problem to someone who has no idea what to do about it.

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School-Age and Teenage Stuttering

School-Age Stuttering

Ask your child whether he or she likes school. When I was in elementary school, the girls liked school and the boys didn't. At this age, girls see school as where they socialize with their friends, via quiet verbal communication and cooperation.

Boys see school as where they're told *not* to play with their friends, via physical interaction such as running around or showing off their physical abilities. This difference makes school more stressful for boys, with effects on their speech.

Why Do More Boys Than Girls Stutter?

Among preschoolers, boys who stutter outnumber girls who stutter about two to one, or less.[24]

But more girls recover fluent speech, and more boys don't.[25] By fifth grade the ratio is about four boys who stutter to one girl who stutters. This ratio remains into adulthood.[26]

Why boys are more likely to stutter, and less likely to recover, isn't certain. Boys generally have more diseases and disorders, for reasons having to do with the Y chromosome. Boys generally have more speech disorders because girls are better at speech and language, and especially at using speech and language for social purposes. Speech and language are more stressful for boys, so boys prefer to interact physically.

At five for girls and seven for boys, children's brains go through a massive adrenaline shift. After this shift, the child is able to socialize with other children in groups. Before this age, playing with more than one or two friends can be a stressful experience.

This was apparent to me at my nephew's sixth birthday party. One of his presents was a slinky. I showed his friends how to make the slinky walk down stairs. Three girls sat together at the top of the stairs and took turns. One girl could easily make the slinky walk down the stairs. This was harder for the second girl, but she could do it. The third girl couldn't do it at all. But they cooperated and encouraged each other.

Two boys wanted to try it. But they couldn't get to top of the stairs without wrestling each other and falling back down the stairs. I wouldn't allow wrestling on the stairs, so they'd run around the living room chasing each other. Then they'd come back to play with the slinky, but start wrestling on the stairs again.

At five, girls are ready to start school. Boys are wild animals until seven. School can be stressful for boys who aren't ready for school. The most stressful part of school for boys may be the communication demands. Girls are using communication to make friends. Girls' communication skills and social skills develop together. In contrast, boys may not be ready to socialize with 25 other children, in a building with hundreds of other children. Some children

are in school and day care for twelve hours, without time to relax or to be alone?that'd stress me out!

If your five- or six-year-old son stutters, and you don't think he's ready for school (e.g., he vomits or wets his pants at school), consider keeping him home another year, or look into a co-op school where a parent can attend school with him, or let him attend school but don't put him in daycare for another six hours each day.

Motivation for Speech Therapy

The father of a ten-year-old stutterer wanted to do everything to help his son. On the advice of his son's speech-language pathologist, the father bought my company's top-of-the-line electronic stuttering therapy device. The speech-language pathologist trained the father to use the device. The father worked with his son thirty minutes every evening.

After two months, the father returned the device for a refund. The son was 100% fluent when practicing with the device. The kid had no interest in using slow, relaxed speech the rest of the day. Stuttering didn't stop the boy from playing baseball or doing other things boys do. In the world of seven- to twelve-year-old boys, talking isn't an important activity.

But your seven- to twelve-year-old son's good self-esteem can be a double-edged sword. It's hard to get school-age boys motivated to do speech therapy. This makes it more important that parents do speech therapy with their child in every conversation. Ask your child's speech-language pathologist what your child should be doing (e.g., slow speech with stretched vowels). Have your child use therapy skills on every sentence he says to you. Be your child's therapy helper.

Advice for Parents, by Magdalene Lima, SLP

I am a speech-language pathologist in private practice and formerly a public school therapist for nine years. My suggestions to parents of children with speech problems are:

1. Do some research in these areas. Check out the communication disorders websites.

2. Go to your school speech-language pathologist with what you know and ask her what she thinks. The best approach is to treat her as the professional she is in a non-critical way with the attitude that you just want to understand all the treatments available for your son. Offer to help get information to her if she doesn't have it. Let her know you understand the position she is in and that you are on her team. This will get you much further in getting the appropriate services for your child than fighting your school.

3. If your insurance covers it or you have the funds, find a good private pediatric speech and languageclinic in your area and AT LEAST have an evaluation done. Just that information alone could really help the school SLP. If you can afford private therapy, get it. The main difference in service is that your child will receive individual therapy with a clinician that has the time and resources needed to provide the highest quality therapy.

As a former school speech-language pathologist, my skills and knowledge didn't suddenly changed when I switched over to private practice. The setting changed, and that makes a huge difference. I now serve 30 clients rather than 75, I see them all individually, and I am paid more than in the schools. In the hours I don't see clients, I am busy researching, giving parent support, writing regular and detailed reports, and planning innovative therapy rather than going to bus duty, lunch duty, hall duty, faculty meetings that don't really apply to me and filling out massive amounts of government-required paperwork.

Is The Problem Ability or Setting?

Now to those of you who think the worst of the public school speech-language pathologist: I'd like you to stand in her shoes for a minute. In the last three years of my public school experience my caseload became unmanageable. I had 75 students, including a severely and profoundly handicapped class, four autistic students and all other students in speech from grades K-5 at that school. I begged, cried and pleaded for help from my supervisors. I KNEW I could not provide the quality of service each and every one of these students and their families deserved. However, the answer was always: get creative, we don't have money in the budget. Please understand, in my situation, it was not a lack of caring, lack of skill or ability?there was absolutely nothing I could do. I became angry and frustrated at our administration. Why didn't they provide the training, time, personnel and support we needed to provide services to these students?

Speech Pathology: A Growing and Diverse Field

The disorders in our field and the therapies that have now been developed have become extremely specialized. In the schools I was expected by parents to be an expert in the following fields: stuttering, swallowing disorders, voice disorders, articulation disorders including tongue thrust, cleft palate, phonological process disorders as well as motor speech disorders, autism and PDD, traumatic brain injury, ADHD, language and learning disabilities, hearing impairments and social and pragmatic communication disorders. Excuse me, do you realize that just as physicians receive a basic foundation in medicine, so do speech-language pathologists receive a basic foundation in all of the above disorders. You graduate from college and through your experience and personal growth and research, you become an expert in a few areas. It would be virtually impossible for one person to have the time and energy it would take to become an expert in all those areas!

This is why our field is moving towards specialty certifications. What will public schools do then? I guess they will have to hire the specialists that their individual students require.

Many and Varied Problems in the Schools

More and more our district began hiring speech assistants (speech practitioners who are not required to meet the standards of education, clinical practicum and experience needed to be fully certified and licensed) to handle huge caseloads with minimal supervision from licensed speech-language pathologists. There is a shortage of qualified speech language pathologists willing to go into public school therapy when there are much more lucrative and attractive

positions available in other settings. As I talked with administrators, I soon became aware of the pressure being applied to them from the state, parents and other agencies to meet all these educational requirements. For every parent who complains there is not enough money to provide quality special education services in the school, there is another parent complaining that their gifted and talented child is not being given the education THEY deserve because of all the money being poured into special education programs. Or what about the parents of children in sports programs, they have THEIR list of complaints. Everyone thinks that their cause is totally justified because they are arguing for their children, and nothing can convince anyone that their child doesn't deserve the best.

I left the public school system to go into private practice and now my problem is solved?I love my work and I'm giving quality services to clients with fantastic results! However, what's your solution? My final and personal resolution to this whole issue, is that in many cases?not all, but many?I truly feel that schools are doing the very best they can with the resources available to them to provide the services that our children need. However, sometimes, parents are right, it's not enough. So what are we going to do? Is every parent in America with a complaint going to file suit against the local school district? If this happens, our schools will begin focusing on preventing lawsuits rather than on how best to serve and educate our children.

Work With Your Administration/Educators

Sometimes all it takes is going to an administrator, such as the Director of Special Education, and pleading your case. Also give your specific suggestions at your child's IEP meeting. You'd better have some research and documentation to back up the necessity of your suggestions. The attitude and manner in which you present yourself is of utmost importance, if they perceive you are willing to make compromises and work with them they will be more willing to stick their neck out for you. Suggest specific things such as the district paying for an outside assessment, or hiring a consultant temporarily who can lend their expertise to your child's case. Get over any intimidation you feel in asserting yourself with these people, they are just people with children and jobs and stresses just like you. What they say to you is never written in stone.

Conclusion

I'm not saying you shouldn't fight extreme injustice or abuse. I'm saying it's a huge system with a lot of variables involved. The fight is societal and governmental?usually not your local educational facility. Become involved politically in your state with your speech and hearing association?they always have a branch that is lobbying for legislation to improve speech services in the schools. Meanwhile, you have a child that has needs for quality services in the area of speech pathology, do the best you can to get that service, whether it be private therapy through insurance or private pay, or school therapy, don't stop looking until you find what you need.

YOU take responsibility to research, learn things for yourself and communicate with those who affect your child's education.

Fostering Teenagers' Passion for Fluency

I am a mother of a stuttering thirteen-year-old boy. Stuttering really had never bothered him until this year. It is very frustrating for him to talk on the phone. His friends call all the time but he has refrained from talking on the phone because his stuttering seems to get worse. My husband and I have noticed him withdrawing from his peers. We have always had an active role with his stuttering. He has been to a lot of speech-language pathologists and we have also tried the CAFET [biofeedback computer] system. This was helping him. Unfortunately the closest center was more than two hours away. After one year it was too stressful on him missing too much school. Because of this we had to stop. Since then he has wanted nothing to do with speech-language pathologists.

I hear similar stories about other teenagers. The stories share these elements:

- The teenager has been seeing his school's speech-language pathologists for five or even ten years. His speech isn't improving. He wants to discontinue speech therapy.
- He's fluent in the speech-language pathologist's office, but stutters everywhere else.
- The parents have taken him to other speech clinics, without success.
- He used to have good speech attitudes, saying whatever he wanted. Now he fears and avoids certain words or speaking situations.
- His social behavior has changed. He's withdrawing from social contacts.

Previously he saw himself as being like most other kids, doing the same things as other kids. School-age boys' social activities, e.g., baseball, don't demand much talking. Now he thinks of himself as a stutterer, different from other teenagers. Teenagers' social activities, e.g., dating or getting an after-school job, are harder for a stutterer.

Your teenager is an adult, in terms of stuttering. He should be doing adult stuttering therapy. This can include:

- Psychological stuttering therapy, training fluent speech (physical) skills.
- A support group for teenagers who stutter.
- An intensive speech therapy program or a summer camp for teenagers who stutter. (Google "speech camp for teens who stutter.")

Develop a Passion

In the chapter Famous People Who Stutter, you'll learn that many celebrities developed their talents during high school as a result of stuttering. E.g.,

- James Earl Jones, Bruce Willis, and Nicholas Brendan overcame stuttering through acting.

- Carly Simon developed her skills as a singer and a songwriter because she couldn't talk about her feelings.

When a teenager feels passion for an activity, he or she can focus with greater intensity than adults. Your job, as a parent, is to help your teenager focus on a speech-positive activity, instead of focusing on video games or memorizing Black Sabbath lyrics.

Help your teenager become passionately involved in activities that require talking, improve his fluency, and develop his social skills. Such activities include:

- Singing.
- Acting.
- Debating.
- Foreign languages.
- Organizing a teenage stuttering support group.
- A science project about stuttering.

Involve Peers in Speech Therapy

Are your teenage clients less than enthusiastic about speech therapy? Well, duh, if you're a speech-language pathologist then you're at least 25! You might even be over 30! Why would a teenage want to talk to someone your age?

Instead, have a teenage stutterer bring a friend to speech therapy. He'll talk to his friend about skateboarding or video games or other stuff you're clueless about. Better yet, you can train the friend to give your client a subtle reminder when he needs to slow down or get back on-target.

Or roleplay the teenager asking a peer out on a date. He can ask her for her telephone number by saying that his speech therapist wants him to practice making telephone calls. I used to do something like this: I met a girlfriend by telling her that my speech therapist wanted me to introduce myself to strangers.

Paramount in teenagers' minds is connecting to peers (other teenagers), e.g., being seen as "cool" by their classmates. Use speech therapy as way to connect to peers and your teenager will want to do speech therapy. E.g., instead of (thinking of himself as) being seen as a boy who stutters, help your teenager think of himself as a boy who's not afraid to ask girls for their telephone numbers and ask them out on dates.

Learn American Sign Language

I took four years of German in high school and college. The classes were taught in a conversational style. Being unable to talk, I learned nothing.

No one suggested that I study American Sign Language instead. I could have been 100% fluent in that! Being good at something would have improved my self-esteem. In contrast, I felt like the stupidest person in the German classes. And if I learned sign language I would've made friends in the deaf community, or maybe worked part-time as a sign language interpreter.

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Auditory Processing

Central Auditory Processing Disorder

Brain scans of adult stutterers have found two abnormalities associated with stuttering.

One neurological abnormality is *underactivity* in the auditory processing area (this chapter). The other neurological abnormality is *overactivity* in the speech motor control area.

This combination of over- and underactivity may explain why the "conventional wisdom" told to stutterers is a contradiction of trying harder and relaxation, e.g. "try harder to relax."

No brain scans have been done of stuttering children. We don't know whether these neurological abnormalities *cause* stuttering or *are caused by* stuttering. It's possible that stuttering causes a child's brain to develop abnormally in these two areas. It's also possible that some children have one or both neurological abnormalities before they start stuttering, which cause them to stutter.

Central Auditory Processing Disorder

Our ears hear sounds. Our brains process those perceived sounds into useful information, such as words. Central auditory processing disorder (CAPD) is not a single disease but rather is the term for anything wrong with how our brains process auditory information. A wide variety of disorders seem to have a CAPD component, including ADHD and language disorders.[27] CAPD is not a hearing disorder, i.e., a person with CAPD usually has nothing wrong with his or her ears.

What's wrong with adult stutterers' auditory processing is unknown. If I had to guess, I'd say that stutterers have something wrong with how we hear our own voices. A study suggested that adult stutterers have an inability to integrate auditory and somatic processing,[28] i.e., comparing what we hear ourselves saying to how we feel our muscles moving. Altered auditory feedback devices (below) impact auditory and somatic integration.

I find that exercises that train me to listen to my speech and feel my muscles moving improve my fluency. I enjoy acting or telling jokes with different voices for different characters. If my hypothesis is correct, then stuttering therapy should include actors' accent training. Learning to switch from an Irish brogue to sounding like a Mississippi Delta blues musician to a Korean shopkeeper should enhance your brain's ability to integrate auditory and somatic processing.

I have other symptoms associated with mild CAPD. I prefer to watch movies with the subtitles on. I can't "pick up" foreign languages by ear. I have to study a written language before I can hear words, and then only if spoken slowly. If there's background noise, such as noise at a party or wind on an outdoor hike, I can't understand what people are saying. Other people experience this, but my threshold for background noise is lower.

Other symptoms of CAPD include sensitivity to certain noises; difficulty identifying the direction of sounds; difficulty following multi-step directions, especially if given in one sentence; and reading, spelling, and speech problems.

Altered Auditory Feedback

Changing how stutterers hear their voices improves fluency. This can be done in many ways:

- Speaking in chorus with another person.
- Hearing your voice distorted.
- Hearing your vocal fold vibration (phonation) without hearing the articulation of your lips, jaw, and tongue.
- Hearing a synthesized sound mimicking your phonation (masking auditory feedback, or MAF).
- Hearing your voice delayed a fraction of a second (delayed auditory feedback, or DAF).
- Hearing your voice shifted higher or lower in pitch (frequency-shifted auditory feedback, or FAF).
- Switching your voice from one ear to the other twenty times per second (binaural switching auditory feedback).

Together these phenomena are called *altered auditory feedback*. No brain scans have looked at stutterers' auditory processing while speaking with altered auditory feedback.[29] Hypothetically, introducing errors targeted at the area that integrates auditory and somatic processing increases blood flow to that area.

In other words, hearing what you're saying out of sync with what you feel your muscles doing raises a red flag. The red flag is raised in the area that's abnormally underactive in stutterers. It's like a poor little overlooked village suddenly saying, "The British are coming! Eureka! There's gold in them thar hills! We've struck oil! Aliens have landed!"

Picture wagon trains, locomotives, and paratroopers descending on this sleepy little burg. In brain terms, more blood flows to this area. The activity level increases to normal.

The errors must *not* raise red flags in other brain areas, such as language processing. E.g., I built a device that, when you walked up to Fred and said, "Hi, Fred," the device whispered in your ear, "Hi, Steve." It didn't improve fluency. It stopped everyone?stutterers or non-stutterers?from talking.

When stutterers hear altered auditory feedback, something feels *right*. You realize that all your life something was wrong but you didn't know it. Speaking feels natural, like this is how we're supposed to talk.

In contrast, non-stutterers can't stand altered auditory feedback. I've amused many non-

stutterers by putting an anti-stuttering device on them and telling them to count to twenty. Most can't get to ten. They repeat or skip numbers, or giggle uncontrollably, then rip the headphones off.

If my hypothesis is correct, then altered auditory feedback increases blood flow to non-stutterers auditory/somatic integration area, raising activity to an abnormally high level. Too much activity is as bad as not enough activity. Interestingly, the effects of too much activity in this area are somewhat like stuttering?repeating words, or not being able to get words out.

Planum Temporale Abnormality and DAF

The planum temporale (PT) is an anatomical feature in the auditory temporal brain region. Typically people have a larger PT on the left side of their brains, and smaller PT the right side (leftward asymmetry). A brain scan study found that stutterers' right PT is larger than their left PT (rightward asymmetry).[30]

A second study found that stutterers with this abnormal right-ward asymmetry had significantly improved fluency with DAF, but stutterers with the normal leftward asymmetry didn't improve with DAF.[31] The study also found that stutterers with this abnormal rightward asymmetry stuttered more severely than stutterers with the normal leftward asymmetry.

These studies suggest that an anatomical abnormality in the brain's auditory area contributes to stuttering, and that DAF corrects this abnormality.

Immediate Effects of Anti-Stuttering Devices

The most effective types of altered auditory feedback are delayed auditory feedback (DAF) and frequency-shifted auditory feedback (FAF). Each reduce stuttering about 70%, immediately, without training, speech therapy, mental effort, or abnormal-sounding speech. You just put the headphones on and talk. Combined DAF/FAF reduces stuttering about 80%.

70-80% is the average improvement found in dozens of studies, with hundreds of stutterers.[32] Rarely does DAF and/or FAF improve anyone's speech more than 90%, or less than 50%. If auditory processing underactivity were the only cause of stuttering, then DAF/FAF devices would make all stutterers 100% fluent. The 70-80% effectiveness shows that auditory processing underactivity is an important factor in stuttering, but not the only factor. To get closer to 100% fluency an anti-stuttering device has to be combined with speech therapy.

Should Adults Use Anti-Stuttering Devices?

The only treatment for the auditory processing abnormality is an altered auditory feedback device. No speech therapy can fix this abnormality.

Many people overcome stuttering by treating the other factors, e.g., fluency shaping therapy. But using an anti-stuttering device in conjunction with other therapies will make the other therapies easier, faster, and more effective. You'll then use your anti-stuttering device less and less.

Even if you have success with speech therapy and can talk fluently in most situations, there will be a few situations in which you stutter. E.g., you may want an anti-stuttering device for public speaking.

And I keep an anti-stuttering device plugged into my telephone. I pick up the phone and talk fluently. After a few calls my speech is improved for the rest of the day. Many states provide telephone-compatible anti-stuttering devices free

Should Children Use Anti-Stuttering Devices?

Children under six shouldn't use anti-stuttering devices. Childhood stuttering therapy is usually 100% effective, so anti-stuttering devices are unnecessary.

Seven- to thirteen-year-olds can use anti-stuttering devices under the supervision of a speech-language pathologist or a parent trained by a speech-language pathologist, or for *limited* unsupervised uses such as a classroom presentation. If your child gets speech therapy in school only twenty minutes each week, buying a device can enable your child to do therapy at home for thirty minutes each day. The typical protocol is ten minutes reading aloud, a ten-minute conversation with a family member, and a ten-minute telephone call (perhaps to a grandparent). Or the parent and child can play Say the Magic Word while driving to school.

We don't know whether children who stutter have the same neurological abnormalities that adult stutterers have. Altering a child's brain activity might cause his brain to develop in a different way. Extensive use of an anti-stuttering device might cause the child's brain to develop normal auditory processing and the child would outgrow stuttering. But maybe extensive use of an anti-stuttering device would cause the child's brain to develop in another, unknown abnormal way.

Some anti-stuttering devices impair the user's hearing. Some devices occlude (block) the ear that the device is in. And some devices pick up, distort, and amplify background noise. If a child can't hear his teacher, he'll fall behind in school. He might get hit by a bus that he didn't hear coming. Users of some anti-stuttering devices have reported symptoms of permanent hearing damage, such as ringing in the ears or pain from loud noises..

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Delayed Auditory Feedback

Delayed Auditory Feedback

DAF supports the slow speaking rate with stretched vowels (continuous phonation) target. It doesn't induce this target in an untrained user. A speech-language pathologist must train a stutterer to use the slow speech target. When the stutterer can complete a simple speaking task, such as counting to ten, using this target correctly, then he can use a DAF device. DAF therapy then has two goals:

- To increase the length and complexity of the utterance, and increase the stress of the speaking situation, while using the DAF device to support on-target fluent speech.
- To reduce the need for the DAF device, until the stutterer no longer needs the device.

For the first goal, after the stutterer can count to ten using the slow-speech target correctly (e.g., all syllables stretched equally, all syllables stretched to one second, no pauses between words, and no dysfluencies) without the DAF device, then use the device to have a conversation at the same slow speaking rate. When the stutterer can achieve the slow speech target with 100% fluency using the DAF device for utterances with the length and complexity of normal conversations, then the stutterer should take the device out of the speech clinic and use it in increasingly stressful conversations. The first goal is speech that is 100% fluent and on-target (i.e., slow) in any conversation. For a severe stutterer, this may mean using one- or two-seconds per syllables speech with the device set at 200 milliseconds.

When the stutterer achieves the first goal, then he gradually reduces his dependence on the device. He decreases the delay and increases his speaking rate. But if he has any dysfluencies he should go back to the longer delay and slower speaking rate. He can also decrease the volume, and use the device in one ear instead of both ears. He can use the device at the beginning of conversations, and then turn it off when he feels capable of speaking on target with the support of the device. He can discontinue using the device in low-stress conversations. Then he can discontinue using the device in medium-stress conversations, reserving the device only for stressful conversations such as public speaking. Eventually he should need the device only occasionally.

Mistakes in DAF Use

The common mistake I've seen with DAF is using a normal speaking rate with a long (slow) delay. If you want to talk at a normal speaking rate, set the DAF delay between 50 and 75 milliseconds. Don't use a delay longer than 75 milliseconds unless you're using closed-loop slow speech. I've seen this scenario over and over. A stutterer gets a 50% fluency improvement at 50 milliseconds. He gets a 75% improvement at 75 milliseconds. He sees that the dial goes up to 200 milliseconds. He thinks, "I'll crank up this baby! I'll redline it! I'll turn it up all the way to 200 milliseconds and I'll be 200% fluent!"

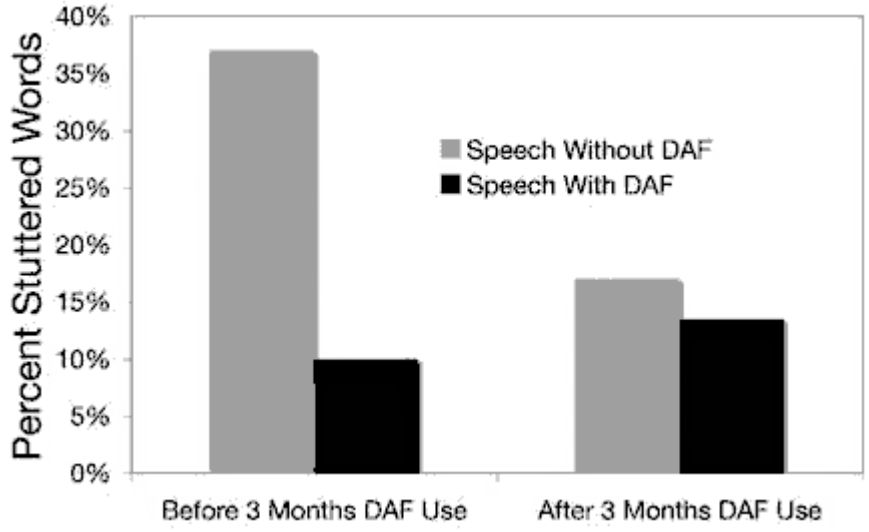
DAF doesn't work like that. 200 milliseconds is for speech five to ten times slower than normal. Non-stutterers can't talk normally with a 200-millisecond delay (with rare exceptions due to a lin-guistic abnormality) but most stutterers are capable of forcing themselves to "tune out" the delay. This appears to be due to our auditory processing underactivity. In other words, if you use DAF incorrectly you may be able to make your auditory processing underactivity worse. This may explain why some stutterers have reported that a DAF device lost effectiveness or "wore off" over time.

Another mistake is to use a DAF device in low-stress situations (such as reading aloud) and expect carryover to high-stress situations. Carryover works the other way. For example, a child could use a DAF device only when called on to speak in class. Or an adult could a DAF device when speaking on the radio at work, but not for conversations with his wife at home. As a rule, use an anti-stuttering device in situations in which you stutter, and don't use it in situations where you speak fluently.

Long-Term Effects of DAF

Nine adult stutterers used DAF devices thirty minutes per day, for three months. The thirty minutes consisted of ten minutes reading aloud, a ten-minute conversation with a family member, and a ten-minute telephone call. The subjects received no speech therapy.[33]

The device used was the School DAF, made by Casa Futura Technologies (disclaimer: the author of this book owns Casa Futura Technologies). The devices were used with binaural (two ears) headsets. The subjects were allowed to set the delay where they wanted. Most selected delays around 100 milliseconds.



Long-Term Effects of DAF

Before the three months of DAF use, the subjects stuttered on 37% of words, on average. When they put on the DAF device their stuttering dropped to 10%. I.e., the device improved their

speech about 70%.

Three months later the subjects stuttered on 17% of words, when not using the DAF device. When wearing the DAF device they stuttered on 13% of words.

This shows that, when not wearing the devices, the subjects' stuttering diminished from 37% of words to 17% of words, or a 55% improvement. This is "carryover fluency." Put another way, the device trained the users to no longer need the device.

The increase (from 10% to 13%) in stuttering when wearing the devices wasn't statistically significant. Examining this more closely, stuttering when wearing the device increased only for "automatic speech," such as reciting days of the week, and for repeating words and sentences after the examiner. No change in effectiveness was found in conversations or in a "picture description" task. This suggests that any "wearing off" effects occurred in less-important speaking situations.

The "carryover fluency" effect was the same across all speaking tasks.

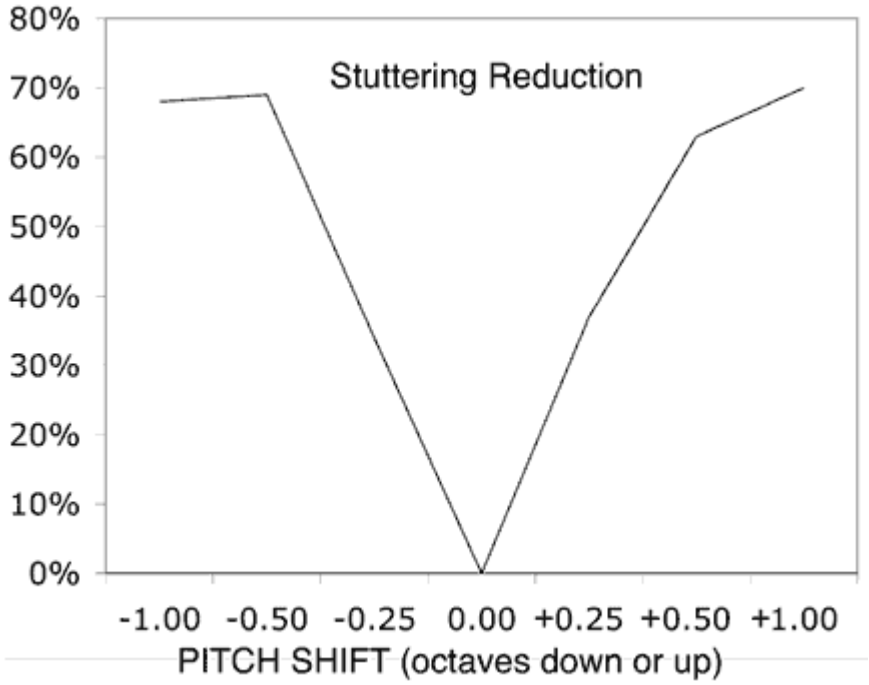
In another study, an eleven-year-old boy received fourteen hours of structured therapy with mediated learning and a School DAF. His stuttering diminished from 9% dysfluencies to 4.8% dysfluencies (when speaking without the device, a 47% improvement). One year later he still had 4.8% dysfluencies. Another fourteen hours of treatment reduced his stuttering to 4.1% dysfluencies.[34]

Two other studies combined speech therapy with a DAF device. One study was of adults,[35] the other of children.[36] Both studies found that combining DAF and stuttering therapy trained the subjects to speak fluently (less than 2% stuttering) and no longer need the devices.

Frequency-Shifted Auditory Feedback

Frequency-shifted auditory feedback (FAF) shifts the pitch of your voice in your earphones. A FAF upshift makes you hear your voice sounding like Mickey Mouse. A FAF downshift makes you hear your voice sounding like a gravel-voiced radio announcer saying his station's call letters.

A quarter-octave pitch shift reduces stuttering about 35%. A half-octave pitch shift reduces stuttering about 65-70%. A full-octave pitch shift reduces stuttering about 70-75%.



FAF Stuttering Reduction

Shifting pitch up or down is equally effective in short-term studies. But there may be long-term differences between up- and downshifts. FAF causes non-stutterers to speak at a higher or lower vocal pitch, depending on whether the device is set for an up or down frequency shift.[37] This higher or lower pitch vocal pitch results from changing vocal fold tension. In other words, FAF induces changes in vocal fold tension in non-stutterers.

Vocal fold relaxation is a primary target of fluency shaping therapy. A study found that my company's FAF devices, set for a half-octave downshift, didn't cause a change in vocal pitch in stutterers.[38] But speech clinics have reported that my FAF devices induce vocal fold relaxation in stutterers. I've seen this myself. Usually stutterers need a greater pitch shift, between one-half and one octave down. Also the study used older headphones which lacked the bass response of today's headphones. I believe that a new study, using one-half or one octave downshifts (the gravel-voice) would find that the current devices induce vocal fold relaxation. I've also seen FAF downshifts induce a slower speaking rate, similar to DAF. If this is true, then a FAF downshift should produce long-term carryover fluency.

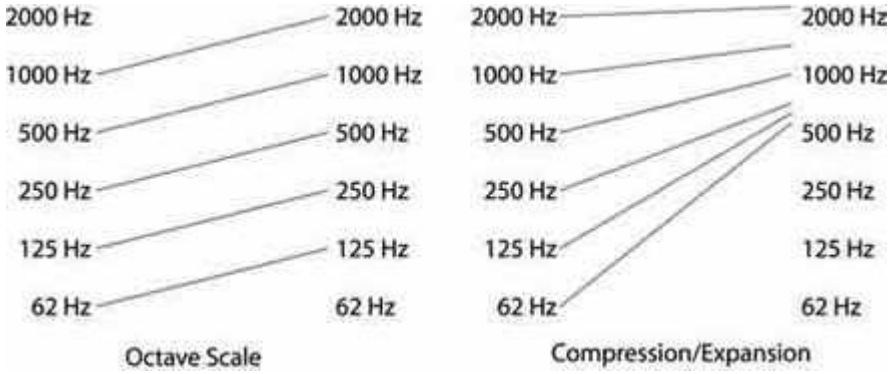
Conversely, a FAF upshift (the Mickey Mouse voice) appears to induce vocal fold tension. And I've seen FAF upshifts induce faster speaking rates. If this is true, then a FAF upshift should result in poor long-term performance (e.g., no carryover fluency, and possibly "wearing off).

Types of FAF

All published studies of FAF used *octave-scale* FAF. Octave-scale FAF requires lots of

computing power (a *fast Fourier transformation*). Casa Futura Technologies devices use octave-scale FAF. When you set these devices to a one-octave upshift, the 125-Hz fundamental frequency of an adult male voice is shifted up to 250 Hz. The 250 Hz first overtone of your voice is shifted to 500 Hz. The 500 Hz second overtone of your voice is shifted to 1000 Hz. And so on.

If you instead use a one-octave downshift, your 125 Hz voice is shifted in your earphones to 62 Hz. Your 250 Hz first overtone is shifted to 125 Hz, and so on.



Octave-Scale vs. Frequency-Compression FAF

But some FAF devices made by other companies don?tm)t have enough processing power to produce octave-scale FAF. Instead, a simpler process uses *frequency compression/expansion* FAF. The upshift adds 500 Hz to your voice (or 1000 Hz or 2000 Hz, depending on the setting). Thus, your 125 Hz fundamental frequency is shifted to 625 Hz?more than two octaves up! Your 250 Hz first overtone is shifted to 750 Hz. Your 500 Hz second overtone is shifted to 1000 Hz.

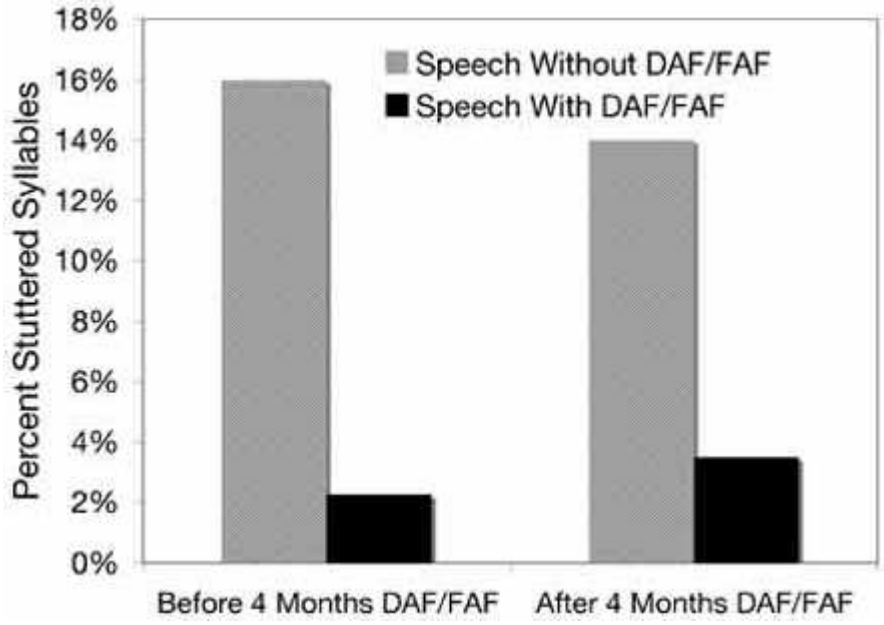
When you switch frequency compression/expansion to downshift or *subtract* 500 Hz from your voice, your 125 Hz fundamental frequency vanishes. 125 Hz minus 500 Hz is nothing (there are no negative frequencies). The 250 Hz first overtone of your voice also vanishes. And the 500 Hz second overtone of your voice vanishes. You can only hear the weak third (1000 Hz) and higher overtones of your voice. When I tried another company?tm)s FAF device, I heard my voice in my ear *rise* in pitch as the FAF was adjusted lower!

No published studies have investigated whether frequency compression/expansion FAF has an effect on stuttering. Anecdotally, upward frequency compression FAF seems to have good immediate effects but poor long-term results. Downward frequency expansion FAF appears to have little or no effect on stuttering.

Long-Term Effects of DAF Combined with FAF

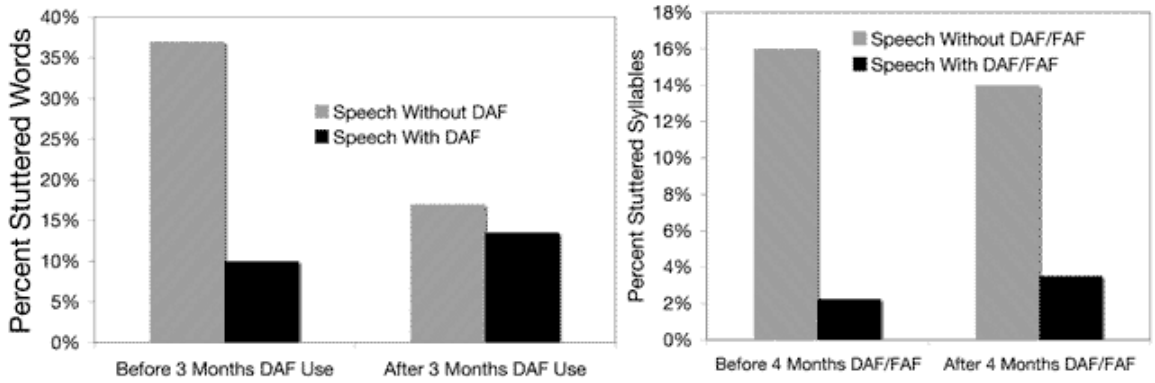
Eight stutterers used a DAF/FAF device about seven hours per day, for four months.[39] The delay was set at 60 milliseconds and the frequency compression FAF at 500 Hz up. The

subjects received brief speech therapy, specifically to prolong vowels and use "starter sounds" such as "um" and "ah."



Long-term effectiveness of DAF/FAF device

Let's compare the two studies side by side:



Comparing two long-term studies

The two anti-stuttering devices had similar immediate effects (the first and third pairs of gray and black bars look similar). The DAF device reduced stuttered *words* about 70%. The DAF/FAF device reduced stuttered *syllables* about 80%.

Both devices show a small but statistically insignificant "wearing off" effect over time (the

second black bar is taller than the first black bar, and the fourth black bar is taller than the third black bar).

The difference between the two studies is the height of second and fourth gray bars. This bar represents "carryover fluency," or the subjects' speech without the devices, after three or four months use. The chart on the left shows a short right-hand gray bar, showing that the DAF users had more than 50% carryover fluency.

The chart on the right shows a tall right-hand gray bar, showing that the DAF/FAF users had no statistically significant carryover fluency.

Why did one anti-stuttering device produce carryover but another device didn't? I hope that researchers will investigate this question. One hypothesis is that upward FAF has positive immediate effects but negative long-term effects. Hearing your voice shifted up (sounding like Mickey Mouse) may correct your auditory processing underactivity but make your speech motor activity worse (i.e., make you speak with a higher vocal pitch and tighter vocal folds). If the auditory processing effect goes away when the device is removed, but the speech motor changes are retained, then no carryover would result.

But the different long-term effects could result from other differences between the studies. E.g., another study found that practicing a skill one hour per day produced better long-term results than practicing four hours per day. Perhaps it's better to use an anti-stuttering device for practice, rather than wearing it all day.

Masking Auditory Feedback (MAF)

If you have silent blocks, in which you can't make a sound, you'll want a device with masking auditory feedback (MAF). You push a button and the device pulls you out of the block.

MAF is a synthesized sine wave at your fundamental frequency (not "white noise," as some "experts" claim).This sound fools your brain into thinking that your vocal folds are vibrating. Your vocal folds relax and start vibrating.

The Edinburgh Masker, popular in the 1980s, helped many stutterers improve their speech over time, until they no longer needed the device. Other stutterers found that the device "wore off" and became ineffective. Still other stutterers have used the device for more than twenty years with no carryover or "wearing off." No research investigated why the device had different effects on different people. My guess is that the device made users talk louder, which increases vocal fold tension, and some users habituated to speaking with too-tense vocal folds. For the users who developed carryover fluency, the device may have helped them overcome fears and anxieties, or they may have used the device to enhance stuttering therapy.

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Sound Quality, Background Noise

Sound Quality

A study comparing two DAF/FAF anti-stuttering devices made by different companies found one device to be more than twice as effective as the other.[40] The difference in effectiveness was likely due to differences in sound quality. It's like the difference between listening to Beethoven at a concert hall, or as a cellphone ringtone.

Frequency Range

Different anti-stuttering devices have different frequency ranges. Generally, the bigger the microphone and earphones, the wider the frequency range.

My company's devices have a flat frequency response from 60 to 5000 Hz. This is the range of human voices, plus additional low range for FAF downshifting.

In contrast, hearing aids typically have a frequency range of 200 to 7000 Hz. The frequency ranges typically aren't flat, but instead are tuned to sound best between 3000 and 4000 Hz[41] (where most people lose their hearing). Hearing aids can't reproduce the low range of human voices, especially the fundamental frequency of phonation that's key to stuttering therapy.

Monaural vs. Binaural Sound

Binaural (two ears) sound is 25% more effective than monaural (one ear) sound.[42] Some devices can be either binaural or monaural. Other devices are monaural only.

No research has tested which ear is better, if you use a monaural anti-device device. The right ear connects to left side of the brain, which processes speech and other rapidly changing auditory signals, and, hypothetically, is the better ear for using an anti-stuttering device. In contrast, the left ear is better for tones and music.[43] But brain scans have found that stutterers have more right-hemisphere activity during speech (in contrast, non-stutterers have more left hemisphere activity during speech). If stutterers process speech on the right side of their brains, then a monaural anti-stuttering device should be worn in the left ear. It would be interesting to investigate left- and right-ear altered auditory feedback with brain scans. This might shed light on the question of whether the unusual right-hemisphere activity of stutterers during speech is speech processing or heightened emotions (such as speech-related fears and anxieties.)

(Or maybe if you're gay and live on the east coast, you wear your anti-stuttering device in your left ear, but…)

Warranties, Returns and Repairs

Read price sheets and warranties carefully. Are there hidden fees? How long is your trial period for returning the device? Do you get a full or partial refund?

Toss the device onto a hard floor (before you pay for it!). How breakable is it? How long is the warranty? Are repairs covered in all situations, or excluded if it was your fault that the device broke?

How easy would it be to lose a device, especially for a child?

Ask about the company's return rates. Less than 1% of my customers return devices.

Background Noise

Some anti-stuttering devices work well in quiet speech clinics, but are unusable in a noisy restaurant. A variety of features help solve the background noise problem.

Noise-Canceling Microphones

Positioned correctly, a *noise-canceling directional microphone* eliminates background noise at the source. In contrast, the omnidirectional microphones in hearing aids pick up background noises louder than your voice.

Push-To-Talk Button

A "push to talk" button also eliminates background noise. You push a button and the device switches sound on. You let go of the button and the sound switches off.

In noisy environments you're usually in a group. E.g., you go out to a restaurant with three friends. You talk one-fourth of the time. Most of the time you sit and listen, with clear hearing. When you have something to say, you push the button.

A push-to-talk button also works well for a child in school, who mostly listens and occasionally is called on by the teacher.

High-Frequency Filters

Most anti-stuttering devices have high-frequency filters to reduce noise above your vocal range.

Voice Activation

Voice activation switches on sound when the user talks, and switches off sound when the user stops talking. Voice activation works well if the device has a noise-canceling directional microphone. If the device has an omnidirectional microphone, loud noises switch on sound.

My company's Pocket Speech Lab analyzes your vocal fold tension and switches on DAF/FAF when you tense your vocal folds, before you stutter. It switches off sound when you're speaking with relaxed vocal folds, or not talking (see Vocal Frequency Biofeedback).

Dynamic Expansion

Some devices have dynamic expansion. This makes loud sounds louder and quiet sounds

quieter. If you're using a noise-canceling directional microphone this makes your voice louder and background sounds quieter. With an omnidirectional microphone it can make your voice quieter and background noise louder.

Acoustical Transparency

Listening to someone talk, while you wear a DAF device that's picking up the other person's voice, is like reading the following:

That says, "difficult to hear another person speaking." You hear the person speaking twice, with the words out of sync.

In contrast, small FAF pitch shifts, without a DAF delay, have little impact on your ability to hear. It's like hearing music played on a violin vs. on a viola. Or hearing your friend's voice drop a little when recovering from a cold. This is known as "acoustically transparent."[44]

Finding Help Paying for an Anti-Stuttering Device

Many states, including Texas, California, Massachusetts, Georgia, Wisconsin, North Carolina, and Arizona have special telephone equipment distribution programs that provide telephone-compatible anti-stuttering devices free to qualified residents.

If you're employed, ask your employer to help pay for an anti-stuttering device. All of my customers who've asked their employers received help. And then they were given extra work and responsibilities. Some also got raises.

If your employer were to say no, you could mention that the Americans with Disabilities Act requires employers to pay for "reasonable accommodations" requested by employees with disabilities.

If you're unemployed and stutter, your state's vocational rehabilitation program will help get you a job, including paying for speech therapy and/or an anti-stuttering device. See the section Vocational Rehabilitation

Some speech clinics will handle your insurance billing for anti-stuttering devices. The CPT/HCPCS procedure code for electronic anti-stuttering devices is E1399-NU. The diagnosis code for stuttering is 307.0.

I've had good experiences with Sertoma and Lions Clubs. Sertoma assists persons with speech, hearing, and language disorders. Service organizations prefer to help low-income children, and they prefer to be approached by the child's speech-language pathologist.

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External Links

Companies that sell altered auditory feedback anti-stuttering devices:

- Casa Futura Technologies
- Fluency Enhancer
- Fluency Master
- Griffin Laboratories
- SpeechEasy

Speech Motor Learning and Control

Open- and Closed-Loop Speech Motor Control

Brain scans of adult stutterers have found two neurological abnormalities. The first is underactivity in the auditory processing area, which is treated with electronic anti-stuttering devices.

The second neurological abnormality is overactivity in the left caudate nucleus speech motor control area. Watch a stutterer struggle to talk. You see that stuttering is primarily overtense, overstimulated respiration, vocal folds, and articulation (lips, jaw, and tongue) muscles. *Fluency shaping therapy* treats this problem. It trains stutterers to speak with relaxed respiration, relaxed vocal folds, and relaxed articulation muscles.

In my experience, fluency shaping therapy is the most important factor in treating stuttering. You likely have had at least some fluency shaping therapy. You might be saying, "Yeah, I did easy onsets and voice contours, and I still stutter." I did a fluency shaping therapy program, then went back for a refresher, and I still stuttered.

Then I discovered the secret side of fluency shaping therapy. The "experts" know nothing about this. I read a textbook about motor learning and control. The book never mentioned stuttering. Yet the book taught me more about stuttering than any book about stuttering.

Motor learning and control is the study of how brains execute complex muscle movements. Physical therapy and occupational therapy students study motor learning and control. Speech-language pathology students don't (at least not for treating stuttering).

Sports coaches also study motor learning and control. The principles of motor learning and control are usually illustrated with examples from gymnastics, tennis, golf, or other sports.

Closed-Loop Motor Control

We perform muscle movements with either *open-loop* or *closed-loop* motor control.

Closed-loop motor control uses perception to consciously, continuously adjust muscle movements. E.g., threading a needle. You look at the needle. You look at the thread. You move the thread towards the needle. You look at the needle again. You look at the thread again. You correct your movement. You do this dozens of times until the thread is through the needle.

Each *stimulus-response* adjustment takes at least 200 milliseconds (one-fifth of a second). If you make ten adjustments, the task takes at least two seconds.

Closed-loop motor control has two advantages. It enables precise control, and it enables execution of novel movements (activities you've never done before). E.g., threading a needle on

the deck of a rolling ship.

Closed-loop motor control has two disadvantages. It's slow, and it requires your full attention. Closed-loop motor control is good for learning new skills, or for executing skills you rarely need. But you don't want to use closed-loop motor control for skills you use often.

Closed-loop motor control is rarely used for speech. Perhaps when you meet a person with a difficult foreign name, you might ask her to say her name slowly, syllable by syllable. You say her name slowly several times until you've learned it. Other than that, closed-loop speech motor control is only used in speech therapy.

Open-Loop Motor Control

In contrast, *open-loop motor control* is the execution of preprogrammed movements, called a *motor program*, without perceptual feedback.

Gymnastics is an example of open-loop motor control. Gymnasts practice hours each day for years, until they can execute complex routines seemingly effortlessly. The colloquial term for this is "muscle memory."

Open-loop motor control has two advantages:

1. It's fast. You can execute muscle movements in tens of milliseconds. Gymnasts execute complex movements with split-second timing.

2. It requires no attention. Movements under open-loop control are *automatic* and mentally *effortless*.

Open-loop motor control has three disadvantages:

1. If your motor program contains errors, you'll execute the errors. You can't stop and adjust a mistake. You may not even be aware that you made a mistake.

2. Developing open-loop control of a motor skill requires long practice?especially for adults. Children learn some motor skills easily, that adults struggle for years to master.

3. Novel or new situations can't be handled. E.g., in the 2000 Olympics, officials set the gymnastic vault two inches too low. The officials didn't correct the height until 18 of the 36 women had performed. These 18 athletes performed poorly, eliminating their hopes of winning medals. The American hopeful, Elise Ray, suffered a "devastating fall."

Speech uses open-loop motor control. Speech is fast. Each sound is executed in tens of milliseconds. You move hundreds of muscles to produce each sound. Speech is as fast and complex as a gymnast's vaults, flips, and twists. Speech is automatic and effortless. Speakers think about what they're saying, not what muscles they're moving.

Open- and Closed-Loop Speech Motor Control

Fluency shaping stuttering therapy uses closed-loop speech motor control. You consciously

relax your breathing. Then, as you exhale, you slowly increase your vocal fold tension, until your vocal folds hum. Then you slowly move your lips, jaw, and tongue to form the sounds of each word.

Note several differences between open-loop and closed-loop speech motor control:

- Closed-loop speech motor control is slow. You speaking rate drops to one or two seconds per syllable, or five to ten times slower than normal speech.
- Closed-loop speech motor control demands your full attention. You must pay attention to your breathing, vocal folds, and lips, jaw, and tongue. This isn't a problem when reading a list of words, but is impossible to use in conversations.
- Your speech loses emotional intonation. Closed-loop speech motor control makes you sound like a robot with dying batteries.
- Stuttering is impossible when using closed-loop speech motor control. Stuttering dysfluencies are open-loop speech motor programs.

Slow Speech

Closed-loop motor control takes about 200 milliseconds (one-fifth of a second) per muscle movement. Open-loop speech sounds are typically in the 20-40 millisecond range. You can see why switching to closed-loop speech motor control slows speech five to ten times.

For severe stutterers, switching to closed-loop speech motor control increases speaking rate. If stuttering slows your speech to one-twentieth of a normal speaking rate, switching to one-tenth of a normal speaking rate is twice the speed. Record conversations with and without using closed-loop speech motor control. Count your syllables per second. You may find that closed-loop speech motor control feels slower but is actually faster than your stuttered speech.

Mild Stutterers and Slow Speech

Mild stutterers can hide their stuttering by avoidance and substitution (of certain sounds, words, or speaking situations). They can sound fluent at a normal speaking rate. These individuals don't like closed-loop speech motor control. Closed-loop speech motor control "advertises to the world" that they have a speech disorder. If they're embarrassed to admit that they stutter, they won't want to use closed-loop speech motor control.

Mild stutterers should consider that closed-loop speech motor control enables them to say anything they want. E.g., a mild stutterer wants to buy a chess set, but isn't sure whether a toy store has chess sets. He's afraid of *s* words, so he calls the store and asks if they have "one of those games with kings and knights and castles."

The puzzled clerk responds that the store has many games with kings and castles and knights. After five minutes of conversation, the clerk asks, "Do you mean *chess sets*?" The stutterer says yes. The clerk never knows that the caller is a stutterer, but she thinks the caller is an idiot. The

stutterer wasted five minutes because he wasn't willing to use ten seconds of slow speech.

Or the stutterer drives to the store and looks for a chess set, without calling first. If the store doesn't have chess sets he wastes an hour, to save ten seconds.

In other words, saying what you want slowly is faster than saying something else, or not speaking.

Slow Speech Is Not the Goal of Stuttering Therapy

Whether you're a severe, moderate, or mild stutterer, closed-loop motor control is a temporary stage of motor learning. After you master fluent speech skills at slow speeds, your speech-language pathologist will gradually increase your speaking rate until you speak at a normal rate. Slow speech is a necessary stage. Slow speech isn't the goal of stuttering therapy.

Let me repeat this often-mistaken fact. When you finish a fluency shaping speech therapy program, you won?tm)t drone like the dying robot.

Your speech-language pathologist may tell you to practice slow speech at home. She may ask you to read aloud, to use slow speech with a family member, or to call another stutterer in her program to practice. She might ask you to use slow speech in some daily situations that don't require listening or thinking about what you're saying, e.g., when you answer the telephone at work.

These slow speech practice exercises don't mean you're expected to use slow speech all the time, for the rest of your life. Just like a golfer or tennis player, you'll use slow speech until you master the target motor skills, and then you'll gradually increase your speed until you're speaking at a normal (or slightly slower than normal) rate.

Analogy to Touchtyping

I've never taken a typing class. I type about 45 words per minute (I'm probably the world's fastest two-fingered typist!).

I've tried to learn touchtyping. My speed dropped to less than ten words per minute. Touchtyping not only slowed me down, it required my full concentration. I couldn't think about what I was writing, only about moving my fingers.

I gave up touchtyping within a week. If I'd kept at it, my speed would have increased and eventually surpassed my two-fingered typing speed. I might have been typing 80 words per minute now. The mental effort would have diminished, until touchtyping was automatic and effortless.

Coaches say they'd rather work with a novice who has never played their sport, rather than with an experienced player who uses incorrect techniques. It's easier to learn a new motor skill correctly than it is to correct an incorrect, deeply learned motor skill.

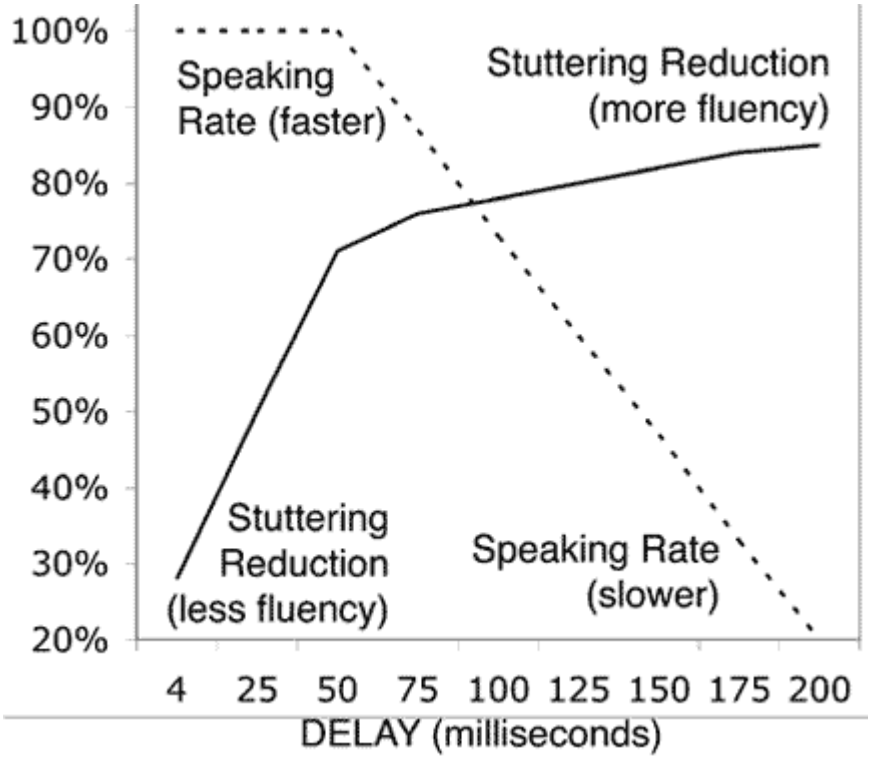
Stuttering is difficult to overcome because we learned to talk incorrectly. We have to learn

new, fluent speech motor skills, *and* we have to not use our old, dysfluent speech motor skills. We learned these dysfluent speech motor skills in childhood, when our brains were growing. Now the dysfluent speech motor skills are hardwired into our brains. Making fluent speech automatic and effortless, for a stutterer, demands more time and effort than learning a new sport or vocational skill.

Using DAF to Slow Speaking Rate

In the previous chapter I said never to adjust DAF beyond 75 milliseconds?unless you want to use slow, stretched-vowel speech. Now that you have a better understanding of slowed speech, I'll explain how DAF can be used to aid slow speech with stretched vowels.

DAF makes slow speech with stretched vowels easy. You just listen to your voice in the headphones and hold the vowel until you hear it.



DAF Effectiveness and Speaking Rate

This chart shows that you get about a 70% reduction in stuttering with a 50 millisecond DAF delay. Increasing the delay to 75 milliseconds gives you a little better fluency, at a little slower speaking rate. Increasing the delay beyond 75 milliseconds only improves fluency very little, and slows your speaking rate a lot. By 200 milliseconds you should have an 85% reduction in stuttering, but you'll be using one- or two-second per syllable stretched speech. Your speech will be five to ten times slower than normal speech.

I said this before but I'll say it again. Don't set a DAF device at more than 75 milliseconds and try to talk at a normal speaking rate. You might succeed for a short time, but over the long term you'll train yourself to "tune out" the delay and the device will become ineffective.

Snake Oil and Charlatans

Closed-loop speech motor control is the wizard behind the curtain of many stuttering "miracle cures." E.g., one stuttering therapy program teaches stutterers to pay attention to their breathing. Another program teaches stutterers to pay attention to their vocal folds. Another program teaches stutterers to pay attention to their articulation muscles.

All of these "miracle cures" have you consciously control some aspect of speech production. Switching to conscious control slows down your motor movements. That, in turn, makes you more aware of other aspects of speech production.

For example, consciously relaxing your breathing also relaxes your vocal fold activity, which also relaxes your articulation muscles. It doesn't really matter where you start, as everything is connected.

This "wizard behind the curtain" has fooled the "experts" too. One "discovered" that slow, conscious breathing eliminates stuttering, so he theorized that stuttering is a breathing disorder. Another "discovered" that slow, conscious vocal fold control eliminates stuttering, so he theorized that stuttering is a vocal fold disorder. Other "experts" noticed that paying attention to any physical aspect of speech production eliminates stuttering, so theorized that all "distractions" eliminate stuttering.

Always these "experts" claim that their therapies are 100% effective if the stutterer "really tries," that is, if he devotes his full attention to closed-loop speech motor control. If he instead pays attention to a conversation, then he stutters because wasn't "really trying." I.e., his relapse is his own fault, not the fault of the speech-language pathologist.

- Some speech-language pathologists claim that the speech areas of stutterers' brains are abnormally slow. This isn't true. Analogously, you likely haven't won an Olympic medal in gymnastics, but that doesn't mean that the gross muscle control area of your brain is slow. It just means that you haven't practiced gymnastics hours a day for many years.

Three Stages of Motor Learning

We learn new muscle movements, or *motor skills*, in three stages:

1. In the *cognitive stage*, an instructor demonstrates the motor skill to you.

2. In the *associative stage*, you learn to perform and refine the motor skill. You perform the movements under closed-loop control.

3. In the *autonomous stage*, the motor skill becomes automatic. You perform the muscle movements without mental effort. You perform the movements under open-loop control.

E.g., imagine yourself learning to play golf or tennis. You watch the coach hit a few practice balls. Then the coach hands you the club or racket. The coach guides you through a swing, telling you to drop this shoulder or extend that forearm. Soon you can execute the swing perfectly, if you fully concentrate on each movement. You then practice the swing, and your game improves.

A few years later a novice admires your excellent swing and asks you to explain how you do it. "I don't know," you say, "I just do it without thinking about it."

For another example, last summer I tried mountain bike racing. In four races I crashed four times. I then hired a coach. In twelve hours over three weeks, he taught me how to ride down hills; make tight turns; jump my bike over logs; climb hills; plus a few tricks such as picking up a water bottle off the ground.

Then I quit mountain bike racing. I'd completed the associative stage and learned how to do each skill. Now I would have to practice these skills hours a day, several times a week for years to make the skills automatic in the fast, high-stress environment of racing. I.e., I could do any of the skills if I thought about it, but my body didn't automatically execute the moves without conscious mental effort. I decided that mountain bike racing isn't important enough to me to spend thousands of hours practicing skills.

Stuttering therapy follows a similar course. A speech-language pathologist can show you the fluency skills?relaxed, diaphragmatic breathing; vocal fold relaxation (gentle onsets); and relaxed articulation muscles (lips, jaw, and tongue)?in ten minutes. Teaching you to execute these skills takes a few hours. You can then speak fluently in the speech clinic, when you mentally concentrate on each skill. Almost everyone successfully completes these cognitive and associative stages.

You then have to practice these skills thousands of hours to make them automatic and effortless, in high-stress situations. Many stutterers fail at this stage. But no one intentionally fails for the reasons I quit mountain bike racing. No one rationally weighs the alternatives and says, "Talking isn't important to me. I'll learn sign language instead, or write notes."

Instead, stutterers fail at the autonomous stage because speech clinics don't train this well.

Speech clinics call this *transfer*. Perhaps your speech-language pathologist takes you to a shopping mall for a few hours. But the autonomous stage requires thousands of hours of conversations, including high-stress conversations. Stutterers habitually avoid such conversations.

You may find that the skills you learned in the low-stress speech clinic fail in high-stress conversations. Your therapy progress begins to fail. You revert to old habits and avoidances. Your stuttering returns.

Choosing a Speech-Language Pathologist

Find a speech-language pathologist who specializes in stuttering. About 90,000 speech-language pathologists are licensed by the American Speech-Language Hearing Association (ASHA). Of these, less than 400 are board-certified Fluency Specialists.

The Stuttering Foundation of America also has lists of recommended speech-language pathologists.

You can also go to a National Stuttering Association local support group and ask for recommendations.

Is Self-Therapy an Option?

You can't learn motor skills out of a book. You can learn the *cognitive* stage from a book or video. Analogously, many videotapes offer to teach golfers how to improve their swing.

But the *associative* stage requires *feedback*. A trained individual must observe you and tell you when your performance is correct, when your performance is incorrect, and what to change to correct your performance.

Performing and Refining Fluent Speech

In the associative stage, you learn to perform the fluency skills that you observed your speech-language pathologist performing in the cognitive stage.

Fluency skills improve your awareness and control of speech-production muscles. Speech-production muscles are divided into three areas: breathing, vocal folds, and articulation (lips, jaw, and tongue).

Breathing

Place one hand on your stomach. Breathe so that your hand moves out when you inhale, and in when you exhale.

Notice that you're taking many small breaths. Your inhale and exhale time in equal.

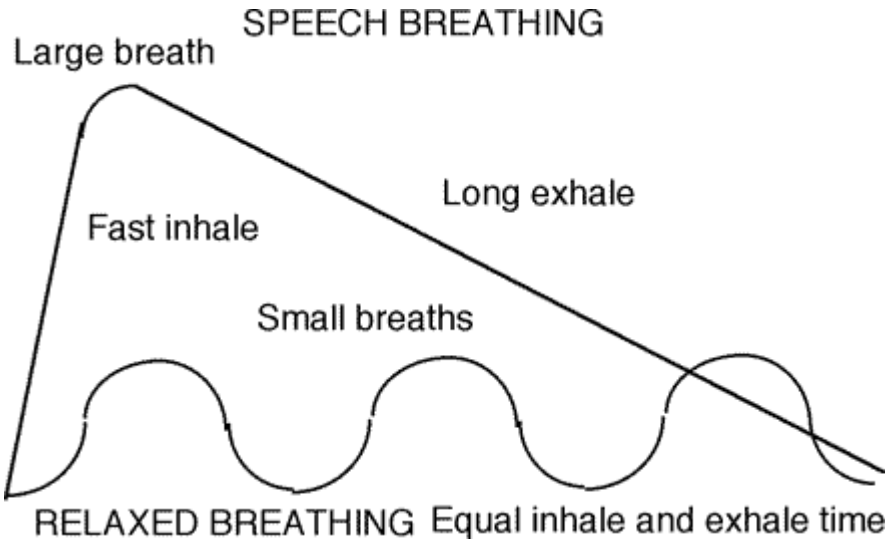
This is relaxed or *diaphragmatic* breathing. This is the way people normally breathe.

Now switch to upper-chest breathing or *thoracic* breathing. Take a big breath, using your upper chest muscles to expand your lungs. Release the air slowly, while maintaining this upper chest muscle tension to hold air in your lungs as long as possible. When you've released the air, quickly take another breath, filling your lungs as rapidly as possible.

Practice switching between thoracic and diaphragmatic breathing.

Thoracic breathing increases our lung capacity. It enables us to maximize our physical exertion. Our "fight or flight" instinct switches us to thoracic breathing. We're then better able to run or fight.

Some individuals *hyperventilate* or switch to thoracic breathing when experiencing non-physical stress. Stress reduction classes teach students to relax by switching to diaphragmatic breathing.



Thoracic vs. Diaphragmatic Breathing

We also use thoracic breathing when talking. A large breath with a long, slow exhale enable us to speak many words before pausing for another breath.

Well-meaning people who know nothing about stuttering may tell you to "take a deep breath" before talking. But the opposite is better advice. Diaphragmatic breathing is the foundation of many stuttering therapy programs. Taking smaller breaths with your diaphragm can help you relax and talk fluently.

Try it. Your relaxed breathing will relax your entire body. Most importantly, it will relax your vocal folds, and then your lips, jaw, and tongue. Your voice will deepen and sound confident and even "sexy." You'll feel relaxed and confident.

Practice a word list using diaphragmatic breathing. Read a magazine page aloud using

diaphragmatic breathing.

You'll soon discover a few problems trying to speak with diaphragmatic breathing. Each breath is small, so you're able to say only a few words on each breath. Inhale time and exhale time are equal, so you have long pauses between short phrases. You're unable to speak loudly.

Like other fluent speech motor skills, speaking with diaphragmatic breathing is abnormal but useful. Include speaking with diaphragmatic breathing in your stuttering therapy practice exercises. Mastering this skill will enable you to speak short phrases fluently in stressful situations. E.g., a police officer pulls you over for speeding. You don't need to say much besides, "Yes, officer," and "No, officer."

And as you master speaking with diaphragmatic breathing, you'll develop something in-between thoracic and diaphragmatic breathing. This "in-between" breathing will be more relaxed than thoracic breathing, yet your phrase length and vocal volume will be within the normal range.

Phonation

Your vocal folds are flaps of muscle in your throat. Making your vocal folds vibrate produces sound. This sound then becomes your voice. Vocal fold vibration is called *phonation*.

Two conditions produce phonation. First, you release air from your lungs. Next, you tension or tighten your vocal folds.

Place your fingers on your throat. Exhale and hum. Your fingers should feel a vibration. This is your vocal folds vibrating.

Stop humming, and feel the vibration stop. Practice switching your phonation on and off.

Now vary your phonation in two ways. Change your volume (hum louder, then quieter). Change your pitch. Hum up and down a musical scale.

How did you do that? You varied your volume of exhalation, i.e., you increased or decreased the air releasing from your lungs by tensing or relaxing your thoracic (upper chest) muscles. More exhalation enabled you to produce more volume.

You also varied your vocal fold tension. Tense vocal folds produce a higher-pitched voice. Relaxed vocal folds produce a deeper or lower-pitched voice.

Tense your vocal folds as hard as you can. You'll completely block your throat, not allowing any air to escape. If you take a deep breath and then block your throat, your increased lung pressure makes your chest stronger. Like inflating a tire to carry a heavier load, this is effective for lifting a heavy weight. But it's not a good way to talk!

Practice one more aspect of phonation. Take a breath and hold it, tense your vocal folds, then release air. Switch to the other way: take a breath, release a little air, then tense your vocal folds. Note that the former produced a croak. The latter produced a nice hum. This shows that

phonation requires timing two muscle movements: exhaling a little air, and then starting to tense your vocal folds.

You now see that three things can go wrong with phonation:

- Releasing too much or too little air (*inadequate breath support*).
- Overtensing your vocal folds. Under stress, you may try too hard to talk, tense your vocal folds too much, and block off air flow. This results in a *silent block*.
- Mistiming exhalation and vocal fold tension. A goal of stuttering therapy is train the stutterer to consciously take a breath, release a little air, gently tense his vocal folds, and then begin to talk. This exercise is called *gentle onset* or *easy onset*.

Adequate Breath Support

This exercise is very simple. Take a breath and say, "This exercise is very simple."

Then take another breath and say, "This exercise is very, very, very simple."

Then take another breath and say, "This exercise is very, very, very, very, very, very, very, very, very, very, very simple."

The last sentence should have forced you to use *residual air*. You had to overtense your chest muscles, to squeeze the last air from your lungs. This increased muscle tension can contribute to stuttering.

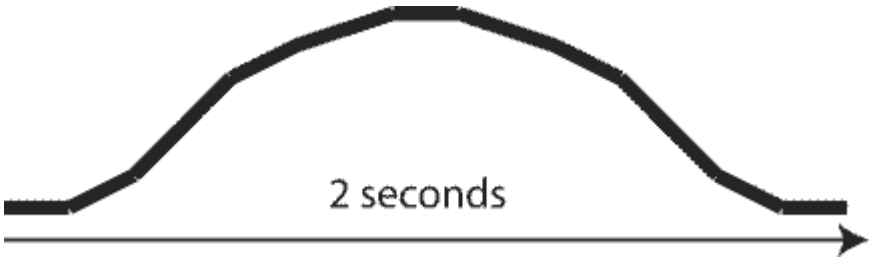
Practice this exercise until you are aware what *inadequate breath support* feels like. If you ever feel this when talking, stop and take a deep breath.

Gentle Onsets with Vowels

To hit a baseball home run, you use all of your arm muscle strength. In contrast, to putt a golf ball a few feet, your arm muscles are more relaxed than tense. Phonation is like putting a golf ball, not like hitting a home run.

To use *gentle onsets* (also called *easy onsets*), take a relaxed breath with your diaphragm. Release a little air. Make an *ah* sound as you gradually increase your vocal fold tension. Feel your vocal folds begin to vibrate. Increase your vocal fold tension, until you reach normal speaking volume. Gradually reduce vocal fold tension, until you reach silence. Time this to take about two seconds. You should be able to do this on one breath, without reaching residual air.

If you were to see your vocal volume charted, it would look like this:



You can buy a computer applications that displays your phonation contour on the screen. Applications include Dr. Fluency, Speak:Gentle, and the Computer-Aided Fluency Establishment and Trainer (CAFET). Or you can use a sound-recording and -editing application (many such applications are available free).

Practice fifteen gentle onsets with the fifteen vowel sounds (say the vowel, not the word):

Front Vowels:

- long *e*, as in *beet*
- short *i*, as in *bit*
- long *a*, as in *bait*
- short *e*, as in *bet*
- short *a*, as in *at*

Back Vowels:

- long *u*, as in *boot*
- short *o*, as in *book*
- long *o*, as in *boat*
- *aw*, as in *cause*
- *ah*, as in *cot*

Central Vowels:

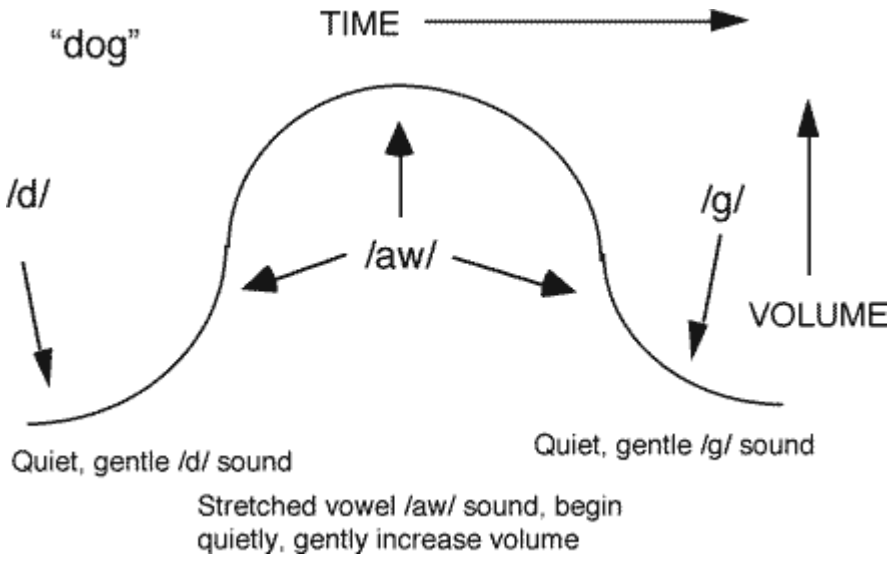
- *ow*, as in *about*
- short *u*, as in *but*

Dipthongs:

- long *i*, as in *bite*
- *oy*, as in *boy*

- *au*, as in *bough*

Gentle Onsets with Words



Gentle Onset with Words

Now say "dog," stretched over two seconds, with gentle onset. Begin with a quiet, gentle /d/ sound. Switch to the /aw/ vowel sound and gradually increase vocal volume. After one second, gradually reduce vocal volume. Switch to the /g/ sound, and stop vocal fold vibration

Voice and Voiceless Consonants

All vowels use phonation. Some consonants use phonation, i.e., are *voiced*. Other consonants are produced without phonation, i.e., are *voiceless*. You can whisper these consonants.

Place your fingers on your throat. Say *ah* to feel your vocal folds vibrating. Say the following words and decide whether the initial consonant is voice or voiceless:

/h/	hail	/w/	whale
/f/	famous	/v/	vacant
/s/	saber	/z/	zany
/sh/	chenille	/zh/	jeté
/ch/	chive	/j/	jive
/thr/	throw	/th/	those
/p/	pipeline	/b/	bison
/t/	tie-dye	/d/	diner
/k/	kindness	/g/	guide

The first column was voiceless. The second column was voiced.

Did you notice that these sounds were pairs? /h/ and /w/ have your lips, jaw, and tongue in the same positions. The difference is that your vocal folds vibrate to produce /w/, but don't vibrate to produce /h/.

To say a word with voiceless consonant, take a breath, let out a little air, shape the consonant with your lips, jaw, and tongue, then switch to the vowel and gently start your vocal fold vibration.

Practice a word list. Keep your fingers on your throat to feel your vocal folds switching on and off as you go from voiced to voiceless sounds. Stretch each word to two seconds.

Because most words contain both voiced and voiceless sounds, we switch our vocal folds on and off many times each second while talking. A core behavior of stuttering is an inability to switch phonation on at the right moments. The timing can be as precise as one one-hundredth (1/100) of a second.

Normal speech is about five syllables per second, or 0.2 seconds per syllable. For this practice you're using two seconds per syllable stretched speech, or ten times slower than a normal speaking rate. Slowing down your speech helps you develop awareness and control of speech elements that are otherwise too fast to notice or control. If you play a sport, such as tennis or golf, your coach might videotape your swing and then replay it back in slow motion. This improves your awareness and control of the motor skill.

Continuous Phonation

Stuttering therapy sometimes teaches techniques that produce fluency, but sound abnormal. E.g., speech with diaphragmatic breathing produces fluency, but shortens phrase length and makes you pause between phrases. The immediate goal is to use these techniques to produce fluent speech, and over time reduce the degree of exaggeration, until your speech sounds normal. Another goal is have a "trick" to use in stressful situations, such as speaking to a police officer.

Continuous phonation is such a technique or trick. Recall that consonants come in voiced/voiceless pairs. Simple substitute a voiced consonant whenever you need to say a voiceless consonant.

E.g., "Patty" becomes "Baddy." Say each word slowly, with your fingers on your throat to feel your phonation. You'll feel your vocal folds switch on and off for "Patty," but stay on for "Baddy."

If you shorten the consonants and stretch your vowels (producing a slower speaking rate), listeners won't hear the difference between "Patty" and "Baddy."

Gentle Onsets with Multisyllabic Words

Practice using a gentle onset on each syllable. Go loud on each vowel. On the consonants, relax, go quiet, and lightly and quickly articulate the sounds. E.g., on "American," you start with a gentle onset on the initial /uh/. Open your mouth wide at the loudest point in the phonation contour.

Take the /uh/ sound down in volume, while at the same time closing your mouth to articulate the voiced /m/. Bring the /eh/ sound up in volume. Again, open your mouth wide at the loudest point in the phonation contour.

Take the /eh/ sound down in volume, while at the same time reduce your jaw opening (but don?tm)t close your lips) to articulate the voiced /r/.

Open your mouth wide again for the /ih/ vowel on the third syllable.

Now you get to the only voiceless sound in "American." Before the /k/ sound, take the down the volume of the /ih/ vowel. Whisper the /k/. If you block, you dropped the /ih/ volume too fast. Try again with a long, slow decline in volume on the /ih/. Articulate the /k/ lightly, for just a moment.

If you still block on the /k/, change it to a voiced /g/. In other words, say "Amerigan."

Use another gentle onset on the final /eh/ vowel. Reduce your volume on the final voiced /n/ consonant.

The result is an abnormal-sounding "sing-song" speech pattern. Your jaw opens and closes noticeably on each syllable. While you won?tm)t want to talk like this for the rest of your life,

for practice or in stressful situations this technique helps you use gentle onsets, continuous phonation, and a slower speaking rate.

Lower Vocal Pitch

Another technique to increase fluency is to speak in a deeper (lower pitch), slightly quieter voice.

Read another word list. Take a breath before each word, gently increase phonation, and note that your vocal pitch is low as you begin phonation. Now keep your pitch low as you increase volume and finish the word. You should be able to reach a nearly normal speaking volume. This volume should be acceptable for most conversations, including telephone conversations.

A deep voice, slow speaking rate, and low volume projects confidence and relaxed authority. Your words will be clear to listeners who don't speak English well. You'll sound "sexy" to persons of the opposite sex.

Articulation

The third set of speech muscles (after respiration and phonation) are your articulators: lips, jaw, and tongue.

These muscles form your vocal fold humming into sounds and words. If you phonate without moving your lips, jaw, and tongue, all that comes out of your mouth is humming.

Read another word list (at the back of this book) aloud. Feel how your lips, jaw, and tongue move to change sounds.

Say each word with normal articulation tension. Then say the word again with tense articulation. Then say the word again with relaxed articulation.

Some stuttering therapy programs at this point devote many hours to teaching the stutterer the correct lips, jaw, and tongue position for each of the 40+ sounds of English. This is usually unnecessary, in my opinion. Stuttering is not an articulation disorder. Stutterers don't, in general, misarticulate sounds (e.g., saying /w/ instead of /v/). Stutterers instead need to learn to relax their lips, jaws, and tongues.

There are exceptions. If your speech-language pathologist diagnoses that you have articulation problems, or if you speak with a foreign accent, do articulation therapy.

Breathing, Vocal Folds, or Articulation?

Stuttering modification therapy ("Van Riper therapy") focused on reducing articulatory pressure and blending sounds together. I.e., stuttering modification therapy trains stutterers to relax their lips, jaws, and tongues. Breathing and vocal folds are ignored.

Fluency shaping therapy starts with relaxed (diaphramatic) breathing, then teaches relaxed vocal folds (gentle or easy onsets), and then trains the correct positions for your lips, jaw, and

tongue, i.e., correct articulatory positions.

The "airflow technique," like fluency shaping, focuses on relaxed breathing and relaxed vocal folds. It assumes that when your breathing and vocal folds relax, your lips, jaws, and tongue automatically relax.

- My experience is that the latter is true. I spent many hours in stuttering modification therapy unsuccessfully trying to relax my lips, jaw, and tongue, because my breathing and vocal folds were tense. I spent many more hours in fluency shaping therapy practicing correct positions for my lips, jaws, and tongue. This seemed too easy, because my breathing and vocal folds were relaxed. Now when I find myself stuttering I stop, relax my breathing, relax my vocal folds, and talk fluently. I never pay attention to my articulators (lips, jaws, and tongue).

Feedback and Biofeedback

The associative stage of motor learning requires feedback. In sports this is called *knowledge of results*. E.g., in golf or tennis you see where the ball goes after you hit it. Playing golf or tennis on a dark, foggy night would be impossible.

Feedback quality is affected by *speed*. If you hit ten golf balls on a dark, foggy night, then the next day find one of the balls 150 yards away, you'll have no memory of what you did right to hit it so far.

Feedback quality is also affected by *accuracy*. If you and your buddy each hit a golf ball, and one ball goes 150 yards but you don't know whose ball it was, you have inaccurate feedback.

Or the observer gets bored. If you hit golf balls for hours, and have a person telling you how far the balls go, sooner or later the person will stop paying attention.

Fluency Skills Feedback

When you're learning fluent speech motor skills, you need knowledge of results. Some skills are easy to observe E.g., resting your hand on your stomach tells you whether you're using diaphragmatic (relaxed) breathing or thoracic (speech) breathing.

Your articulators (lips, jaw, and tongue) are a little harder to be aware of, as you can't see them. But you have good proprioceptive awareness of these muscles, so developing awareness and control isn't hard.

Your vocal folds are another story. These muscles are deep in your throat. You can't touch them or see them. Most people don't even know they have vocal folds.

The most difficult feedback is with the timing of all this. E.g., your speech-language pathologist tells you to exhale a little air and then increase your vocal fold tension. You do this slowly and correctly. Then she tells you to increase the speed. You must execute these movements within hundredths of a second. You can't tell whether you're doing it right, and most speech-language pathologists can't either.

A fluency specialist who's helped hundreds of stutterers has better-trained ear and visual skills and gives better quality of feedback than a speech-language pathologist who's never treated a stutterer.

Biofeedback Devices

In the last chapter I discussed anti-stuttering devices that treat the auditory processing underactivity associated with stuttering. Now I'll discuss stuttering therapy devices that use biofeedback to treat the speech motor control overactivity associated with stuttering.

Biofeedback is the measurement and display (to the user) of a physiological activity, to enable the user to improve awareness and control of the activity.

Biofeedback machines provide faster, more precise, and more reliable feedback than a human observer. Machines can provide feedback in real-time, beeping the instant you make a mistake. Machines can accurately measure things humans can't see or hear. And machines never get bored, even after hours of practice.

But biofeedback devices aren't a "miracle cure" for stuttering. Stuttering therapy works on many motor skills, so you might need several devices. Another problem is that certain motor activities are difficult to monitor, especially the vocal folds.

CAFET and Dr. Fluency

The Computer-Aided Fluency Establishment and Trainer (CAFET) and Dr. Fluency are computer-based stuttering biofeedback systems. Both use a microphone to monitor vocal volume, as a surrogate for vocal fold activity, and a chest strap to monitor breathing. Dr. Fluency uses two chest straps, to differentiate diaphragmatic (relaxed) breathing from thoracic (upper chest) breathing.

You see your breathing and vocal volume displayed on the computer screen, along with instructions or error messages. The two computer systems train similar speech motor skills:

1. Relaxed, diaphragmatic breathing.
2. Continuous breathing. The computer alerts you if you hold your breath more than 1/3 of a second.
3. Gradual exhalation, as opposed to the rapid, uncontrolled exhalation associated with stuttering.
4. Pre-voice exhalation, or letting a little air out before you begin tensing your vocal folds.
5. Gentle onset, or gradually increase vocal volume. The computer alerts you if your vocal volume changes too rapidly. The computer also alerts you if your voice is too quiet for your air flow (which sounds breathy).
6. Continuous phonation. Breaks in vocal volume are shown on the computer monitor.
7. Adequate breath support. The computer alerts you if you continue to talk after the point at which you should take another breath. Stutterers too often try to finish a phrase with insufficient air in their lungs.
8. Phrasing. Each of the above seven speech targets is taught first with vowels, then progressing to monosyllabic words, then to marked-length phrases. Stutterers too often pause to breathe at feared words or when they run out of air, rather than pausing to breathe at linguistically-appropriate points.

The CAFET and Dr. Fluency provide the following advantage over non-instrument-based stuttering therapy:

- The computer provides instant, accurate information on what you are doing right or wrong.
- The computers are always paying attention, and never get tired of helping you practice.
- The computers provide step-by-step instructions. Dr. Fluency has animated graphics showing what your speech muscles should do for each exercise.
- With the computer training the physical speech motor skills, the speech pathologist can spend more time on the psychological aspects of stuttering.
- If you learn *visually* rather than *aurally*, you may learn faster with the computer displays than by listening to your speech on a tape recorder.
- Dr. Fluency is designed for home practice use as well as clinical use. According to motor learning theory, practicing one hour per day is optimal. Practicing more hours per day or fewer days per week produces poorer results in the long run.

  An unpublished study of the CAFET program with 197 adults and teenagers reported that 82% met fluency criteria six months after completing the program; 89% were fluent after twelve months; and 92% were fluent two years post-therapy.

Electromyography (EMG)

EMG measures muscle activity via electrodes taped to your skin. Several studies found EMG to be effective for treating stuttering.[45] These include the large study that found computers to be more effective than speech-language pathologists.

My biggest fluency breakthrough was with EMG biofeedback. I brought my company's first EMG/DAF/FAF device to a speech-language pathology convention. For four days, eight hours a day, I showed hundreds of speech-language pathologists how the devices worked. I showed how tensing my vocal folds caused red lights and DAF/FAF to switch on, and relaxing my vocal folds made green lights go on and DAF/FAF to switch off. For a week after the convention I couldn't stutter. Eventually my stuttering returned, but daily use of the device on telephone calls kept my stuttering under control.

But EMG biofeedback isn't a "miracle cure." Surface electrodes poorly monitor vocal fold activity (the primary symptom of stuttering), because vocal folds are deep in the neck, surrounded by other muscles. EMG devices are costly and difficult to set up. And even at the convention I heard speech-language pathologists laughing behind my back at the strange apparatus, with electrodes taped to my face and wires everywhere.

Vocal Frequency Biofeedback

The great problem in stuttering therapy biofeedback is how to monitor vocal fold activity. EMG surface electrodes can't do this. The CAFET and Dr. Fluency monitor vocal fold activity indirectly via vocal volume. These devices assume is that a quiet voice means relaxed vocal folds, and loud voice means tense vocal folds. That isn't always true.

A better method is to monitor the frequencies of the stutterer's voice. Relaxed vocal folds generally produce a deep-pitched voice; tense vocal folds generally produce a high-pitched voice. The user simply speaks into a microphone; no electrodes are needed.

Vocal frequency biofeedback is also available in Kay Elemetrics' Visi-Pitch device, and in my company's Pocket Speech Lab. I've found that no one?stutterers or speech-language pathologists?can control the red and green lights when they first try the device. But after about ten minutes of training a light bulb goes on in their heads and they can easily control their vocal fold tension and vocal pitch, and make the light turn red or green at will. This suggests to me that no stuttering therapy programs train how to relax one's vocal folds. Many stuttering therapy programs claim to do this but I don't see the results. I suspect that "gentle onsets" are not the best way to train stutterers to speak with relaxed vocal folds.

- ^ Craig, A., Cleary, P. "Reduction of Stuttering by Young Male Stutterers Using EMG Feedback," *Biofeedback and Self-Regulation*, *7*, No. 3, 1982. Manschreck, T., Kalotkin, M., Jacobson, A. "Utility of Electromyographic Biological Feedback in Chronic Stuttering: A Clinical Study With Follow-Up," *Perceptual and Motor Skills*, 1980, *51*, 535-540.

Automatic, Effortless Fluency

The third or *autonomous* stage of motor learning moves you from closed-loop motor control to open-loop motor control. In stuttering therapy, the autonomous stage makes fluent speech automatic and effortless.

Autonomous stage motor learning has four components:

- Practicing target muscle movements *faster* and *harder*,
- While making *no errors*,
- In *stressful* situations,
- With an ideal *practice schedule*,
- For about three million *repetitions*.

E.g., you take tennis lessons. Your coach shows you how to grip the racket properly, and swing at the ball. At first you execute this movement slowly, with little force. As your skill improves, you swing faster, and hit the ball harder. Whenever you make a mistake, your coach stops you and makes you begin again, slowly. At first your coach hits you easy balls. Then he hits harder balls to you, making the game stressful. Then you play tennis regularly. Over several years your game improves.

Where Stuttering Therapy Fails

Most stuttering therapy programs do little or nothing to train autonomous motor learning:

- Your speech-language pathologist tells you to make a conscious effort to speak fluently. You're told that if your fluency fails, it's your fault for not concentrating on your speech.
- All practice is done with relaxed speech-production muscles. You never increase muscle tension.
- All practice is done at slow speaking rates.
- All practice is done in the speech clinic, or at home alone. You don't do practice in high-stress situations.

Increasing Force and Speed

Stuttering therapy programs fail to train the autonomous stage of speech motor learning because of a counterintuitive aspect of stuttering. Stuttering is characterized by excessive speech-production muscle activity. The obvious but wrong treatment for stuttering is to reduce speech-production muscle activity, i.e., to speak with relaxed breathing, vocal folds, and articulation muscles.

As noted earlier, speech-language pathologists see that slowing down and switching to closed-loop speech motor control eliminates stuttering. They reach the obvious but wrong conclusion that stuttering therapy should be done at slow speaking rates.

Fluency shaping therapy begins by training slow, relaxed, fluent speech motor skills. Similarly, golf and tennis instruction begins with slow, relaxed, correct movements. Golf and tennis instructors then have you increase your force and speed. In contrast, speech-language pathologists tell you not to increase your force and speed. It may seem counterintuitive, but after you master slow, relaxed fluent speech, you must increase both the speed and force of your speech, without making errors, to train automatic, effortless fluency.

Increasing Force

The force of your speech is measured by volume. Work on getting loud. But don't shout or yell. Instead, *project* your voice. Vocal volume is a factor of both exhalation volume and vocal fold tension. Increase your exhalation volume while keeping your vocal folds relatively relaxed. This result is high volume with the intonations of normal conversational speech. Stage actors do this.

Increase your onset speed while maintaining long syllable duration. Pretend that your forearm is a sports car's accelerator. When your fist is up, your vocal volume is quiet. As you push your fist down, your volume increases. When your fist is all the way down, you're at maximum volume. Listeners one hundred feet away can hear you.

Slowly lower your fist to produce a gentle onset. Then slam your fist down fast to go from silence to maximum volume. Then hold that volume while stretching the vowel. Pull your fist up fast to end the word with speed. This is slow speech with maximum effort.

Be careful not to damage your vocal folds. Stop if you feel hoarse or start to lose your voice.

Increasing Speed

Shorten syllable duration from two seconds, to one second, to one-half second, to one-quarter second. Practice this both with relaxed, quiet speech, and with loud, forceful speech.

Using the practice word lists say each work four times:

- Slow and relaxed (quietly).
- Slow and projecting your voice (loudly).
- Relaxed (quietly) with a quick onset.
- Loudly projecting the word with a hard onset.

Where to Practice Force and Speed

It's hard to practice loud speech in a small room. The ideal place to practice is an empty

auditorium. Have your speech-language pathologist sit in the back row. Stand on stage and project your voice to her. She yells, "Can't hear you!" until you reach ideal volume.

Another place to practice is near a building that produces an echo. A third place to practice is on a freeway overpass. Demosthenes, the stutterer who became the greatest orator of ancient Greece, projected his voice over breaking waves at the seashore. Work on projecting your voice over the cars.

Reinforcing On-Target Speech

Increasing speed and force *myelinates* or reinforces neural pathways in your brain. A mistake reinforces the wrong neural pathways.

Learning to talk fluently requires talking fluently 100% of the time. That sounds like circular advice, and it is. Reinforcing motor skills is a "virtuous cycle." Using target skills reinforces the skills, making the skills easier to use.

Conversely, stuttering reinforces undesirable speech motor skills (core behaviors) and bad communication habits (secondary behaviors). Stuttering sets up a "vicious cycle" instead of a "virtuous cycle."

Swimming Analogy

I wanted to improve my swimming. At first I could swim only one length of the pool, and then I had to rest. But I got in that pool three times a week. I found that a small flotation device helped me swim five or ten laps. After two months something "clicked" in my brain and I swam half a mile. It was easy, almost effortless. I didn't need the flotation device any more.

Then I moved to an apartment without a swimming pool, stopped swimming, and now I swim as poorly as I did before that summer.

Similarly, stutterers go to speech therapy three times a week for months. Then suddenly one day they find themselves talking fluently, without effort. If they discontinue speech therapy, this "lucky" fluency disappears and they go back to stuttering.

Stutterers' brains have two sets of speech motor programs. Sometimes our brains pick the fluent speech motor programs. At other times our brains pick the stuttering speech motor programs. Speech therapy reinforces the fluent speech motor programs. Eventually this fluent speech becomes habitual. But during "lucky" fluency this habit is precariously balanced. One stressful day, in which you allow yourself to stutter, can reinforce the stuttering motor programs, and your "lucky" fluency is gone.

Speech Buddies

Children learn grammar by listening to other people talking, then speaking, then having their parents correct their grammar. You may not remember this, but after a family vacation to the seashore you told your mother's friend, "We went nearly to the beach every day," and your

mother corrected you, "No, dear, we went to the beach nearly every day."

Your mom was your speech buddy. You need another speech buddy now, to help you correct your speech when you're dysfluent.

Ask your speech-language pathologist to let you organize a practice group with her other clients. Meet once a week to practice fluent speech. Exchange telephone numbers and arrange to call a speech buddy every day.

Here's an idea that'll get you talking fluently. If you have a spare bedroom in your house, call your local university and offer to let a speech-language pathology student live rent-free, in return for reminding you to use fluency shaping skills. If you don't have a university with a communication sciences department, call your school district and see if they have a speech-language pathologist who'd go for free rent.

Train your spouse, housemates, and the people you work with to remind you to use fluency skills. If you're a parent with a child in speech therapy, ask your child's speech-language pathologist train you to correct your child at home (see SLPs vs. Parents vs. Computers).

Your spouse can come with you to speech therapy, or you can tell her what you're learning. You can tell your housemates or co-workers. But there's a problem. Suppose you wear a sign offering to pay $1 whenever a listener hears you stutter. Listeners are too polite to do that. They'd feel like they were getting paid to kick a paraplegic in his wheelchair.

And you can't wear a sign around your neck offering to pay $1 whenever anyone catches you doing a hard onset, or using thoracic breathing. No one but a speech-language pathologist knows what those behaviors are. Non-stutterers have no idea what they do to speak fluently. They don't know how to correct you or tell you what you did wrong.

My Romantic Disaster of 1996

In eighth grade I had a teacher with a forceful personality and a large ego. He decided to cure my stuttering. Whenever I stuttered he stopped me, then told me to say it without stuttering. I hadn't had speech therapy and had no idea what to do. His method was as effective as teaching me Chinese by stopping me from speaking English and telling me to speak in Chinese.

Twenty years later I'd completed several speech therapy programs. I'd used electronic anti-stuttering devices for several years. I dated a young woman who disliked my stuttering. Whenever I started to block, she'd give me a certain look. I'd stop, relax my breathing and vocal folds, and speak fluently.

Within a few days with her I was talking fluently all the time. The relationship crashed and burned shortly after that.

For an individual who hasn't completed a speech therapy program, a person pointing out their stuttering is the worst thing. Such an individual doesn't have any control over his speech. Telling him to talk fluently increases his stress and his stuttering. (See the section Modeling.)

But for an individual who has mastered fluent speech skills, pointing out his disfluencies and reminding him to use fluent speech skills will help him. When you're at that stage, find someone to do this for you.

Or pay listeners $1 whenever you stutter. I tried this and never stuttered. I'm not sure if that was a success or a failure.

Start a Virtuous Cycle

Do whatever you need to get into the virtuous cycle. You may have to do things that are difficult or embarrassing?e.g., telling your co-workers that you stutter (hint: they've probably already figured that out!).

Once you're in the virtuous cycle, fluent speech will become easier and easier with less and less effort. The difficult things will become easier, and the embarrassing things won't be embarrassing (or necessary). Done right, you'll only have to do these things for a few days or weeks.

Getting into the virtuous cycle may require:

- Using closed-loop speech motor control (very slow speech).
- Using an electronic anti-stuttering device.
- Taking a dopamine-antagonist medication.
- Talking in uncomfortable situations, e.g., to strangers or to telemarketers.

For a high-testosterone kickstart, see The Predator Approach.

Practicing Under Stress

Autonomous motor learning requires practicing a new motor skill in stressful situations.

Design a hierarchy of stressful situations. The first might be leaving a message on your speech-language pathologist's answering machine. When you can do that comfortably and fluently, you might talk to telemarketers using closed-loop speech motor control (slow, fluent speech). Then you could join Toastmasters and make a series of speeches to your club. More about this in the chapter Speech-Related Fears and Anxieties.

Practice Scheduling

The United States Postal Service studied workers learning to type on mail-sorting machines (similar to typewriters). All subjects received 60 hours of training. The scheduling varied between four groups.

One group had two two-hour sessions per day, for 15 days. A second group had one two-hour session per day, for 30 days. A third group had two one-hour sessions per day, for 30 days. The

fourth group had one one-hour session per day, for 60 days.

The first group (two two-hour sessions per day) learned fastest, but in the long run had the worst performance. The fourth group (one one-hour session per day) took the longest to get "up to speed," but eventually had the best performance.

Surprisingly, the postal workers preferred the two-hour/two-session schedule, even though they had the worst performance. People are impatient. They don't want to spend 60 days learning something, if they think there's a 15-day shortcut.

Extinguishing Old Skills

We could simplistically conclude that you should practice stuttering therapy no more than one hour per day. But there's an essential difference between speech therapy and mail sorting. The postal workers were learning a new motor skill. Stutterers have to learn a new motor skill and *extinguish* an old motor skill. As noted earlier, coaches often prefer to work with individuals who have never played a sport and haven't learned bad habits, rather than work with experienced athletes and have to break their bad habits.

To extinguish an old motor skill you must stop doing it. Perhaps the ideal stuttering therapy is done one hour per day, and then you take a vow of silence the rest of the day. But that's unrealistic. To burn new fluent neural pathways, and extinguish old stuttering neural pathways, you must use fluent speech every time you talk. You must never stutter. Each disfluency weakens your new fluent neural pathways and strengthens your old stuttering neural pathways.

Intensive Residential Speech Therapy Programs

Some stutterers go to intensive residential speech therapy programs. These programs typically last three weeks. You're surrounded by speech-language pathologists and other stutterers, and isolated from the real world. For the first two weeks, you use two-second stretch all the time. In the third week, you move to one-second stretch, then half-second, and finally quarter-second slow normal.

Intensive residential speech therapy programs are like the postal workers who did the "short cut" training. In three weeks of intensive therapy you learned to talk fluently. But many stutterers find that long-term results are disappointing.

Your Ideal Practice Schedule

Work with your speech-language pathologist to develop a practice schedule. A severe stutterer may have to spend many hours a day doing "homework."

Don't practice sitting alone in a room reading endless word lists. This isn't going to produce carryover fluency to stressful situations.

A one-hour daily practice could have the following three elements:

- After breakfast, twenty minutes of high intensity (using projection and hard onsets) practice,

using practice word lists.

- During the day, a stressful twenty-minute session while using a biofeedback device to keep your vocal folds relaxed. This could be calling strangers for your job.
- After supper, twenty minutes of very slow closed-loop speech motor control conversation. You could call another stutterer in your support group. Or you could talk to telemarketers or call infomercial toll-free numbers.

How Long Does Autonomous Learning Take?

Gymnasts practice daily for about eight years to become proficient.

Motor learning researchers studied the manual (hand) skills of cigar-makers. Beginner cigar-makers worked three times slower than experienced cigar-makers. Becoming fully skilled required making three million cigars.[46]

Three million repetitions were also needed for Japanese pearl handlers to become proficient. The Suzuki method of teaching violin to children requires the production of about 2.5 million notes. Basketball, football, and baseball throws require about a million practice throws.

This suggests that making fluent speech automatic and effortless requires saying about three million syllables. At five syllables per second, talking four hours a day (just your time talking, not combined talking and listening), you could produce three million syllables in six weeks.

If you got a job answering telephone calls, and you did your stuttering therapy skills on every call, and you connected a biofeedback device into your telephone to alert you when you missed a therapy target, and you spent your free time at Toastmasters clubs making speeches or volunteering at a hospital's information desk, fluent speech might become automatic for you in six weeks.

But most stutterers practice between ten minutes and one hour per day. If they were silent the rest of the day, they'd say three million syllables somewhere between six months and three years.

No one has studied whether using undesirable motor skills cancels out on-target practice. I.e., does a half-hour of on-target practice get cancelled out by not using fluency skills the rest of the day? Such a practice schedule might take years to produce automatic fluent speech?or might never work.

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Zen in the Art of Stuttering

Zen in the Art of Stuttering

Eugen Herrigel taught philosophy at the University of Tokyo in the 1920s and 1930s. To learn the Japanese philosophy of Zen Buddhism he studied archery for six years with a Zen master. In 1953 he wrote Zen in the Art of Archery about his experiences.

Daisetz T. Suzuki wrote in the introduction to Herrigel's book:

> Zen is the "everyday mind," as was proclaimed by Baso (died 788); this "everyday mind" is no more than "sleeping when tired, eating when hungry." As soon as we reflect, deliberate, and conceptualize, the original unconsciousness is lost and a thought interferes. We no longer eat while eating, we no longer sleep while sleeping. The arrow is off the string but does not fly straight to the target…Calculation which is miscalculation sets in…The archer's confused mind betrays itself in every direction and every field of activity.

Wendell Johnson said, "Stuttering is what you do trying not to stutter again."

Malcolm Fraser (founder of NAPA Auto Parts and the Stuttering Foundation of America said, "Stuttering is largely what the stutterer does trying not to stutter."

The goal of stuttering therapy is spontaneous fluent speech. The goal of Zen is to do life activities without self-conscious calculating and thinking.

Non-stutterers usually talk without self-conscious calculating and thinking. But sometimes they are self-conscious about their speech. Fear of public speaking is common. And non-stutterers are self-conscious about asking the boss for a raise, or asking someone out on a date, or when discussing a difficult subject. Speech pathologists call this pragmatics?the mental effort of calculating the listener's reaction to your speech. In the Zen framework, pragmatics is the calculation that is miscalculation.

The goal of stuttering therapy should be to become a "Zen master of speech," just as other Zen masters are archers or swordsmen or calligraphers. To make an analogy to Baso, you sleep when tired, eat when hungry, and talk when you need to communicate. You don't worry about the listener's reaction. You don't fear embarrassment. If the listener doesn't do what you want or expect, you don't get upset.

You also talk fluently?but let's define fluency as if we're learning a foreign language. You need vocabulary to express your thoughts, grammar so your meaning isn't misconstrued, and accent and articulation to be understood. Mild stuttering may be OK, if your listener understands you, and you don't fear or avoid speaking. Van Riper called this "fluent stuttering," and a Zen master might call it "fluency which is not fluency."

Like speech, archery is a combination of motor skills. You tense and relax certain muscles, with split-second timing. Like fluency for a stutterer, these motor skills are not easy or obvious.

Like many stutterers working on their speech, Herrigel worked six years before he considered himself an archer.

Why did Herrigel study archery to learn Zen philosophy? Most Zen students read books, take classes, and talk with Zen masters. How could learning a set of motor skills teach you a philosophy? Herrigel was told that to learn Zen he must begin "by learning one of the Japanese arts associated with Zen."

Master Kenzo Awa's first lesson was drawing the bow, letting "only your two hands do the work, while your arm and shoulder muscles remain relaxed, as though they looked on impassively."

This step is like stuttering therapy, with the goal of speaking while keeping your speech-production muscles relaxed.

Herrigel couldn't do this first step. He would "start trembling after a few moments, and my breathing became more and more labored." Sounds like stuttering!

He was trying to draw a six-foot bow held above his head, which requires great strength. But somehow the Master did this effortlessly.

> …he called out to me to "Relax! Relax!"…the day came when…I lost patience and brought myself to admit that I absolutely could not draw the bow in the manner prescribed.

"You cannot do it," explained the Master, "because you do not breathe right."

Sounds like stuttering therapy! The Master continued,

> "Press your breath down gently after breathing in, so that the abdominal wall is tightly stretched, and hold it there for a while. Then breathe out as slowly and evenly as possible, and after a short pause, draw a quick breath of air again?out and in continually, in a rhythm, that will gradually settle itself. If it is done properly, you will feel the shooting becoming easier every day. For through this breathing you will not only discover the source of all spiritual strength but will also cause this source to flow more abundantly, and to pour more easily through your limbs the more relaxed you are."

And as if to prove it, he drew his strong bow and invited me to step behind him and feel his arm muscles. They were indeed quite relaxed, as though they were doing no work at all.

The new way of breathing was practiced, without bow and arrow at first, until it came naturally. The slight feeling of discomfort noticeable in the beginning was quickly overcome. The Master attached so much importance to breathing out as slowly and steadily as possible to the very end, that, for better practice and control, he made us combine it with a humming note.

First relaxed breathing, and now vocal fold vibration!

I cannot think back to those days without recalling, over and over again, how difficult I found it, in the beginning, to get my breathing to work out right…

When, to excuse myself, I once remarked that I was conscientiously making an effort to keep relaxed, he replied: "That's just the trouble, you make an effort to think about it. Concentrate entirely on your breathing, as if you had nothing else to do!"

I've heard stuttering therapists say the same thing…

It took me considerable time before I succeeded in doing what the Master wanted. But?I succeeded. I learned to lose myself so effortlessly in the breathing that I sometimes had the feeling that I myself was not breathing but?strange as this may sound?being breathed. And even when, in hours of thoughtful reflection, I struggled against this bold idea, I could no longer doubt that the breathing held out all that the Master had promised.

Learning to draw the bow took a year. Perhaps stuttering therapies are unsuccessful because we expect results too quickly. Stuttering therapy could start with a year of breathing exercises.

Then Herrigel learned to loose the arrow. This was even more difficult than drawing the bow. Herrigel kept jerking his hand at the moment of release, resulting in "visible shaking of my whole body and affected the bow and arrow as well." This caused the arrow to "wobble."

The Master told Herrigel, "Don't think of what you have to do, don't consider how to carry it out! You mustn't open the right hand on purpose."

Herrigel told the Master that after drawing the bow, "unless the shot comes at once I shan't be able to endure the tension…I can't wait any longer."

The Master replied that Herrigel's inability to wait was because, "You do not wait for fulfillment, but brace yourself for failure."

Herrigel spent three years learning to release the arrow. The Master kept saying to release the arrow without tension, like a bamboo leaf holding snow, bending lower and lower until the snow slips off. The bamboo leaf waits without effort until the snow falls off.

In stuttering therapy, the first word of a phrase should be without effort, rolling off your vocal folds like the snow sliding off the bamboo leaf. You shouldn't intend to say the first word, as the archer doesn't open his hand on purpose. The word should say itself, without your planning or calculating or trying.

Herrigel's three years practice releasing the arrow suggests that learning to release the first word of a phrase may also take three years, and be the hardest part of stuttering therapy.

Herrigel was dedicated to his practice, but he couldn't release the arrow smoothly. The Master kept telling Herrigel to become "truly egoless." Herrigel became dejected, and planned to discontinue the archery lessons, concluding that, "all my efforts of the last few years had become meaningless."

Then, one day, after a shot, the Master made a deep bow and broke off the lesson. "Just then 'It' shot!" he cried.

"It" meant that Herrigel had loosed a shot without loosing the shot. "It" had loosed the shot, not Herrigel. The Master could not say anymore what "It" was, just that "It" can only be known through experience.

Only after considerable time did more right shots occasionally come off, which the Master signalized by a deep bow. How it happened that they loosed themselves without my doing anything, how it came about that my tightly closed right hand suddenly flew back wide open, I could not explain then and I cannot explain today…I got to the point of being able to distinguish, on my own, the right shots from the failures. The qualitative difference is so great that it cannot be overlooked once it has been experienced.

In stuttering therapy, the difference between your relaxed, fluent voice and your tense, stuttering voice is as obvious as night and day?after you learn relaxed, fluent speech. Until then it seems impossible.

The Master then began training Herrigel to shoot at a target, adding, "He who has a hundred miles to walk should reckon ninety as half the journey."

The Master refused to teach Herrigel to aim, insisting that the target was not the goal, and the goal cannot be aimed at, and that the goal doesn't have a name, except maybe "enlightenment".

But even though the Master did not aim, all of his shots lodged in the black center of the target, from sixty feet away.

At first Herrigel tried to shoot without caring if the arrows hit the target. But he couldn't do this, and "I confessed to him that I was at the end of my tether."

The Master replied:

You worry yourself unnecessarily. Put the thought of hitting right out of your mind! You can be a Master even if every shot does not hit.

You can be a Zen master of speech even if you still stutter. Mild disfluencies don't matter, if you communicate well.

When the Master said he sees "the goal as though I don't see it," Herrigel replied that the Master should then be able to shoot blindfolded. The Master then had Herrigel set up the target in darkness, except for one candle. Herrigel could not see the target at all, but the Master shot two arrows. When Herrigel turned on the lights, he saw that not only had both arrows hit the bulls-eye, but the second arrow had hit the first and splintered it!

Herrigel describes the following months as the hardest yet, of trying to hit the target yet not trying to hit the target. He gradually came to see the value of this training:

It destroyed the last traces of any preoccupation with myself and the fluctuations of my

mood.

Finally, the Master had Herrigel shoot in front of spectators, and awarded him a diploma, "inscribed with the degree of mastery." Before Herrigel returned to Europe, the Master added,

- I must only warn you of one thing. You have become a different person in the course of these years. For this is what the art of archery means: a profound and far-reaching contest of the archer with himself. Perhaps you have hardly noticed it yet, but you will feel it very strongly when you meet your friends and acquaintances again…You will see with other eyes and measure with other measures.

Response Selection under Stress

Stuttering Reduces Stress

Under stress, people's voices change. They tense their speech-production muscles, increasing their vocal pitch. They try to talk faster. They repeat words or phrases. They add interjections, such as "uh." These are *normal dysfluencies*. A study found that under stress, non-stutterers went from 0% to 4% dysfluencies, for the simple task of saying colors. Stutterers went from 1% to 9%.[47]

The "conventional wisdom" is that stutterers are always nervous or stressed out. Many psychological studies have proven that this isn't true. But stress has an important role in stuttering.

This next fact is so obvious that you've probably never thought about how important it is. All stutterers can talk fluently. In relaxed, low-stress situations we can say any sound or word fluently. If you're a severe stutterer, there might not be many such situations. But there are some.

In other situations we stutter. How many paraplegics do you know who can walk in some situations, but not other situations? Or people who are blind with certain people, but not with other people? None that I've ever known.

Think about this. Our brains are capable of producing fluent speech. We have all the speech motor programs necessary to produce any speech sound, fluently.

We also have speech motor programs for producing dysfluent sounds. Stutterers have two sets of open-loop speech motor programs. Our brains *select* one or the other set of speech motor programs, depending on *environmental cues*?where we are or whom we're talking to.

This is like a person who grew up summers in Massachusetts and winters in Georgia. Such a person would have a set of speech motor programs to speak with a New England accent. And this person would have a set of speech motor programs to speak with a Southern accent. When she's in Massachusetts, hearing people speak with New England accents, her brain automatically selects the New England accent speech motor programs. In Georgia, her brain selects Southern accent speech motor programs.

You always have choices for handling stressful situations. Some choices trigger your brain to automatically select dysfluent speech motor programs. Other choices trigger your brain to select fluent speech motor programs. This chapter will teach you to make choices for handling stress that automatically select fluent, relaxed speech. You'll feel relaxed and speak confidently even when non-stutterers are stressed out.

Are Responses to Stress Psychological?

According to "conventional wisdom," stuttering is a psychological disorder because stutterers generally speak fluently in low-stress situations, and stutter in high-stress situations.

But many responses to stress are physical. E.g., "fight or flight" increased heart rate. Stress is considered to be a factor in the development of physical disorders, such as heart disease, and a primary factor in gastrointestinal disorders. Why is stuttering considered to be a psychological disorder, but stomach ulcers are considered to be a physical disorder?

This chapter presents how stuttering is a response to stress, and then presents psychological treatments for better handling stress. Although the presented treatments are psychological, I object to referring to responses to stress as psychological responses. You can treat responses to stress physically, such as with medications or using an anti-stuttering device. I've put those treatments into other chapters. Perhaps more than the other factors, responses to stress show that the factors that contribute to stuttering are complex and interconnected.

Stuttering Reduces Stress

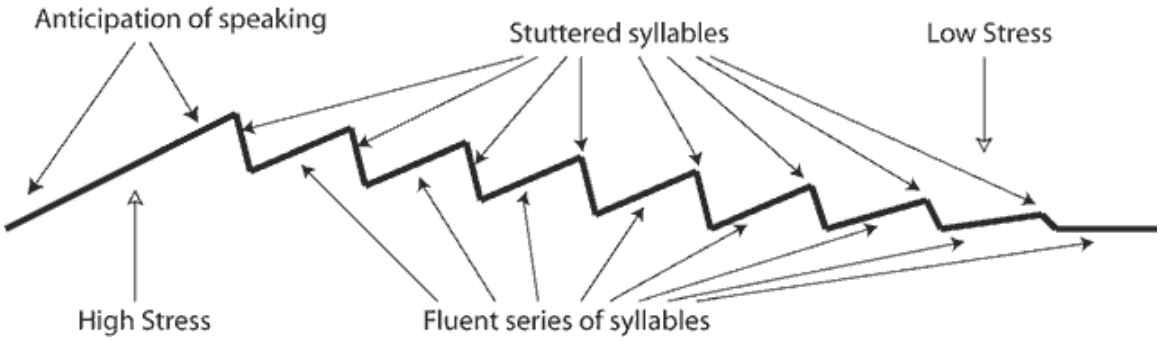
Systolic blood pressure is an indicator of stress. Stuttering reduced stutterers' blood pressure 10%. In contrast, fluent speech, chewing gum, and sitting quietly each reduced blood pressure about 2%.[48]

You're thinking, "No way. Stuttering doesn't relax me. Stuttering doesn't feel like a massage and warm bath."

But think about it. Stutterers are, on average, disfluent on 10% of syllables. We say 90% of syllables fluently. But we don't say one hundred syllables fluently, and then finish a conversation with ten dysfluencies. Stuttering usually occurs on the first sound of the first word, in a stressful situation. I.e., your stress builds up as you anticipate speaking. You stutter, and this releases stress. You then say several syllables fluently.

You then stutter on another syllable, then say several more syllables fluently. Usually your speech improves over the course of the conversation, and your last few sentences are your most fluent.

If your blood pressure were monitored in such a conversation, it might look like this (this is speculative, not based on research):



Stuttering Reducing Stress

Your stress increases as you anticipate speaking. You block on the first syllable. This reduces your stress, and you speak fluently. Your stress builds up again, and you stutter again. This reduces your stress, and the cycle repeats until you're speaking fluently at the end of the conversation.

Stuttering Isn't a Good Response to Stress

Stuttering doesn't change the stressful situation. E.g., a highway patrol officer pulls you over for speeding. Stuttering won't make the officer think you weren't speeding.

Stuttering might make the situation worse. E.g., the highway patrol officer mistakes your stuttering for methamphetamine addiction. He handcuffs you and searches your car. This stresses you more, and you stutter more.

Stuttering and stress are a vicious cycle. Stuttering reduces your stress for a few seconds, but then causes more stress. You get stuck in the cycle, unable to break free.

Another study measured *listeners'* systolic blood pressure. Listening to stuttering made listeners feel stress.[49] The listeners' increased stress may in turn increase the stutterer's stress. Again, stuttering and stress start a vicious cycle.

This chapter will show you that you have other choices for handling stress, instead of stuttering. These other choices reduce stress, instead of throwing you into an endless cycle.

Distraction and Placebos

The "experts" believe that "Distraction methods can be used to eliminate stuttering temporarily."[50] But if distraction worked, stutterers would work a Rubik's cube or play a pocket video game whenever they wanted to talk fluently.

Two studies tried to distract stutterers from stuttering. In the first study, stutterers stepped on and off a 10-inch platform while reading out loud. In the second study, stutterers manually tracked an irregular line on a rotating drum while speaking. Neither distraction was able to reduce stuttering.[51]

Distraction can cause stuttering. Stutterers often say that they can use therapy skills in a clinical environment, but the distractions of normal conversations make fluent speech difficult.

An "expert" wrote, "if a stutterer were to forget that he was a stutterer, he would have no further difficulty with his speech."[52] Another "expert" wrote, "our beliefs about stuttering seem to be one of the main factors in stuttering severity."[53]

Placebos are pills without medications, or, more generally, an inactive, nonspecific medical treatment that alters the beliefs of a patient. A study found that placebos did not reduce stuttering.[54] Another study also found that placebos had no effect on stuttering?but the placebos caused terrible side effects! Reported placebo side effects included constipation, sexual dysfunction, dizziness, sweating, and tremors. The placebo was six times more powerful than the medication in the study, in producing side effects.[55]

This raises an interesting question. Placebos are effective treatments for almost every disease and symptom:

> Study after study showed that, for virtually any disease, a substantial portion of symptoms?roughly one-third, by most estimates?would improve when patients were given a placebo treatment with no pharmacological activity. Patients simply believed that the treatment would help them, and somehow, it did.[56]

> …for a wide range of afflictions, including pain, high blood pressure, asthma and cough, roughly 30 to 40 percent of patients experience relief after taking a placebo…placebos seem to be most reliably effective for afflictions in which stress directly affects the symptoms…pain, asthma and moderate high blood pressure can become worse when the patient is upset…placebos may work in part by lessening the apprehension associated with the disease [because] the immune system falters under stressful conditions.[57]

Stuttering may be the only disorder that placebos have no effect upon! I.e., stuttering isn't affected by belief, and stutterers can't be "psyched" into fluency. In contrast, heart disease, asthma, etc. appear to be physical diseases but are actually in large part psychological. Could stuttering?long believed to be psychological?actually have no psychological component?

Good Stress, Bad Stress

We experience many forms of stress. Some forms of stress reduce stuttering. Other forms of stress increase stuttering. Still other forms of stress have no effect on stuttering.

Adrenaline and Fluency-Enhancing Stress

In World War Two, a severe stutterer regularly spoke fluently for mortar communication during combat.[58]

One night, a person physically threatened me for several hours. I've never been so fluent in my life! My voice was calm and relaxed as I tried to get the person to calm down.

Noradrenaline and adrenaline compete with dopamine for the binding sites on D4 receptors,

and when bound, act as agonists. At the same time, through feedback inhibition, norepinephrine inhibits tyrosine hydroxylase, which in turn inhibits the production of dopamine. Because dopamine in the striatal system increases stuttering (see Genes and Neurotransmitters, and adrenaline blocks dopamine, "fight or flight" situations that increase adrenaline reduce stuttering. [59]

Stutterers report that when the adrenaline wears off, their stuttering increases.[60]

Physiological Stress

Physical activities such as running or bicycling elevate heart rate, blood pressure, etc. Dropping a rock on your foot is another form of physiological stress.

Exercise makes you breath harder, with your diaphragm. If your stuttering involves disordered breathing you may stutter more when exercising. On the other hand, if your speech-language pathologist trained you to speak with diaphragmatic breathing, exercise may improve your fluency.

In general, physiological stress has no effect on stuttering.

Progressive relaxation trains you to relax all of your muscles, starting with your toes and ending with your facial muscles. Progressive relaxation has minimal effect on stuttering. Relaxation exercises only reduce stuttering when the focus is on relaxation speech production muscles (respiration, vocal folds, and the lips, jaw, and tongue articulators).

Cognitive Stress

Hearing or seeing several things at once, especially if the events contradict each other (*cognitive dissonance*), increases stuttering.

For example, I can't stand talking to a person who's watching television. Or a person who's playing guitar, or picks up the phone to make a call while I'm trying to talk to him. I have a cousin who watches TV, plays guitar, and makes telephone calls, all at the same time, when I to talk to him. He thinks he's making efficient use of his time, but he wastes my time.

Listeners should give their full attention to stutterers. Turning away to do something else, even if you say, "I'm still listening," will increase the individual's stuttering.

If a listener won't give you his or her full attention, consider whether the conversation matters to you. If not, walk away. Don't consider whether what you're saying is important to the listener. It's obviously not.

Time Pressure

Time pressure increases stuttering. At the beginning of this chapter I mentioned a study in which subjects were told to say colors.[61] At first, "red" was written in red on a computer monitor. The screens came faster and faster, to increase time pressure.

Next, cognitive stress was added. E.g., the word "red" was written in yellow on a computer

monitor. The subjects had to say "yellow," not "red."

These results were dramatic. Non-stutterers went from 0% dysfluent words, to 2% disfluencies with time pressure, then to 4% with time pressure and cognitive stress.

Stutterers went from 1% stuttered words, to 3% with time pressure, to 9% with time pressure and cognitive stress.

Telling a stutterer to talk faster will have the opposite effect. Instead, tell stutterers to take all the time they need.

Use time pressure to your advantage by limiting what you say. Tell most people to make a five-minute speech and they ramble on for ten minutes, without getting to the point. If you're asked to make a five-minute speech, get to the point in one minute, without the rambling. What you think is one minute will actually take two or three minutes, and then adding in stuttering will make it five minutes. Even when I stuttered severely I had professors compliment my presentations.

Pragmatic Speech

Pragmatic speech is intended to cause another person to do a specific action. This might be telling a co-worker how to send a fax. Don't say, "Let me do it for you."

More stressful is asking someone to do something you want, when you're afraid that the person will say no. E.g., asking your boss for a raise, or asking an attractive person out on a date, or telling your housemate to wash the dishes. The listener is relatively powerful, and you're in a position of relative weakness.

To reduce stress, we usually try to make the question look casual. You "just happen" to run into the attractive person at the health club, and you "just happen" to have tickets to a show in your pocket, and you "casually" ask for a date. Or you wait until you've just landed a big sale for the company, and "jokingly" tell your boss that you deserve a raise.

But then you stutter, belying that this "casual" conversation is stressful for you. Your listener recognizes your weak position and, if he or she has an ego problem, enjoys manipulating you. A powerful person with an ego problem manipulating you is a pretty good description of stress. Instead, use other ways to reduce stress. First, don't make a big effort to set up a "casual"-seeming situation. The more effort you make, the more stress you'll feel that it's "now or never" to get a positive response.

Next, use Winston Churchill's strategy of preparing your points in advance ("I deserve a raise for three reasons…"), anticipating your listener's objections, and preparing responses to those objections. Then use slow speech to explain each point. Pause between points. Use the pause to check that your breathing and vocal folds are relaxed. You'll sound confident and in control.

Lastly, be willing to walk away. Is it the end of the world if your housemate doesn't wash the dishes, or you don't get a date? Visual what you'll do and how you'll feel if the answer is no.

Be an Anti-Mirror

People tend to mirror each others' speech patterns. A person speaks fast to you, so you talk fast. A listener jumps in before you finish your sentences, so you interrupt her sentences. A person gets angry at you, so you raise your voice and get emotional.

All of those speech patterns increase stuttering. Instead, be an anti-mirror. The faster people speak to you, the slower you talk. Instead of interrupting, wait for the other person to finish speaking, then count to three before you start to talk. If a person expresses anger, make your voice quieter, slower, and less emotional.

Embarrassment and Uncertainty

We fear embarrassment. E.g., I'm about to call you Josh, when I think, "Wait, his name is Joel."

This fear is multiplied when we're speaking to more than one person?saying something embarrassing in front of an audience of a thousand people is more embarrassing than in front of one person.

Lack of feedback increases our fears of embarrassment. I.e., when speaking on television we can't observe the reactions of listeners. You could say something stupid and never know it. You try to remember and analyze the last thing you said while you're saying something else.

If you say something embarrassing, make a joke out of it. E.g., I was waiting for a woman I'd never met. She said she'd arrive at 6pm. At 6:05pm a woman parked in front of my house. I went out and said, "You must be Ariana." She didn't say anything so I said it again. She responded that she wasn't Ariana. I said, "Oh my God, I'm so embarrassed," in a humorous way.

Then there's always the "at my advanced age I can't remember names." That's funny whether you're 90 or 19.

That sounds obvious, but there's a subtle point in there. Acknowledging embarrassment ends embarrassment.

Establishing Status

We communicate status largely via speech. We feel anxiety when status is ambiguous.

E.g., you find a large, muscular hoodlum sitting on your car. Do you speak with firm authority, ordering the hoodlum off your car? Do choose a friendly, buddy-buddy tone of equality? Do you meekly ask if the hoodlum could let you have your car back?

Stuttering doesn't necessarily communicate low status. Embarassment and anxiety about stuttering communicates low status. Calmly stuttering, while looking the hoodlum in the eye, establishes that you're not afraid to stutter and you're not afraid of the hoodlum.

Moral Stress

You did something wrong. You didn't realize it was wrong at the time, but now you're suspected of this minor crime. You make up a lie to eliminate the suspicion. But your lie is caught. Now you're in real trouble.

I'm not going to preach whether "honesty is the best policy" or whether lying your way out of situations sometimes works. What I'll tell you is how to use stuttering to appear to be telling the truth. Interrogations start with "baseline" questions such as your name. But every stutterer blocks on their name! Get into some good dysfluencies on your name. Imagine yourself hooked up to a lie detector machine. Make the needle swing into the red.

Then when you're asked the real question, pause, relax your breathing and your vocal folds, and slowly and fluently tell your story?truthfully or otherwise. A lie detector machine will indicate that you're telling the truth. A human listener will do the same.

Categorize Stress to React Rationally

Movies show characters in stressful situations. When watching movies, name the type of stress a character experiences. Soon you should feel an inner voice say "moral stress," or "time pressure" when watching movies.

Then the same light bulb will switch on in your mind when watching people in daily life. When the light bulb switches on in situations stressful to you, you're on your way to eliminating this type of stress.

Stress causes you to react emotionally, not rationally. When reacting emotionally, you react one way. Different people have different emotional reactions, depending on their personality type. E.g., one person might react with outward anger, when another person reacts with inward shame. That doesn't matter. What matters is the automatic, single response to all stressful situations.

Shifting out of an emotion and into "neutral" enables you to see other possible responses, and select the best response. The light bulb switching on enables you to switch gears.

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Speech-Related Fears and Anxieties

Introducing yourself to an attractive person. Raising your hand to answer a teacher's question. Ordering in a restaurant. Calling a store to ask if they have what you want. Making a toast at your best friend's wedding reception. Calling to order a pizza. Leaving a voicemail.

Do any of these make you nervous? Any that you never, ever do? Everyone is nervous about some speaking situations. Public speaking is humanity's most common fear, greater than the fear of death. Few women will introduce themselves to a man to ask for a date, or call a man who's given his telephone number and asked for a date. Ordering in a French restaurant is scarier than ordering at McDonald's.

The Predator Approach

Rent the video Predator, starring Arnold Schwarzenegger and Jesse Ventura. Settle down with a bowl of popcorn to watch the governor of California and the governor of Minnesota discuss school funding and property tax reform. Just joking. Back in 1987, Schwarzenegger and Ventura were action movie heroes. In *Predator* the men shoot a variety of large weapons, including an M-134 7.62mm minigun and an M-79 grenade launcher.

Now write down a list of speaking tasks that you don't do, that non-stutterers don't think twice about doing. Let's say that you're afraid to leave voicemails on answering machines. Write down all the speech therapy tools you can use in this situation. Imagine yourself as Schwarzenegger and Ventura making a list of weapons to bring. But instead of arming yourself with a minigun and a grenade launcher, your weapons for voicemail could include:

- Practicing your message before you call.
- Fluency skills, such as slow speech with stretched vowels, relaxing your breathing, or relaxing your vocal folds.
- Using a DAF/FAF anti-stuttering device.
- A hierarchy of stress, beginning with calling your own answering machine, then calling your speech-language pathologist's answering machine, then calling a friend's answering machine, then calling a business's answering machine (e.g., calling restaurants before they open asking if they have banquet facilities), and finally calling that attractive person of the opposite sex.

Don't stop listing your arsenal until you look at the list and laugh at how you'll blow away that poor little voicemail. Then think of one more weapon to add to your list. You're ready when you're confident that you won't stutter.

Let's say that your message is, "You're the most wonderful person I've ever met. I can't wait to see you again." Using all of your fluency weapons, pick up the phone and call your own answering machine. Check your messages. Pretty good, huh?

Now call yourself again. This time, reduce or throw away one of your weapons. If you used one-second stretched syllables on the first call, call yourself using half-second stretch. Then go to quarter-second "slow normal" speech.

If you used an anti-stuttering device on the first call, don't use the device for your next call.

If you practiced the message on the first call, say something spontaneous on your next call.

Step by step, throw away your weapons, until you can call your own voicemail fluently, without effort or fear.

OK, if you're a non-violent person, think of this as a multifactoral approach to stuttering therapy. Instead of relying on one fluency skill, take one item from the auditory processing category, e.g., an anti-stuttering device; one item from the speech motor control category, e.g., relaxed vocal folds; one item from the stress control category, e.g., using a hierarchy of stress; one item from the neurotransmitters category, e.g., medication, etc. Don't select all your fluency skills from one category, e.g., gentle onsets, diaphragmatic breathing, relaxed vocal folds, etc.

Make a Stress Hierarchy

Now take a step up the stress hierarchy. Call your speech-language pathologist and leave a message. (If you're not in speech therapy, call a friend or relative.) Begin with your full arsenal of fluency weapons, then call back, using fewer fluency weapons. Then work your way up your stress hierarchy. If you feel any twinge of fear on a call, take a step back until you feel confident again.

Approaching feared speaking situations can be like fighting a grizzly bear armed only with a pocket knife. Scary speaking situations combine to look like a ten-foot-tall bear. Most speech therapy programs give you only one weapon.

Divide your general fear of speaking into specific fears. The giant bear becomes many small bears. Now create a stress hierarchy, with a small bear on one end, and a bunny rabbit on the other end. And instead of having one weapon, which your speech-language pathologist (or the expert who trained her back at the university) assured you was the One True treatment for stuttering, you now have a variety of fluency skills.

You're armed like Arnold Schwarzenegger, you're hunting bunny rabbits, and you're in a pet shop before Easter. Armed to the teeth with speech therapy skills, there's no possibility of stuttering in your feared situation. Heck, it isn't even a feared situation anymore!

You now see why this chapter follows the auditory processing chapter and the speech motor learning and control chapter. The previous chapters gave you many weapons for your fluency arsenal. Now that you have many fluency skills you have no reason to fear speaking situations. Work your way down your list of feared speaking situations until you have no more speech-related fears and anxieties than an average non-stutterer.

Further Reducing Fears and Anxieties

When you run out speech-related fears and anxieties that non-stutterers aren't scared of, make a list of speaking situations that scare non-stutterers. Remember when I said that your speech can be better than non-stutterers? When you're ready, move on to these areas:

- Walk up to strangers at parties. If you're single, pick attractive persons of the opposite sex. Say that your speech therapist wants you to talk to strangers and ask if you can talk to this person. If you have an anti-stuttering device, ask if it's OK to use it. No one is going to say no. I met one of my ex-girlfriends this way.
- Join Toastmasters International to learn public speaking skills.
- Sign up for a beginning acting class at a university or community theater. Acting classes are the most fun you've had since sixth grade.
- Put together some funny stories and sign up to do stand-up comedy on amateur night at a nightclub.
- Sign up for voice lessons. Amaze people by singing at social occasions.
- Learn a foreign language. Talk to cab drivers in their native language.

Stress Is the Absence of Choices

We experience stress when our plans are thwarted. We try to reach a goal, and some little thing stops us. For stutterers, that little thing often is an inability to communicate.

E.g., you go to a fast-food restaurant to buy a cheeseburger. You can see the cheeseburgers behind the counter. You can smell the cheeseburgers. You even have correct change in your hand. All you have to do is say, "Cheeseburger"?but stuttering stops you.

Instead of thinking of stress as thwarted plans, think about your choices. You could point at the cheeseburgers. You could write "cheeseburger" on a note. You always have choices.

If you focus only on reaching your goal, you miss opportunities that may be better than your goal. E.g., you miss the salmon pesto salad the restaurant just added to the menu.

Or you pantomime "cheeseburger" as if you were playing charades. You feel ridiculous, and people in the line laugh at you. Then a movie producer offers you a million dollars to star in his new "stupid and stupider" movie.

OK, that's unlikely. Just realize that you always have choices. As you imagine your choices, you'll feel your stress going away. Your insurmountable problem now looks like a variety of choices (see the section Personal Construct Therapy.

Use a Partner to Center Your Emotions

When you feel stressed, find a partner who expresses the opposite emotion.

E.g., if you're fired from your job. You come home feeling like a failure and you'll never succeed. You don't want a partner who agrees with you.

Instead, you want a partner who'll tell you that you're smart and hardworking, and you'll soon find a better job.

Picture your emotions like a car with a manual transmission. To shift from one gear to another gear, you have to shift through neutral gear. Similarly, to shift from feeling stressed to another emotion, first seek your emotional center.

Reduce Your Child's Stress

No studies have tested whether reducing stress affects children's stuttering. But you can try and observe whether this helps your child's speech.

Don't demand that your child confess guilt (fear of punishment). When your child experiences overwhelming emotions, e.g., is afraid to do something, don't demand that your child explain why he or she feels overwhelmed. Emotions are in a deeper, older brain area. Language is a higher, new brain function. An emotionally overwhelmed child may be unable to speak.

Don't insist that your child talk in an unfamiliar situation, e.g., at a new day care center (uncertain what to say, fear of embarrassment, uncertainty of status with new children). Situations that feel comfortable to you may be stressful to your child. Try to see stress from your child's point of view.

Reduce Your Listener's Stress

Stuttering is a rare disorder. Many people have never met a stutterer. I've had listeners ask if I was having a medical emergency, or ask if I was cold (apparently I looked like I was shivering). I have no doubt that other listeners thought that I was mentally retarded or psychotic, perhaps dangerous. Reduce their fears by saying that you stutter.

Some listeners think that they did something to make you stutter. Other listeners wish there were something they could do to help you. Tell them that you stutter. If they have any questions about stuttering, they'll ask you.

Make a joke about stuttering. Or you could put stuttering on your business card, perhaps describing you as chapter leader of your local stuttering support group.

Better, tell listeners that you're using speech therapy skills. Ask if your fluency skills sound weird, then do what your speech-language pathologist wants you to do (e.g., breathe with your diaphragm, relax your vocal folds, slow down your speaking rate). Ask if your stuttering therapy speech sounds better than your stuttering.

Ask the listener to remind you when you miss a speech motor control target. You could ask listeners to remind you when you stutter, but they'll be uncomfortable doing this, and you'll feel embarrassed if you don't have good control over your stuttering. Instead, ask listeners to remind you when you miss targets, e.g., you talk too fast. You should have better control over that.

If you're doing speech therapy, tell listeners you'll pay $1 for each missed target they point out (see my Romantic Disaster of 1996).

Lastly, if you use an anti-stuttering device, show it to your listener and ask if she minds if you use it. This is perhaps the best way to tell listeners that you stutter. Listeners invariably ask questions about the devices. In contrast, listeners rarely ask questions about speech therapy, e.g., vocal fold relaxation isn't of great interest to the general population. But everyone wants to know how anti-stuttering devices work. Suggest that the listener try on the device, and adjust it to make the listener stutter (by maximizing the delay, or moving the pitch shift up and down). When I do this, other people come over to see what's making their friend trip over his or her words. They give me positive feedback about my stuttering, laugh at their own failure to talk, and experience for a few minutes what it feels like to stutter.

Alternative Ways to Reduce Stress

If stuttering is the only way you know to reduce stress, you'll always stutter in stressful situations. Instead, learn alternative ways to reduce stress. Take a stress reduction class. Read books about handling stress.

One of the best ways to reduce stress is to relax your breathing. Stress reduction classes teach this. Or take a meditation or yoga class. Relaxed breathing not only reduces stress, it helps stutterers talk fluently.

Look for Stuttering-Reducers

Imagine a stutterer reading a projected PowerPoint presentation aloud to an audience. He scans the slides for feared words. Sure enough, there's a p-word. And an s-word! He scans the prodigious thesaurus in his brain, looking for words he can substitute. But the audience is reading the slides projected on the screen. Will they think he's illiterate if he substitutes or skips words? But what if he blocks and the audience discovers that he stutters! What can he do?

He's looking for stuttering-increasers. I.e., he's looking for ways to stutter. And, sure enough, stuttering-increasers?difficult sounds, feared words, judgmental listeners?abound, if you know where to find them.

Imagine another stutterer, also reading aloud to an audience. Instead of looking for stuttering-increasers, she looks for stuttering-reducers:

- With her text prepared for her, she can focus on using her speech therapy skills instead of thinking about what she's saying.
- She can pretend to be a robot reading machine. The robot has no emotions, it just sees words,

moves its mouth, and words come out.

- She can wear an anti-stuttering device and the audience will think it's a microphone for the PA system.
- When she introduces herself she can say that she stutters. Audiences love presentations that start with a joke, so she could start with a joke about her stuttering.

  You'll recognize this as a variation of the *Predator* approach.

Increasing or Decreasing Stress in Therapy

Stuttering therapy typically begins with a stutterer learning closed-loop speech motor control in a low-stress environment, e.g., chatting with the speech-language pathologist, or alone practicing word lists.

The stutterer gradually moves from closed-loop speech motor control to open-loop speech motor control. When he achieves fluent open-loop speech motor control, the speech-language pathologist takes him to a shopping mall for "transfer" practice. Then they're finished with speech therapy and he's on his own.

The result is fluent open-loop speech in low-stress environments, and relapse to open-loop stuttering in high-stress environments. The relapse shake the stutterer's self-confidence. Or the stress de-myelinates (weakens) fluent speech motor programs. A single high-stress, dysfluent experience might destroy weeks of low-stress practice.

Or both. The stutterer then gets into a vicious cycle of stress and relapse leading to more stress and more relapse.

A better plan would be to train a stutterer to recognize stressful situations, and consciously switch to closed-loop speech motor control (i.e., very slow speech) in high-stress environments. When he feels his stress diminishing he can switch to open-loop speech motor control (i.e., normal-sounding speech).

For example, I used to meet strangers and say, "My speech-language pathologist wants me to talk to strangers. May I talk to you?" I would then use very slow closed-loop speech motor control. After we had a friendly conversation going and my fears and anxieties diminished, I'd use the "slow-normal" speaking rate that mixes open- and closed-loop speech motor control.

In other words, with traditional therapy the stutterer switches between stuttering and fluent speech, as situations change between high-stress and low-stress. Instead, I switched between closed-loop and open-loop speech motor control, as stress changed. The result was that I constantly myelinated (strengthened) the fluent speech motor programs in my brain. Most important, I strengthened my brain's connection between stressful situations and closed-loop speech motor control. Switching to closed-loop speech motor control in a stressful situation should be as habitual as remembering to count to ten before punching someone.

You might object that severe stutterers may be unable to produce even two-second stretch closed-loop speech motor control in stressful situations. I.e., their fluent speech completely breaks down under stress. So use the *Predator* approach.

Or you might object that closed-loop speech motor control sounds "weird," and stressful situations are where you most want to sound normal. When I said to strangers, "My speech-language pathologist wants me to talk to strangers…#133;" no one ever refused. Most people then asked me questions about stuttering therapy. As long as the stutterer tells listeners that he is using special "speech therapy speech," sounding "weird" isn't an issue.

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Personal Construct Therapy: You Always Have Choices

No one needs to be completely hemmed in by circumstances; no one needs to be the victim of his biography.

? George Kelly, The Psychology of Personal Constructs (1955)

In every situation, you always have a choice of how to react. This insight is the basis of *personal construct therapy* (PCT). The goal of PCT is to develop awareness of your choices in every situation. The antithesis is to always react the same way to stressful situations.

If you make the same speech choices in high-stress situations, no amount of practice in a low-stress speech clinic will change your speech. E.g., if you always substitute words "when the going gets tough," you're not going to use gentle onsets in a difficult situations, even after practicing 5,000 gentle onsets in the speech clinic.

To develop awareness of your choices, describe a situation in which you stuttered. Imagine different ways you could have responded to the situation.

Role-play the scene with your speech-languge pathologist or in your support group. When someone sees a choice that hasn't been played, switch roles, for that person to play the new choice. E.g., the situation is answering the telephone at work. One person pretends to be a caller, and the other pretends to be the employee answering at Pasquale's Pizza. The employee uses slow speech. But another choice might be to switch to voiced consonants, i.e., answering the phone *Basdahllee's Bizza*. You should be able to think of a half-dozen other possibilities. Role play every choice and see what feels best.

Slow Down by Not Interrupting

Conscious choice requires slow reactions. In a fast reaction to environmental stimuli, your brain will select the most myelinated (habitual) open-loop motor program. Interrupting people, or responding quickly in a conversation, is a fast reaction.

Let people finish their sentences. Wait two seconds. Then start talking. Your fluency will improve.

Verbal Aikido

[w:Aikido|Aikido] is a Japanese martial art. Combatants focus not on punching or kicking opponents, but rather on using their own energy to gain control of them or to throw them away from you.

Verbal aikido is the art of not arguing, but instead agreeing with someone who is verbally attacking you. Then you help the assailant attack you, until?surprise?he realizes that he's just

been made to look like a fool.

E.g., a middle-aged, overweight woman owned a chain of women-only health clubs. Middle-aged, overweight women could work out in these health clubs without feeling intimidated by young male bodybuilders.

A "shock jock" radio host invited the health club owner onto his show. He described her physical appearance, then asked why anyone would want to work out at a health club owned by a fat, ugly old lady.

She responded, "So we don't have to work out with boorish meatheads like you."

This silenced the radio host long enough for her to say that overweight, middle-aged ladies have to exercise too, and the radio host was a perfect example of the men she didn't want to have to be around when she exercised.

My example of the parents responding to their teenagers' four-letter words is another example of verbal aikido.

Use verbal aikido to turn around the stress. E.g., a highway patrol officer pulls you over for speeding. Instead of trying to hide your stuttering, you make a joke: "I stutter, so I'm not going to try to talk you out of giving me a ticket." Maybe this will put the officer in a good mood and let you go with a warning.

Changing Self-Descriptions

Many stutterers improve their speech, yet continue to believe that their speech is worse than non-stutterers. Graduates of fluency shaping therapy programs sometimes have beautiful, clear speech that is easier and more pleasant to listen to than non-stutterers' speech. Yet they continue to believe that they can't do certain things, such as public speaking.[62]

Conversely, stutterers who improve their speech attitudes have better speech a year after completing therapy, as compared to stutterers who maintain poor attitudes.[63]

Write a description of yourself, and then describe who you expects to be in five years. Look for items that are opposite in the two descriptions. E.g., now you're now single, but in five years you hope to be married.

Then write a description of yourself as a stutterer, and then describe who you'd be if you didn't stutter. E.g., assertive vs. shy, or popular vs. lonely. These descriptions are your *personal constructs*.

Work on changing your personal constructs. Again, imagine specific situations for each personal construct. E.g., if you wrote that you'd be assertive instead of shy, describe a recent situation in which you weren't assertive. Now role-play the scene with your speech-language pathologist or your support group. Imagine different ways to react in the situation and switch roles.

"Who Would I Be If I Didn't Stutter?"

This is a favorite conversation topic at stuttering support groups. People initially say, "I'd be more successful at work," "I'd be more assertive with my husband and family," and other *negative* aspects of stuttering.

After fifteen minutes, people start saying, "If I didn't stutter, I'd be less compassionate," or "I would never have developed my musical talent." People realize that they chose a career in a "helping profession" (e.g., nursing or teaching), or they developed non-verbal skills, such as athletics or painting, because they stutter. They realize *positive* aspects of stuttering. They see that stuttering can be a gift.

In contrast, a stutterer completed a speech therapy program, but refused to speak fluently. He said that his co-workers had listened to his stuttering for 20 years. He asked, "What would they think if I came to work speaking fluently?"

Another stutterer was earning $25,000/year as a computer programmer. His supervisor left, and the company wanted to promote the stutterer. He would receive a salary of $55,000/year. The management position required talking to clients on the telephone. The company offered to pay for speech therapy and an anti-stuttering device. The stutterer refused the promotion, saying that he didn't want to talk to anyone. The company instead hired a less-qualified manager from outside the company.

For these stutterers, the psychological issues surrounding stuttering are more disabling than their disfluencies.

Change Your Lifestyle

As your improve your fluency, ask your supervisor for tasks that require talking. Do social activities that involve talking.

Training a new motor skill requires about three million repetitions. To say three million words, you must talk at least four hours a day for at least six months.

Take an acting class. Take singing lessons. You'll have fun, and meet new people. You'll get over your speech-related fears.

You'll find some things other people can easily do that you can't, but you'll also find things you can easily do that other people can't. E.g., I took a public speaking course. I was able to project your voice, when other students are afraid to raise their voices. I was able to switch emotions (anger, sadness) easily and convincingly, when other students couldn't. And there were simple presentations that you couldn't understand a word I said.

Volunteer to read to blind or elderly individuals. Volunteer at a hospital directing visitors where to go. Volunteer with your public radio station answering pledge week calls.

Or moonlight at a job that requires talking. Find a job that requires being charming and friendly.

Join social clubs that requires talking. Put Toastmasters at the top of your list. Members give a series of ten speeches, usually one speech per month. The speeches are four to ten minutes long. Each of the ten speeches teaches you a new skill, such as using gestures and body language, or being persuasive on a controversial topic. Judges always point out things you did well?and award lots of ribbons?as well as ways you can improve. You'll find that even if you stutter severely, you're better than non-stutterers at some aspects of public speaking.

The National Stuttering Association has its own public speaking training program, which is quite different from Toastmasters. Ask for the "Speaking Circles" video.

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Genes and Neurotransmitters

The neurotransmitter *dopamine* makes you feel alert, motivated, and mentally acute. When you feel "energy," your brain has plenty of dopamine. Caffeine, cocaine, and amphetamines produce their "buzz" by affecting your brain's dopamine.

Three genes control dopamine. Individuals with these genes switched on for high dopamine levels have increased likelihood of attention deficit hyperactivity disorder (ADHD), Tourette's Syndrome, stuttering, obsessive-compulsive disorder (OCD), and tics.[64]

All five disorders involve too much movement:

- Hyperactive children can't sit still.
- Tics cause a muscle, often in your face, to move rapidly and uncontrollably.
- Individuals with OCD repeatedly perform physical tasks, e.g., hand-washing.
- Individuals with Tourette's syndrome compulsively touch objects (e.g., floors or walls) or make stereotyped movements or noises.
- Stuttering is excessive speech-production muscle activity resulting in blocked, prolonged, or repeated sounds.

All five disorders manifest most strongly?and are most difficult to control?in high-stress situations. These disorders may all be stress reducers that work for a few moments but then cause greater stress, resulting in cyclical abnormal behaviors (see the section Stuttering Reduces Stress).

In some families as many as half the family members stutter.[65] Researchers have not yet investigated whether such families also have members who have Tourette's or other dopamine-based disorders, or whether there are families who stutter but don't have other dopamine-based disorders. The latter would suggest that additional genes affect stuttering.

Tourette's and Stuttering

Tourette's and stuttering have many commonalties:

- Tourettec tics and stuttering disfluencies are embarrassing.
- The more a Touretter tries not to make a certain movement, or a stutterer tries not to stutter, the less he or she can control the behavior.
- Touretters control the disorder by substituting more-acceptable tics. Stutterers substitute words they can say.
- Both Touretters and stutterers enjoy support groups, where they can "let go" and move or

stutter without embarrassment.

- Environmental cues can "switch off" Tourette's and stuttering temporarily. E.g., a surgeon with Tourette's has tics everywhere but the operating room.[66]
- Dopamine-blocking medications, such as Haldol, reduce both stuttering and Tourette's.
- Both disorders run in families.
- The prevalence of Tourette's and adult stuttering is similar.
- Both disorders originate in childhood.
- Both disorders can be disabling, but Touretters and stutterers who achieve success say that their disorder was a gift.

Invite a Tourette's support group to meet with your stuttering support group.

A Trigger for Tourette's

Why do some individuals with these three genes develop stuttering, while others develop Tourette's or OCD, and still other individuals with these genes develop none of these disorders?

In a subgroup of individuals with Tourette's, a childhood automimmune "trigger" leads to Tourette's. A childhood streptococcal infection can cause a child's immune system to attack brain cells in the putamen area.[67] The putamen controls gross (large) muscle movements. Excessive dopamine in the putamen area of the brain is associated with Tourette's. The child recovers from the fever, but then develops Tourette's.

Tourette's involves a *genetic* predisposition and an *autoimmune* trigger leading to a *neurological* abnormality. Combined with later *psychological* issues, Tourette's is a *multifactoral* disorder. Because only some individuals with Tourette?tm)s developed the disorder from this autoimmune trigger, Tourette?tm)s has *multiple development pathways*.

The Left Caudate Nucleus and Stuttering

Brain scans have found that adult stutterers have overactivity in the left caudate nucleus area of their brains. The left caudate nucleus translates sentences (formed in Broca's area) into muscle movements.

Neuroscientists believe that stutterers' left caudate nucleus has too much dopamine (or is too sensitive to dopamine). Too much dopamine causes stutterers' left caudate nucleus to execute too-large speech muscle movements.

No one has studied whether the left caudate nucleus of children before stuttering is different from this area after stuttering. Perhaps an autoimmune disorder triggers this area to become sensitive to dopamine.

"Good Days, Bad Days"?and the Anti-Stuttering Diet

Stutterers have "good days"?with less stuttering?and "bad days"?when they can't get a word out. The "good days/bad days" syndrome may be due to varying levels of dopamine in the brain.

Dopamine is affected by several factors, including diet. Dopamine is produced from the amino acids phenylalanine and tyrosine. Both amino acids are components of protein. Meat sources of protein have more tyrosine than plant sources of protein. The exception is wheat germ, which is high in tyrosine. The foods highest in phenylalanine are soy and fish.

A vegetarian, wheat-free, low-protein diet lowers dopamine levels. I tried this. I stuttered less, but felt sluggish and depressed. I'd rather eat protein, feel mentally alert, and stutter.

Dopamine Antagonist Medications

Dopamine antagonists can reduce stuttering. However, these medications have side effects. Also, the long-term effects of the following medications are unknown. Rather than taking medication indefinitely, it may be better for a severe stutterer to take a medication at the start of a stuttering therapy program, and then reduce his dosage as his fluency improves, until he no longer needs the medication.

If you suspect that your child?tm)s medication contributes to his or her stuttering?especially if your child is on several medications?I suggest that you consult a pharmacist who specializes in stuttering and medications. I recommend contacting Richard Harkness.

Haldol

Haloperidol (Haldol) is an old dopamine antagonist. It was the first medication to reduce stuttering in two clinical trials.

The side effects can be severe. A stutterer took it for several days, then one night found his head rotating slowly back and forth 180 degrees?and there was nothing he could do to stop it! The effect on his speech had been minimal, so he stopped taking the medication.

Risperdal

Newer medications more narrowly target certain dopamine receptors. The dopamine D2-receptor antagonist risperidone (Risperdal) reduces stuttering about 50%.[68] Like other stuttering therapies, the drug is most effective in low-stress situations, and least effective in high-stress situations.

The drug is FDA-approved only for short-term (6-8 week) treatment of schizophrenia. Side effects include insomnia, agitation, anxiety, somnolence, extrapyramidal nervous system disorders, headaches, dizziness, constipation, rhinitis (a breathing disorder), rashes, tachycardia (a heart disorder), and breast growth in men and women (due to increased levels of the hormone prolactin), and neuroleptic malignant syndrome (potentially fatal).

A stutterer tried Risperdal and couldn't leave his house due to severe anxiety.

Another male stutterer wrote, "I used Risperdal for about 6 months. It had a marginal (if any) effect on the intensity of my stutter. I had to discontinue its use due to hormonal side-effects (my right breast started to grow)."

Zyprexa

Olanzapine (Zyprexa) reduces stuttering on average 33%.[69] Side effects are mostly limited to slight weight gain and drowsiness.[70]

Other Dopamine Antagonists

Pimozide[71] and Tiapride[72] are other dopamine antagonists that have been reported to help stutterers. Pagoclone is currently being tested on stutterers.

Antidepressants Increase Stuttering

Some antidepressant medications boost dopamine. These medications include the selective serotonin reuptake inhibitor (SSRI) class, which includes Prozac and Zoloft. These medications have increased stuttering in stutterers. In a few cases, these drugs caused non-stutterers to stutter.

Stutterers taking SSRI anti-depressants report feeling less depression, but their increased stuttering makes them feel worse:

I was sitting in the hallway, in the dark. I had been crying and hitting my head on the wall, screaming to God, why me? I hated my stuttering and I suppose hated myself as well. From that point on it was as if when I remembered that incident all the feelings came back to me and wouldn't leave. Those angry, hurt, frustrating feelings from so long ago wouldn't go away. I was hiding my feelings from everyone around me, pretending to be super mom and super wife. I decided to seek professional help.

We decided that I would try Wellbutrin. As my doctor put it, kill two birds with one stone, since Wellbutrin is also prescribed to help you quit smoking. The first week I felt like I had so much anxiety that I could explode. The second week I noticed my stuttering getting worse. By the third week the controls that I had learned in speech therapy were virtually unusable. It was so frustrating to not be able to control my stuttering at all. Needless to say we all agreed to flush the Wellbutrin and never go back on anything like that.

Prozac, Trazadone and Effexor did not effect my speech at all.[73]

Another stutterer wrote:

I have tried 3 antidepressants: Prozac, Wellbutrin, and Zoloft. All increased my stuttering noticeably. The antidepressants that I have tried make me more able to get out of bed in the morning and restore my "get up and go"; however, they have caused me to go from being a person with a barely noticeable stutter to a more pronounced stutter.

I went into my psychiatrist yesterday and explained that the current antidepressant is making my stutter significantly worse. However, in the 10 minutes we talked I was practically perfectly fluent. He then concludes that obviously "it's not that unmanageable."

He prescribed 10mg Propanolol to take before I have to be in a difficult speaking presentation. It is supposed to "reduce performance anxiety." I don't feel like I have a tremendous amount of performance anxiety; stuttering just isn't very fun. I think he doesn't believe me about the severity of the stuttering.

Other Medications and Drugs

Ritalin

A speech pathologist asked on the Internet:

I'm treating an 8-year-old diagnosed ADHD and who suddenly began stuttering (advanced core and secondary behaviors) without any prior history of dysfluency, as a side effect of the medication Ritalin. He's had a whole neuro work-up which revealed nothing.

Another speech pathologist responded that many of the children he treated for stuttering were on Ritalin for ADHD.

Pharmacist Richard Harkness advises against Ritalin for children who stutter:

Ritalin increases dopaminergic neurotransmission and is contraindicated for use in those with Tourette's disorder. Ritalin has also, in rare cases, brought on symptoms of Tourette's disorder. Tourette's disorder has been likened to stuttering in that it involves a flaw in dopaminergic neurotransmission.

Botulinum Toxin

Botox, the toxin in botulism, has been injected into stutterers' vocal folds. The toxin partially paralyzes your vocal folds so you can't get into hard blocks. You also can't talk loudly or forcefully. The toxin reduces stuttering somewhat. It wears off in a few months, and you get a second shot. The second shot reduces stuttering less than the first. By the third shot, the toxin usually has no effect on stuttering.

Tranquilizers

Some doctors prescribe tranquilizers to stutterers on the erroneous belief that nervousness causes stuttering.

A psychiatrist had some pills he thought might help. Einer was to take one per day during the week remaining before the great day, and one extra big super pill on the morning of the wedding. The pills made him feel somewhat relaxed but had no noticeable effect on his speech. The wedding arrived, Einer took his super pill, and went off to London on the train to meet his relatives who had come for the ceremony.

An hour before the wedding Einer had still not returned. I kept the smiling calm that I had learned to assume in the face of all our difficulties and began dressing. Half an hour later I stood in white satin complete with veil and bouquet, looking out of the bedroom window towards the railway station, wondering what could have happened and preparing myself mentally for a last minute cancellation of the wedding. Had he thrown himself under a train, unable to continue life as a stutterer? Had he run back to Canada as a supreme act of avoidance? The minutes ticked by. Finally another train pulled in, and up the hill walked Einer, a lazy smile on his face, apparently unaware of the panic that he had caused. He had forgotten to take pencil and paper and so was unable to ask for guidance and had become hopelessly lost. However, the super pill had kept him smiling. I am glad to say that thanks to the kindly vicar in reading along with Einer, the wedding vows were the first and only fluent words my family heard Einer speak that summer.[74]>

Alcohol

No researchers have studied the effects of alcohol on stuttering. (Finding volunteers wouldn't be a problem at certain universities!) Anecdotally, alcohol reduces stutterers' fears and anxieties (e.g., about talking to persons of the opposite sex) and so reduces stuttering. But alcohol reduces one's ability to use therapy techniques, so increases stuttering.

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Psychological Issues

"Experts" have proposed dozens of psychological causes for stuttering. Then they use psychological tests to test their hypotheses. And, every time, the tests prove the "experts" wrong. But this doesn't stop the experts from writing books promoting their theories.

In 1928, a Freudian psychologist advanced a theory that stuttering was an attempt to satisfy unresolved oral-erotic needs.[76] If this were true, there would stuttering phone sex lines. Imagine finding ads in the back of *Playboy* magazine with scantily-dressed women saying, "Call me! I stutter!"

A 1939 personality test study found that stutterers were more neurotic, more introverted, less dominant, less self-confident, and less sociable than non-stutterers.[77] Examination of the personality test found sixteen speech-related questions, including "If you are dining out do you prefer someone else to order dinner for you?" The psychologists had interpreted stutterers' reluctance to order in restaurants as evidence of neuroses, rather than as difficulty talking.

A 1952 study of hostility and aggression found stutterers more likely to turn hostility inward. A 1953 study found the opposite.[78]

Other psychological studies found no difference between stutterers and non-stutterers for self-concept, levels of aspiration, body images, role perception, handwriting, social maturity, birth order, exaggerated fears, sleep disturbances, hyperactivity, temper tantrums, thumb sucking, and nail biting.[79]

Stutterers are, on average, psychologically normal, except for fears and anxieties around talking. We generally have the same speech-related fears and anxieties as non-stutterers, such as fear of talking to strangers and fear of speaking to an audience, but these fears are greater in stutterers.

Freedom to Speak?Badly

I found this in the book How to Learn Any Language:

> Americans, however, hold one high card that too frequently goes unplayed. We're gregarious. We're extroverts. Some say it contemptuously. Some say it admiringly. But those who know us best agree that we Americans are the only people in the world who enjoy speaking another language badly!
>
> Most people in the world are shy, embarrassed, even paralyzed when it comes to letting themselves be heard in languages they speak less than fluently. An American may master a foreign language to the point where he considers himself fluent. A European, however, who speaks a language equally well and no better will often deny he speaks it at all!

Are you an American?happy to talk even when your speech isn't good? Or are you a European?"shy, embarrassed, even paralyzed" when you can't speak fluently?

Or are you Chinese? In China, stutterers are expected to keep their mouths shut because stuttering will embarrass their families. You don't want the neighbors to find out that your brother stutters, so you find him work that doesn't require speech, and he stays at home the rest of the time.

If that doesn't sound fair to you, stick an American flag pin in your lapel. Then go out and speak English?badly, if you have to.

The First Amendment to our Constitution is freedom of *speech*. Our ancestors believed that talking is the most basic human right. If you don't want to talk, are you throwing away the fundamental freedom that previous generations fought for?

Change Your Lifestyle to Talk More

Ask your supervisor to give you work requiring talking. This could be talking to customers, or calling suppliers, or training other employees.

Or change careers to a job that requires talking. A man bought an anti-stuttering device, quit his job as a back room accountant at a bank, then worked at the Chicago Board of Trade, yelling orders to buy or sell soybean futures.

Or find a volunteer service requiring talking. Hospitals have information booths where volunteers direct visitors to their floors. Public television stations need volunteers to answer the phones during pledge drives.

Political groups need canvassers to collect signatures on petitions. Pick a cause you believe in. Imagine yourself standing on a busy street corner, talking to passerby about an important issue. Can you picture anything more American?

Complimenting People

Here's another way to make the world a better place. Make eye contact, smile, and then compliment a person.

Don't limit this to attractive, single persons of the opposite sex. Make everyone you meet feel good about themselves. Compliment old men, women pushing strollers in the park, the person behind you in the supermarket line, and your in-laws.

Here are a few compliments you can make about anyone:

- Compliment the person's smile. Then smile. This will make the person smile. Add a little joke such as, "Give my compliments to your orthodontist."
- Compliment the person's eyes. This reminds you to make eye contact. Look into the person's eyes long enough to mentally note his or her eye color. A friend broke up with her boyfriend when, wearing sunglasses, she asked him what color her eyes were. He didn't know.
- Compliment the person's name. This helps you remember the person's name. Associate the

person's name with an interesting fact, e.g., ask how his or her name is spelled (e.g., Rebecca vs. Rebekah), the ethnic origin, or the meaning of the name. (I got a date with a woman named Alethea because I knew that *alethea* is Greek for *truth*). Ask if the person is related to a celebrity with the same last name. Read a history of your area to learn the names of local heroes and historical figures.

- Compare the person to a celebrity. (A friend writing a personal ad asked if she looked like Natalie Merchant or Neve Campbell. I replied that she reminded me more of a young Tommy Lee Jones.)

- Listen for extraordinary things people have done, then reflect this back to them. Everyone thinks that their lives are ordinary. E.g., a man who flies jet fighters thinks of himself as an ordinary fighter pilot.

Tell Stuttering Jokes

Here's my favorite stuttering joke:

A stutterer goes away to a two-week intensive speech therapy course on the East Coast. When he returns, his friends ask how it went.

The stutterer pauses, takes a deep breath, and slowly says, "Peter Piper picked a peck of pickled peppers."

His friends are amazed. "You said that completely fluently!" they say.

The stutterer says, "Y-y-yeah b-b-but it's, it's h-h-hard t-t-to w-w-work th-that in-t-to a, a c-c-conversation."

Actually, that's my favorite clean stuttering joke. If you're 18, you can go to my website to read the other kind!

Inward Anger vs. Outward Anger

Stuttering, like any frustrating experience, causes anger. Some individuals direct these feelings inward (i.e., they hate themselves). This leads to a vicious cycle or "self-fulfilling prophecy" of failure.

But other stutterers direct these feelings outward. These individuals feel anger at other people. Their relationships at work or socially go poorly, again creating a vicious cycle of failure.

How do you feel when people disrepect you when you stutter? Do you feel anger at yourself for stuttering? Or do you feel anger at the person who treated you poorly?

When you're angry, do you do nothing, but get angrier inside? That's inner-directed self-hatred.

Or do you take action to "send a message" nonverbally?which the other person is certain to misunderstand? I once "sent a message" to my housemates that it was their turn to buy toilet

paper. Don't ask me what I did! They didn't get the message. They just got angry back at me. That didn't lead to domestic bliss.

In the chapter on fluency shaping therapy I suggested that you use slow, stretched syllables when telemarketers call. Do you look forward to annoying telemarketers? If so, your anger is directed outward.

Or do you refuse to annoy telemarketers? A stutterer told me that he couldn't do stretched-syllable speech with telemarketers because he was a Christian. His anger was directed inward.

OK, you're not following that line of reasoning. A telemarketer calls, trying to get you to donate money from to the Retarded American Veterans. You practice two-second stretched syllables. The telemarketer is paid by the hour. You ask, "Does your charity help retarded American veterans who stutter?" That takes 30 seconds. You explain that you stutter, and your speech therapist wants you to practice slowing down your speech. That takes a minute. You can see that a five-minute conversation is easy with stretched-syllable speech. The telemarketer is happy to answer questions, that's his job.

My Christian customer stuttered extremely severely. Two-second stretch would have increased his speaking rate. Yet he assumed that the telemarketer would be unhappy to talk to him, regardless of whether he stuttered or practiced speech therapy. Assuming that an individual who gets paid to call people would be unhappy to talk to you is self-hatred.

Outer-directed anger is easier to outgrow than inner-directed anger. E.g., you can't wait for telemarketers to call. You have your DAF device plugged into your telephone. You sit down to dinner, and the phone rings. It's the Munificent Police Protective Association. You happily draw out a forty-five minute conversation. Your dinner gets cold but your speech gets better. Then a friend calls, and you speak fluently at a slow-normal rate. You feel good about yourself and your anger drops away.

In contrast, my Christian customer decides not to practice his speech therapy, stutters a "No, thank you" to the telemarketer and hangs up. His speech doesn't improve, he doesn't find out that telemarketers are happy to chat with stutterers, and his self-hatred continues.

If practicing speech therapy with a telemarketer scares you, have your speech-language pathologist pretend to call you. She'll try to sell you slow pitch bats, slow blow fuses, stainless steel slow cookers, and slow jam CDs. If you can't think of anything to say, ask, "How slow are the slow pitch bats?"

Then call her, reversing roles. Convince her that your slow blow fuses are the slowest, and that no one makes a slower slow cooker. Practice this until you're willing to practice therapy skills with a telemarketer.

Denial Is a Bigger Problem Than What You're Denying

I had a neighbor with schizophenia. He went to a dentist for a root canal, and the CIA put a radio into his tooth. The government was broadcasting messages to his brain.

Like 40% of schizophrenics, he denied that he had the disorder. He'd lost his job as a chemical engineer, and now worked as a minimum-wage security guard. He had no friends other than me.

My neighbor enjoyed reading French and Italian newspapers at a university library. He'd take the newspapers to the basement where no one would hear him repeating obscenities to annoy the CIA agents listening to his thoughts. One day security guards asked him to leave. To get away from them he ran into traffic in a busy street. He wasn't allowed to use the library after that.

Consider what would have happened if he'd told a librarian that he had a mental illness that made him talk to himself, and asked if there was somewhere he could read the newspapers without disturbing anyone. The librarian would have unlocked a conference room for him to use.

Denying that he had schizophrenia took a lot of effort. His life would have been simpler if he admitted that he had the disorder. If you put more effort into denying that you have a disorder than the treatment would demand, then you have a denial problem.

He'd ask me whether I thought he was crazy. I'd say, "You're crazy if you deny that you have a mental illness. If you admit it, then you're not crazy."

Avoidance is Denial

Denial can look like avoidance. Many stutterers will spend two hours driving to a store to see if the store has an item, instead of spending two minutes calling the store (and experiencing the embarrassment of stuttering).

Many stutterers substitute words. E.g., saying "the great American pastime" instead of "baseball." That's eight syllables instead of two, and some listeners won't know what you're talking about.

When avoiding stuttering takes more effort than stuttering, you're denying how much effort avoiding stuttering takes.

Here's an extreme example of avoidance. A woman called, inquiring about my company's anti-stuttering devices. Her husband was a computer software engineer. He'd stopped talking. He'd requested a demotion at work to a position in which he never spoke to anyone. He sat in his cubicle, communicating by e-mail. At home he no longer spoke to his wife or children. He stopped participating in social activities or friendships. His wife was considering divorce. But first she was learning everything she could about stuttering, in hopes of finding something that would enable him to speak.

Did this man have a stuttering problem? Or did he have a denial problem? He thought he could make his life easier by not talking. But the effort required to not talk (e.g., an unhappy marriage) outweighed the effort of talking (e.g., to his wife, who already knew and accepted that he stuttered).

"I Can Do It Without Help" Is Denial

A friend lives in a state that provides anti-stuttering telephones free (see State Special Telephone Equipment Programs). He stutters moderately to severely. I suggested that he fill out the application to get an anti-stuttering device. He said no, he'd been to a good speech therapy program, and he knew what he had to do. He was determined to improve his speech without electronic devices, medications, or other help.

It's been five years since he went to that speech therapy program. He still stutters. He's denying that the speech therapy program wasn't helpful. He's denying that he doesn't know what to do to improve his speech. He's denying that he needs help.

In contrast, a stutterer not in denial will use whatever's avail-able to improve his speech. If your state wants to give you a telephone that helps you talk fluently, why not take it?

"But I've Tried Speech Therapy" Is Denial

Consider why crazy weight loss diets attract customers. People try the "pizza and ice cream" diet, it doesn't work, and then they can say that they tried to lose weight but the diet didn't work. Therefore no diet, exercise plan, or anything else will ever work. Therefore they have an excuse to be overweight. These people chose the "pizza and ice cream" diet instead of the salads and running ten miles a day diet. They chose a fad diet because they knew it wouldn't work.

Similarly, some stutterers go to one speech therapy program, it doesn't help, and then write articles saying that "achieving fluency…is nearly impossible" and "stuttering is a physical impediment for which little can be done."[80] That's also denial. The person avoids effective treatments, by denying that effective treatments exist.

Denying the Most Important Thing in Your Life

I was unaware how severely I stuttered (see My Life in Stuttering). I thought that I had a minor speech problem. I tried to do everything that everyone else does. When I consistently failed at things most people seemed to effortlessly achieve (e.g., finding a job, finding a girlfriend) I didn't realize it was because talking to me was an excruciating experience for listeners. No one told me that. They just avoided me.

Did I have a denial problem? Yes?but let me tell you about an accountant I had dinner with. He worked for the local government. He kept pen and paper next to his bed because he'd wake up with ideas of how to solve accounting problems at work.

My first thought was, this guy needs a life! He dreams about accounting!

Then I thought, he thinks about accounting 24/7. He must be a good accountant. When I need an accountant I'll hire him.

My speech improved after I was 30, when I made stuttering the center of my life. I thought about stuttering 24/7. I'd wake up with ideas for how to solve speech problems. Speech therapy

changed from something I did two hours a week in speech clinics, to what I did all the time.

My denial problem wasn't that I didn't admit that I stuttered. My denial problem was that I didn't admit that stuttering was the most important thing I did. I'd pushed it to the side and focused on other things.

Whatever you focus on, you can achieve. It may take years of persistence but you will succeed. But you can only think about one thing 24/7. You don't want to spend your life climbing a mountain, get to the top, then see that you climbed the wrong mountain.

Miracles Happen

I'll end this chapter by asking you to think about whether stuttering is the most important you do. I'll also admit that miracles happen. Miracles happen when you focus on the most important thing in your life, and then everything else falls into place, effortlessly. E.g., you improve your speech, then your boss gives you a promotion. Then the pretty blonde at the photo store wants to be your girlfriend. It happened to me, and it'll happen to you. To read about more miracles, see the appendix Famous People Who Stutter.

But before your miracles can happen, think about my question. Is stuttering the most important thing you do? If you're a severe stutterer, as I was, the answer may be yes. Miracles aren't going to happen in your life until you think about stuttering 24/7. If your child stutters, you may have to focus on your child's treatment, rather than leaving it to the school's speech-language pathologist.

But if you're a mild stutterer, stuttering might be the wrong mountain for you to climb. You might be focusing your energy on avoiding stuttering, when listeners don't care whether you stutter. They might even like hearing you stutter occasionally. Maybe you should put your energy somewhere else.

References

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You're Not Alone: Join a Support Group

You're Not Alone: Join a Support Group

Likely you've never met another stutterer. You've never seen a book about stuttering in a bookstore. You may be the first stutterer that your speech-language pathologist has met. You might feel that you're the only person in the world with this problem.

Your speech-language pathologist printed a webpage for you with the time and place of stuttering support group. You put it off the first month, but this month you drive there. You drive by the house. You see a group of people in the living room. You sit in your car, not sure if you have the courage to walk into the house.

Let's back up to how you find a stuttering support group. The National Stuttering Association(http://www.nsastutter.org/) (800 364-1677) has more than 70 local support groups across the United States. Many stutterers say that the annual NSA convention is the best experience of their lives.

Speak Easy International has stuttering support groups in the New York-New Jersey area. Call Bob Gathman, at (201) 262-0895.

The National Association of Young People Who Stutter(http://www.friendswhostutter.org/) (866 866-8335) has support groups for children and teenagers who stutter.

Many speech clinics have their own stuttering support groups. These are often for practicing therapy. Practicing in a group is better than practicing alone because we learn best by seeing other people make mistakes and then improving. In contrast, seeing a speech-language pathologist (who likely doesn't stutter) perfectly executing a speech motor skill can make you feel like she has a gift you'll never have.

If you're outside the United States, find a stuttering support organization in your country by visiting the International Stuttering Association (http://www.stutterisa.org/) website.

Then there are the online support groups. Yahoo Groups lists more than seventy stuttering e-mail lists. The Usenet discussion group is alt.support.stuttering.

The online support groups tend to be a few individuals who do 90% of the chatting, and hundreds of people who don't write anything. I remember when one individual used several e-mail addresses and fake names to have long arguments with himself.

I set up a website for stutterers to search for one person to write to, as a penpal. You searched by age, gender, location, special interests, etc. Thousands of people used my website (and two couples married who met there) but I didn't have time to maintain it. Maybe I'll set up another website like this?check my website (http://www.casafuturatech.com/FriendshipCenter/).

Benefits of Support Groups

Researchers found that cancer patients who joined a support group, without receiving treatment, lived longer than patients who received treatment, without a support group. I.e., support groups were more effective than surgery, drugs, or radiation therapy in fighting cancer.

A support group will help you learn what works for other people. You'll get feedback on what you're doing. A group of people will generate new ideas that no individual would have thought of.

In a support group, you'll find that you've solved problems that other people face. Other people may have solved problems you face. Stuttering will no longer seem like one big problem, but rather will become a set of small problems.

When you ask your support group to solve a small problem (e.g., answering the telephone at work) they'll tell you. If your support group has six members, you'll get six solutions to your problem. At least.

A support group improves your emotional state. Hearing other people's experiences improves your perspective. Your setbacks don't seem so bad. Sharing positive experiences makes everyone in the group feel good.

When you feel frustrated or depressed, you have no idea what to do. Talking to individuals who've been in the same situation will help you see that you have choices (see the section Personal Construct Therapy).

Support Group Activities

I was a National Stuttering Association chapter leader. Our meetings usually had a dozen people. We met twice a month. One meeting I would invite a guest speaker. E.g., one guest was a speech-language pathologist who stuttered and was the superintendent of the county office of education. She was responsible for 33 school districts and seven community colleges.

The other semi-monthly meeting would be a fun activity, requiring talking. E.g., one month we read a Winnie-the-Pooh story with each character doing a type of speech therapy. Winnie-the-Pooh hums a lot, so he used continuous phonation. Owl used the Hot Airflow Method. Eeyore used Dreary Auditory Feedback, which is tediously slow and depressing, but makes you fluent. T-T-T-Tigger b-b-b-bounced his words.

Talking About Your Stuttering

One of my customers sent me this e-mail:

I am a severe stutterer. At the time I ordered the Pocket DAF, I was blocking on every single word I spoke. I decided to try the DAF with the encouragement of my speech therapist.

The first day I brought it to work, everyone in my office tried it. Before long, everyone in

the entire office area was in my office wanting to hear me talk and try it out themselves.

I found the experience both wonderful and frightening. It was wonderful to know that so many of my co-workers wanted something good for me and were so excited about seeing it happening. It was frightening because I didn't know if the effects of the DAF would last. I've found that having the DAF allows (forces) me to be more open about my stuttering because everyone can see that I'm using some sort of device. I also think that it helps people understand my stuttering. If something analogous to a hearing aid can help, maybe my stuttering doesn't seem so mysterious to them after all!

After using the device over a year now, I'm very pleased to report that many people at the National Stuttering Project convention remarked on how much my fluency had improved since they last talked to me.

I use the DAF only sometimes at work and most of the time on the telephone. I'm very glad that I bought it.

In ten years working with the same people, she'd never discussed her speech. When she brought up the subject, she found that her co-workers wanted to support her.

Watch the video (http://casafuturatech.com/Books/NoMiracleCures/GardenInterviews.mov) I made interviewing people about my speech, after I performed in a play. You'll see that everyone was supportive.

Listeners have different messages for mild and severe stutterers. Mild stuttering is "no big deal" or even appealing to listeners. A movie producer told me that my stuttering was appealing because it showed that I wasn't a "phony" person. Apparently she'd met plenty of "phony" people in Los Angeles (i.e., people who pretended to be someone they weren't).

In contrast, mild stutterers may be able to successfully hide stuttering, but listeners figure out that they're hiding something. Listeners may not know what the stutterer is hiding, but he'll come across as "phony" or dishonest.

Listeners have a different message for severe stutterers. Severe stuttering disturbs listeners. They don't understand stuttering. They want to know if there's anything they can do to help you. But they're too polite to ask you about your disability. They want you to educate them. They don't want the proverbial "elephant in the living room" that no one will talk about.

The Disability Hierarchy

Some disabilities get more respect than others. Most people respect individuals with visible physical disabilities. E.g., you'd make room on a crowded bus for a paraplegic using a wheelchair.

Individuals with non-visible physical disabilities, such as heart disease, get less respect. Would you give up your seat on a bus for a man who said that he had a heart condition and couldn't stand for long periods? What if he were your age and looked fit and healthy?

Non-physical, visible disabilities get even less respect. E.g., a man gets onto a bus, talking excitedly to himself. You don't see a cellphone earset in his ear. Plus he's repeating the same paranoid sentence over and over. You suspect he has schizophrenia. You see people on the bus getting up from their seats as he approaches?and getting off at the next stop.

The least respected disabilities are non-physical and non-visible. Stutterers look normal, until we talk. Listeners feel shock seeing you go from normal behavior one moment to head jerks, facial spasms, stuck in repeating dysfluencies the next moment.

But you can move up the disability hierarchy. You can change your stuttering into a visible, non-physical disability:

- Wear a National Stuttering Association button.
- Tell people that you stutter.
- Telling a stuttering joke.
- Show people your anti-stuttering device.

Recall that my customer wrote that her listeners felt more comfortable when they say that a physical device helped her speech, suggesting that stuttering is a physical disability.

Fear of Listeners Discovering That You Stutter

In contrast, hiding your stuttering throws away the respect and support that people would otherwise give you.

I used to get calls from stutterers wanting an anti-stuttering device that was completely invisible, 100% effective, and required no speech therapy. I'd patiently explain that no stuttering treatment could do that. Then I'd suggest that perhaps their real problem wasn't stuttering, but rather was fear of listeners discovering that they stuttered. If you fear listeners discovering that you stutter, then your stress increases and you're more likely to stutter.

My company used to have a 10% rejection/return rate.[ ] Then another company marketed their anti-stuttering device as an invisible "miracle cure." Since then I've gotten no calls from stutterers wanting invisible instant cures. My rejection/return rate has dropped to less than 1%. I've heard that the other company has more than a 50% rejection/return rate. I'm happy that the "miracle cure" stutterers buy from them, not me.

One "expert" claimed that stuttering was caused by the fear of listeners discovering that you stutter. His treatment was that you should intentionally stutter. He taught stutterers to b-b-bounce their words, making sure they got a good dysfluency on every word.

I tried that therapy. When I tried to fake stutter, I'd get into a real stutter. My stuttering went from severe to ridiculous. Instead of fake stuttering, just tell listeners that you stutter.

What to Talk About

Of course, stuttering doesn't often come up as a topic of conversation. You'll have to bring it up.

I used to go up to strangers and say "My speech therapist wants me to introduce myself to more people…" I met a girlfriend this way.

Now I take my anti-stuttering device out of my pocket, and say that I'm putting on my anti-stuttering device. Almost always the listener asks me about the device.

I then ask the listener if she wants to try the device. I explain that I can adjust the device to make fluent people stutter.

Then all the conversations in the room stop. Everyone turns to watch my victim tripping over her tongue trying to count to ten with DAF adjusted to 200 milliseconds. Then they line up to try the device. And sometimes, after I've been the life of the party for an hour, an attractive person of the opposite sex wants to talk to me at length about stuttering, usually because she has a friend or cousin who stutters.

Then I wonder why anyone fears listeners discovering that they stutter.

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Famous People Who Stutter

I am 21 years old. Recently, I graduated from my third college course and still no job. Interviews come by the dozens but job offers are none! I am a Pharmacy Assistant Health Care Aide plus a medical transcriptionist, but after all the years in school and all the money spent on education, I am still unable to find work! Am I to live in poverty because people only see me at my worst?

Interviews for me are a horrid experience. I've had people pick up a newspaper and start reading it, waiting for me to get out of a block. All the interviewers act as if I'm wasting their time. It's more like they're wasting mine.

If people could only see me when I am fluent I'm sure I would have a job. On interviews I find myself apologizing for my speech…but why do I?

Is there anyone out there who is experiencing the same problems? I need help to cope.[81]

?????

I am an embedded software engineer, and today I was faced with a situation that I have not ran into yet in my pursuit of employment. Like many of you I have had the phone hung up on me by recruiters, or they rudely and quickly end the phone conversation. I had a personal phone interview with Motorola. First, the interview was designed to be very high stress. Second, the questions were given to me in advance which only made the situation worse. Of course it being a phone interview made it worst. I was unable to form sentences and completely locked up on the interview and was eliminated from the running for this software engineering position. Can I do anything? According to the recruiter I'm a great fit for the position, god this frustrating.

?????

Graduate students in my stuttering class [surveyed employers, who] indicated that they would prefer to hire someone who was deaf or someone with moderate cerebral palsy rather than someone who stuttered. Interestingly, several of the employers who said they would not hire a stutterer had one or more stutterers already working for them.

When we probed to understand the WHY behind the employers' responses, we learned that essentially they thought they "understood" deafness and cerebral palsy, but stuttering was strange?and they assumed that persons who stutter were strange.[82]

Ten months after completing a stuttering therapy program, 44% of stutterers had received a promotion. 40% had changed jobs, 36% reporting that the change was for the better. Combining these, about 60% had improved employment after stuttering therapy. The study also found that 88% of the stutterers had maintained their fluency.

Their employers reported a 20% improvement in "communication effectiveness" for the

stutterers completing therapy.[83]

Stutterers earn approximately $7200 less per year than non-stutterers.[84] Two groups of 25 persons were examined. The groups were matched for age, sex, IQ, race, education, and socioeconomic background. The subjects were contacted ten years after graduating from college. They were asked a number of questions relating to levels of achievement. The difference did not appear to be the result of employer discrimination. Rather, the stutterers were reluctant to accept promotions that involved making presentations to groups of people:

> I have refused (or went "kicking") different projects at my job, which may/may not lead to promotions. Most recently, I went kicking on co-facilitating a corporate-wide quality workshop initiative. My partner in facilitation, after much coaxing by me, took the majority of the speaking sections, while I became her assistant. (Please be aware that I have not discussed my disorder with my co-workers, I am a mild stutter that can usually "pass" for a fluent speaker.) I am now interested in changing careers and am looking for careers that focus on "behind the scenes" work…i.e., technical writing. I have considered such careers as Law, but have veered away from them.[85]

Talk About Your Stuttering

> Another interview lasted about two minutes. The interviewer (another personnel director?they seem to be the worst problem) found an excuse to say I was not qualified for the job?so good-bye. I protested, asked for the technical interview and was asked to leave. As his excuse was plainly made up?this was also probably a case of discrimination.[86]

Begin the interview by talking about your stuttering. You may only get two minutes if you don't!

Whether you're looking for a job or already have a job, talk about your stuttering. Many people feel uncomfortable talking to a person who stutters. Educate them about stuttering to make them feel comfortable.

Some people make incorrect assumptions about individuals who stutter. E.g., some people think that individuals who stutter are mentally retarded?even if you have a Ph.D.!

"Excellent communication skills" is the #1 qualification employers look for. Regardless of whether the help-wanted ad included this, say that you have excellent communication skills. Give concrete examples:

- If you're in a speech therapy program, discuss your progress and the techniques or strategies you use.
- If you learned nonavoidance skills in speech therapy, explain that although you stutter, you've overcome your fears of talking to strangers, etc.
- "I can say a phrase fluently if I say it a lot. In my last job, I pretty much said the same things to customers all day, and my speech was fine." This should be acceptable for retail jobs, etc.

- If you use an electronic anti-stuttering device, show it to the interviewer and explain how it works.

  If the job requires making presentations, say that you can't say as much as non-stutterers so you prepare your remarks in advance and get right to the main points, unlike people who ramble on for half an hour.

  Membership in Toastmasters proves that you have excellent communication skills. Toastmasters gives out lots of prizes, so mention if you won a blue ribbon for one of your speeches.

  Communication is a two-way street. Say that you may not speak as well as other people, but you listen more carefully. Demonstrate that by not interrupting the interviewer, and by rephrasing and repeating back his questions. Ask the interviewer whether listening or speaking is more important in the job?they'll always say that listening is more important.

  The interview for the job that I currently have was one of the few interviews in which I discussed in depth the nature of my stuttering problem. I spent about a half-hour discussing my speech, and I think that it was very helpful for the interviewer in understanding how well I could work around my handicap.[87]

The Americans With Disabilities Act

In 1992, the Americans with Disabilities Act (ADA) outlawed employment discrimination against individuals with disabilities. Speaking was defined as a "major life activity" that the inability to do is disabling.

The central point of the ADA is that individuals with a disability can ask their employer (or potential employer) for a *reasonable accommodation*. A reasonable accommodation is a change to the job that will enable the individual to do the job. E.g., a stutterer might ask that he not have to answer the telephone. Or he might ask that the employer buy an anti-stuttering telephone.

When an individual with a disability requests a reasonable accommodation, the employer must make the accommodation. The individual must make the request. If the individual doesn't make such a request, the employer is not obligated to suggest an accommodation, or to hire the individual.

Employers aren't allowed to ask employees (or potential employees) about disabilities. It is essential that stutterers talk to employers about their speech. In a job interview, say that you stutter. Then ask whether your speech will interfere with the job. If you don't ask, winning a lawsuit will be difficult or impossible.

If you employer (or potential employer) tells you that "good communication skills" are necessary for the job, talk about the specifics. As noted above, you can explain that you have excellent communication skills. You can also ask for reasonable accommodations as necessary.

Stutterers rarely talk to their employers about their speech. The few stutterers who've told me that they talked about their stuttering with their employer reported 100% successful results of the conversation. In every case, the employer wanted to help the stutterer, but didn't know what to do. Every request was a reasonable accommodation has been granted, as far as I've heard.

The 99% of stutterers who don't talk about their speech with their employers are treated badly, in one way or another. When they feel they've been discriminated against, they don't win ADA lawsuits because neither they nor their employer ever said anything about their speech.

For more information about the ADA, visit the Equal Employment Opportunity Commission website or http://www.justice.gov/disabilities.htm. If you need to hire an attorney experienced with discrimination against stutterers, call the National Stuttering Association.

The ADA does not apply to the federal government, including the military services. The ADA covers only employment discrimination. If you experience discrimination or harassment outside of work, you will have to rely on other federal or state laws.

Vocational Rehabilitation

If you're looking for a job, make an appointment with a vocational rehabilitation counselor. Look in your telephone directory's blue (government) pages under your state's department of labor (or department of education in some states).

Voc rehab counselors want you to succeed. They'll get you whatever therapy, devices, or job training you need. I've heard many good reports from stutterers about voc rehab counselors.

A stutterer complained that, after paying for stuttering therapy and an electronic device, the counselor also wanted to pay for his CPA certification. The stutterer insisted he would pay for his own certification.

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4. ^ Schwartz, Martin, 1996, Stutterers Earn Significantly Less 10 Years After Graduating College.
5. ^ Personal e-mail.
6. ^ David Bertollo, e-mail.

- ^ Tom Morrow, e-mail.

High School Science Projects

Altered Auditory Feedback

High school students can build an altered auditory feedback device for a science project. Several alternatives are also possible:

- Find a DAF kit by doing a websearch for "delay echo reverb kit."
- Find a FAF kit by doing a websearch for "voice changer kit." Or rewire a voice changer toy (about $20) to use headphones instead of a speaker.
- Find a MAF kit by doing a websearch for "function generator kit." MAF uses a 105 Hz sine wave.
- Guitar effects processors usually have both reverb (DAF) and frequency-shift (FAF) effects.
- Writing your own DAF software is easy. FAF software is harder, as it requires a fast Fourier transformation (FFT) for octave-scale FAF. DAF/FAF software can be downloaded for about $30 from http://www.artefactsoft.com/.
- Set up a computer to measure and display your vocal amplitude and frequency. Use a Radio Shack multimeter with a frequency counter and computer output. With a microphone the total cost should be $100-150. Or look for audio recording software with frequency analysis.

  You can do the following experiments on yourself, or find volunteer subjects in your stuttering support group. Ask your speech-language pathologist to help you find a support group, or call the National Stuttering Association at (800) 364-1677. Experiments to do:

- Tape record a stutterer's speech at fast and slow speaking rates, without the device; and then with DAF set at 50 ms, 100 ms, and 200 ms. Count the number of disfluencies per minute, and the number of syllables per minute. Graph the relationship between fluency and speaking rate.
- Do you agree with speech-language pathologist Janice Costello-Ingham, Ph.D., that "the functional variable in regard to the reduction of stuttering is not DAF, but prolonged speech, and the latter can be produced without reliance on a DAF machine"[88] or do you agree with speech-language pathologist Joseph Kalinowski, Ph.D., that "a slowed rate of speech is not a necessary antecedent for fluency improvement under conditions of altered auditory feedback."[89] I.e., does DAF improve speech only when the stutterer talks slower, or does DAF improve speech at normal speaking rates?
- Math and physics: measure and calibrate the delay control of a DAF device. You'll need a frequency generator, frequency counter, and a dual-trace oscilloscope. Feed a sine wave into the DAF device. Set up the oscilloscope to display the input and output of the DAF device. At what frequencies do the two waves match? Find at least three matching frequencies for each DAF setting. Divide one by the differences between the matching frequencies to get the delay

length, in milliseconds. Explain why this works.

- Use the DAF device on a person who does not stutter, at different delay settings. How is the DAF effect different on individuals who don't stutter, and persons who stutter?

- Tape record a stutterer speaking (without DAF) for at least three minutes. Then have the person speak with DAF for ten minutes. Take off the device and record another three minutes of speech. Does DAF cause carryover fluency (after removing the device)?

- Show how to use a vocal amplitude display to help you do gentle onsets. Show how vocal frequency is a surrogate for vocal fold tension, i.e., relaxed vocal folds produce a low vocal frequency, and tense vocal folds produce a high vocal frequency.

- Find out if any of your relatives stutter. Draw a family tree showing your relationship to the person. Present evidence that stuttering has a genetic cause, and evidence that stuttering is not genetic.

- Find a speech clinic that has a speech biofeedback system. Write a report about what the biofeedback system does.

- Repeat Wendell Johnson's 1937 studies of adaptation and anticipation. These studies are described in A Handbook on Stuttering, by Oliver Bloodstein.

History

- Write a report on the history of stuttering therapy, using Stuttering: The Search for a Cause and Cure by Oliver Bloodstein.

- Write a report about a famous person who stutters.

Community

- Interview a speech pathologist about the cause of and treatments for stuttering. Describe the techniques and goals of two therapies. Ask your school district if they have a speech pathologist specializing in stuttering, or call the Stuttering Foundation of America at (800) 992-9392 to find a stuttering specialist.

- Help your school's speech pathologist organize a "Youth Day," with the help of Friends Who Stutter or the National Stuttering Association. This is a weekend workshop in which a childhood stuttering specialist trains school speech-language pathologists and parents to treat stuttering. At the same time, the children play speech therapy games and meet each other.

- Observe a speech pathologist treating a preschool child who stutters. Write a report about this, answering these questions: What games did the speech pathologist play with the child? What was the purpose of the game? What did the speech pathologist talk about with the child's parents?

- Interview a successful adult who stutters. This could be an accountant, a lawyer, or a teacher. You can find such a person by calling a local stuttering support group. Ask how stuttering affected the person's childhood and high school years; adult life; choice of career; and marriage or relationships. What stuttering therapy has the person had? How severely did the person stutter when he or she was younger? Are there situations in which he or she stutters more, or stutters less? Are there are speaking situations he or she fears or avoids because of stuttering?

- Does another student have a disability? Compare yourself to a student with a physical disability, and to a student with a non-physical disability (e.g., mental, emotional, or learning disability). See The Disability Hierarchy.

References

1. ^ Costello-Ingham, J. *Journal of Fluency Disorders*, *18*, 1993, page 30.

- ^ Kalinowski, J. *European Journal of Disorders of Communication*, *31*, 1996, page 259.

Audience Reaction Video

After performing in a play I interviewed audience members asking what they thought about seeing an actor who stutters.

Watch the video.

First Interview

WOMAN: I thought you did a great job. And at first I didn't know if it was part of the acting or not. I even asked Richard if it was part of it or not. I couldn't even tell if you were acting or if it was real. But I thought you did a great job and I didn't think it made it any worse than it would have been if you didn't stutter. I thought it was great.

Second Interview

WOMAN: I thought you were excellent. I met you before the show so I already knew. But it was like part of the act. I didn't know that was an anti-stutter device. I just thought that was part of your costume. I thought you were great.

Third Interview

TDK: What did you think of my stuttering?

MAN: It just seemed natural, like a part of who you were. And also there were times when you used it well.

TDK: If you heard that another play had an actor who stuttered in it, would that make you less likely to go see the play, or would you not care?

FAST-TALKING WOMAN: It gives the opportunity to slow down and actually the words that are being said. Otherwise if they're flying by too fast then it just kinda does just that, you're not even able to catch it as it rides by. But if you slow down and catch, you syllabalize it goes then that would seem to me to be a good thing. Just kinda slowing down the gears a little bit, snapping them back.

Fourth Interview

TDK: What did you think about me stuttering?

SETH'S MOM: Well, what I first thought that it was part of your act. Then eventually I caught on and I just thought it was great that you were performing and just being who you were and

being an actor and making us all comfortable with that. It's not an experience I have every day, communicating with someone that has any kind of speech difficulties. And then the part where you said, "No, I just stutter," after the crushed nut episode, that was just a real, it just helped us all, kind of, yeah, it was a joke, and broke the ice, along with everything else being, talk about rawness of human emotions and kind of everything laid open, it was very helpful, and once again remembering that we're all human and we all have things to contribute and we all have things we don't like about us.

SETH DREAMSEEKER WAXING MOON BRAUN: I felt like it's engaging to watch you perform because what's engaging about a performer is presence, and you're ability to stay present with the dynamic of your character, even though you're stuttering. It's very interesting, it's like, if you're that committed as a performer, to move through what might be difficult, it engages me.

TDK: What did you think of my electronic anti-stuttering device? Was it weird or distracting that I was using this?

SETH DREAMSEEKER WAXING MOON BRAUN: Well, since I know you, David, I thought, OK, I wonder if that's an anti-stuttering device? But I didn't even think about that until I'd seen it like ten minutes into the show. It was just like, maybe this is character. I really that it was part of a shift of character because you used it really well.

TDK: There's a group of teenagers who stutter in New York City who've formed an acting company. Is there anything you'd like to tell them?

SETH DREAMSEEKER WAXING MOON BRAUN: Hell yeah! I support you in training as young warrior artists.

Fifth Interview

TDK: What did you think about me stuttering?

DUNE: I just saw these different characters on stage, and it was just a quality of that character. Every different, completely different character. It took on a different quality, just like any other attribute that a person would have.

TDK: A group of teenagers who stutter in New York City have formed an acting company. Is there anything you'd like to say to them?

DUNE: Right on! Just keep doing what you're doing. I mean, I think that watching the performance, people that are trying out these different aspects of themselves, I want to do it. So I think that anyone that's doing it, go for it. It must be really a freeing thing, and takes a lot of courage.

Sixth Interview

TDK: Nir Banai was also in this play. What was it like working with a person who stuttered?

NIR BANAI: It was great. It was very inspiring to see you do such a performance with stuttering and having so much confidence to do it. It was really impressive. It was so impressive that you even used it as a joke in one of the skits. I was really impressed that you feel so comfortable with it.

Seventh Interview

TDK: If you heard that another actor in another play stuttered, would that make you less likely to go to the play?

MAN: Well, no, I don't think so. I mean, no. Definitely not.

TDK: There's a group of teenagers who stutter in New York who have formed an acting company. Is there anything you'd like to say to them?

MAN: Well, um, so, I think if they are looking for some inspiration then, um, well, if I was them I would have found that tonight.

Eighth Interview

TDK: What did you think about me stuttering?

GIGGLING WOMAN: I thought it was beautiful. You did a great job, I thought it was very real. Yeah, I was convinced?

TDK: Well, it was real, I do stutter!

GIGGLING WOMAN: You do stutter? No, you don't really stutter, do you?

TDK: Amazingly real, isn't it?

GIGGLING WOMAN: It was. It was very very real.

TDK: Wow. Great. I achieved that.

GIGGLING WOMAN: Yeah.

TDK: What did you think of the electronic anti-stuttering device I was wearing?

GIGGLING WOMAN: Oh this thing? I thought that was super cool. I did, I thought it was great.

Ninth Interview

TDK: What did you think of me stuttering?

WOMAN: It was beautiful. For real. I thought, I was much more, like, into the creativity of the play and thought that you guys pulled off a really beautiful creation, that you guys made.

TDK: You weren't wishing they had someone who wasn't stuttering?

- WOMAN: No way, man. No way. I thought it was beautiful. It was great. You were great. I was very impressed.

States That Provide Anti-Stuttering Telephone Devices

Most states have programs to help individuals with disabilities use telephones. The following states provide anti-stuttering telephone devices:

- Arizona
- California
- Georgia
- Maryland
- Massachusetts
- Missouri
- North Carolina
- Pennsylvania
- Texas
- Wisconsin

States that *DO NOT* provide anti-stuttering telephone devices include:

- Alabama (no program)
- Colorado (hearing impaired only)
- Idaho (hearing impaired only)
- New Hampshire (independent living only)
- New York (no program)
- Ohio (no program)

Other states may provide anti-stuttering devices on a case-by-case basis. Find other state programs on the TEDPA website. In general, if a program's mandate includes speech-impaired individuals then the program might help stutterers. If a program's mandate is only for hearing-impaired individuals then the program doesn't help stutterers.

The following information may be inaccurate or out of date. Please check with your state's program.

Arizona

- Arizona Telecommunications Equipment Distribution Program (AzTEDP)
- No income limit
- Website: http://www.aztedp.org/
- Telephone: (866) 223-3412 or (602) 264-6876

California

- California Telephone Access Program (CTAP)
- No income limit
- Website: http://www.ddtp.org/CTAP/
- Telephone: (800) 806-1191

Georgia

- Georgia Telecommunications Equipment Distribution Program (GATEDP)
- Income cannot exceed $36,208 for family of four
- Website: http://www.gachi.org/gatedp/intro.htm
- Telephone: (888) 297-9461 or (404) 297-9461

Maryland

- Maryland Accessible Telecommunications (MAT)
- Individual must be on welfare (SSI, SSDI, TDAP or TCA) or a "hardship case"
- Website: http://www.mdrelay.org/equipment.html
- Telephone: (800) 552-7724

Massachusetts

- Massachusetts Specialized Telephone Equipment Program
- No income limit
- Website: http://www22.verizon.com/foryourhome/SAS/Massachusetts_Availability.asp

- Telephone: (800) 974-6006

Missouri

- Telecommunications Access Program for Telephone (TAP for Telephone)
- Income cannot exceed $60,000
- Website: http://www.at.mo.gov/TAP_telephone.shtm
- Call local Independent Living Centers (see website for telephone numbers)

North Carolina

- North Carolina Telecommunications Equipment Distribution Program (NCTEDP)
- Income cannot exceed 250% of the current federal poverty level
- Website: http://www.relaync.com/get_equipment/get_equipment.html
- Telephone: (800) 999-5737

Pennsylvania

- Telecommunication Device Distribution Program
- No website
- Telephone: (866) 227-6810 (ext. 8728)
- Address: Hiram G. Andrews Center
  Attention: R.D. Robinson, Program Manager
  727 Goucher Street
  Johnstown, PA 15905

Texas

- Specialized Telecommunications Assistance Program (STAP)
- No income limit
- Website: http://www.dars.state.tx.us/dhhs/stap.shtml
- Telephone: (512) 407-3250
- Texas STAP provides a voucher worth up to $995. Only devices that plug into telephones are covered.

Wisconsin

- Telecommunications Equipment Purchase Program (TEPP)
- No income limit.
- Website: http://psc.wi.gov/consumerinfo/assistancePgms/tepp/tepp-ind.htm.
- Telephone: (608) 231-3305
- Wisconsin TEPP provides a voucher worth up to $1600. The consumer must send a $100 co-payment to the vendor. Only devices that plug into telephones are covered.
- Next chapter: Other Fluency Disorders
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Other Fluency Disorders

See also:

- Cluttering
- Parkinson's speech
- Essential tremor
- Spasmodic dysphonia
- Social anxiety

Head injuries and strokes

Head injuries and strokes can cause repetitions, prolongations, and blocks. However, these *neurogenic* stutterers lack the struggle behavior and fears and anxieties of developmental stuttering.

Developmental stutterers can fluently speak certain memorized phrases, such as the "Pledge of Allegiance." Neurogenic stutterers are disfluent on everything. Developmental stutterers can speak fluently in certain (typically low-stress) situations. Neurogenic stutterers are disfluent everywhere.

Stuttering therapy techniques and devices help some individuals with neurogenic speech disorders, but don't help others. Because different people have different areas of their brains injured, a treatment that's effective for one person may not be effective for another person.

Psychogenic stuttering

Rarely, traumatic experiences caused an adult to stutter. *Psychogenic* stuttering typically involves rapid, effortless repetitions of initial sounds, without struggle behavior.

- Next chapter: Long-Term Studies of Stuttering Therapy
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Evidence-based practice means that a healthcare practitioner makes clinical decisions based on three criteria: scientific evidence that a therapy is effective, clinical expertise, and the goals and values of the client. The American Speech-Language Hearing Association (http://www.asha.org/)(ASHA), the "No Child Left Behind" Act, Medicaid, and insurance companies support evidence-based practice.[90]

This chapter focuses on the scientific evidence: long-term studies of stuttering therapies, published in peer-reviewed journals.

Satisfaction with "Smooth Speech" Fluency Shaping

In a study of a "smooth speech" fluency shaping stuttering therapy program, about 95% of stutterers were "very satisfied" or "satisfied" with their speech at the end of the treatment. A year later, their satisfaction dropped to 43%.[91]

ISTAR Comprehensive Stuttering Program

A rigorous study followed 42 stutterers through the three-week program at the Institute for Stuttering Therapy and Treatment (http://www.ualberta.ca/~istar/)(ISTAR) in Edmonton, Alberta, Canada.[92]

The fluency shaping program was based on slow, prolonged speech, starting with 1.5 seconds per syllable stretch, and ending with slow-normal speech. The program also works on reducing fears and avoidances, discussing stuttering openly, and changing social habits to increase speaking. The program includes a maintenance program for practicing at home. The therapy program reduced stuttering from about 15-20% stuttered syllables to 1-2% stuttered syllables.

12 to 24 months after therapy, about 70% of the stutterers had satisfactory fluency. About 5% were marginally successful. About 25% had unsatisfactory fluency.

Attrition in a Long-Term Study

A study of a "prolonged speech" fluency shaping stuttering therapy program had 32 stutterers initially speak about five times slower than normal speech, then gradually increase their speaking rate. Six subjects (19%) failed to learn the "prolonged speech" technique during the two-week residential therapy program. Eight subjects (25%) completed the residential training but refused to participate in a six-week, weekly therapy "phase II" program. Six subjects (19%) completed the six-week "phase II" program but refused to participate in the year-long "maintenance" program with infrequent therapy at the speech clinic.[93]

One year later, the twelve subjects (38%) who stayed in the program were able to speak nearly fluently. Was this therapy program a success? 100% of the stutterers who completed the program were successful. But two-thirds of the stutterers didn't complete the program.

SLPs vs. Parents vs. Computers

A study of 98 children, 9 to 14 years old, compared three types of stuttering therapy. The three types of therapy were:[94]

1. Intensive "smooth speech" fluency shaping trained relaxed, diaphragmatic breathing; a slow speaking rate with prolonged vowels; gentle onsets and offsets (loudness contour); soft articulation contacts; and pauses between phrases. The children did this therapy in a speech clinic for 35 hours over one week.

2. Home-based "smooth speech." This was similar to the first group, but parents were

included, and encouraged to continue therapy at home. Therapy was done in a speech clinic for six hours once a week for four weeks (24 hours total).

3. Electromyographic biofeedback. The children used an EMG biofeedback computer system about six hours a day for one week (30 hours total). The EMG system monitored the child's speech-production muscle activity. The children were instructed to tense and then relax their speech-production muscles. The goal was to develop awareness and control of these muscles. The children then worked through a hierarchy from simple words to conversations, while keeping their speech-production muscles relaxed. After mastering this while watching the computer display, the children did the exercises with the computer monitoring but not displaying their muscle activity. The speech pathologists did relatively little with the children: "Constant clinician presence was not necessary as the computer provided feedback as to whether the child was performing the skills correctly."

A fourth (control) group didn't receive any stuttering therapy.

At the end of each therapy program, all three therapies reduced stuttering below 1% on average. The control group had no improvement in fluency.

One year after the therapy program, the percentage of children with disfluency rates under 2% were:

1. 48% of the children from the clinician-based program.
2. 63% of the children from the parent-based program.
3. 71% of the children from the computer-based program.

The results for children with disfluency rates under 1% were even more striking:

1. 10% of the children from the clinician-based program.
2. 37% of the children from the "parent-based" program.
3. 44% of the children from the computer-based program.

I.e., the computers were most effective, the parents next most effective, and the speech-language pathologists were least effective in the long term. At the 1% disfluency level, the computers and the parents were about *four times* more effective than the speech-language pathologists.

Four years later, all three groups had average stuttering reductions between 76% and 79%. This may have been due to the more dysfluent children receiving additional speech therapy.[95]

Computer System for Reducing Short Phonation Intervals

Another study had five stutterers use a computer that trained reduction of short phonation intervals. Normal speakers switch their vocal folds on and off many times each second, as they

pronounce vowels and voiced consonants, such as /b/ and /g/, and then unvoiced consonants such as /s/ and /t/. A core stuttering behavior is an inability to quickly switch from voiceless to voiced sounds, i.e., to instantly switch on your vocal folds. The computer program trained stutterers to slow down that part of speech without slowing down other parts of speech (and so maintain natural-sounding speech). One year post-therapy all five subjects were able to speak nearly fluently. Larger clinical trials are scheduled for 2006.[96]

Two Long-Term Studies of Anti-Stuttering Devices

Nine adult stutterers used pocket-sized delayed auditory feedback (DAF) anti-stuttering devices thirty minutes per day. Three months later the subjects' speech had improved more than 50%, when they weren't using the devices.[97] (More about this study.)

Another study had eight stutterers use a hearing aid-style DAF/FAF anti-stuttering device five to eight hours per day for four months. The device improved the subjects' speech while they were wearing it, but no speech improvement was found when they weren't wearing the devices.[98] (More about this study.)

Stuttering Modification Therapy

Fluency shaping therapy focuses on physical speech production, with the goal of training stutterers to speak fluently, without stuttering. In contrast, *stuttering modification therapy*, developed by Charles Van Riper in the 1940s, trains stutterers to stutter differently, with less physical effort, less disruption in the onward flow of speech, and with fewer speech-related fears and anxieties. Fluent speech is *not* the goal. Instead, stutterers are trained to stutter more ("voluntary stuttering"), stutter longer ("freezing" core stuttering behaviors), increase normal dysfluencies ("easy or effortless stuttering"), stop and repeat stuttered words ("cancellations"), "pull out" of dysfluencies by combining these techniques, and scan ahead for feared words. Stutterers are admonished for speaking fluently on the theory that such "lucky fluency" won't last.

Only one long-term study has examined stuttering modification therapy. Nineteen adult stutterers participated in the three-and-a-half-week Successful Stuttering Management Program (http://www.ssmpmanual.com/)(SSMP, developed by Dorvan Breitenfeldt) program. Immediately post-treatment their fluency improved 10%. Six months later this small change in fluency had all but disappeared.[99]

Several measures of anxiety found a 10-15% psychological improvement. The researchers cautioned that six months isn't a long follow-up, and that this psychological improvement might not last, given the absence of speech changes. The researchers concluded, "…the SSMP appears to be ineffective in producing durable improvements in stuttering behaviors."

Stuttering modification therapy contrasts the three aspects of evidence-based practice. Judged on scientific evidence, stuttering modification therapy is "ineffective." But if a speech-language pathologist's "clinical expertise" is in stuttering modification therapy, should she abandon what she's good at and switch to another, more effective therapy that she lacks expertise in? Or if the

"goals and values" of a stutterer are to be a good communicator who stutters, rather than to speak fluently, perhaps stuttering modification therapy is ideal. Problems occur when speech-language pathologists practice any stuttering therapy without asking clients about their "goals and values," e.g., using fluency shaping therapy with a client who doesn't want to speak fluently, or using stuttering modification therapy with a client who wants to speak fluently; without telling a client what the speech-language pathologist's "clinical expertise" is in, or more likely, without telling a client what her clinical expertise is *not* in (e.g., she's good at changing attitudes and beliefs but not good at training fluent speech); or without communicating scientific research to a client, e.g., practicing stuttering modification therapy without letting the client know that the therapy is ineffective for lasting improvements in fluency.

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Long-Term Studies of Stuttering Therapy

These 357 words include every combination of consonant and vowel in the English language.

Word List 1

able

baby

chainsaw

dateline

famous

gatepost

halo

jaywalk

cable

label

mailbag

nadir (*nay-deer*, the lowest point)

pacer

rabies

saber (cavalry sword)

shapeless

table

they

vacant

weightless

whale

zany

Word List 2

abbey (a monastery)

baboon

chalice

dancer

famine

gadget

hacksaw

jasmine (a climbing shrub with white flowers)

cabin

ladder

macro

knapsack

package

rabbit

saddle

shadow

tactile

than

thankful

vanish

wacky

whacker

yammer

zander (European perch fish)

Word List 3

achoo

baa

cha-cha

dachshund

father

gaga

hah

jaunt

calf

launch

macho

nachos

pasta

rajah (Indian prince)

psalm

shah (sovereign of Iran)

tabla (Indian hand drums)

waft

yahoo

genre

Word List 4

alarm

balloon

debris

facade

galore

hallo (greeting)

kazoo

lacrosse

macaw

patrol

ramose (*ray-mose*, composed of branches)

salon

chagrin

taboo

valise (suitcase)

yapok (South American water opossum)

jeté (*zhah-tay*, ballet jump from one foot to the other)

Word List 5

eager

beachfront

cheap

dealer

feature

geese

healer

genius

kiwi

legion

meager

kneecap

peaceful

react

cease-fire

sheepdog

teak

thee

theme

V-eight

weasel

wheel

yeast

zeal

Word List 6

any

bedtime

checkbook

dentist

felon

guest

health

gentle

kettle

leather

meadow

nephew

peck

redwood

self-talk

shepherd

ten-speed

them

theft

vent

wealthy

whether

yell

zest

Word List 7

aisle

byte

child

diamond

fiber

guide

height

jive

cayenne

lion

micro

knife

pie

rhino

cyclist

shiner

thyme

thy

thigh

vibrant

wildcat

whitefish

yipe

xylan (plant substance)

Word List 8

image

bemoan

chipmunk

divide

fishbowl

gift-wrap

hitchhike

ginger

kibbutz

lily

midcourse

nimble

picture

rebel

system

shiftless

ticket

this

thicket

vicar

wizard

whimsy

yip

zigzag

Word List 9

oaken

boastful

choke

domain

focus

ghost

hoagie (sandwich)

joke

coleslaw

locust

motion

noble

pollster

romance

soapstone

chauffer

toaster

those

thole (endure)

vogue

woven

yolk

zonal

Word List 10

otter

bobcat

chocolate

docile

foggy

goblin

hobby

jogger

cobbler

lobster

model

knockout

pocket

robin

soccer

shocker

toddler

volley

waffle

whopper

yacht

Word List 11

alder

bald

chalk

daughter

fallen

gauntlet

hallmark

jaunt

caller

laundry

mossy

gnaw

pause

raucous

salted

shawl

talking

thoughtful

vault

walker

yawn

Word List 12

oil

boil

choice

doily (small napkin)

foible

goiter

hoist

join

coin

loin

moist

noise

poignant

royal

soil

toil

voice

yoicks (cry to encourage foxhounds)

Word List 13

ouster

bough

chow

downbeat (conductor's downstroke on first beat of a measure)

foul

gauss (measure of magnetism)

hound

jounce (bounce, jolt)

couch

loud

mountain

noun

pouch

round

sow

shout

tout (extravagant praise)

thou

thousand

vouch

wound (as in string, not as in injury)

yowl (cry of distress)

zounds (a mild oath)

Word List 14

oops (mild surprise or apology)

boomer

chew

deuce

food

goober (peanut)

hoop

juice

coolant

lunar

moon

nougat

poodle

rupee

sewage

shoe

tomb

woo

whoosh

U-boat

zoo

Word List 15

butte

deuce

feudal

gewgaw (showy trifle, bauble)

hewn

coupon

mule

neutral

pewter

tuba

view

whew

Word List 16

oomph

butcher

football

good

hoof

cookbook

lookout

nook

pudding

roof

soot

shook

took

wolf

whoops

Word List 17

onion

bubble

chubby

doesn't

fungus

govern

hovel

judge

color

love

money

knuckle

pump

rough

someday

shutter

touchdown

thus

thumbnail

vulgar

once

what

youngster

Recommended Books

Fun With Fluency: Direct Therapy with the Young Child, by Patty Walton, MA-SLP, and Mary Wallace, MA-SLP (1998; ISBN 1883315395) is the best book I've read about treating children ages two to seven years old. It's all about direct stuttering therapy (as opposed to the old, ineffective indirect methods. A hierarchical progression of therapy begins with easy, stretchy speech; making direct requests for easy speech; modeling self-corrections; play speech games; contrast easy speech with hard speech; and embracing the speech villains.

Motor Control and Learning: A Behavioral Emphasis, by Richard Schmidt, Tim Lee (2005; ISBN 073604258X) will tell you more about stuttering therapy, especially fluency shaping therapy, than any other book?even though this book never mentions stuttering. This book is about how our brains learn and execute complex motor (muscle) skills. Fluent speech is our most complex motor skill. If the stuttering "experts" were to read this book, stuttering therapy would advance fifty years.

Stuttering: An Integrated Approach to Its Nature and Treatment, by Barry Guitar (1998). This is the best book I've read about stuttering. The first part of the book presents the essentials of stuttering research. The second part of the book differentiates stuttering modification therapy from fluency shaping therapy, and then shows how to integrate the two therapies. The writing is clear and understandable to undergraduate speech-language pathology students or even non-speech-language pathologists.

Smart Moves: Why Learning Is Not All in Your Head, by Carla Hannaford (1995; ISBN 0915556278) is yet another book that isn?tm)t about stuttering. This book shows how (and why) to use cross-lateral exercises to enhance learning. When we learn one thing in one area of our brain, and learn something else in another area, sometimes the different areas of the brain fail to communi-cate and we don?tm)t seem to have learned. This is clear with learning-disabled children who can learn numbers, learn the words for numbers, and learn pictures of a number of objects (e.g., 7, seven, and seven apples) but fail to connect these concepts. Cross-lateral exercises involve moving your left hand or foot to the right side of your body, and your right hand or foot to the left side of your body (crossing your midline). Such exercises require commu-nication between your brain?tm)s left and right hemispheres and seem to enhance learning. Because stutterers have more activity in their right hemispheres during speech, when non-stutterers have more activity in their left hemispheres during speech, cross-lateral exercises might enhance stuttering therapy.

Stuttering: A Life Bound Up In Words, by Marty Jezer (1997). Jezer was a talented and entertaining writer, and author of biographies of Abbie Hoffman, Rachel Carson, and other books. This is Jezer's autobiography, and stuttering affected everything in his life. You learn much about stuttering and especially stuttering therapies, because Jezer went gone through just about every therapy program (and still stuttered).

Knotted Tongues, by Benson Bobrick (1996). Bobrick is a historian, and the bulk of the book is

about historical and literary persons who stuttered. These include Moses, Charles I, Lewis Carroll, Henry James, W. Somerset Maugham, Winston Churchill, and Marilyn Monroe. Bobrick also covers the history of stuttering treatments. *Knotted Tongues* is written for non-professionals. The book also has a thirty-page overview of stuttering science, and a twenty-page overview of stuttering therapies.

The *Mary Marony* series of books, by Suzy Kline, portrays a seven-year-old girl who stutters. She is supported by her parents, speech pathologist, and teacher. In Mary Marony Hides Out (1996), Mary's favorite author comes to talk to her school. She is torn between her desire to talk to the author and her fear of speaking in the school assembly. When she gets up the courage to speak, a classmate makes fun of her, and Mary hides in the bathroom. The author stuttered growing up.

- The Loop, by Nicholas Evans (1998; ISBN 0440224624) Like Evans' first novel The Horse Whisperer, this book is set in Montana. The central characters are a successful rancher and Luke, the rancher's 18-year-old son. Luke stutters, and the father punishes him as if stuttering were a character flaw. The other teenagers ridicule Luke. His speech-language pathologist (who uses stuttering modification therapy) is sincere but ineffective. Luke decides not to go to college because he's afraid to talk. He's happy alone in the mountains, watching his father's cattle. Or so his father thinks. Luke is actually watching a family of wolves. When his father wants to kill the wolves, Luke courageously stands up to his father.

External Links

- http://www.mnsu.edu/comdis/kuster/stutter.html The Stuttering Homepage

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