



# The Voice

Volume 29 Issue 1  
February, 2024

Got Stress?

# Got



## From the Editor



Introduction  
Rosemary A.  
Lester-Smith, Ph.D., CCC-SLP

Happy Spring, Voice Foundation Community! Although we have moved past the winter holiday season, which can change routines, challenge interpersonal relationships, strain financial resources, and increase stress, we may need to work on decluttering our minds as much as our closets this spring. Stress may impact us and our colleagues, as well as our patients and students. The impacts may persist after we return to our normal routines and may have pervasive effects on our health and well-being.

In this issue, Andrés Carrillo-González discusses the effects of stress on voice, Maria Dietrich explains the stress response and how it contributes to the development of voice disorders, and Catherine Brown shares methods for stress management through mindfulness training in speakers with voice disorders. We thank the authors for giving us a window into their unique perspectives on the interactions between stress and voice and for offering ways to identify stressors and manage stress-related voice changes.

Here's to meditating more in spring 2024!



# In This Issue



## **4** The Interplay of Psychological Stress and Voice: Insights and Advances

**Andrés Carrillo-González, M.Sc**



## **8** Big Little Stress

**Maria Dietrich, PhD, CCC-SLP**



## **12** How Mindfulness Can Help Patients with Voice Disorders

**Catherine Kay Brown**

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# The Interplay of Psychological Stress and Voice: Insights and Advances

Andrés Carrillo-González, M.Sc

Voice, often perceived as a mirror to our emotions and well-being, is pivotal in human communication and expression. As we explore the intricate relationship between psychological stress and voice, we uncover the profound impact that stress can have on vocal functioning. Stress, seen as a condition that disrupts the balance or homeostasis of living organisms, triggers adaptive responses that can manifest broadly or specifically in response to various stressors. While the physiological effects of stress on heart rate, autonomic responses, and psychoneuroimmunologic changes are well-documented<sup>1</sup>, it is important to recognize that these effects extend to the realm of voice. In this reflective article, I delve into the multifaceted dimensions of psychological stress and its influence on voice, examining the implications for various professional domains and the recent technological advancements in voice stress analysis.

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Psychological stress can directly or indirectly affect vocal function. The heightened stress induced by unprecedented events, such as the COVID-19 pandemic, has created a unique and pervasive source of stress worldwide. This form of stress often results in an overall lower perceived state of health, accompanied by anxiety-related behaviors, including sleep disruptions. The impact of stress on voice is mediated through the sympathetic nervous system and elevated laryngeal



muscle tension. Notably, teachers who report stress at work are more than twice as likely to report voice disorders<sup>2</sup>, underlining the significant impact of occupational stress on vocal health. Voice quality can suffer as well, with stress-induced changes in fundamental frequency, intensity, and other vocal parameters, particularly prominent in women facing stressful conditions<sup>3</sup>.

*This intricate connection between stress and effective communication has profound implications for a range of professionals, influencing their methods in voice care and education*

The vocal manifestations of stress hold relevance across a wide spectrum of contexts. Stress not only influences the nonverbal aspects of speech but can also lead to a breathy and strained voice quality and adversely affect resonance and articulatory precision. Interestingly, changes in stress levels also influence how listeners perceive the emotions conveyed through speech. Speakers under stress may find their negative emotions less accurately recognized by their audience<sup>4</sup>. This intricate connection between stress and effective communication has profound implications for a range of professionals, including laryngologists, speech-language pathologists, and voice coaches, influencing their methods in voice care and education.



Voice stress analysis, a valuable tool for assessing stress levels, has undergone remarkable evolution in recent years. It has found applications in diverse scenarios, ranging from forensic and security contexts to domains like cognitive and physical load assessment, real estate ethics, medical psychology, and deception detection. These applications emphasize the wide-ranging relevance of voice stress analysis. The advent of artificial intelligence (AI) and deep learning has ushered in a new era in stress detection through voice analysis. Advanced techniques, including Mel Spectrogram and Mel-frequency cepstral coefficients (MFCC), enable more accurate and reliable identification of stress markers in vocal recordings<sup>5</sup>. These innovations hold promise for enhancing stress assessment and management, not only in clinical settings but also in everyday life.

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In essence, the intricate interplay between psychological stress and voice is a topic of paramount importance in the world of voice science and beyond. As we navigate the challenges of our ever-evolving world, understanding how stress affects vocal function and communication is crucial. It offers valuable insights into maintaining vocal health, effective teaching and coaching strategies, and improved stress management. Furthermore, the ongoing advancements in voice stress analysis, driven by AI and deep learning technologies, open up exciting possibilities for more precise stress detection and intervention. By bridging the gap between science, practice, and technology, we can empower professionals in voice-related fields to better serve their diverse clientele and foster healthier, more expressive voices in a stressful world.

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Andrés Carrillo González is a dedicated psychologist and occupational health and safety expert, with a focus on the intersection of mental health, stress, and voice science. A graduate of the Universidad Nacional de Colombia, he currently leads research at PAIDEIA, Fundación Universitaria del Área Andina in Pereira, Colombia. Andrés is actively involved in groundbreaking research on workplace mental health and sleep, particularly among teachers in a post-COVID-19 world. His work extends to developing intervention models for public speaking fear and strategies to prevent workplace stress and burnout. As a professor and researcher, Andrés combines his extensive clinical experience with a passion for educating future psychologists. His contributions to peer-reviewed journals and role as a peer-reviewer reflect his commitment to advancing voice science.



Notably, Andrés has actively participated in multiple international academic events, contributing significantly to global discussions on voice science. This international engagement underlines his role as a key contributor to the understanding of psychological stress and its impact on vocal health. His research interests span a wide range of topics, including occupational health, health promotion, epidemiology, psychosocial factors, and the relationship between stress, sleep, and voice.

# The Voice Foundation

53<sup>rd</sup>

Annual Symposium:

Care of The Professional Voice

May 29 – June 2, 2024



Maria Dietrich is a Research Associate at University Hospital Bonn in Germany in the department of Psychiatry and Psychotherapy. She directs the Vocal Control and Vocal Well-Being Lab (VoCoWell Lab) and the specialty outpatient clinic for functional voice and swallowing disorders in the same department. She is also an Adjunct Associate Professor at the University of Missouri and the University of Memphis. The VoCoWell Lab focuses on how individuals differ in their vocal control and vocal behavior as a function of stressor exposure and personality and the resulting implications for risk for voice disorders. Research



methods encompass basic and clinical voice science and psychophysiological and neuroimaging methods. In addition to studying vocal control in vocally healthy individuals, the VoCoWell Lab studies vocal control in patients with functional dysphonia and aphonia related to functional neurological disorder, primary muscle tension voice disorder, and occupational voice users such as teachers and student teachers. The research program aims to contribute to an evidence-based biopsychosocial model of risk for voice disorders that informs innovative screening, prevention, and treatment approaches. Among many multiple professional memberships, she is a founding member of the Functional Neurological Disorder Society.

## **Big Little Stress**

### **Maria Dietrich, PhD, CCC-SLP**

Stress is part of life. Typical, ordinary life events such as a move are stressors. Stress can appear with joy and with sorrow. Our clients are exposed to it, and we as clinicians and researchers are as well. How then does stress creep in to our patients' bodies and voices in such a way that it feeds a voice disorder when it does not in others? In my point of view, I will focus on non-organic muscle tension voice disorder (MTVD) and functional voice disorder (FVD). Some use the umbrella term malregulative voice disorder for both, which is descriptive, but does not help to distinguish the two. FVD sounds innocent but has internationally developed a specific meaning related to dissociative disorders that include a subgroup nowadays known as functional neurological disorder (FND, previously conversion disorder) per DSM-5 or dissociative neurological symptom disorder per ICD-11. Functional speech symptoms (e.g., functional aphonia, functional dysphonia, functional stuttering) received for the first time a separate ICD code. How can stress escalate so much that MTVD or FVD develops?





*The multi-leveled nature of the stress response creates a complicated web that must be understood against the backdrop of a person's adverse events in childhood and adulthood and patterns of emotion regulation.*

Stress is perceived stress, which may or may not be decoupled from the biological stress response. The multi-leveled nature of the stress response (genetic, hormonal, neurobiological, psychological) creates a complicated web that must be understood against the backdrop of a person's adverse events in childhood and adulthood and patterns of emotion regulation. In general, most individuals react to acute stress with their voice, some in more audible and some in more subtle ways, and these are certainly highly dependent on personality and on situational and interpersonal context. On top of that, stress is a bodily response that may manifest in the neck, shoulders, chest, and belly and thereby encroaches on the voice production system. In MTVD, a stress component

may be expressed in the larynx in variable ways. For example, stress may manifest as a hyperfunctional voice disorder with ventricular fold compression and pressed voice or as a hypo-hyperfunctional voice disorder with incomplete glottic closure. As voice production is a black box for most people, time for self-awareness and self-exploration of one's own voice, breathing, and vocal abilities is essential. Achieving self-efficacy for voice production will help to modulate the negative effects of acute stress on vocal function.



Stress leaves traces in the body and the body keeps a count. Stress can wreak havoc to the extent that a functional aphonia occurs, a dissociative functional neurological symptom disorder based on positive clinical signs such as inconsistency and reversibility. Likewise, we need to be aware of cases of potential functional dysphonia, more likely to be overlooked or determined to be MTVD. Functional cases do not exclusively revolve around traumatic events, nor do they require the presence of stressful events. Yet, it is our obligation to cast a wide net to catch psychosocial stressors possibly related FVD. That means to explore if interpersonal conflicts linger, severe conflicts burden the client, or trauma-associated events took place. A timeline of events surrounding FVD, going back several years, helps to uncover periods of feeling “powerless in the system,” experiencing a “conflict over speaking out”, or a lost self and eventually sparks a discourse about the



relationship between stress and voice. Some FVD can also become chronified and other functional symptoms and comorbidities may occur. The acceptance of the diagnosis and the buy-in into the biopsychosocial multi-network and stress-diathesis model of FND are critical. For example, evidence exists for hypothalamic-pituitary-adrenal (HPA)-axis hyperarousal and sympathetic hyperarousal, altered motor planning, altered interoceptive awareness, and altered threat or attention processing.

It is worthwhile to go beyond a global perceived stress score to better understand a client's stress. There are instruments such as the Trier Inventory of Chronic Stress that differentiate between social and professional stress in multiple subscales. Additionally, a fruitful avenue is to analyze specific situations that are linked to stress-induced voice changes, shedding light on the contributions of personality traits and beliefs, autonomic arousal as well as reinforcing and punishing factors. Learning about a person's emotion regulation tendencies will help to break patterns and foster resilience.

*Stress has become an inflationary term, at times belittled, yet bears the potential for big, profound issues.*

Persistence and resilience are important traits that facilitate the process of regaining control over motor functions such as voice production. Speech-language pathologists specialized in voice should employ counseling techniques in voice therapy and learn from growing literature how to best engage with people with FND. Psychotherapy is typically necessary at some stage of the functional disorder and often happens in parallel with voice therapy. A good strategy is to recommend a psychiatric/psychosomatic assessment to get an assessment of burdens and resources, the need for psychotropic medications, and recommendations for psychotherapy informed by research on FND. Stress has become an inflationary term, at times belittled, yet bears the potential for big, profound issues. In the realm of stress-related MTVD and life-disruptive FND, building confidence in voice production and building resilience is daunting but worthwhile.

# **How Mindfulness Can Help Patients with Voice Disorders**

**By Catherine Kay Brown**

As a voice teacher with vocal fold paresis and muscle tension dysphonia (MTD), I use mindfulness to manage my MTD. A few years ago, I began wondering if mindfulness might help others with voice disorders, but a search of the scientific literature revealed that no one had studied the subject. I enrolled in a graduate program in applied mindfulness and conducted a systematic study. The resulting article, “Effects of an 8-Week Mindfulness Course in People with Voice Disorders,” is now available in press in *Journal of Voice*.



People often turn to mindfulness because conventional treatments have not fully resolved their health problem. The objective of the study was to determine whether a mindfulness course could decrease Voice Handicap Index (VHI) scores in people with voice disorders. Patients with voice disorders report high levels of stress, but whether stress alone has caused a particular voice disorder is difficult to prove. Many of the participants in my study described stress as part of a perfect storm leading up to their diagnosis. All of them spoke of living with a voice disorder as stressful and expressed hope that mindfulness might alleviate their symptoms.

Prior to beginning the mindfulness course in our study, the average VHI score was 62.3, indicating severe vocal handicap.



Following the mindfulness course, the average VHI score decreased by nearly 11 points. This change was similar to the 13 point average decrease in VHI scores following voice therapy.

I would like to offer some thoughts, based on my research, on what mindfulness might do for patients with voice disorders. (Recommended mindfulness practices are listed in italics.)

## What is Mindfulness?

Mindfulness is “awareness that arises through paying attention, on purpose, in the present moment, non-judgmentally.” Mindfulness-based interventions are structured, multi-week group classes led by a trained instructor. They include meditation, movement, and group discussion. Daily home practice is encouraged.

- My study did not show a statistically significant change in perceived stress scores among participants when compared to the waitlist control group. However, follow-up interviews revealed that mindfulness gave participants new ways to manage stress. (*Sitting Meditation*)
- Patients with voice disorders frequently experience physical tension and discomfort in their throats. Mindfulness may help patients release tension and reduce chronic pain, making it particularly helpful for patients with MTD. (*Body Scan*)
- Mindfulness has been shown to increase somatic (or interoceptive) awareness. This may make vocal learning more efficient. (*Body Scan, Mindful Yoga*)
- Many patients with voice disorders do not know anyone else with similar struggles. Practicing mindfulness in a group produces feelings of community and results in better outcomes than solo practice. (*Mindfulness for People with Voice Disorders*)
- Grief quickly comes to the surface as people discuss how their voice disorder affects their daily life. A mindfulness teacher can help participants begin to acknowledge and move through grief. (*Mountain Meditation*)
- For anyone who struggles with self-criticism, including of their voice, mindfulness can provide a pathway towards acceptance. (*Lovingkindness Meditation*)
- Agency erodes when we have little control over or understanding of what is happening to us. Mindfulness can increase our sense of agency by highlighting what we can and cannot control. (*Expanding Awareness Meditation*)

## Conclusions and Application

Voice practitioners can incorporate brief body awareness or breathing exercises into voice lessons or voice therapy sessions. However, patients may benefit more from taking a mindfulness course or practicing mindfulness with recordings that can be assigned as homework.

- Dysphonia International webinar: “Mindfulness for People with Voice Disorders: Research and Resources,” <https://www.youtube.com/watch?v=92KB-anOh9I>

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Catherine Kay Brown is an adjunct voice instructor at Immaculata University and a private voice teacher in Downingtown, PA. She has presented on mindfulness and the voice for the Voice Foundation, the Pan-American Vocology Association (PAVA), and Dysphonia International. In March 2024, she will present a workshop on mindfulness for singers at the National Association of Teachers of Singing (NATS) Eastern Regional.

Her singing students have performed with professional theaters and have been accepted to top performing arts colleges and university programs. She holds a B.A. in music and German from St. Olaf College and a Graduate Certificate in applied mindfulness from West Chester University.



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