

Constructing an Evidence-Based Adolescent Vocal Health and Development Curriculum

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Project Proposal

Context

I am currently working in the United States as a school-based speech language pathologist (SLP). I am also an independent voice researcher. I chose to complete an MA with Voice Study Centre UK because I entered the field of speech language pathology in order to eventually specialize in voice therapy. I have used this program to bolster my knowledge of different voice disorders and their treatment. I plan to open my own voice-specialized private practice, Voices Ablaze, in spring of 2023, once I complete my voice pedagogy MA. In addition to one-on-one voice therapy sessions, I hope to offer vocal health education classes to singers and singing teachers of different levels. I am undertaking this study to ensure that these classes are evidence-based.

Justification

I was diagnosed with a functional voice disorder (FVD) when I was a 19-year-old college student majoring in vocal performance. While I had other predisposing factors for a FVD, to this day I wonder if I might have avoided developing a voice disorder in the first place if I had been afforded better vocal health education in high school and college. Instead, I had very little prior information. The only voice disorder that I knew about was “nodes” (nodules), I thought I could safely sing through an upper respiratory infection if I just drank enough Throat Coat Tea, and, in short, I thought I was invincible. This led to a couple of instances of me singing demanding repertoire while sick, which precipitated the onset of my vocal problems. Since then, I have had the desire to

educate young singers on how to make good vocal health decisions, so they can hopefully avoid the vocal trauma I have had to endure.

There is ample literature on vocal health (Behlau and Oliveira, 2009) and adolescent vocal development (Leborgne, 2016). There are also a few studies on vocal health interventions for adults, especially school teachers and college/graduate level singing students (de Oliveira Bastos and Hermes, 2018; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019). However, there are no studies on vocal health interventions specifically for *adolescents*. Protogerou and Johnson (2014) define *adolescent* as the age range from ten to nineteen years old, however Sweet (2016b) defines it as the age range from middle school (age 11) to the mid-20s. While there is scant evidence on what constitutes an effective adolescent vocal health intervention, there is abundant high quality research on adolescent health interventions for other topics, such as sex, drugs, alcohol, mental health, and nutrition. This study aims to combine vocal health and vocal development research with research on other adolescent health interventions. In so doing, I intend to construct an evidence-based adolescent vocal health and development curriculum.

Intended Impact

By conducting this study, I plan to increase my knowledge of vocal health and vocal development, which will increase my clinical skills as a voice therapist. In addition, by combining this knowledge with research on other adolescent health interventions, I will construct an evidence-based vocal health and development curriculum for adolescents. As part of my private practice, I will offer this curriculum to young singers, in order to decrease the likelihood that they will develop vocal difficulties and to increase

their self efficacy in seeking treatment if they do develop vocal problems. This study addresses a gap within my field as there is currently a paucity of research on adolescent vocal health curricula.

Outlined Intention

Overview

This study will consist of three different stages:

1. The *data gathering stage*, in which I will conduct three separate literature searches on vocal health, vocal development, and adolescent vocal health interventions
2. The *analysis stage*, in which I will use qualitative methods to synthesize and report the findings of these literature searches
3. The *curriculum design stage*, in which I will combine the information gathered in the previous stages to construct an evidence-based vocal health and development curriculum for adolescents

Methods

The pragmatic paradigm guides my research. This paradigm focuses on concrete ways to solve problems (Mackenzie and Knipe, 2006). Because of my personal experience as a vocalist with a FVD, I feel a deep sense of urgency to collect and share this information with young singers quickly so that they can hopefully have better experiences than I have had. Because of this urgency, I am drawn to methods that are practical and accessible and that can lead to immediately applicable results.

While my research is driven by a “whatever works” mentality, I also want to make sure that I am being thorough and removing as much bias as possible. Because of this, when conducting my initial literature searches, I will be specific about my selection process. I will gather vocal health and vocal development literature not only from scientific voice journals, which I am most familiar with, but also from professional singing and choral journals that focus more on expert opinion. Within the evidence-based practice model, one relies not only on research studies, but also on expert experience (Dollaghan, 2016)

When analyzing the information gathered on adolescent health interventions, I intend to use a qualitative method known as Thematic Network Analysis (Attride-Stirling, 2001). I used this method to good success in my Module 3 study, and I found that it fit well within the pragmatic paradigm as it was extremely accessible.

Timeline

- 2022
 - July: Study design, project proposal
 - October 31st-November 5th: Devise inclusion and exclusion criteria, conduct vocal health and vocal development literature searches
 - November 6th-November 12th: Conduct adolescent health intervention literature search
 - November 13th-December 31st: Read literature, take notes
- 2023
 - January 1st-January 7th: Synthesize vocal health and vocal development literature

- January 8th-January 14th: Conduct Thematic Network Analysis on adolescent health intervention literature
- January 15th-January 28th: Write literature reviews
- January 29th-February 18th: Write curriculum
- February 19th-March 1st: Edit Module 6
- March 1st: Turn in Module 6
- March 3rd-March 9th: Prepare, record, and turn in project presentation

Ethics

As this study is not human subject research, ethical approval is not required. However, I will still submit to the University of Wales Trinity St. David Ethics Board (Appendix 1).

Personal Learning Outcomes

- Continue to increase competence in conducting desktop research
- Continue to increase competence in conducting Thematic Network Analysis
- Increase personal knowledge of vocal health and vocal development
- Identify most important components of adolescent health interventions
- Identify gaps in the literature
- Gain independence in constructing vocal health curricula

Project Report

Introduction

Background

I am a speech language pathologist (SLP) working in the public schools in the United States. I plan to open my own voice-specialized private practice this year. One of the services my practice will offer is vocal health classes for singers and voice teachers.

Sweet (2016b) defines adolescence as the age spanning from middle school (age 11) to the mid-20s. While there is ample research on vocal health interventions for adults (de Oliveira Bastos and Hermes, 2018; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019), adolescent singers are a currently under-studied population when it comes to vocal health interventions.

Justification

I came to the field of speech language pathology after my own experience as a singer with a voice disorder. I believe that I could have avoided a lot of my vocal challenges if I had received better vocal health education throughout high school and college. I am conducting this study so that I can equip myself with the knowledge to construct an evidence-based vocal health and vocal development curriculum to offer to young singers through my private practice. By doing this, I hope to decrease my students' likelihood of experiencing voice disorders while also increasing their ability to

deal with vocal problems in a healthy and proactive manner. This will fill a critical gap within my professional field.

Learning Outcomes

- Build personal skills in conducting desktop research and qualitative analysis
- Increase knowledge and clinical skills regarding vocal health and vocal development
- Fill gaps in field regarding adolescent vocal health education
- Build competence in constructing vocal health curricula

Part 1: Vocal Health and Development

Methods

Search Process

Vocal Health

I searched PubMed, JSTOR, Journal of Voice, Journal of Singing, and Voice and Speech Review with the search terms “vocal health” OR “vocal hygiene.” I selected these sources in order to get a wide array of high quality literature from both scientific and practitioner publications. I only searched for research from the past 20 years, in order to select sources that are currently relevant. While I may have missed some crucial foundational research from before 2002, I decided that any earlier information was likely to be included in citations if it was truly important. When possible, I only searched for reviews, but this was not always an option depending on the database. I excluded articles that were about specific voice disorders as this was not the primary topic for this study. I also used the search terms ("vocal health" OR "vocal hygiene") AND ("education" OR "training") in order to find research on vocal health interventions specifically. I did not refine my search to reviews for these terms as it was a narrower topic.

These searches resulted in 1027 articles. I selected 120 of those articles for further review based on title. I then selected 61 of those articles for further review based on abstract. I selected 33 of those articles for inclusion based on thematic relevance,

evidence quality, and uniqueness of information. After reading the articles, 3 were excluded due to not being relevant to this project's aims.

Vocal Development

I searched PubMed, JSTOR, Journal of Voice, Journal of Singing, Voice and Speech Review with the terms ("vocal development") AND ("adolescent" OR "teen" OR "young adult") for peer reviewed articles published in English in the last 20 years. This resulted in 111 articles. Of these, 30 were selected for further review based on title. I then read abstracts and selected 12 for further review. 6 articles from the vocal health search were also added as they were mainly about vocal development. Ultimately, 18 articles were selected for inclusion based on thematic relevance, evidence quality, and uniqueness of information. One of these articles was excluded after reading due to being irrelevant to this study's aims.

Analysis

Since the articles selected came from similar fields and covered similar topics, I decided to do a simple narrative review of the findings instead of choosing a more rigorous qualitative analysis framework. As I am driven by the pragmatic paradigm, I wanted to select procedures that were truly worthy of my time. I decided that I would get sufficient information by informally organizing the findings from the articles into similar topics. Ultimately, my goal was to analyze what is already known within the voice literature, not to find deeper underlying themes as I would with other types of qualitative analysis.

Results

Justifications

Sweet (2016b) defines adolescence as the age spanning from middle school (age 11) to the mid-20s. Adolescent singers may be defined as *vocal athletes*, who have heightened vocal demands compared to their peers (Archambeault and Smith, 2019). Adolescent singers take part in many vocally demanding activities, including vocal ensembles, voice lessons, and theatrical performances (Achey, He and Akst, 2016). Donahue et al. (2014) report that college-level musical theater majors sing an average of 2-3 hours per day.

Given this degree of vocal demand, it should come as no surprise that many adolescent singers report dealing with troubling vocal symptoms and voice pathology. In a survey of 129 young singers (under age 25), Tepe et al. (2002) found that 56% had experienced some type of vocal difficulty, 43% strained to sing, 10% reported pain after singing, and 8% reported pain while singing. Almost one-third of the young singers surveyed by Kwak et al. (2014) had prior history of vocal pathology, such as nodules, polyps, reflux, or laryngitis. Donahue et al. (2014) surveyed undergraduate musical theatre majors and found that 5% were dealing with current vocal problems, 17% had a history of undergoing medical treatment for a voice problem, 52% reported currently dealing with at least one vocal symptom (fatigue, pain, breathiness, hoarseness, loss of range), and 50% reported high stress levels. In a survey of twenty adolescent singers aged 11-17, negative vocal habits such as yelling, throat clearing, eating late at night, and experiencing stress were common (Smith-Vaughn, Hooper and Hodges, 2013).

In spite of high vocal demands and high degrees of vocal problems, many adolescent singers have little understanding of how their voices work or how to keep them healthy (Sweet, 2016b). Instead, many singers turn to their voice teachers or choir directors for vocal health advice (Sweet, 2016b; Ravall and Simberg, 2020). However, depending on training, teachers might not have accurate information to share with these students (Sweet, 2016b). Because of these factors, developing evidence-based vocal health curricula is crucial. By equipping adolescent singers with the knowledge and skills necessary to navigate vocal challenges and changes, we can increase their self efficacy (Sweet, 2016b; Flynn, 2020).

Phonotraumatic Behaviors, Reflux, and Irritants

In order to maintain good vocal health, singers should avoid loud vocalizing and frequent throat clearing (Santa Maria et al. 2020). It is also important to monitor the *amount* one uses their voice, as well as avoid highly phonotraumatic behaviors such as screaming (Achey, He and Akst, 2016)

Reflux is a frequently cited risk factor for developing vocal problems (Timmermans, Vanderwegen and De Bodt, 2005). Symptoms of reflux include chronic throat clearing, globus sensation, hoarseness, and vocal fatigue (Timmermans, Vanderwegen and De Bodt, 2005). In order to reduce the risk of developing reflux, vocalists may avoid excessive amounts of coffee, soda, and alcohol (Donahue et al., 2014). They may also find it helpful to avoid eating excessively large meals, spicy food, and eating right before going to bed (Archambeault and Smith, 2019). Singers should also endeavor to avoid vocally irritating substances such as cigarettes, marijuana, and

e-cigarettes, all of which increase laryngeal inflammation, leading to hoarseness (Santa Maria et al., 2020).

Mental Health

Adolescent singers frequently report experiencing high stress levels (Donahue et al., 2014). Webb (2007) explains that mental stress can lead to physical tension, which leads to strain when singing that can become phonotraumatic. Achey, He, and Akst (2016) found that stress levels and stress management skills had a greater correlation with Singing Voice Handicap Index scores than adherence to other vocal hygiene components. Sweet (2016b) stresses the importance of promoting self esteem when working with adolescent vocalists.

Warm Ups

Warm ups are frequently cited in the literature as being extremely important for protecting and maintaining good vocal health. Behlau and Oliveira (2009, p 152) define vocal warm ups as “a structured sequence of exercises that seek to ready the voice for acting, singing or any other professional use.” Timmermans, Vanderwegen, and De Bodt (2005) state that vocal warm ups help prevent vocal injury and delay the onset of vocal fatigue. Vocal warm ups can help stretch the muscles involved in voicing, which decreases muscle stiffness and decreases the amount of energy needed to make a muscle move (Donahue et al., 2014). Bhavsar (2009) states that vocal warm ups also help with motor learning, increased attention, and psychologically preparing oneself to sing.

Cool Downs

While warm ups are important *before* vocalizing, cool downs are important *after*. Cool downs decrease body temperature, remove waste products from muscles that have been engaged, and help muscles relax (Behlau and Oliveira, 2009). Cool downs can help decrease how much effort a singer perceives (Donahue et al., 2014). Webb (2007) recommends cooling down by starting in the middle of one's range and vocalizing downwards. While vocal cool downs are beneficial, singers tend to adhere to vocal warm ups more consistently (Donahue et al., 2014).

Rehearsal Techniques

Several authors recommended specific rehearsal techniques to support vocal health. Archambeault and Smith (2019, p 53) recommend *tapering*, or “decreasing [vocal] activity immediately before a demanding contest.” Webb (2007) recommends rehearsing music in small chunks, rehearsing passages an octave lower when appropriate, and speaking passages when focusing on rhythms. Leborgne (2016) recommends changing vocal tasks every 5-7 minutes in a rehearsal, alternating between focusing on breathing, melody, text, rhythm, etc. She states that this decreases the risk of repetitive strain. She also stresses the importance of ensuring that people are singing the appropriate vocal part. Directors should avoid having singers sing alto just because they are good at harmonies, for example.

Hydration

Hartley and Thibeault (2014, p 652.e2) define *hydration* as “the current state of water balance within an individual.” Hydration has several positive effects on the voice

and, conversely, dehydration has several negative vocal impacts. Hartley and Thibeault (2014) state that fluid balance is essential for optimum vocal performance and that vocal health programs should include guidance on proper hydration methods. Hydration adds mass to the vocal fold tissues and increases lubrication, which reduces contact stress when the vocal folds vibrate and also requires less subglottic pressure (Alves et al., 2019). Conversely, dehydration alters the *sol layer*, which is a thin film of water that covers the vocal folds. This leads to the vocal folds being sticky when they vibrate, which increases the amount of collision stress (Bhavsar, 2009). Dehydration can also lead to negative acoustic effects, including hoarseness, difficulty controlling pitch and loudness, increased effort, and breathiness (Alves et al., 2019).

In the past, vocal health educators have stressed the importance of avoiding drying substances such as caffeine, alcohol, aspirin, antihistamines, decongestants, and diuretic medications (Hartley and Thibeault, 2014). However, Hartley and Thibeault (2014) state that strict avoidance of these substances is not supported by research. Alves et al. (2019) state that it is most important to consume caffeine in moderation.

There are two types of hydration: *systemic hydration* and *surface hydration*. *Systemic hydration* can be defined as “general body hydration” (Alves et al., 2019, p 125.e13), and is maintained by taking fluids into the body orally or by other digestive means. Hartley and Thibeault (2014) explain that the body has homeostatic mechanisms to maintain proper hydration levels, and that the body will create either thirst signals or urination signals if the hydration levels are off. However, they also stress the importance of proactively drinking water, because thirst signals are not created until *after* hydration levels have already dropped below the amount that impacts vocal fold

functioning. In addition, it takes 30 minutes for ingested water to be processed in order to increase vocal fold hydration (Webb, 2007). Leborgne (2016) stresses the importance of educating singers that liquids that they drink or gargle actually do not touch the vocal folds themselves. In addition, if singers wish to monitor their systemic hydration levels, the easiest way to do so is to monitor the color of their urine. Pale yellow implies good hydration levels, although this color might be impacted by certain medicines or vitamins.

Surface hydration, on the other hand, refers to methods that bring superficial hydration directly to the surface of the vocal folds. Surface hydration can be maintained by avoiding dry environments, using a nebulizer with 0.9% isotonic saline, using a humidifier, or using a steam inhaler (Leborgne, 2016; Alves et al., 2019). Surface hydration works by keeping the epithelial layer of the vocal folds moist and pliable (Alves et al., 2019).

Home Remedies

There are several home remedies used by singers, the effects of which are outlined in Table 1. Much of this information is drawn from Commission E, a German campaign to examine safety and efficacy of these types of substances (Meenan et al., 2016a). *Demulcents* are “substances that lubricate and moisten at least part of the voice conduction system” (Meenan et al., 2016a, p 47).

Substance	Effect	Source
Honey	Demulcent, anti-inflammatory, anti-bacterial (systemic effects)	Leborgne, 2016
Slippery elm (Throat Coat tea ingredient)	Coats oral mucosa, leading to <i>feeling</i> of lubrication,	Leborgne, 2016

	anti-inflammatory, increases mucus production of tissues it touches (it does not reach the vocal folds)	
Licorice root (Throat Coat tea ingredient)	Demulcent, anti-inflammatory, antibacterial, antiviral, expectorant	Meenan et al., 2016a
Marshmallow root (Throat Coat tea ingredient)	Demulcent, decreases irritation and cough reflexes	Meenan et al., 2016a
Ginger root	Anti-inflammatory, analgesic	Meenan et al., 2016a
Peppermint (Vocal Zone Pastilles ingredient)	May help with indigestion, relax GI muscles May cause heartburn	Meenan et al., 2016b

Table 1: Home Vocal Remedies

It is important to note that, while we have preliminary evidence on the overall effects of the above substances, there are few clinical trials on their use specifically for vocalists. In addition, as the above products are not regulated, there is no way to know how much of each substance is included or what dose is most appropriate (Meenan et al., 2016a; 2016b). However, there are still several principals to keep in mind when considering the efficacy of the above substances. Firstly, Meenan et al. (2016a; 2016b) caution against using substances that mask pain signals, such as menthol. Although it dulls pain, they point out that pain is a protective mechanism to prevent injury. These types of substances may be useful for short-term illnesses, but if they are being used to mask ongoing vocal pain, there is likely something more serious occurring that warrants medical attention. While the above substances do not actually come in contact with the

vocal folds themselves, they may decrease inflammation and increase comfort in the upper vocal tract, which may increase perceptual comfort when vocalizing (Meenan et al., 2016b). Meenan et al. (2016b, p 175) summarize by saying, “Above all, singers must listen to their bodies, heed warning signs, avoid masking symptoms, and seek the care and guidance of a laryngologist when vocal health is in question.” When considering the use of substances such as the above, it is important to consider if they are truly helpful, not helpful but not harmful, or harmful to vocalists. This is likely to vary from person to person (Edgar and Michael, 2021).

Myths

This literature search resulted in a couple of sources that discuss myths or misconceptions about voicing. Dindzans, Wangerin, and Woodard (2006) stress the importance of educating people that many voice problems are not permanent and actually respond well to treatment. They also say that it is important for vocalists to be aware that there are other vocal conditions besides nodules. Hansen et al. (2014) outline several misconceptions singers should be aware of. When talking about breathing, the diaphragm is only active/engaged during inhalation and is passive during exhalation. In addition, more breath support is not always warranted or useful. The body can produce twice as much air pressure as is needed to voice loudly. Having too much air pressure to manage can actually be detrimental. It is more important to have good quality breath support than lots of breath support. They also state that good posture does not always mean “standing tall.” If a singer’s posture is too rigid, this can lead to counterproductive back and abdominal tension. It is more important to have evenly distributed weight with flexible legs and arms and released shoulders.

Advice for Sick Singers

It is important, when possible, for singers to see a laryngologist when they are healthy to establish what their vocal folds look like and how their voices function at baseline. This can help prevent misdiagnoses if vocal problems develop later on (Heman-Ackah et al., 2008a). Rosenberg (2022) states that, ideally, singers would have long-term relationships with laryngologists, but this is not always possible, depending on where the singer lives. Regardless, it is important for singers to be educated early in their vocal training on how to care for their voices when they encounter illness.

Generally speaking, singers should look out for signs of voice disorders, such as hoarseness, breathiness, pitch breaks, and aphonia, especially when they last for longer than two weeks (Dindzans, Wangerin and Woodard, 2006; Heman-Ackah et al., 2008). Heman-Ackah et al. (2008a) outline a few situations in which immediate medical attention is warranted. If a singer experiences sudden hoarseness or aphonia, especially during a period of vocalizing, coughing, or vomiting, there is high likelihood that they have experienced a vocal injury such as a vocal fold hemorrhage, and need swift medical treatment in order to minimize damage. In addition, external neck trauma due to being choked or blunt trauma in a car crash necessitates immediate medical attention, as collapsed structures or swelling tissues could close off the airway and be life threatening.

There are a few different levels of vocal rest for vocalists to consider. *Complete voice rest* (i.e., complete silence) is only recommended for acute laryngitis, laryngeal trauma (such as a vocal fold hemorrhage), and after laryngeal surgery (Behlau and Oliveira, 2009; Heman-Ackah et al., 2008a). *Relative voice rest* refers to being mostly

silent and only voicing when necessary (Heman-Ackah et al, 2008a). *Light voice use* refers to talking for only five minutes per hour, and no more than one continuous minute at a time (Heman-Ackah et al., 2008a).

If a singer has to perform when ill, Rosenberg (2022) recommends they follow the “M guidelines,” which maximize voice function while minimizing risk: get medical input to assess safety, minimize unnecessary voicing, modify performance components (i.e., consider amplification and singing in a lower key), and mucosal pampering (i.e. drink water, use a nebulizer, use a humidifier, do semi-occluded vocal tract exercises/SOVTs). She also recommends “R guidelines” to recover after a performance: return to neutral/cool down for five minutes (i.e. descending hums, SOVTs), recovery time/recharge (silence for twice the length of the performance, avoid post-performance parties, get lots of sleep), retraining/reconditioning (get back to normal voicing slowly, do swelling checks-described in further detail below), and rehabilitation with an SLP if there is ongoing fatigue. Heman-Ackah et al. (2008a) state that a prescription of corticosteroids to lessen vocal fold edema is sometimes appropriate, but should be used sparingly, as this might lead a singer to vocalize more than is healthy, leading to further vocal fold damage.

Rosenberg (2022) recommends that singers do swelling checks to determine where their “mucosal ceiling” is. These checks were first recommended by laryngologist Robert Bastian. These checks determine “the highest note a singer can phonate softly in a light, pure ‘head tone’” (Rosenberg, 2022, p 208). If the voice cuts out on high soft notes that are usually clear when healthy, this is indicative of vocal fold swelling. The singer should sing the song “Happy Birthday” in a soft and high voice. The mucosal

ceiling is the highest note at which a singer can vocalize in a soft voice without a delayed vocal onset. This should be done multiple times over a couple of weeks to establish a normal baseline. After illness, a singer should wait for one to two weeks after they return to their normal mucosal ceiling to engage in full vocalizing.

Care Teams

Many different professionals may comprise a voice care team, including (oto)laryngologists, SLPs, singing voice specialists (SVSs), voice scientists, psychologists, voice teachers, choir directors, endocrinologists, pulmonologists, gastroenterologists, and neurologists, among others (Heman-Ackah et al., 2008b; Archambeault and Smith, 2019). Heman-Ackah et al. (2008b) outline that singers should have guidance on what type of professional to see. Otolaryngologists are doctors who have training on conditions affecting the ear, nose, and throat. They often do not have specialized voice training. On the other hand, laryngologists are specialized in voice, swallowing, and upper airway concerns. Whenever possible, singers should seek medical treatment for their voice concerns from a laryngologist. Laryngologists diagnose, coordinate treatment, prescribe medication, administer botox injections, and perform laryngeal surgeries. If a singer is only able to see an otolaryngologist, they should be aware of several red flags: if the doctor recommends surgery for nodules immediately without first exploring options such as voice therapy, they don't recommend voice therapy after undergoing a surgery, or if they recommend out of date procedures such as "vocal fold stripping" (Heman-Ackah et al., 2008b). Vocalists may also work with SLPs, who can have a variety of specialty areas. Not all SLPs have sufficient voice training, and even those that do do not always work with singers. When possible, it is

important to find an SLP with the appropriate training. SVSs are singing teachers who work in medical settings and have specialized training in vocal rehabilitation. While seeking care from a qualified team is recommended, it is not always possible. Barriers include geography (Rosenberg, 2022) and lack of insurance coverage (Gilman et al., 2009).

Testosterone-Dominant Vocal Development

Testosterone-dominant voice change, which generally applies to people who are assigned male at birth, coincides with puberty, and can start any time between the ages of 9 and 15, with the average age of onset being 12.5 years (Leborgne, 2016; Williams, Welch and Howard, 2021; Brunssen, 2010). Puberty can last from 8 months to over 4 years (Williams, Welch and Howard, 2021). The vocal changes are due to increases in androgen hormones which trigger physical changes (Leborgne, 2016). These physical changes can be sudden or gradual (Brunssen, 2010). The larynx grows in the anterior/posterior plane, creating a pronounced Adam's apple (Sweet, 2015; 2016b). The vocal folds also gain thickness and grow a centimeter in length, resulting in the voice dropping about one octave (Sweet, 2015; Brunssen, 2010). The sinuses, nasal cavity, and pharynx also grow, shifting resonant qualities (Brunssen, 2010). Periods of growth are typically followed by periods of incoordination while the voice stabilizes (Williams, Welch and Howard, 2021). This is because, when the vocal muscles lengthen, there is a lag in time before they gain enough strength to properly coordinate (Williams, Welch and Howard, 2021). This incoordination may lead to the voice sounding husky. Singers might not be aware of these changes if they occur gradually (Williams, Welch and Howard, 2021). Regardless, Brunssen (2010) stresses the

importance of remembering that this incoordination is temporary and normal. It is not uncommon for adolescents going through these vocal changes to experience feelings such as insecurity, frustration, and embarrassment (Sweet, 2015).

Estrogen-Dominant Vocal Development

Estrogen-dominant voice change typically occurs in people who are assigned female at birth, can occur any time between the ages of 8 and 15, and takes 1.5-3 years to complete. Three hormones are involved in this type of voice change: androgens, estrogen, and progesterone (Leborgne, 2016). Estrogen thickens the mucosal membrane of the vocal folds, leading to more amplitude and flexibility, and also causes the laryngeal cartilages to ossify (Leborgne, 2016). Androgens do not occur in large quantities in most cases, but can lead to permanent voice changes when present in excess (Leborgne, 2016).

Whereas in testosterone-dominant puberty the larynx grows anteriorly and posteriorly, in estrogen-dominant puberty the larynx grows taller and wider, leading adult larynges to be rounder (Sweet, 2015). The vocal folds also grow 3-4 millimeters, which causes the voice to drop one third of an octave (Sweet, 2015). The vocal folds grow rapidly, leading to a period of weakness because of the new growth. This makes it difficult to fully adduct the vocal folds, leading to a posterior glottal gap, passaggio problems, and a breathy voice quality (Sweet, 2014). It is important that voice teachers and choir directors do not try to eliminate this breathiness entirely, as this can lead to long term vocal hyperfunction (Leborgne, 2016). Adolescent singers may also experience inconsistent singing range, voice breaks, pitch instability, and difficulty with vocal onsets (Gackle, 2006). The vocal tract also grows bigger, leading to timbral

changes (Gackle, 2006). Adolescent singers may experience negative emotions such as sadness, fear, self doubt, insecurity, frustration, and embarrassment (Sweet 2015, 2018).

Throughout adolescence and much of adulthood, people who menstruate need to navigate varying voice symptoms in different menstrual stages. In the premenstrual phase, there are the most notable vocal changes. Estrogen and progesterone levels increase, causing body tissues to retain more water. This makes the vocal folds thicker, which leads to difficult and sluggish movement. There is also an increased risk of hemorrhage during this phase. Vocal symptoms include less vocal efficiency and flexibility with more breathiness, fatigue, hoarseness, and intonation difficulties (Gunjawate et al., 2017). Singers also may notice perceptual differences during this stage, but these differences may not be noticeable by others (Ryan and Kenny, 2009). During ovulation, the voice's fundamental frequency increases (Gunjawate et al., 2017). Hormonal vocal changes may only last for a couple of days for some people and up to two weeks for others (Brown, 2015). People with irregular menstrual cycles generally deal with more significant hormone fluctuations, which may have greater vocal impacts (Ryan and Kenny). Birth control may help with these fluctuations (Ryan and Kenny, 2009). People may also experience symptoms such as abdominal cramps and reflux during their periods, which can negatively impact vocalizing (Brown, 2015). Brown (2015) states that more awareness of menstruation's impact on the voice can help people determine what vocal changes are temporary, but educators should be aware that this is a sensitive topic and that some students might not feel comfortable discussing these issues with teachers who are men.

Transmasculine Vocal Development

Graham (2022) states that many people assume that transmasculine vocal development is fairly straightforward, as taking artificial testosterone lowers the voice, but the process is more complex, especially for singers. Transmasculine people wishing to lower their voices often undergo hormone replacement therapy (HRT). In HRT, testosterone can be delivered via injection, gels, subdermal pellets, nasal spray, dermal and buccal patches, or oral tablets, with intramuscular injections and topical gels being the most common (Graham, 2022). The delivery method should be as consistent as possible. Oral pills, nasal sprays, and some injections are variable. Gels most closely mimic the natural hormone cycle, but they are not a good fit for everyone and are not always covered by insurance (Graham, 2022).

In addition, it is often a lengthy process for the voice to stabilize after HRT. It takes about one year for the speaking fundamental frequency to drop and an additional 3-4 months for it to stabilize (Graham, 2022). Graham (2022) states that singing stability takes even longer to develop, and that it can take up to three years for the voice to gain reliability for professional singing. Constantis and Foteinou (2017) found that their participant needed 6 weeks after HRT for the voice to stabilize.

There are many benefits and risks to HRT. Once menstruation stops, the voice may become more stable (Graham, 2022). HRT can also have a significant positive impact on transmasculine people's mental health (Graham, 2022). Young transmasculine people who undergo HRT prior to going through an estrogen-dominant puberty may have a similar vocal trajectory to cis males who only go through testosterone-dominant puberty (Graham, 2022). However, HRT is not without negative

side effects. Testosterone can make muscles stiffer, which can lead to vocal hyperfunction (Graham, 2022). HRT can cause vocal instability, fatigue, and difficulty projecting (Graham, 2022). 50% of people undergoing HRT may experience hyperfunction and supraglottic compression (Graham, 2022). In addition, 21% of people who go through HRT do not have enough of a drop in speaking fundamental frequency to be perceived as male (Graham, 2022). HRT can also lead to other non-vocal side effects, such as baldness and cardiovascular issues (Graham, 2022). Graham (2022) states that it is important for voice professionals such as voice teachers and voice SLPs to help their vocalists contextualize the risks and benefits of HRT by providing a neutral, safe space to have discussions in order for the vocalist to make their own decisions. Voice therapy can also help mitigate many of the negative vocal side effects.

Transfeminine Vocal Development

While transmasculine people largely rely on HRT to undergo vocal changes, HRT for transfeminine people does not raise vocal pitch (Hancock and Helenius, 2012). There are ways to suppress a testosterone-dominant puberty, but this should be done under an endocrinologist's supervision (Hancock and Helenius, 2012). Because HRT does not alter pitch for transfeminine people, the usual course of action for a transfeminine person wishing to change her voice is voice therapy or voice training. The main goal of this type of training is to raise the speaking fundamental frequency to at least 155-165 Hz (Hancock and Helenius, 2012). In addition, perceptually "female" voices tend to have more pitch variability and are quieter/breathier (Azul et al., 2017). Head resonance is also more dominant than chest resonance (Hancock and Helenius, 2012). Hancock and Helenius (2012) state that, while we cannot assume that voice

therapy techniques used for adult transfeminine people are also appropriate for adolescent transfeminine people, there is reason to believe that adolescent voice therapy for transfeminine people may be easier, as they have had less time to develop maladaptive habits to create a higher vocal pitch.

Ideal Program Components

While there is little research specifically on adolescent vocal health education, there is literature on both voice hygiene education for people with voice disorders and vocal health interventions for adults. These types of interventions typically include the following vocal health topics:

1. Voice disorders/symptoms of voice problems (de Oliveira Bastos and Hermes, 2018; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)
2. Voice anatomy and physiology (Behlau and Oliveira, 2009; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)
3. Phonotraumatic behaviors (Behlau and Oliveira, 2009; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)
4. Healthy voicing, including warm ups, cool downs, and breathing techniques (de Oliveira Bastos and Hermes, 2018; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)
5. Voice rest (Behlau and Oliveira, 2009; Faham et al., 2016)
6. Hydration (Behlau and Oliveira, 2009; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)
7. Diet/reflux (Behlau and Oliveira, 2009; Faham et al., 2016; Pomaville, Tekerlek and Radford, 2019)

8. Medications/substance use (Behlau and Oliveira, 2009)
9. Allergies (Behlau and Oliveira, 2009)
10. Sleep (Behlau and Oliveira, 2009)

While Behlau and Oliveira (2009) state that vocal hygiene education alone is not enough to cure voice disorders, it is beneficial for professional voice users. However, de Oliveira Bastos and Hermes (2018) found that teachers with vocal problems in the intervention group had a significant reduction in negative vocal symptoms, while teachers in the control group had stable or increased symptoms. Pomaville, Tekerlek and Radford (2019) found that vocal health education significantly increased knowledge of vocal health and vocal problems for vocal performers, and also increased healthy vocal habits such as drinking water, but did not decrease negative vocal symptoms. Faham et al. (2016), in a study of elementary school teachers, found that people in the training group had an average decrease in Voice Handicap Index score of 7.4 points, while people in the control group had an increase of 3.5 points. They concluded that vocal health education is more useful for prevention of voice problems than for treatment of voice problems.

There have also been a few survey and qualitative interview studies asking singers what they think should be included in vocal health curricula. Participants shared that the following topics should be included:

1. Information that vocal injuries do not have to be career ending; education around the stigma of having a voice problem (Flynn, 2020; Suddeth and Flynn, IP)
2. Voice care team members, voice treatment (Flynn, 2020; Kwak et al., 2014)
3. Voice disorders and symptoms (Flynn, 2020; Kwak et al., 2014)

4. Voice changes during puberty (Sweet, 2018)
5. Self advocacy skills (Sweet, 2018)

Part 2: Adolescent Health Interventions

Methods

Search Process

I searched PubMed with the terms ("sex education" OR "drug education" OR "health intervention" OR "health education") AND ("adolescent" OR "teen" OR "young adult"). I only selected systematic reviews and meta analyses published within the past 10 years in English. As these search terms cover well-studied topics from a large number of disciplines, it was crucial for me to have a way to narrow my scope. I chose only systematic reviews and meta analyses because I knew this would be the most time efficient way to gain understanding of the most salient features of effective interventions. I only selected articles that were about adolescents. This search resulted in 388 articles. I selected 135 articles for further review based on title. I then selected 35 of these articles based on abstract, excluding articles primarily about the *mode* of intervention delivery, articles that did not specifically denote the qualities of successful interventions, and studies about parent-led interventions. I selected 22 of these articles based on thematic relevance and uniqueness of information. After reading, 6 of these articles were excluded due to not being relevant to this study's aims.

Analysis

I analyzed notes I wrote on the included articles using a process based on Thematic Network Analysis (TNA; Attride-Stirling, 2001). I used this same methodology for my Module 3 study and found it to be very practical and highly effective, fitting nicely within the pragmatic paradigm. TNA results in Thematic Network Webs, which are “web-like illustrations... that summarize the main themes constituting a piece of text” (Attride-Stirling, 2001, p 386). Thematic Network Webs are organized into Basic Themes (small pieces of information that need to be combined with other information in order to achieve significance), Organizing Themes (groups of similar Basic Themes), and Global Themes (groups of similar Organizing Themes).

I analyzed the article notes by first assigning keywords to text segments with words that either came directly from the text or summarized it. This resulted in 26 key words (Appendix 3). These keywords were then organized into groups with similar information, resulting in 4 initial codes: *relevance*, *content*, *larger environment*, and *implementation* (Appendix 4). I made separate documents for each initial code and then organized text segments from the article notes into the appropriate codes. I then examined each code’s document, extracting issues discussed in each code. I then summarized these issues with 14 initial themes (Appendix 5). I then organized these themes into two resulting Thematic Network Webs with two Global Themes: *Effective interventions are engaging* and *Effective interventions are purposeful and comprehensive*.

Results

Global Theme: Effective Interventions are Engaging

The first Global Theme that emerged is that effective health interventions for adolescents are engaging. Both internal and external engagement factors are important.

This Global Theme is summarized in the Thematic Network Web shown in Figure 1:

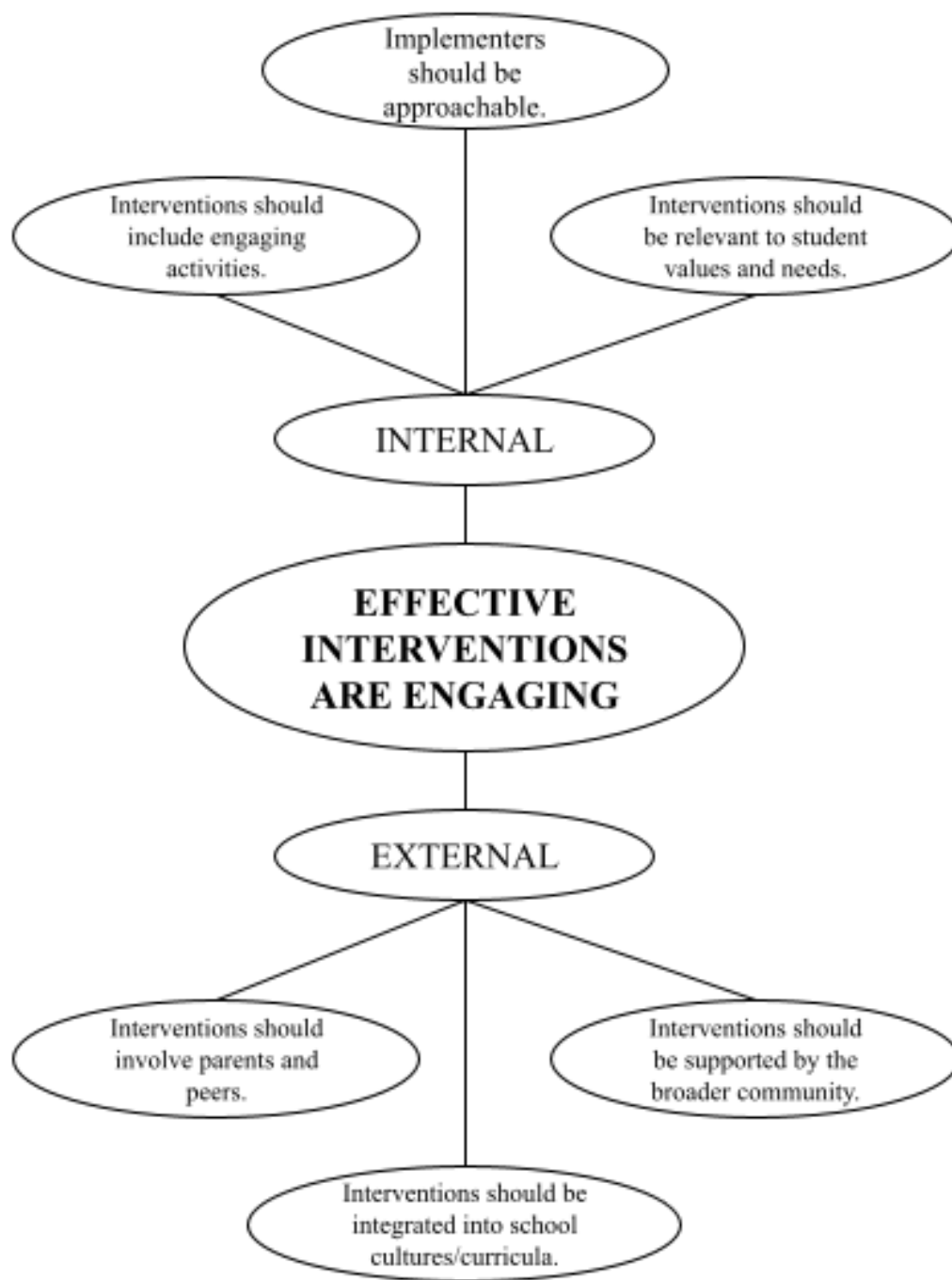


Figure 1: Global Theme 1: Effective Interventions are Engaging

Organizing Theme: Internal Engagement

Internal engagement is an important component of successful adolescent health interventions. This theme covers internal aspects of what makes an intervention engaging for adolescents, including activities, qualities of implementers, and relevance of interventions.

Basic Theme: Interventions Should Include Engaging Activities

The included reviews found that interventions that include engaging activities are generally more effective than interventions that do not include engaging activities. Many of the studied interventions included role play activities (Garzón-Orjuela et al., 2021; Murimi et al., 2018; O'Farrell, Corcoran and Davoren, 2021; Shepherd et al., 2014). Shepherd et al. (2014) stress the importance of making sure that role play activities do not embarrass the students. Denford et al. (2017) state that it is important to include a variety of different activities. Murimi et al. (2018) state that the activities should be age appropriate. Interventions also included activities such as (peer-led) discussions, technology-based activities, external speakers, and watching videos.

Many of the vocal health interventions that have been formally studied are primarily lecture-based. However, some studies did include engaging activities. De Oliveira Bastos and Hermes (2018) included workshops to practice skills such as warm ups, cool downs, and breathing. Pomaville, Tekerlek and Radford (2019) included several opportunities for discussion throughout their lectures. Faham et al. (2016) included lessons to discuss the vocal health information that had been covered in other lessons.

As stated above, Murimi et al. (2018) found that it is important for activities to be age appropriate. This is challenging when constructing a curriculum for adolescent singers, as adolescence spans from age 11 to the mid-20s (Sweet, 2016b). It is likely that some activities will have to be adapted to better suit the age group. When designing my adolescent vocal health intervention, I will have to be more narrow in the age range I am targeting.

Basic Theme: Implementers Should Be Approachable

Reviews also found that implementers, the people leading or teaching the interventions, needed to be approachable and knowledgeable (O'Farrell, Corcoran and Davoren, 2021; Shepherd et al., 2014). O'Farrell, Corcoran and Davoren (2021) state that positive facilitator attributes include interpersonal skills, listening skills, acceptance, emotional support, and appearing comfortable with the targeted topics. Shepherd et al. (2014) state that implementers should be enthusiastic.

This theme makes sense when constructing an adolescent vocal health curriculum. Vocal health problems are often associated with stigma for singers and can result in negative emotions (Flynn, 2020; Suddeth and Flynn, IP). It makes sense that implementers should be approachable when teaching about such sensitive topics.

Basic Theme: Interventions Should Be Relevant To Student Values And Needs

Effective interventions are also relevant to both student values and student needs. Many reviews stressed the importance of being culturally relevant, considering the participants' sexuality, gender, ethnicity, race, and age (O'Farrell, Corcoran and Davoren, 2021; Denford et al., 2017; Oringanje et al., 2016; Protogerou and Johnson,

2014). O'Farrell, Corcoran and Davoren (2021) found that including LGBT+ issues in adolescent health interventions actually increased engagement for cisgender and heterosexual participants while also decreasing social stigma. Many interventions stressed the importance of using technology to increase engagement and cultural relevance for adolescents (Garzón-Orjuela et al., 2021; O'Farrell, Corcoran and Davoren, 2021; Murimi et al., 2018; Garzón-Orjuela et al., 2021; Meiklejohn, Ryan and Palermo, 2016)

Intentionally considering the needs of LGBT+ students is likely to be a crucial component when constructing a vocal health curriculum for adolescents. The voice is very personal and often tightly connected to gender identity. O'Farrell, Corcoran and Davoren (2021) found that when LGBT+ students are not intentionally included in sex education curricula, they tend to turn to the internet for answers, not always finding accurate information. Adolescents considering a gender transition are entitled to accurate information on treatment options, as well as how their vocal development trajectories may differ from those of their cisgender peers.

Organizing Theme: External Engagement

Basic Theme: Interventions Should Involve Parents And Peers

The included reviews also frequently cited parental and peer involvement as useful components of adolescent health interventions (Garzón-Orjuela et al., 2021; Meiklejohn, Ryan and Palermo, 2016; Murimi et al., 2018; Oringanje et al., 2016; Tancred et al., 2018; Waller et al., 2017). However, Petrova and Garcia-Retamero (2015) found that parental involvement did not have a strong effect.

Parental and peer involvement is interesting to consider when constructing an adolescent vocal health curriculum. Young singers are often involved in ensembles such as choirs and theatrical productions. It seems that there is space here to encourage adolescents to support each other in fostering good vocal health, for the good of each other and for the good of their collective performances. It is interesting to consider if this may increase adherence to vocal health guidelines. It is less clear whether parental involvement would be as crucial for vocal health as it is for topics such as sex education or nutrition. However, depending on the age of the vocalist, parents can likely still play roles in encouraging adolescents to adhere to vocal health guidelines, especially close to performances. In addition, in the United States, access to vocal health care is often a complicated issue, and adolescents will likely need adult guidance to know how to find medical professionals and treatments that are covered by insurance.

Basic Theme: Interventions Should Be Integrated Into School Cultures/Curricula

Another Basic Theme is that adolescent health interventions are generally more effective if they are integrated into school cultures and curricula (Meiklejohn, Ryan and Palermo, 2016; Oringanje et al., 2016; Tancred et al., 2018; . Meiklejohn, Ryan and Palermo (2016) recommended incorporating nutrition education with already existing curricula, such as physical education. Waller et al. (2017) specify that health interventions should fit within the school's ethos.

This sentiment is also reflected within the vocal health literature. Suddeth and Flynn (IP) outline situations in which a school's ethos is at odds with vocal health guidelines, putting vocalists in precarious situations, such as being expected to perform even when vocally unhealthy. It seems like performing programs could implement

policies to encourage vocal health from a systems perspective, such as casting understudies in plays, clearly specifying protocols to miss performances when ill, and providing time for adequate vocal rest before and after performances.

Basic Theme: Interventions Should Be Supported By The Broader Community

A few of the included reviews talked about instances in which it is helpful to have broader community involvement. O'Farrell, Corcoran and Davoren (2021) talked about the importance of knowing where transgender youth can turn for affirming healthcare and procedures. Oringanje et al. (2016) and Tancred et al. (2018) both state that interventions are more effective with broad community support, including the health care sector.

There are ways to improve broader community support for positive vocal health practices. For example, implementers should be familiar with the vocal health medical teams available in their geographic areas, including laryngologists and voice-specialized SLPs.

Global Theme: Effective Interventions Are Purposeful and Comprehensive

The second Global Theme that emerged was that effective interventions should be both purposeful and comprehensive. This theme refers to the benefits of being intentional with design choices for what drives an intervention as well as the content choices for what information is presented in an intervention. This Global Theme is illustrated by the Thematic Network Web in Figure 2.

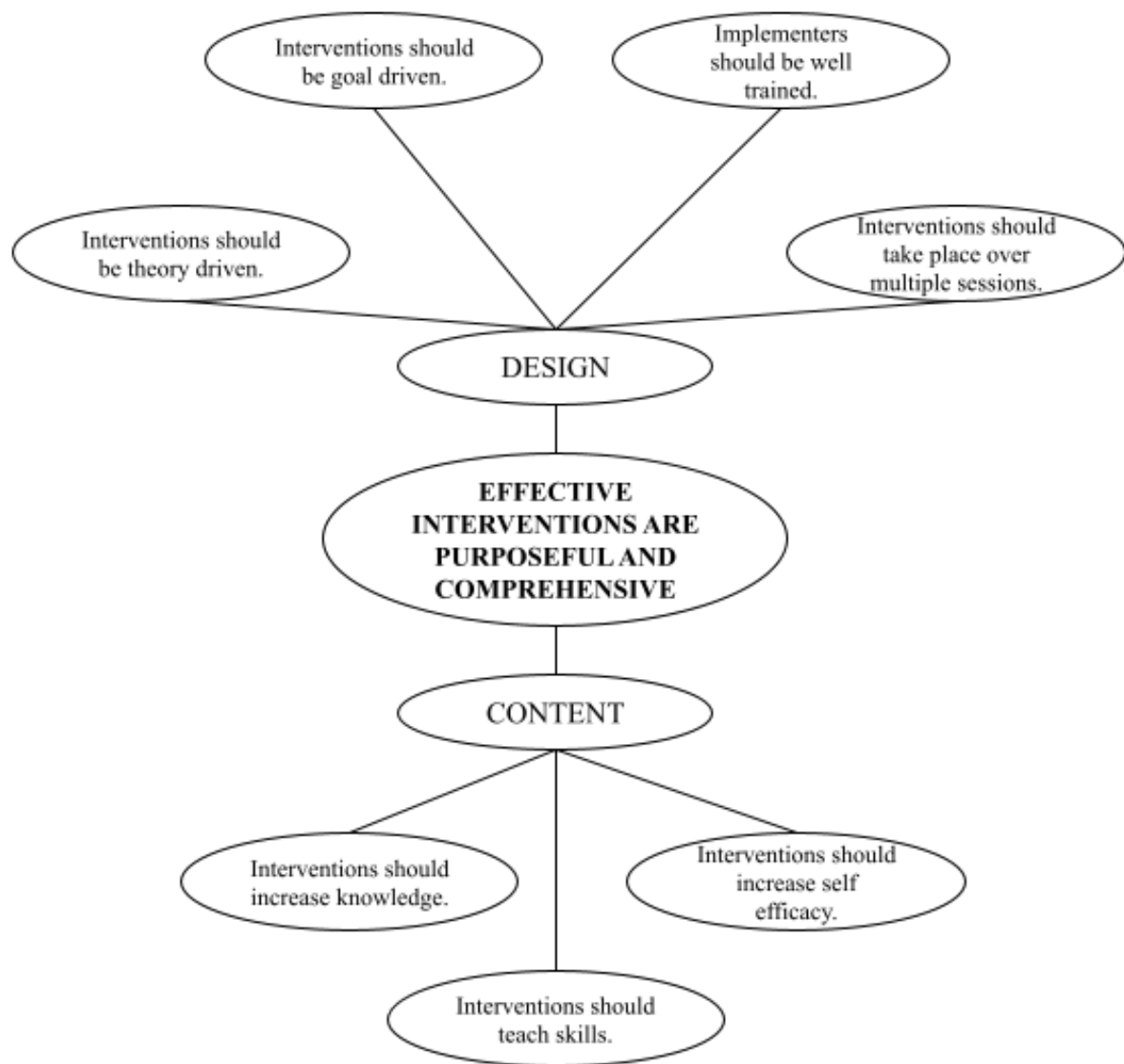


Figure 2: Global Theme 2: Effective Interventions are Purposeful and Comprehensive

Organizing Theme: Design

The first Organizing Theme that emerged was that effective interventions are made up of intentional design choices that are based in well-researched theory, have clearly defined goals, have well-trained instructors, and take place over the course of multiple sessions.

Basic Theme: Interventions Should Be Theory Driven

The most effective adolescent health interventions are based on well-established theories. Theories included in the literature included the logic model (Denford et al., 2017), social-cognitive-ecological theory, developmental theories, resilience theory, rebound-rebound theory, theory of resilience-recoil-rebound, biopsychosocial theory (Garzón-Orjuela et al., 2021), social cognitive theory (Meiklejohn, Ryan and Palermo, 2016), theory of planned behavior, the transtheoretical model (Nakabayashi, Melo and Toral, 2020), the evidence based practice model (Oringanje et al., 2016), social learning theory, and social cognitive theory (Protogerou and Johnson, 2014).

It is unclear whether all of these theories would apply to an adolescent vocal health intervention in the same way that they apply to other types of adolescent health interventions without further research that is out of the scope of this current study. However, a few of the above mentioned theories have been cited in the vocal health literature, including biopsychosocial theory (Woisard et al., 2007), the transtheoretical model (van Leer, Hapner and Connor, 2008), and the evidence-based practice model (Dollaghan, 2016).

The biopsychosocial model (Engel, 1977) approaches health conditions both biologically and by examining personal psychological and larger societal factors. This

model would work well for an adolescent vocal health intervention. It would be important to include lessons on anatomy and physiology of the vocal mechanism, as well as hormone-driven vocal changes (biological components). It would also be important to include discussions surrounding the psychological factors connected to voice, including why people enjoy singing, what it means to them, and how they feel when they run into different degrees of vocal challenges, as well as healthy ways to deal with these emotions. Lastly, it would be important to talk about the different social factors impacting healthy voicing, including potential pressures from directors, peers, or the public to perform when feeling unwell and the social stigma attached to experiencing voice problems, and to have productive discussions around how to deal with these pressures while fostering self efficacy.

Basic Theme: Interventions Should Be Goal Driven

The next Basic Theme that emerged from the data was that effective interventions are goal driven (Denford et al., 2017), and that activities should be linked to clearly defined objectives (Murimi et al., 2018). Garzón-Orjuela et al. (2021) recommend focusing on only one or two objectives at a time in order to more easily track the effectiveness of an intervention and so that the intervention can be replicated.

In voice therapy, it is common to have clearly stated objectives for what the client is working on. It stands to reason that clearly stated objectives will make a vocal health intervention more purposeful and effective as well.

Basic Theme: Implementers Should Be Well Trained

The included reviews also discussed the importance of implementers being well trained (Shepherd et al., 2014; Waller et al., 2017), as well as the negative consequences of instructors not having sufficient training. O'Farrell, Corcoran and Davoren (2021) stated that sex education facilitators often did not have adequate training, and as a result were uncomfortable with LGBT+ terminology, excluded nonbinary and intersex youth, and did not know how to refer LGBT+ students to local resources. Shepherd et al. (2014) found that issues occurred when teachers did not understand the theory behind interventions, did not provide opportunities to role play skills, and tried to modify the interventions by themselves without the proper training.

This gap in knowledge is also reflected in adolescent vocal health education. Most of the time, when a vocalist starts to experience vocal challenges, they first turn to their voice teachers or choir directors for guidance (Flynn, 2020). However, these instructors, while knowledgeable about other aspects of their prospective fields, often do not have sufficient training to give evidence-based vocal health advice, sometimes even pushing vocalists into unhealthy situations or increasing social stigma (Suddeth and Flynn, IP). I am reminded of one instance in which I gave a couple of short vocal health lectures to the high school choirs in my school district. The choir director, who was highly skilled and got fantastic results from his singing students, was astounded that vocal nodules responded well to voice therapy and were neither permanent nor career ending.

While my initial intention for my adolescent vocal health curriculum is for me to be the primary instructor, I can envision providing trainings to choir directors and voice

teachers on these topics so that they can implement this curricula in their own programs. I would likely have to design some sort of assessment that the teachers would have to pass before they got access to the curriculum, as well as provide a framework for ongoing guidance and education.

Basic Theme: Interventions Should Take Place Over Multiple Sessions

Another Basic Theme that emerged was that, ideally, interventions should take place over multiple sessions. Murimi et al. (2018) suggest that interventions take place weekly or biweekly for 30-60 minutes for at least 6 months. Nakabayashi, Melo and Toral (2020) point out that one needs at least 6 months to make a behavior change. Yager et al. (2013) state that most effective interventions have multiple sessions, but that longer interventions are not necessarily better. They suggested 4-5 one hour long sessions. Waller et al. (2017) state that there should be enough time to cover all the necessary topics.

In the voice literature, vocal health interventions vary in duration. De Oliveira Bastos and Hermes (2018) had two lectures followed by two workshops to practice skills such as warm ups and cool downs. Pomaville, Tekerlek and Radford (2019) delivered one 2-3 hour lecture/discussion. Faham et al. (2016) delivered an 8 week long intervention that consisted of four hour-long lectures followed by four hour-long discussion sections to guide participants on how to implement the information they had acquired.

This is where my commitment to the pragmatic paradigm becomes especially important. It appears that having a longer duration intervention is more likely to be effective than a single lecture. However, one has to consider the context in which the

intervention will be delivered. It is unlikely that the majority of academic music programs have the time to incorporate a vocal health curriculum of this duration into their already packed lesson plans. I will have to think creatively about different delivery models. I could see myself offering an independent vocal health class that people could sign up for “on their own time” that is more intensive, and also a smaller vocal health lecture series that could be delivered in conjunction with a school-based music curriculum.

Organizing Theme: Content

The final Organizing Theme that emerged from the data had to do with the content of adolescent health interventions. Reviews found that interventions were most effective if they were comprehensive (Denford et al., 2017; Oringanje et al., 2016; Petrova and Garcia-Retamero, 2015) and included contextual factors such as local resources (O’Farrell, Corcoran and Davoren, 2021). Reviews found that it is important that interventions increase not only knowledge about health topics, but also teach skills and increase self efficacy.

Basic Theme: Interventions Should Increase Knowledge

Successful interventions increase knowledge of health topics. However, reviewers stressed that increasing knowledge about anatomy or the risks of certain behaviors is not generally sufficient to actually change behaviors themselves (Calverley, Petrass and Blitvich, 2021; Denford et al., 2017; Oringanje et al., 2016; Petrova and Garcia-Retamero, 2015). Examples of knowledge-focused vocal health topics include vocal anatomy and physiology, voice disorders, and stages of vocal development.

Basic Theme: Interventions Should Teach Skills

Effective adolescent health interventions target skills in order to change adolescent behaviors. It is important to identify specifically which behaviors need to change, and to incorporate that into the skills that are taught (Denford et al., 2017; Murimi et al., 2018).

The most frequently cited skill included in these interventions was communication skills (Denford et al., 2017; Petrova and Garcia-Retamero, 2015; Protogerou and Johnson, 2014; Skeen et al., 2019; Thomas, McLellan and Perera, 2015). Many interventions also include activities to increase assertiveness when communicating with others (Protogerou and Johnson, 2014; Skeen et al., 2019; Thomas, McLellan and Perera, 2015). Thomas, McLellan and Perera (2015) found that interventions that focused on social competence (communication skills, problem solving, self control, assertiveness) and social influences (societal and peer pressure) did a better job at preventing smoking at a one year follow up when compared to information-only interventions. Skeen et al. (2019) found that effective mental health interventions included skills to increase emotional regulation. This included lessons on mindfulness, as well as stress management skills.

Vocal health interventions sometimes include skills training, including warm ups, cool downs, breathing techniques, and replacing phonotraumatic behaviors (de Oliveira Bastos and Hermes, 2018; Faham et al., 2016). However, they do not always specifically target communication skills, assertiveness, or emotional regulation techniques. One potentially beneficial framework for teaching communication and assertiveness skills within this context is outlined by Manternach and Eggers (2022),

drawing from the boundary setting skills used when choreographing intimate scenes in theatrical productions. It is important to remember the social pressures adolescent vocalists may feel from adults and peers to continue performing even when unwell, and to give them opportunities to practice healthy boundary setting for the sake of their own vocal health.

Basic Theme: Interventions Should Increase Self Efficacy

Finally, the included reviews found that it is important to increase self efficacy and self esteem in program participants (Petrova and Garcia-Retamero, 2015; Protogerou and Johnson, 2014; Nakabayashi, Melo and Toral, 2020; Yager et al., 2013). Petrova and Garcia-Retamero (2015) and Protogerou and Johnson (2014) found that it was important to increase participants' motivation to commit to healthy behaviors.

Intuitively, it makes sense to increase motivation and self efficacy in an adolescent vocal health intervention. This will help participants to be more assertive in making positive choices for their vocal health. It will likely be useful to include activities that ask participants why they are interested in learning more about vocal health, and to show them the benefits of increasing their knowledge and skills, including fewer vocal health challenges and increased confidence in seeking care should they need it, which can increase the longevity of healthy singing throughout their lifetimes.

Conclusion

Effective adolescent health interventions are engaging, purposeful, and comprehensive. Instead of just being lectures where adolescents sit and passively listen, they should increase motivation, impart practical skills, and be fun. Many of these

concepts are already included in vocal health curricula for adults, including increasing knowledge and some skill building. However, there were other themes that emerged from the data that are not always reflected in previous vocal health curricula for different populations. It is important to discuss the social pressures related to not making good vocal health decisions and to give students the social skills necessary to assertively navigate these situations. This will be more effective if there is support within the larger school culture and curriculum for students to make good vocal health choices. Some of these aspects are likely beyond students' control, and are instead up to program coordinators such as choir directors. There is also a gap in the literature on how to train these stakeholders to support their students' vocal health on a systems level. I can envision incorporating this type of consulting into my future private practice. Finally, it is important to consider time factors. In the past, I have delivered onetime knowledge-based lectures on vocal health to local high school choirs. I now know that these were unlikely to lead to significant behavioral changes. However, music programs are generally busy, so integration is difficult. I now have a goal of offering two different types of vocal health curricula: a short-term, intensive, weekly curriculum that takes place over the course of 8 weeks, to be delivered privately outside of school hours, as well as a more widely spaced curriculum that takes place over the course of a whole school year, with monthly guest lectures in conjunction with an already established choral program. Further research is to be done to determine which type of intervention leads to the greatest behavioral changes.

Part 3: Adolescent Vocal Health and Development Curriculum

Development

In developing this curriculum, I had two primary goals: 1) cover the major vocal health and development topics that arose in my initial literature search, emphasizing topics that have been included in other vocal health interventions and 2) incorporate elements of effective adolescent health interventions. These were the most important factors that I decided to incorporate:

1. Effective interventions are engaging, relevant, and increase self efficacy
2. Effective interventions take place over multiple sessions
3. Effective interventions incorporate theory
4. Effective interventions are goal driven
5. Effective interventions increase knowledge
6. Effective interventions increase skills

The other themes that arose regarding adolescent health curricula are still important. However, several of them are related to systemic factors, such as the training level of the instructor or the amount of support within a community, so they need to be addressed alongside or outside of the curriculum instead of within the curriculum itself.

Effective Interventions Are Engaging, Relevant, and Increase Self Efficacy

The first decision that I had to make was the specific age range for this curriculum, as adolescence spans a wide range of ages. I decided to construct this

particular curriculum to target high school students (ages 14-18). I selected this age range because it is in the middle of the other two age groups that could fall into the category of adolescents, middle schoolers (ages 11-13) and undergraduate aged students (ages 19-22). Eventually I would like to modify this curriculum to be appropriate for these other age groups as well, so I decided that targeting 14-18 year olds would be the most likely to lay the groundwork for building curricula for older and younger students later on.

In order for this curriculum to be engaging, there will be a dynamic activity in each lesson. Sometimes this will be a discussion, but other times it will be more active and involve movement or technology. I also will have opportunities for role plays and have lessons on assertiveness to increase self efficacy.

It is also important that the included topics are relevant for the selected age group. For example, if this curriculum was for middle school students, I would likely spend more time talking about the stages of vocal development and how to navigate them. This is still relevant for high schoolers, but many of them may have already gone through hormonal voice changes. Because of this, only one lesson is dedicated to this topic. On the other end of the spectrum, in a curriculum for undergraduate singers, I would probably dedicate more time to discussing the impacts of vocal health on one's singing career and less time to the stages of young adolescent vocal development.

Effective Interventions Take Place Over Multiple Sessions

This curriculum will take place over the course of 8 lessons. In a more intensive intervention, this could take place weekly over the course of two months. This seems like a reasonable amount of time for a young person to dedicate to learning about these

topics. In a more spread out intervention, however, this would translate to having roughly one lesson per month in an American school year, taking December off, as this month is usually dedicated to winter concerts and academic breaks. This increases the likelihood that this curriculum could be integrated into a high school music curriculum.

Effective Interventions Incorporate Theory

I selected biopsychosocial theory (Engel, 1977) for this curriculum, as it already has been applied to voice in other research (Woisard et al., 2007). Each lesson will emphasize at least one domain for adolescents: biological, psychological, or social, and all three domains will be targeted at some point in the curriculum.

Effective Interventions Are Goal Driven

Each lesson in this curriculum will have a small set of clearly-defined goals, in order to make sure the proper topics are targeted in an organized manner.

Effective Interventions Increase Knowledge

Each lesson will have a lecture on a specific vocal health topic. This information will be delivered in simple language that is appropriate for the age group.

Effective Interventions Increase Skills

Each lesson will teach a skill that is related to the knowledge topic for the lesson. These skills will be taught through the use of engaging activities.

Lesson 1: Basic Vocal Hygiene

Lesson Goals

1. Students will learn basic vocal hygiene concepts.
2. Students will learn when to seek medical care for voice problems.
3. Students will learn and demonstrate basic vocal warm ups and cool downs.

Biopsychosocial Target

- Biological, psychological

Knowledge Target

- Vocal hygiene (when to seek medical attention, hydration, emotions)

Skills Target

- Warm ups, cool downs, SOVTs

Materials

- [Presentation](#)
 - <https://docs.google.com/presentation/d/1sCixV73xIBs5Ti63FSu5jjfsyhFhRAIY1cAg1XHYGPE/edit?usp=sharing>
- [Handout](#)
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Lesson 2: What to Do When Sick, Phonotraumatic Behaviors

Lesson Goals

1. Students will learn the stages of an upper respiratory infection and how to care for their voice in each stage.
2. Students will learn about different types of phonotraumatic behaviors and how to replace them.
3. Students will learn how to find their mucosal ceiling.

Biopsychosocial Target

- Biological

Knowledge Target

- Stages of upper respiratory infections, types of phonotraumatic behaviors

Skills Target

- How to replace throat clearing, finding your mucosal ceiling

Materials

- [Presentation](#)
 - <https://docs.google.com/presentation/d/1zuMW4aQd7bMjLRmHNRqhMbZoWDceUcQhKaHQAYnGcQ/edit?usp=sharing>
- [Handout](#)
 - <https://docs.google.com/document/d/1-gj-AHMn6ivXU8aD2KHUqTRcATqrdEjTD4hMcjo7Csg/edit?usp=sharing>

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Lesson 3: Voice Disorders, Care Teams

Lesson Goals

1. Students will learn about the causes and symptoms of three of the most common voice disorders affecting singers.
2. Students will learn about the different professions comprising a voice care team.
3. Students will create a map of different members of their voice care team.

Biopsychosocial Target

- Biological, psychological, social

Knowledge Target

- Types of voice disorders, people on a voice care team

Skills Target

- Putting together a care team map.

Materials

- [Presentation](#)
 - <https://docs.google.com/presentation/d/1mcsjUGHiLQe2u8GZ4HFzWDI2aJ1Ewre3tkFnlo-7zrE/edit?usp=sharing>
- [Handout](#)
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Lesson 4: Voice Anatomy and Physiology

Lesson Goals

1. Students will learn about basic laryngeal anatomy and physiology.
2. Students will act out the roles of different laryngeal muscles.

Biopsychosocial Target

- Biological

Knowledge Target

- Laryngeal anatomy and physiology

Skills Target

- Acting out the roles of different laryngeal muscles

Materials

- [Presentation](#)
 - https://docs.google.com/presentation/d/1uSAPGkLYlYnvMB55xt_wlFZbKu6KIPny1hN8GUjdS1o/edit?usp=sharing
- [Handout](#)
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Lesson 5: Vocal Development, Hormones

Lesson Goals

1. Students will learn about basic vocal changes that happen during puberty for people of different gender identities.
2. Students will learn about the impact of menstruation on the voice.
3. Students will brainstorm ways to support each other through vocal changes.

Biopsychosocial Target

- Biological, psychological, social

Knowledge Target

- Vocal development, impacts of menstruation

Skills Target

- Ways to support peers through vocal changes

Materials

- [Presentation](#)
 - <https://docs.google.com/presentation/d/12yNNrgQGR1mQhJIY1cdPYfX5Dofn24269Zvk7LA1cZA/edit?usp=sharing>

- [Handout](#)
 - https://docs.google.com/document/d/1tg1nbvWzRd78dtAylf0VnhVHFh1w9W_qa12VvMbYGVY/edit?usp=sharing

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Lesson 6: Self Advocacy, Social Stigma

Lesson Goals

- Students will learn about famous people who have had voice disorders.
- Students will learn why voice disorders happen.
- Students will practice self advocacy skills.

Biopsychosocial Target

- Biological, psychological, social

Knowledge Target

- Famous people who have had voice disorders, why voice disorders happen

Skills Target

- Self advocacy skills

Materials

- [Presentation](#)
 - https://docs.google.com/presentation/d/1xY7eaNHzbjPnnCL70Aa_MKmjvgPJam6VkpIfW-aPEIs/edit?usp=sharing
- [Handout](#)
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Lesson 7: Performance Anxiety

Lesson Goals

1. Students will learn the major components of performance anxiety.
2. Students will learn basic strategies to combat performance anxiety.

Biopsychosocial Target

- Biological, psychological, social

Knowledge Target

- Components of performance anxiety

Skills Target

- Alternate nostril breathing, thought restructuring

Materials

- [Presentation](#)
 - https://docs.google.com/presentation/d/17CVF0UF13TH2VY7i068tGb8la_qyrjfRKBR1z2W4C5A/edit?usp=sharing
- [Handout](#)

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Lesson 8: Wrap Up Day

Lesson Goals

1. Students will review key concepts from the curriculum.
2. Students will discuss what else they would like to learn.

Biopsychosocial Target

- Biological, psychological, social

Knowledge Target

- Review of curriculum

Skills Target

- Critical thinking about future questions

Materials

- [Presentation](#)
 - <https://docs.google.com/presentation/u/2/d/126zx5VBGhoni-5xIHJvRBST79mz6PL9ZdvE31seblFw/edit>

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Appendices

Appendix 1: Ethics Form

APPLICATION FOR ETHICAL APPROVAL

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically. A researcher may not be covered by the University's insurance if ethical approval has not been obtained prior to commencement.

The University follows the OECD Frascati manual definition of **research activity**: "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the "principal researcher".

Ethical approval is not required for routine audits, performance reviews, quality assurance studies, testing within normal educational requirements, and literary or artistic criticism.

Please read the notes for guidance before completing ALL sections of the form.

This form must be completed and approved prior to undertaking any research activity. Please see Checklist for details of process for different categories of application.

Delete the Guidance Notes at the end of the form BEFORE submitting your application

SECTION A: About You (Principal Researcher)

1	Full Name:	Judith Wodzak			
2	Tick all boxes which apply:	Member of staff:	☐	Honorary research fellow:	☐
3	Undergraduate Student	☐	Taught Postgraduate Student	☒	Postgraduate Research Student
4	Institute/Academic Discipline/Centre:	WAPPAR			
5	Campus:	Carmarthen			
6	E-mail address:	judithwodzak@gmail.com			
7	Contact Telephone Number:	(608) 797-5480			
For students:					

8	Student Number:	1920987
9	Programme of Study:	MA in Professional Practice (Voice Pedagogy)
10	Director of Studies/Supervisor:	Debbie Winters

SECTION B: Approval for Research Activity

1	Has the research activity received approval in principle? (please check the Guidance Notes as to the appropriate approval process for different levels of research by different categories of individual)	YES	☒	NO	☐
				Date	
2	If Yes, please indicate source of approval (and date where known): Approval in principle must be obtained from the relevant source prior to seeking ethical approval	Research Degrees Committee	☐		
3		Institute Research Committee	☐		
4		Other (write in) WAPPAR Ethics Board Representative	☒		

SECTION C: Internal and External Ethical Guidance Materials

	Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines.	
1	UWTSD Research Ethics & Integrity Code of Practice	☒
2	UWTSD Research Data Management Policy	☒
3	American Speech and Hearing Association Code of Ethics	☒

SECTION D: External Collaborative Research Activity

1	Does the research activity involve collaborators outside of the University?	YES	☐	NO	☒
2	If Yes, please provide the name of the external organisation and name and contact details for the main contact person and confirmation this person has consented to their personal data being shared as part of this collaboration.				
3	Institution				
4	Contact person name				
5	Contact person e-mail address				
6	Has this individual consented to sharing their details on this form?	YES	☐	NO	☐
7	Are you in receipt of a KESS scholarship?	YES	☐	NO	☒
8	Is your research externally funded	YES	☐	NO	☒
9	Are you specifically employed to undertake this research in either a paid or voluntary capacity?	Voluntary	YES	☐	NO ☒
10		Employed	YES	☐	NO ☒

11	Is the research being undertaken within an existing UWTSD Athrofa Professional Learning Partnership (APLP)	If YES then the permission question below does not need to be answered.	YES	☐	NO	☒
12	Permission to undertake the research has been provided by the partner organisation	(If YES attach copy) If NO the application cannot continue	YES	☒	NO	☐

Where research activity is carried out in collaboration with an external organisation

13	Does this organisation have its own ethics approval system?	YES	☐	NO	☒
14	If Yes, please attach a copy of any final approval (or interim approval) from the organisation				

SECTION E: Details of Research Activity

1	Indicative title:	Constructing an Adolescent Vocal Health Education Curriculum		
2	Proposed start date:	July 15 th , 2022	Proposed end date:	March 1 st , 2023
3	Introduction to the Research (maximum 300 words) Ensure that you write for a <u>Non-Specialist Audience</u> when outlining your response to the three points below: • <i>Purpose of Research Activity</i> • <i>Proposed Research Question</i> • <i>Aims of Research Activity</i> • <i>Objectives of Research Activity</i> Demonstrate, briefly, how <u>Existing Research</u> has informed the proposed activity and explain • <i>What the research activity will add to the body of knowledge</i> • <i>How it addresses an area of importance.</i>			
4	Purpose of Research Activity To create/design an adolescent vocal health education curriculum to decrease likelihood of vocal injury and increase self-efficacy in adolescent vocalists. Ample research exists on best vocal health practices and adolescent vocal development. However, there is little guidance on how to teach these concepts to young vocalists to ensure long-term success and retention of vocal health concepts. While scare-tactics may be memorable, they could have the unintended impact of making vocalists overly protective and afraid of using their voices, which has the potential to trigger other vocal health issues such as Muscle Tension Dysphonia. While there is little research on how to construct an effective adolescent <i>vocal health</i> program, there is ample research on creating health intervention programs for adolescents in other areas, including sex education, drug use prevention, and mental health awareness. This study's purpose is to combine known voice literature on vocal health and development with "grey area" literature on other types of health intervention/education programs.			

	(this box should expand as you type)
5	Research Question What elements need to be included in an adolescent vocal health curriculum for it to be effective? (this box should expand as you type)
6	Aims of Research Activity 1) Understand key vocal health concepts necessary for young vocalists 2) Understand how voices change during adolescent years 3) Understand markers of successful and unsuccessful adolescent health education programs (this box should expand as you type)
7	Objectives of Research Activity 1) Conduct desktop research on vocal health 2) Conduct desktop research on vocal development 3) Conduct desktop research on adolescent health education programs 4) Synthesize results using qualitative methods 5) Construct adolescent vocal health curriculum (this box should expand as you type)
8	Proposed methods (maximum 600 words) Provide a brief summary of all the methods that may be used in the research activity, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods will be needed.
9	1) I will engage in documentary analysis of: 2) A) Primary source literature. I will adopt strategies employed within a qualitative evidence thesis. I will include an inclusion/exclusion criteria and data will be analysed and presented in themes via thematic analysis I will examine adolescent vocal development and vocal health concepts. B) Other grey literature documents will be examined to evaluate current programmes – I will use documentary analysis to assess validity. Key themes will be presented. 3) A vocal health programme will be constructed. This will be thoroughly researched with a clear rationale presented for the content 4) Reflective analysis will analyse the programme content and evaluate impact on practice to enable application to take place during the next stage.

10	Location of research activity Identify all locations where research activity will take place.		
11	United States of America (this box should expand as you type)		
12	Research activity outside of the UK If research activity will take place overseas, you are responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Specify any local guidelines (e.g. from local professional associations/learned societies/universities) that exist and whether these involve any ethical stipulations beyond those usual in the UK (provide details of any licenses or permissions required). Also specify whether there are any specific ethical issues raised by the local context in which the research activity is taking place, for example, particular cultural and/or legal sensitivities or vulnerabilities of participants.		
13	The primary researcher is a licensed speech language pathologist and will operate within the American Speech and Hearing Association's code of ethics. As this study is not human subjects research, IRB approval is not necessary. (this box should expand as you type)		

14	Use of documentation not in the public domain: Are any documents NOT publicly available?	NO	☒
		YES	☐
15	If Yes, please provide details here of how you will gain access to specific documentation that is not in the public domain and that this is in accordance with prevailing data protection law of the country in question and England and Wales. (this box should expand as you type)		

SECTION F: Scope of Research Activity

1	Will the research activity include:	YES	NO
2	Use of a questionnaire or similar research instrument?	☐	☒
3	Use of interviews?	☐	☒
4	Use of diaries?	☐	☒
5	Participant observation with their knowledge?	☐	☒
6	Participant observation without their knowledge?	☐	☒
7	Use of video or audio recording?	☐	☒
8	Access to personal or confidential information without the participants' specific consent?	☐	☒
9	Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒

10	Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
11	Investigation of participants involved in illegal activities?	☐	☒
12	Use of procedures that involve deception?	☐	☒
13	Administration of any substance, agent or placebo?	☐	☒
14	Working with live vertebrate animals?	☐	☒
15	Other primary data collection methods, please explain in this box For example, 'focus groups'. Please indicate the type of data collection method(s) in this box and tick the accompany box.	☐	☒
16	Details of any other primary data collection method: (this box should expand as you type)		

If NO to every question, then the research activity is (ethically) low risk and **may** be exempt from **some** of the following sections (please refer to Guidance Notes).

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION G: Intended Participants

1	Who are the intended participants:	YES	NO
2	Students or staff at the University?	☐	☒
3	Adults (over the age of 18 and competent to give consent)?	☐	☒
4	Vulnerable adults?	☐	☒
5	Children and Young People under the age of 18? (Consent from Parent, Carer or Guardian will be required)	☐	☒
6	Prisoners?	☐	☒
7	Young offenders?	☐	☒
8	Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
9	People engaged in illegal activities?	☐	☒
10	Others (please identify specifically any group who may be unable to give consent) please indicate here and tick the appropriate box.	☐	☒
11	Other – please indicate here: (this box should expand as you type)		

12	Participant numbers and source Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?
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13	How many participants are expected?	NA- This study is a document analysis <i>(this box should expand as you type)</i>
14	Who will the participants be?	NA <i>(this box should expand as you type)</i>
15	How will you identify the participants?	NA <i>(this box should expand as you type)</i>

16	Information for participants:	YES	NO	N/A
17	Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☐	☐	☒
18	Will you tell participants that their participation is voluntary?	☐	☐	☒
19	Will you obtain written consent for participation?	☐	☐	☒
20	Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☐	☐	☒
21	If the research is observational, will you ask participants for their consent to being observed?	☐	☐	☒
22	Will you tell participants that they may withdraw from the research at any time and for any reason?	☐	☐	☒
23	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
24	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☐	☐	☒
25	Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☐	☐	☒
26	If NO to any of above questions, please give an explanation			
27	There are no participants for this study- it is document analysis <i>(this box should expand as you type)</i>			

28	Information for participants:	YES	NO	N/A
29	Will participants be paid?	☐	☐	☒
30	Is specialist electrical or other equipment to be used with participants?	☐	☐	☒
31	Are there any financial or other interests to the investigator or University arising from this study?	☐	☐	☒
32	Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☐	☒
33	If YES to any question, please provide full details			
34	NA- there are no participants for this study- it is document analysis <i>(this box should expand as you type)</i>			

SECTION H: Anticipated Risks

1	Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them. If you have completed a full risk assessment (for example as required by a laboratory, or external research collaborator) you may append that to this form.
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2	Full risk assessment completed and appended?		Yes	☐
			No	☒
3	Risks to participants For example: emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information			
4	Risk to Participant: NA- there are no participants for this study- it is document analysis <i>(this box should expand as you type)</i>	How will you mitigate the Risk to Participant <i>(this box should expand as you type)</i>		
5	If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities			
	NA- there are no participants for this study- it is document analysis <i>(this box should expand as you type)</i>			
6	Risks to investigator For example: personal safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest			
	Risk to Investigator: Emotional distress (creating a vocal health program that was not available when the researcher was younger) <i>(this box should expand as you type)</i>	How will you mitigate the Risk to Investigator: Monitor emotions, take breaks and seek support if necessary and check in regularly with a supervisor. <i>(this box should expand as you type)</i>		
7	University/institutional risks For example: adverse publicity, financial loss, data protection			
	Risk to University: None – as the project involves content creation and evaluation rather than implementation <i>(this box should expand as you type)</i>	How will you mitigate the Risk to University: <i>(this box should expand as you type)</i>		
8	Disclosure and Barring Service			
9	If the research activity involves children or vulnerable adults, a Disclosure and Barring Service (DBS) certificate must be obtained before any contact with such participants.	YES	NO	N/A
10	Does your research require you to hold a current DBS Certificate?	☐	☐	☒

SECTION I: Feedback, Consent and Confidentiality

1	Feedback
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	What de-briefing and feedback will be provided to participants, how will this be done and when?
	NA- there are no participants for this study- it is document analysis (this box should expand as you type)
2	Informed consent Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded in accordance with prevailing data protection legislation.
	NA- there are no participants for this study- it is document analysis (this box should expand as you type)
3	Confidentiality / Anonymity Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case.
	NA- there are no participants for this study- it is document analysis (this box should expand as you type)

SECTION J: Data Protection and Storage

In completing this section refer to the University's Research Data Management Policy and the extensive resources on the University's Research Data Management web pages (<http://uwtsd.ac.uk/library/research-data-management/>).

1	Does the research activity involve personal data (as defined by the General Data Protection Regulation 2016 "GDPR" and the Data Protection Act 2018 "DPA")?	YES	NO
	"Personal data" means any information relating to an identified or identifiable natural person ('data subject'). An identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.	☐	X
2	If YES, provide a description of the data and explain why this data needs to be collected: (this box should expand as you type)		
3	Does it involve special category data (as defined by the GDPR)?	YES	NO
	"Special category data" means sensitive personal data consisting of information as to the data subjects' – (a) racial or ethnic origin, (b) political opinions, (c) religious beliefs or other beliefs of a similar nature, (d) membership of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) physical or mental health or condition, (f) sexual life, (g) genetics,	☐	X

	(h) biometric data (as used for ID purposes),		
4	If YES, provide a description of the special category data and explain why this data needs to be collected:		
	(this box should expand as you type)		

5	Will the research activity involve storing personal data and/or special category data on one of the following:	YES	NO
6	Manual files (i.e. in paper form)?	☐	☒
7	University computers?	☐	☒
8	Private company computers?	☐	☒
9	Home or other personal computers?	☐	☒
10	Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☐	☒
11	"Cloud" storage or websites?	☐	☒
12	Other – specify:	☐	☒
13	For all stored data, explain the measures in place to ensure the security of the data collected, data confidentiality, including details of password protection, encryption, anonymisation and pseudonymisation:		
	NA- there are no participants for this study- it is document analysis (this box should expand as you type)		
14	All Data Storage		
15	Will the research activity involve any of the following activities:	YES	NO
16	Electronic transfer of data in any form?	☐	☒
17	Sharing of data with others at the University?	☐	☒
18	Sharing of data with other organisations?	☐	☒
19	Export of data outside the European Union or importing of data from outside the UK?	☐	☒
20	Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☐	☒
21	Publication of data that might allow identification of individuals?	☐	☒
22	Use of data management system?	☐	☒
23	Data archiving?	☐	☒
24	If YES to any question, please provide full details, explaining how this will be conducted in accordance with the GDPR and DPA (and/or any international equivalent):		
	NA- there are no participants for this study- it is document analysis		

25	List all who will have access to the data generated by the research activity:		
	Judith Wodzak <i>(this box should expand as you type)</i>		
26	List who will have control of, and act as custodian(s) for, data generated by the research activity:		
	Judith Wodzak <i>(this box should expand as you type)</i>		
27	Give details of data storage arrangements, including security measures in place to protect the data, where data will be stored, how long for, and in what form. Will data be archived – if so how and if not why not.		
	NA- there are no participants for this study- it is document analysis <i>(this box should expand as you type)</i>		
28	Please indicate if your data will be stored in the UWTSD Research Data Repository (see https://researchdata.uwtsd.ac.uk/). If so please explain. <i>(Most relevant to academic staff)</i>		
	NA <i>(this box should expand as you type)</i>		
29	Confirm that you have read the UWTSD guidance on data management (see https://www.uwtsd.ac.uk/library/research-data-management/)	YES	☒
		NO	☐
30	Confirm that you are aware that you need to keep all data until after your research has completed or the end of your funding	YES	☒
		NO	☐

SECTION K: Declaration

31	The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants. In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice which is published on the website: https://www.uwtsd.ac.uk/research/research-ethics/		
	Signature of applicant:	Judith Wodzak	Date: June 21 2022

For STUDENT Submissions:

32	Director of Studies/Supervisor:	Louise Emanuel	Date: 11-7-22
33	Signature:	Louise Emanuel	

For STAFF Submissions:

34	Academic Director/ Assistant Dean:		Date:
35	Signature:		

Checklist: Please complete the checklist below to ensure that you have completed the form according to the guidelines and attached any required documentation:

☒	I have read the guidance notes supplied before completing the form.
☒	I have completed ALL RELEVANT sections of the form in full.
☒	I confirm that the research activity has received approval in principle
☐	I have attached a copy of final/interim approval from external organisation (where appropriate)
☐	I have attached a full risk assessment (and have NOT completed Section H of this form) (where appropriate) ONLY TICK IF YOU HAVE ATTACHED A FULL RISK ASSESSMENT
☒	I understand that it is my responsibility to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice.
☒	I understand that before commencing data collection all documents aimed at respondents (including information sheets, consent forms, questionnaires, interview schedules etc.) must be confirmed by the DoS/Supervisor, module tutor or Academic Director.
☒	I have deleted the guidance notes before submitting the PG2 for consideration

RESEARCH STUDENTS AND STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk, with the title 'Ethical Approval' followed by your name. You will be informed of the outcome of your claim by email; therefore it is important that you check your University and personal email accounts regularly.

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

This form is available electronically from the Academic Office web pages:

<https://www.uwtsd.ac.uk/academic-office/appendices-and-forms/>

Application Process

All staff research projects and all research students must submit the Ethical Approval Form to the **University Research Ethics Committee** via the Academic Office (pgresearch@uwtsd.ac.uk). Staff research directly in relation to personal study for taught undergraduate or Masters programmes should be submitted via the Institute procedures explained below.

Taught masters and taught undergraduate research Ethical Approval Forms are considered **within Institutes**. Institutes will provide details of the specific processes for this. Where the Ethical issues within any single ethical application are of particular concern the Institute will refer these to the University Research Ethics Committee. Any student activity that involves the collection of primary data needs to undergo Ethical approval, this includes assignment work as well as dissertations.

Notes for guidance in completion of this form

Section A: About You

Please complete all relevant sections

Section B: Approval for research activity

Research proposals must be approved in principle before applying for Ethical Approval. The proposal approval only becomes final when the ethical approval is received.

The process for proposal approval varies according to the individual and programme of study:

- Research students, by application on form PG1 to the Research Degrees Committee
- Taught students by review of research proposal within Institutes (Institutes provide specific details of these processes)
- Staff, by agreement by the Academic Director/Assistant Dean

Section C: External Ethical Guidance materials

Many discipline areas are required to operate with the discipline specific codes of research ethics (for example health, psychology, education etc.), any such codes must be listed and you must tick to confirm that you have consulted with these.

Section D: External Collaborative Research Activity

Provide details of the external collaborative partners, where appropriate you might want to submit a copy of the external collaboration agreement with the Ethical Approval Form. If the partner requires the research to be subject to its own internal Ethical approval process then please provide details of that process and a copy of any final (or interim) approvals received from the organisation.

Section E: Details of Research Activity

Remember that the individuals reviewing this Ethical Approval Form may not have seen your research proposal, and also may not be experts in the specific area of your research. The information provided should therefore be jargon free and clearly stated.

Indicative Title: please use the same title as used on the research proposal.

Purpose: the Ethical approval process will want to ensure that the methods you propose are adequate and appropriate to address the research aims and objectives. Excessive additional data collection can be seen as unethical.

Proposed Methods: the Ethical approval process seeks to ensure that you understand the methods that are intended, and that the implementation of those methods will be appropriate and without unnecessary impact on respondents. This section must explain how the methods described will lead to the collection of necessary and sufficient data, but not excessive data. Please be specific.

Location: this needs to mention geographical location and also local situation (for example, within Local Authority Offices in Cardiff, using a private room but close to other individuals). If you are collecting data within an organisational setting then you need to explain the permissions that you have obtained to do this.

Research Activity outside of the UK: please complete this section in detail, and note any guidance you have received. Also describe your own familiarity (or not) with the location that you will be utilising.

Section F: Scope of Research Activity

Please tick ALL of the research activities that might be undertaken. If any additional types of activity are intended then please add an extra box and describe these.

If you have answered no to all questions in F then sections G and I do not need to be completed. . Signatures are still required in section K.

Section G: Intended Participants

Please tick all categories that might apply.

Numbers & Source: if you are using a series of different methods or research activities please list numbers for each stage/phase. Be clear about how you will find respondents. Will you use intermediaries, and if so how? How will you ensure compliance with your sampling strategy?

Information for participants: all participants should be appropriately informed about the research, what is expected of them and what will happen to the information that they provide. The Ethical review process does not ask to see this documentation, but requires this to be reviewed and approved by the Director of Studies in the case of research students, the supervisor/module tutor in relation to students on taught programmes and the Academic Director/Assistant Dean in relation to staff research.

Section H: Anticipate Risks

All research carries some level of risk. The answers you provide to questions in this section will be reviewed to ensure that you have an appropriate understanding of the type of risks involved and how you can mitigate against these risks. If you have completed a full risk assessment, as required for example for laboratory work, field work, clinical tests, diving operations, or by a collaborative partner, you may append that to this form. In that case, please tick the box indicating this has been provided. You will not then be required to complete Section H.

Risk to participants Think very carefully about how your actions/questions/discussions might affect the people you are involving as participants. You might identify the risk as small but it would still be a risk. Many types of question have the potential to make respondents less content with their life / job; you need to recognise and try to ameliorate any such effects
If these are business owners, time with you may reduce profit.

In some locations physical risk is very real to both participants and yourself, please consider this.

Risk to you, the researcher Think about where you will meet people, if there are any dangers involved in the location. If you are meeting people as individuals think about using a public place. In general do not visit people in their own homes or remote locations. If you are talking to individuals about certain issues think about how their responses might affect you emotionally. What about the risk of collecting insufficient data?

Risk to the University When undertaking your research, you are acting as a member of the University (student or staff). Professionalism is important, so it is important to be well organised and well prepared. Punctuality, clarity etc. are all part of this. What will you do to ensure this? You must ensure you do not harm the good name of the University in any way and do nothing to undermine the reputation of the research it conducts and sponsors. Upholding high standards of conduct and integrity are vital in this regard. You must also conduct the research in such a way to minimise the potential for claims of negligence made against the University, its researchers and any collaborating individual or organisation. In this respect you should always comply with ethical, legal and professional frameworks, obligations and standards as required by statutory and regulatory authorities, as well as the university's Research Integrity and Ethics Code of Practice. Research misconduct in this respect can take many forms, including:

- fabrication: making up results or other outputs (eg, artefacts) and presenting them as if they were real
- falsification: manipulating research processes or changing or omitting data without good cause
- plagiarism: using other people's material without giving proper credit
- failure to meet ethical, legal and professional obligations: for example failure to declare competing interests; misrepresentation of involvement or authorship; misrepresentation of interests; breach of confidentiality; lack of informed consent; misuse of personal data; and abuse of research subjects or material
- improper dealing with allegations of misconduct: failing to address possible infringements such as attempts to cover up misconduct and reprisals against whistle-blowers

Adverse Outcomes. Think carefully about the possibilities, and cover here

Section I: Feedback, Consent and Confidentiality

Feedback to participants: outline your approach. Will interview transcripts be shared with respondents to check accuracy? Will summaries of questionnaire analysis be made available to respondents in some way? Will an overview report be provided? How and when?

Informed consent: Draft letter / e-mail / or heading (or footer) section of questionnaire must be approved by DoS/supervisor (if research student), supervisor/module tutor if taught student, or Academic Director / Assistant Dean if a member of staff.

Confidentiality/Anonymity. Explain clearly how you will ensure confidentiality and anonymity.

Section J: Data Protection and Storage

Before completing this section it is necessary to read the University's Research Data Management information. The questions that follow are designed to ensure compliance with the Data Protection Act as well as established research protocols.

Many research activities will involve electronic transfer of data and use of data management systems in the summarisation and analysis of data. You will need to explain these in relation to compliance with the Data Protection Act.

Think carefully about who will have access to your data, this will include supervisors and examiners. Also that a thesis will be made available via the University library and the British Library system. If you are seeking an access bar for a period of time after completion then mention it here. If you will provide a copy of your findings, or intend to give a presentation, to a facilitating/ supporting/accessing organisation then

explain that in this section. But also think about the general principle of data sharing, as explained in the Research Data Management information.

In terms of storage of data please ensure security, and also mitigate against loss of data.

Section K: Declaration

Ensure the appropriate countersignatures have been provided

Look carefully at the checklist and ensure that you comply with and tick all that are relevant to your research.

Appendix 2: Letter of Approval

Debbie Winter

Voice Workshop Ltd

Wales Institute for Work Based Learning

University of Wales Trinity St David

Dear Debbie,

I am writing this letter to give my consent, as an independent researcher, to conduct a study on adolescent vocal health and development. I am conducting this study in order to improve my clinical practice as an SLP.

Best,

Judith Wodzak

Student number 1920987

Appendix 3: TNA Key Words

- | | |
|-----------------------------|--------------------------|
| 1. Relevance | 15. Emotions |
| 2. Knowledge | 16. Parents |
| 3. Upstream | 17. Peers |
| 4. Behaviors | 18. Fidelity |
| 5. Time | 19. Incorporation |
| 6. Implementers | 20. Abstinence |
| 7. Activities | 21. Goal driven |
| 8. Theory | 22. Health care |
| 9. Self efficacy | 23. Educational strategy |
| 10. Technology | 24. Biology |
| 11. LGBT+ | 25. Evidence based |
| 12. Comprehensive education | 26. Flexibility |
| 13. Communication skills | |
| 14. Skill training | |

Appendix 4: TNA Codes

1. Relevance

- a. Relevance
- b. LGBT+

2. Content

- a. Knowledge
- b. Comprehensive education
- c. Communication skills
- d. Skill training
- e. Abstinence
- f. Educational strategy
- g. Biology
- h. Behaviors
- i. Emotions
- j. Self efficacy

3. Larger environment

- a. Upstream
- b. Parents
- c. Peers
- d. Incorporation
- e. Health care

4. Implementation

- a. Time
- b. Implementers
- c. Activities
- d. Theory
- e. Technology
- f. Fidelity
- g. Goal driven
- h. Evidence based
- i. Flexibility

Appendix 5: TNA Issues and Initial Themes

Code	Issues Discussed	Initial Themes
Relevance	• Cultural backgrounds • Student needs • Student values • Engagement • Technology • LGBT+ students • Age factors	1. Interventions should be relevant to student needs and values 2. Interventions should be engaging
Larger Environment	• Parental involvement • Peer involvement • School policies • Curriculum integration • Health care access • Community support	1. Interventions should involve parents and peers 2. Interventions should be integrated into school cultures and curricula 3. Interventions should be supported by the broader community
Implementation	• Theory • Duration • Activities • Technology • Fidelity • Implementers	1. Interventions should be theory driven 2. Interventions should be goal driven 3. Interventions should include engaging activities 4. Implementers should be well trained and approachable 5. Interventions should take place over multiple sessions
Content	• Behavior • Knowledge • Motivation • Attitudes • Skill training • Biology	1. Interventions should be comprehensive 2. Interventions should increase knowledge 3. Interventions should teach skills

	• Comprehensive education • Communication skills • Emotions • Self efficacy	4. Interventions should increase self efficacy
--	--	--

Appendix 6: Curriculum Presentations

Lesson 1: Basic Vocal Hygiene

Tips to Keep You
Singing

Tip #1: Stay hydrated

Why is hydration important?

- When the vocal folds are hydrated, they are more slippery, so they vibrate easier.
- When the vocal folds are dry, they can get a little sticky, this might make you sound hoarse or make it feel harder to sing.

How to stay hydrated

- There are two types of hydration:
 - Systemic hydration
 - Surface hydration
- Let's learn about them!

Systemic hydration

- Hydration throughout your whole body
- Maintained by eating food and drinking liquids
- Nothing you drink actually touches your vocal folds
- It takes 30 minutes for water you drink to be processed and taken to the vocal folds- make sure to stay hydrated long before a performance!
- Rule of thumb: "Pee pale"

Surface hydration

- Hydration directly on the surface of the vocal folds
- Methods: humidifier, steam inhaler, nebulizer with 0.9% isotonic saline

7

Discussion

- Do you usually drink enough water, or is this something you want to improve?
- How does singing feel when you're dehydrated?
- Turn to your neighbor and discuss.

8

Tip #2: If you are having voice problems for more than 2 weeks and you don't know why, talk to your doctor

This could be a sign of a more serious problem that you deserve to get help for!

10

Examples

- You suddenly lost your voice while singing a high note (get medical attention ASAP and go on voice rest)
- Your voice has been hoarse for a while, but you aren't sick
- Singing or speaking feels painful for 2+ weeks

Tip #3: Take care of your mental health

Why is mental health important?

- The brain's emotion pathways are connected to your voice
- If you're stressed out, this can impact the way your voice works
- Tips: get enough sleep, do activities that bring you joy, reach out for help when you need it

12

Tip #4: Warm up and cool down before and after you sing

Why are warm ups important?

- Just like athletes have to stretch before they run or play in a game, you need to stretch your voice before you sing.
- Singers are **vocal athletes**!
- Warm ups make your vocal folds less stiff, so it takes less effort to sing.

Why are cool downs important?

- Help relax your vocal folds
- Help your voice feel better
- Decrease vocal effort
- How: start in the middle of your singing range and vocalize downwards in gentle scales or glides

Let's practice!

Semi-occluded vocal tract exercises

- SOVTs
- Vocalizing with some type of block above your vocal folds (usually at your lips)
- This creates air pressure above your vocal folds, which helps the vocal folds vibrate more easily without using a lot of muscular force- it's physics!

Some SOVTs

Straw Phonation

- Bring straw to your lips
- Sing through the straw
- Focus on the buzzy sensation at your lips

Gargling

- Take a small drink of water but don't swallow
- Tip your head back
- Vocalize while gargling the water for a few seconds
- Swallow, repeat

Cup Bubbles

- Fill a cup 1/4 full of water
- Bring the cup to your lips
- Sing into the water
- Focus on making a steady stream of bubbles
- Bonus: try it with a straw in the water!

Puffer Fish

- Gently place the side of your pointer finger in between your lips (keep them loose)
- Puff your cheeks out!
- Sing!

Discussion

- Which SOVT did you like the most? Why?
- What is one thing that you learned today that you're going to start using tomorrow?

Lesson 2: What to do when you're sick

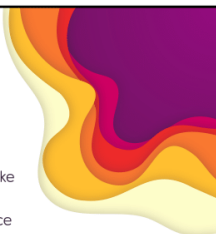


Oh no! I'm sick!
What do I do????

2

What happens when you're sick?

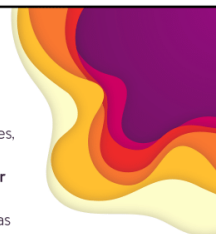
- Your vocal folds swell
- Your vocal folds become inflamed
- Your voice sounds hoarse
- It takes more muscular effort to make your vocal folds vibrate
- You're more likely to injure your voice if you sing or talk a lot



3

At the start of a cold...

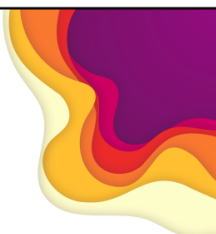
- Acute phase
- Congestion, coughing, voice changes, throat pain
- **When your cold is acute, put your voice on mute!**
- Avoid singing and talking as much as possible- be silent when you can
- You can communicate with writing, text, text to speech apps



4

During the middle/end of a cold...

- What if I **have** to sing???
- Follow the M and R guidelines



5

M guidelines

Maximize your voice function and
minimize your risks



Medical input

- Check with your doctor to see if it is safe to sing
- An ENT (ear, nose, throat doctor) can prescribe steroids to help reduce swelling, but **this should only be done in emergency situations**

7

Minimize unnecessary voicing

- Only speak or sing if you absolutely have to
- Rule of thumb: Only speak for 5 minutes/hour, and no more than 1 minute at a time

8

Modify performance components

- Sing in a lower key
- Sing fewer songs
- Have more breaks between songs

9

Mucosal pampering

- Mucosa=fancy word for your vocal folds
- Do things to keep your vocal folds healthy: drink water, breathe steam, use a nebulizer with 0.9% saline, do gentle SOVTs

10

R guidelines

How to **recover** after a performance

11

Return to neutral

- Cool your voice down for 5 minutes after a performance (like we practiced last time)

12

Recharge

- Be silent for twice as long as you were performing
- Get plenty of sleep

13

Reconditioning

- It can take a few weeks after a cold for your voice to return to normal
- Be gentle with your voice and slowly return to singing normally

14

Rehabilitation

- If you're still having problems after a few weeks, consult with your doctor

15

Other vocal habits to avoid (even if you aren't sick!)

- Throat clearing/coughing all the time (take sips of water, breathe through pursed lips, or do lip trills instead)
- Screaming a lot
- Yelling a lot
- Smoking (cigarettes, marijuana, vapes)

16

Activity time!

17

Vocal fold swelling checks

- How high can you sing quietly in a soft, breathy tone?
- If you can't sing in this voice as high as usual, you might be dealing with some vocal fold swelling and need to be more gentle for a while

18

How to do a swelling check

1. Sing "happy birthday" as high as you can (and still be comfortable)
2. Use a QUIET and BREATHY voice
3. What's the highest note where you can sing the highlighted word? (Happy birthday to you, happy birthday to you, happy **birth**day dear vocal folds, happy birthday to you)
4. Find out what this note is on a day when you are feeling healthy so you can compare.
5. Do this once you start recovering from a cold to determine when your voice is back to normal.

19

Discussion

Turn to your neighbor.
What is one thing you
learned today that you
think will be useful?

20

Lesson 3: Voice Disorders and Care Teams

What causes voice disorders?

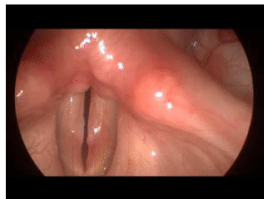
- It could be lots of things! Including...
- Tissue injuries
- Nerve injuries
- Vocal habits
- Emotions/stress/trauma
- Personality factors
- Genetics
- ...and more

It would take months to learn all of them...

- ...so today we're going to focus on three of the most common voice disorders faced by singers: vocal fold nodules, vocal fold hemorrhages, and functional voice disorders
- The MOST important thing is to get medical attention if you have been having vocal problems for over 2 weeks

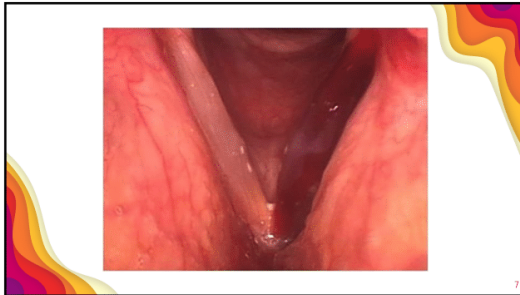
Nodules

- AKA "nodes"
- Small calluses in the middle of the vocal folds
- Caused by lots of loud vocalizing or lots of high vocalizing
- Symptoms: hoarse, raspy voice
- More common in people with high voices
- More common in extraverts
- Treatment: voice therapy, surgery if necessary (therapy is often enough!)



Hemorrhage

- Caused by extremely loud or high vocalizing
- Burst blood vessel in the vocal folds
- Symptoms: sudden voice loss, hoarseness
- Complete voice rest necessary, see doctor right away
- Treatment: surgery, voice rest, voice therapy



7

Functional voice disorders

- AKA muscle tension dysphonia, psychogenic dysphonia
- Voice disorder without clear physical cause/injury
- Caused by: muscle tension, emotional stress, pain pathways, vocal habits
- More common in introverts
- Symptoms: voice changes, pain
- Treatment: voice therapy, massage, psychotherapy (depends on the cause)

8

Most voice problems are treatable!

- This information is meant to **empower** you, not make you afraid
- Follow good vocal health habits, see a doctor if you start developing problems
- Voice problems can happen to anyone. If you experience difficulties it is **NOT YOUR FAULT!**

9

Let's talk about care teams!

- LOTS of people can be involved in keeping your voice healthy.
- Medical: doctors, speech language pathologists, singing voice specialists, psychologists, massage therapists
- Educational: voice teachers, choir directors, theatre directors
- Social: family members, friends, choir members, castmates

10

What type of doctor should I see?

- Otolaryngologist= ear/nose/throat doctor (ENT)- they have more training on voice than a regular doctor, but a lot of them are more focused on ear or nose problems
- You should see a **laryngologist** if at all possible

11

What is a laryngologist?

- An ENT who has done extra training specifically on voice problems
- They can figure out what is causing your difficulties and recommend the right kind of treatment
- First step is probably doing a stroboscopy

12

What are some red flags that my doctor doesn't know what they're talking about?

- They recommend surgery for nodules without trying voice therapy first
- They don't recommend voice therapy after going through a vocal surgery
- They recommend something called "vocal fold stripping" (this procedure is out of date and harmful)
- If you see these red flags, seek a second opinion

13

What is a speech language pathologist (SLP)?

- Training in: speech, language, communication, swallowing disorders, voice disorders, autism, strokes, dementia, and more
- They can specialize in lots of different things, and not everyone has specialized voice training
- If possible, see an SLP who is a voice specialist

14

Educational team members

- Voice teachers, directors
- They can help you decide if you need medical help
- They can support you as you go through voice therapy

15

Social support

- Family members, friends, castmates, fellow choir members, etc.
- It's not uncommon for people with voice disorders to feel isolated- make sure to lean on others for support!

16

Activity: care team maps

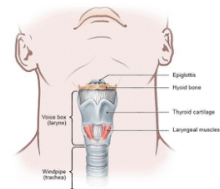
- Materials: paper, pencils, markers
- Directions: Create a visual diagram showing the different people who are part of YOUR voice care team.
- Label each person as: medical, educational, social
- Write down or draw what they can do to support your vocal health
- Make a list of voice care team members you still need to find

17

Lesson 4: Voice Anatomy and Physiology

Larynx

- "Voice box"
- Located right behind your Adam's apple
- Made of cartilages and muscles



2

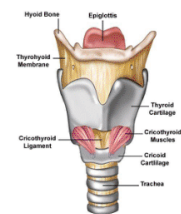
The larynx's jobs

1. PROTECT THE AIRWAY! This is number one. It keeps food and water from going down your windpipe and into your lungs.
2. Vocalizing
3. Helping with heavy lifting

3

Cartilages

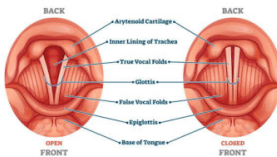
- Epiglottis
- Thyroid
- Cricoid
- Arytenoids



4

Top view

VOCAL CORDS



5

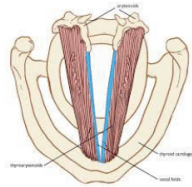
Muscles

- Laryngeal muscles can have one of 4 different jobs: closing the vocal folds, opening the vocal folds, lengthening the vocal folds, shortening the vocal folds

6

Thyroarytenoids

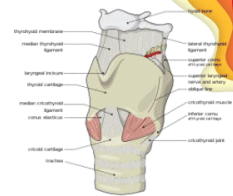
- =Vocal folds
- Job: shortener
- Short/loose vocal folds=low pitch
- =TA



7

Cricothyroids

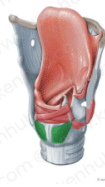
- In front of larynx
- Job: lengthener
- Long/tight vocal folds=high pitch
- =CT



8

Posterior cricoarytenoids

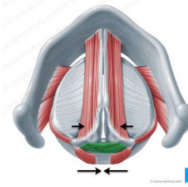
- In the back of the larynx
- Job: opener
- Open vocal folds to breathe air into lungs
- =PCA



9

Interarytenoid

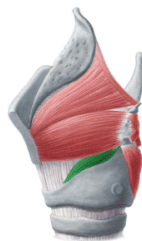
- Job: closer
- Close vocal folds to vocalize
- =IA



10

Lateral cricoarytenoids

- Job: Closer
- Close vocal folds to vocalize
- =LCA



11

What do healthy vocal folds look like when they vibrate?



12

How quickly do vocal folds vibrate?

- Hundreds or even thousands of times every second
- The faster they vibrate, the higher the pitch
- This is why it's so important to rest your voice if you get a vocal fold hemorrhage

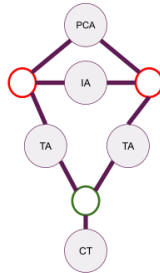
13

Activity time!

- Get into groups of 5 people
- Choose your roles: 2 TAs, 1 IA, 1 PCA, 1 CT
- Materials: 3 rings per group

14

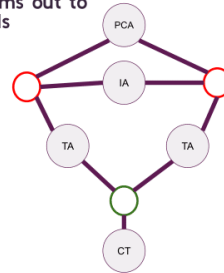
Stand in this formation



15

PCA, move your arms out to open the vocal folds

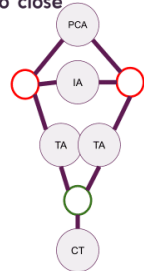
BREATHE IN



16

IA, move your arms IN to close the vocal folds

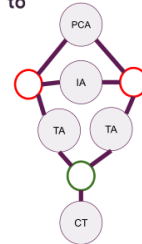
Close vocal folds



17

TAs, move your arms IN to shorten the vocal folds

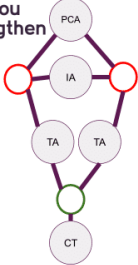
TAs: Vibrate your arms slowly and sing a low note



18

CT, pull the ring towards you and step backwards to lengthen the vocal folds

TAs: Vibrate your arms quickly and sing a high note



19

Challenge time: Can you work together to breathe in and sing a glide from a low note to a high note?



Challenge 2: Work together as a team. Choose a simple song and try to demonstrate how the larynx has to move to sing it. Remember to breathe!



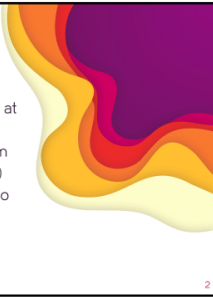
Bonus optional homework: Make a larynx at home. We'll have a competition next time!



Lesson 5: Vocal Development & Hormones



Testosterone Dominant Vocal Development

- Happens with people assigned male at birth
 - Changes can happen anywhere from 9-15 years (average is 12.5 years old)
 - Can last anywhere from 8 months to 4 years depending on the person
 - More androgen hormones
- 

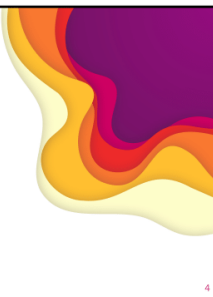
2

Physical Changes

- Larynx gets bigger front to back (creates pronounced Adam's apple)
 - Vocal folds thicken
 - Vocal folds get one centimeter longer
- 

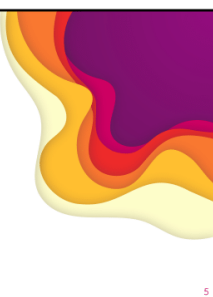
3

Vocal Changes

- Voice drops one octave
 - Vocal folds lengthen before muscles can catch up, so there is some incoordination
 - Voice might sound husky or crack
 - This is all normal!
- 

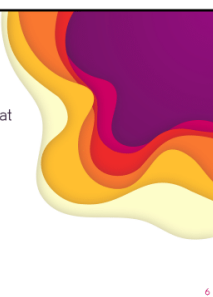
4

Emotions

- Some people may feel insecurity, frustration, or embarrassment
- 

5

Estrogen-Dominant Vocal Development

- Happens in people assigned female at birth
 - Can take place any time from 8-15 years old
 - Lasts 1.5-3 years
 - Androgens, estrogen, progesterone
- 

6

Physical Changes

- Larynx grows taller/wider and becomes rounder
- Vocal folds grow 3-4 millimeters
- Vocal folds grow quickly, leading to some muscle weakness

7

Vocal Changes

- Voice drops $\frac{1}{3}$ of an octave
- It's harder to close the vocal folds during this time, so the voice sounds breathier
- Voice breaks, instability
- This is all normal!

8

Emotions

- Sadness, fear, self doubt, insecurity, frustration, embarrassment

9

Transmasculine Vocal Development

- Some people go through hormone replacement therapy (HRT)
- People take testosterone (there are a lot of different options- injections or topical gels are the most common)

10

Physical changes

- Vocal folds get thicker

11

Vocal changes

- It takes about one year for the speaking voice to drop and 3-4 months for speaking voice to stabilize
- It takes longer for the singing voice to stabilize after HRT

12

Transfeminine Vocal Development

- HRT for transfeminine people doesn't cause vocal changes
- Some transfeminine people can suppress going through a testosterone-dominant puberty like cis males (need to consult your doctor)

13

Vocal Changes

- Usually done through voice training or voice therapy
- Often focus on raising pitch to 155-165 Hz
- Might also work on making the voice a little bit breathier with a more forward resonance
- It depends on what the person's vocal goals are

14

Menstruation

- Most noticeable vocal difficulties in the week before the period starts
- Vocal folds hold more water/swell a bit→slightly higher risk of vocal fold hemorrhage
- Voice is less flexible, breathier, fatigues easily
- These changes usually only last for a couple of days

15

Activity #1: Word Cloud

- Go to https://PollEv.com/free_text_polls/zco5PHmaoQzrqLDFxvCa/respond
- What words describe your feelings about going through voice changes? They can be positive, negative, or neutral!

16

Activity #2

- Go to https://PollEv.com/free_text_polls/bGhWj4i6gRBEJ4gJkNlxy/respond
- What are some things you can do to support your friends going through voice changes?

17

Lesson 6: Social Stigma and Self Advocacy



When you think of “voice disorders,” what words come to mind?

- Go to:
https://PollEv.com/free_text_polls/TVbwWnpd7DFbdG9fNebL5/respond

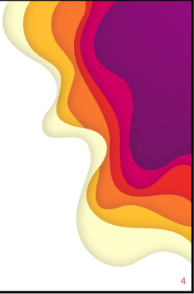
2

Social stigma

- People often feel isolated, ashamed, or guilty if they develop voice problems
 - IT'S NOT YOUR FAULT!
 - Even professional singers develop voice disorders sometimes
- 

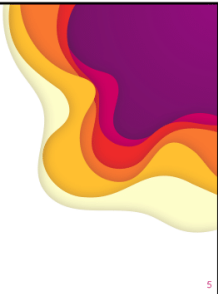
3

Famous performers with voice disorders...

- | | |
|-------------------------------|-------------------------------|
| • Adele (hemorrhage) | • Freddy Mercury (nodules) |
| • Meghan Trainor (hemorrhage) | • Justin Timberlake (nodules) |
| • Jon Hamm (polyps) | • Shania Twain (Lyme disease) |
| • Bjork (nodules) | • Sam Smith (hemorrhage) |
| • Whitney Houston (nodules) | • Brandi Carlile (cysts) |
| • Elton John (nodules) | |
- 

4

Are all voice disorders permanent?

- No! Most of the time, voice therapy and other medical procedures can help. The important thing is to get help early.
- 

5

Self advocacy

- What if a director or teacher is asking you to do something vocally unhealthy?
 - What if you're sick and have to cancel a performance?
- 

6

"The show must go on"

- Not always true
- Speak up for yourself! It's better to take care of your voice than it is to do long term damage.

7

Let's practice...

- Get into groups of 2
- Role play the following scenarios to practice sticking up for yourself

8

Scenario #1

- Your voice teacher assigns you a song to sing in voice lessons, but you have to strain your voice to hit all the notes. What do you do?

9

Scenario #2

- You're sick, but there is a big choir concert this week. You don't want to miss it, but you also want to protect your voice. What do you do?

10

Scenario #3

- You had to go to the laryngologist because of some voice problems, and now you're in voice therapy. You overhear some people talking behind your back about how you "broke your voice" because you have "bad technique." What do you do?

11

Scenario #4

- You woke up this morning with a bad cold, but you're supposed to be singing at church later tonight. What do you do?

12

Discussion

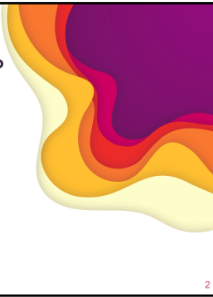
Was this easy or hard?
What feelings came up?
What skills do you need to
build for self advocacy to
be easier? How can your
teachers and friends
support you?

13

Lesson 7: Performance Anxiety

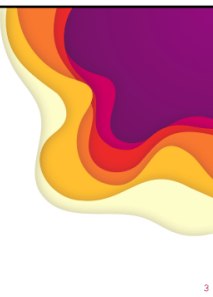


What is Performance Anxiety?

- AKA "Stage Fright"
 - How our bodies respond to the "threat" of a performance
 - Components: Physical, cognitive, emotional
- 

2

Physical Responses

- Heart rate increases
 - Sweaty
 - Cold hands
 - Muscles tighten
- 

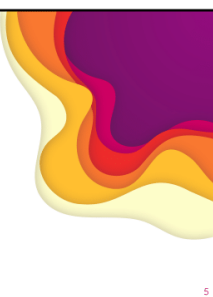
3

Cognitive Responses

- Negative inner dialogue
 - What if I mess up?
 - What if my teacher is disappointed in me?
 - I can't do this
 - What if everyone laughs?
- 

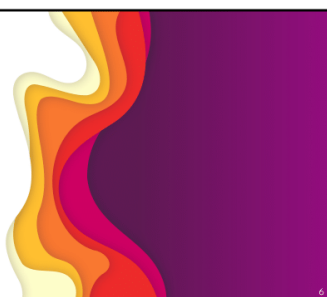
4

Emotional Responses

- Shame
 - Embarrassment
 - Sadness
 - Nervousness
- 

5

Discussion

- Have you ever experienced performance anxiety? What part stands out the most: physical, cognitive, or emotional?
 - Turn to your neighbor and share.
- 

6

So what do we do?

- Don't want to completely get rid of performance anxiety! It shows that you care and want to do well.
- Want to have a little bit to keep you alert, but you can also build skills to help manage it.

7

Activity #1: Alternate Nostril Breathing



8

Discussion

- How did that feel?
What did you notice about your body after doing the breathing?

9

What if I have physical anxiety WHILE I'm performing?

- That's normal!
- Do your best to shift your attention away from your anxious thoughts and towards the music.
- Use breaks in singing to focus on taking low deep breaths

10

What to do about negative thoughts?

- Work on shifting them to positive thoughts
- "What if I mess up?" → "I have prepared for this. If I do mess up, I will be okay."
- "What if my teacher is disappointed in me?" → "My teacher is here to support me no matter what"

11

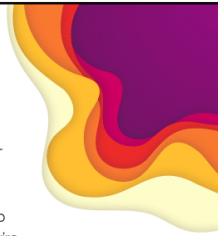
Activity #2: Negative thought replacement

- Get into small groups
- Brainstorm 3 negative thoughts you might have because of performance anxiety
- Brainstorm 3 thoughts you can tell yourself in response

12

What to do about negative emotions?

- Remember that everyone feels like this sometimes
- Talk to your voice teacher and your friends
- Do fun activities that you love
- Remember that it's okay to get help from a therapist or counselor if you're dealing with a lot of negative emotions



13

Lesson 8: Review Day

Jeopardy!

Vocal Hygiene	Voice Disorders	Anatomy and Physiology	Vocal Development	Miscellaneous
\$100	\$100	\$100	\$100	\$100
\$200	\$200	\$200	\$200	\$200
\$300	\$300	\$300	\$300	\$300
\$400	\$400	\$400	\$400	\$400
\$500	\$500	\$500	\$500	\$500

Vocal Hygiene

Vocal Hygiene- \$100

Should you sing when you have a cold?



Vocal Hygiene- \$100

Should you sing when you have a cold?
No. "When your cold is acute, stay on mute."



Vocal Hygiene- \$200

What color should your urine be if you are well hydrated?



7

Vocal Hygiene- \$200

What color should your urine be if you are well hydrated?

Light yellow. Remember to "pee pale."



8

Vocal Hygiene- \$300

If you have been having problems for _____, go see a doctor.



9

Vocal Hygiene- \$300

If you have been having problems for _____, go see a doctor.

Two weeks or more



10

Vocal Hygiene- \$400

Why should you see a **laryngologist** if possible?



11

Vocal Hygiene- \$400

Why should you see a **laryngologist** if possible?

They have specialized training in voice disorders.



12

Vocal Hygiene- \$500

What are the two types of hydration?



13

Vocal Hygiene- \$500

What are the two types of hydration?

Systemic and surface



14

Voice Disorders

Voice Disorders- \$100

True or false: most voice disorders are treatable.



15

Voice Disorders- \$100

True or false: most voice disorders are treatable.

TRUE



17

Voice Disorders- \$200

True or false: if you get a voice disorder, it is all your fault. You should be ashamed.



18

Voice Disorders- \$200

True or false: if you get a voice disorder, it is all your fault. You should be ashamed.
FALSE



19

Voice Disorders- \$300

What are vocal fold nodules?



20

Voice Disorders- \$300

What are vocal fold nodules?
Small calluses on the vocal folds that develop with lots of loud or high vocalizing



21

Voice Disorders- \$400

What type of professional leads people through voice therapy?



22

Voice Disorders- \$400

What type of professional leads people through voice therapy?
Speech language pathologist



23

Voice Disorders- \$500

With what type of voice disorder is complete voice rest absolutely CRUCIAL?



24

Voice Disorders- \$500

With what type of voice disorder is complete voice rest absolutely CRUCIAL?
Vocal fold hemorrhage



25

Anatomy and Physiology

A&P- \$100

How many vocal folds does one person have?



27

A&P- \$100

How many vocal folds does one person have?

Two



28

A&P- \$200

What is the technical term for the "voice box"?



29

A&P- \$200

What is the technical term for the "voice box"?

Larynx



30

A&P- \$300

When the vocal folds are long and tight, do they make high notes or low notes?



1

A&P- \$300

When the vocal folds are long and tight, do they make high notes or low notes?

High notes



2

A&P- \$400

What is the thyroarytenoid (TA) muscle's main job?



3

A&P- \$400

What is the thyroarytenoid (TA) muscle's main job?

Vocal fold shortening



4

A&P- \$500

What is the cricothyroid (CT) muscle's main job?



5

A&P- \$500

What is the cricothyroid (CT) muscle's main job?

Vocal fold lengthening



6

Vocal Development

Vocal Development- \$100

How much does a voice drop in AMAB vocal development?

Vocal Development- \$100

How much does a voice drop in AMAB vocal development?

One octave

Vocal Development- \$200

True or false: the larynx grows wider and rounder in AFAB vocal development?

Vocal Development- \$200

True or false: the larynx grows wider and rounder in AFAB vocal development?

True

Vocal Development- \$300

What type of hormone do people take in transmasculine hormone replacement therapy (HRT)?

Vocal Development- \$300

What type of hormone do people take in transmasculine hormone replacement therapy (HRT)?

Testosterone



13

Vocal Development- \$400

Do trans feminine people who want to change their voice do it through HRT or through voice therapy?



14

Vocal Development- \$400

Do trans feminine people who want to change their voice do it through HRT or through voice therapy?

Voice therapy



15

Vocal Development- \$500

Why are the few days before the period starts the most difficult vocally?



16

Vocal Development- \$500

Why are the few days before the period starts the most difficult vocally?

The vocal folds hold onto more water/swell a little bit



17

Miscellaneous

Misc- \$100

Name one famous person who has had a voice disorder.



19

Misc- \$100

Name one famous person who has had a voice disorder.

Examples: Adele, Justin Timberlake, Sam Smith (many others!)



20

Misc- \$200

What should you always do before singing and after singing?



21

Misc- \$200

What should you always do before singing and after singing?

Warm up (before) and cool down (after)



22

Misc- \$300

What are some physical symptoms of performance anxiety?



23

Misc- \$300

What are some physical symptoms of performance anxiety?

Sweating, tense muscles, increased heart rate, etc.



24

Misc- \$400

Are extroverts more likely to develop nodules or functional voice disorders?



25

Misc- \$400

Are extroverts more likely to develop nodules or functional voice disorders?

Nodules



26

Misc- \$500

How do you do a vocal fold swelling check?



27

Misc- \$500

How do you do a vocal fold swelling check?

Sing "Happy Birthday" in a high, breathy voice. How high can you go with this voice and still have a clear vocal onset?



28

Discussion

What questions do you still have about vocal health?
How can you find answers?

29