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DESCRIBING YOUR VOICE: VIEWPOINTS FROM PRE-PROFESSIONAL SINGING VOICE USERS

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ABSTRACT

The purpose of this qualitative study was to begin to better understand the collegiate-vocal student's lived experience with their voices and voice care knowledge. This study aims to what participants did to take care of their voices and to identify where gaps in their knowledge may exist. A total of 10 pre-professional voice users answered demographic questions and completed a semi-structured interview lasting approximately 45-60 minutes. Data were analyzed in two steps: free coding of nodes of meaning and horizontalization of data/categorization. Data were then reviewed in relation to three primary categories for this study: personal preventative voice care, personal rehabilitative voice care, and personal definitions of the term "voice problem." The researcher translated these topics into the following questions: 1) What do people do to take care of their healthy voice?, 2) How do people classify 'voice problem'?, and 3) What do people do to treat their 'voice problems'?. Examining participants' comments around these topics revealed that their voice and voice care knowledge were limited. Recommendations are made where unhealthy assumptions or practices are identified. Future work with these data will utilize a third level of analysis in which all categories are further analyzed and placed together under common themes, incorporating novel data and formerly-gathered data not discussed in this thesis. This work begins to highlight the need for more collaboration between speech-language pathologists and pre-professional voice users.

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Chapter 1

Introduction

"The production of voice is viewed as both a powerful communication tool and an artistic medium." (Stemple, 2000, p. 1)

What is Voice?

This quote succinctly describes two manners in which voice can be viewed and studied from both scientific and artistic standpoints. This paper will address the latter artistic medium as it pertains to college voice students and their training programs. However, the idea of "voice" encompasses more than what Stemple's quote may suggest. The word voice has roots in the Latin word *vocare*, which means "to call or invoke," and evolved out of the idea that it "is the thing that is being called out of us in the midst of our work"; 'voice', then, "is the underlying why of our passion, even if we've never considered it" (Henry, 2017). Indeed, colloquial use of the word 'voice' in expressions such as "Everyone has a voice," and "Find/use your voice," etc. evokes the idea of an instrument that is more personal than just a communication tool or an artistic medium; it evokes the ideas of uniqueness and personality, such that every person has their own voice and can use it to express their thoughts, feelings, and true selves.

It is important to consider both the colloquial definition of voice and its scientific description when talking about singing: the artistic medium to which Stemple refers. Scientifically, voice is defined as the sound produced by humans and other vertebrates when the vocal folds are adducted sufficiently enough that the air flowing through the folds causes them to

vibrate (Stemple, Glaze, & Klaben, 2000). It is a myoelastic/aerodynamic phenomenon (Van den Berg, 1958) caused by the precise coordination of respiration, phonation, and resonance with neurological bases in both branches of the vagus nerve, (Stemple, Glaze, & Klaben, 2000; Sataloff et al., 2016) the motor cortex, and connections to the brain's limbic system (Dietrich, Andreatta, Jiang, & Stemple, 2019). Singing entails the athletic mastery of the vocal systems for their efficient and optimal use. However, the masterful singer will have also explored and discovered their internal emotions, thoughts, and passions, as the ability to access such machinations lends itself to more beautiful, artistic creation. This makes sense scientifically as well, as stress and other emotional states are known to influence a person's voice in terms of tension, frequency, and prosody (Gartner-Schmidt, 2018; Dietrich, Andreatta, Jiang, & Stemple, 2019). Therefore, singing voice can be considered the combination of one's inner self and one's physical ability to produce sound through artistic expression.

Referring to the idea of the "masterful singer," the singing skills an individual needs to be able to convey, such a wide range of emotions, inevitably lies in their physical capabilities and coordination. These are skills that the participants in this study are training to master in their collegiate training programs. Therefore, having an understanding of the foundational innerworkings of the physical voice is necessary in increasing one's ability to provide high-quality voice training and care.

Chapter 2

Literature Review

Anatomy and Physiology Overview

The production of vocal sound is combination of the coordination of four physical processes in the body: respiration, phonation, resonation, and articulation. The process of voice production begins as breath is taken into the lungs, continues as it is blown through adducted vocal folds, reverberates around the vocal tract, and is emitted from the oral cavity and/or nasal cavity (Stemple, Glaze, & Klaben, 2000; Sataloff et al., 2016). The following chapter will examine this complex phenomenon in terms of respiration, phonation, and resonation.

Respiration

The primary purpose of respiration is to live; we exchange CO_2 for O_2, which in turn allows us to create the energy necessary for our bodies to perform all of its daily activities. Respiration serving as an power source for voice production is a secondary function (McKinney, 1994). The most prominent anatomical features of respiration include the lungs, the abdominal viscera, and the following skeletomuscular features: the thoracic cage, spine, and pelvic girdle; the diaphragm, external and internal intercostal muscles, abdominal muscles, and pelvic floor muscles.

Inspiration. The diaphragm attaches to the most inferior ribs, the interior spinal column, and the sternum. During inspiration, the diaphragm contracts, flattening and descending, to expand the volume of the thoracic cavity. The diaphragm is the only muscle involved in passive

inspiration. One the other hand, during active inspiration – such as that involved during speech production, singing, or exercising – the diaphragm is aided in its action of expanding the thoracic cavity by the external intercostals, outer internal intercostals, and possibly other accessory muscles of inspiration (such as the sternocleidomastoid or scalene muscles) ("Muscles of Respiration," 1995).

The pleurae of the lungs and thoracic cavity are held together with pleural fluid, allowing the lungs to expand with the thoracic cavity when the muscles of inspiration contract (D'Agostino & Edens, 2020). As the lungs expand, negative pressure is created within them in relation to atmospheric pressure outside the body; hence, air is pulled into the lungs for gas exchange, and thus, an individual will inhale. Furthermore, the abdominal viscera are displaced inferiorly and laterally as the diaphragm contracts, which are then supported by the abdominal muscles, the pelvic girdle, and the pelvic floor. The abdominal and pelvic floor muscles must relax in order for full descent of the diaphragm to occur (Park & Han, 2015).

Expiration. During expiration, the diaphragm relaxes and assumes its resting dome-shape. This decreases the volume of the thoracic cavity and creates positive pressure within the lungs in relation to the atmosphere; hence, air is expelled from the lungs. The diaphragm is the only muscle involved in passive expiration. However, during active expiration, or the expiration needed for voice tasks, the ascent of the diaphragm is aided in its action of decreasing the size of the thoracic cavity and creating positive pressure in the lungs by the activation of the abdominal muscles, inner internal intercostal muscles, and possibly other muscles such as those of the pelvic floor ("Muscles of Respiration," 1995; Park & Han, 2015).

"Breathing for Life vs. Breathing for Singing"

The concept of breathing for life falls in line with passive, unconscious breathing, while breathing for singing is more comparable to active breathing. In addition, breathing for singing aims to avoid activating accessory muscles of inspiration that might be used during typical life activities such as speech or exercise, and includes the following stages: 1) inhalation, 2) suspension and prephonatory preparation period, 3) controlled exhalation, during which phonation occurs, and 4) recovery (McKinney, 1994, p. 48). While there are no actual physiological differences between how breathing for speech and breathing for singing occur, breathing for singing is more exaggerated and brought more into conscious control than it is for speech. A trained singer will also very consciously check their phonatory controls before beginning to expire (Miller, 1996).

Phonation

The primary function of the laryngeal anatomy is airway valving – that is, it serves as a means to close the airway during swallowing and bearing down. Phonation is a secondary function of that anatomy, and it entails the process in which sound is produced within the larynx through the vibration of the vocal folds (VF) (Miller, 1994). Phonation is essential to the production of voice for verbal communication and singing. In addition to the VF and its constituent parts, the laryngeal anatomy has many important skeletomuscular features: the hyoid bone; the thyroid, cricoid, and arytenoid cartilages; the internal muscles of the larynx, including the cricoid thyroid (CT) and thyroarytenoid (TA) muscles; the posterior and lateral cricoarytenoid muscles; the oblique and transverse interarytenoid muscles; and the extrinsic muscles of the larynx.

Laryngeal Skeleton and Musculature. The hyoid bone is the structure from which the larynx is suspended; it is attached to the superior cornua of the thyroid cartilage by ligaments.

The thyroid cartilage is the most prominent skeletal feature of the larynx. It houses the vocal folds and serves as their protective shield, while also serving as a foundation to which many laryngeal muscles, ligaments, and membranes attach. (Stemple, 2000; Sataloff et al., 2016). The vocal folds attach to the thyroid cartilage right behind the thyroid notch, and the cartilage itself articulates with the cricoid cartilage via is inferior cornua.

The cricoid cartilage is shaped like a signet ring and serves as the base of the larynx at the top of the trachea. The thyroid cartilage and cricoid cartilage are connected by the cricothyroid muscles, which permit the thyroid cartilage to rock forward and backward atop the cricoid cartilage via its contraction/relaxation. The rocking action of the thyroid cartilage causes the VF to stretch/lengthen when its rocks forward and shorten/relax when it rocks back, and when phonation is occurring, this lengthening and shortening of the VF causes a person's fundamental frequency – or pitch – to rise and fall, respectively (McKinney, 1994; Miller, 1996; Stemple, Glaze, & Klaben, 2000; Sataloff et al., 2016).

Atop the cricoid cartilages are situated two arytenoid cartilages, and each have three distinct processes: the vocal process, the muscular process, and the apex. The thyroarytenoid muscles, which comprise much of the vocal folds, attach to the vocal and muscular processes of the arytenoid cartilages – the thyrovocalis part to the vocal process, and the thyromuscularis part to the muscular process. When the thyrovocalis contracts, it tenses and shortens the vibratory edges of the VF. When the thyromuscularis contracts, it allows the edges of the VF to "relax" by allowing their margins to be less tense. In this manner, the thyroarytenoid muscle can serve to control the registration events of the VF (McKinney, 1994; Stemple, Glaze, & Klaben, 2000).

Also attached to the arytenoid cartilages are the posterior cricoarytenoid, the lateral cricoarytenoids, and the interarytenoid muscles. The posterior cricoarytenoid muscles attach to

the muscular process of the arytenoids and course posteriorly/inferiorly to their origin point on the posterior cricoid cartilage; when they contract, they abduct the vocal folds, allowing for (quick) inspiration. The lateral cricoarytenoid muscles also attach to the muscular process of the arytenoids, but they course inferiorly/anteriorly to their origin point on the anterior cricoid cartilage; when they contract, they adduct the vocal folds, bringing their margins together. The lateral cricoarytenoid is the muscle primarily responsible for medial compression of the VF, and a phenomenon which is primarily responsible for the intensity (loudness) of the sound produced by the VF (McKinney, 1994).

Contraction of the lateral cricoarytenoid muscle leaves a mutational chink, or gap, in VF closure which can only be closed by the action of the interarytenoid muscles (McKinney, 1994). The interarytenoid muscles (transverse and oblique interarytenoids) serve to increase medial pressure and close this chink by drawing the arytenoid cartilages closer together; therefore, perfect adduction of the VF is attained through the action of both the lateral cricoarytenoid and interarytenoid muscles (McKinney, 1994).

Finally, the extrinsic muscles of the larynx are responsible for major adjustments of the larynx – they are not vital to phonation, but they can still play an important role in it. These major adjustments include elevating and/or depressing the larynx, which is important for events such as yawning and swallowing, and stabilization of the larynx during phonation. These major adjustments are also associated with certain styles of singing; for example, western classical singing is associated with a relatively low laryngeal position, while musical theatre singing is associated with a relatively high laryngeal position (McKinney, 1994; Miller, 1996, Stemple, Glaze, & Klaben, 2000; Sataloff et al., 2016).

Myoelastic/Aerodynamic Phenomenon

Phonation occurs due to the coordination of laryngeal musculature adjustments, including VF elasticity, and movement of respiratory air through the laryngeal system capitalizing on the Bernoulli principle; this is formally referred to as the myoelastic/aerodynamic theory (Van den Berg, 1958). When the VF adduct and are approximated, air pressure from lungs will blow the inferior VF, then the superior VF, apart. Due to the elastic nature of the VF, the lower – followed by the upper – portions of the VFs want to rebound and return to their original positions. This elastic event is aided in its action by the Bernoulli principle, which states that air (or liquid) in motion exerts less than normal pressure on its surrounding environment. This less than normal pressure aids the rebound of the vocal folds in "sucking" the VF back together after they have been blown apart.

Expanding upon the myoelastic-aerodynamic theory, Titze's phonation expansion theory stated that factors both *above* and *below* the level of the larynx in can affect what happens *at* level of larynx (Stemple, Glaze, & Klaben, 2000; Wolfe, Garnier, & Smith). Indeed, too much/too little subglottal pressure, intrinsic or extrinsic muscular tension, and issues with resonation may all affect how phonation occurs, thereby affecting voice quality.

Phonation for singing is not necessarily physically different from the phonation that occurs during speech, but it does involve accessing a wider range of fundamental frequencies, volume/amplitude levels, and control over registration events (Wolfe, Garnier, Smith; McKinney, 1994; Miller, 1996). Flow phonation, which requires more medial compression than typical phonation used for speech, is also desirable in many styles of singing, though certainly this can vary. Finally, conscious control and mastery over the voice's resonators is often not a point of discussion during speech production.

Resonation

Resonation is the process by which the amplitude of a frequency of a periodically applied force is magnified when it comes into contact with a system that shares a similar natural frequency (Resnick & Halliday, 1977). Considered in terms of voice resonance, this periodically applied force is the air moving through the vocal tract at specific frequencies, and the system on which it acts is the vocal tract itself (Stemple, Glaze, & Klaben, 2000; Wolfe, Garnier, & Smith). The most important anatomical features involved in vocal resonance are as follows: the laryngo-, oro-, and nasopharynx; the oral cavity; the nasal cavity and sinuses.

Source-Filter Theory. When the frequencies produced by the VF act upon the vocal tract, the vocal tract amplifies the frequencies at which it has natural resonances. In more basic terms, vocal resonance "is the process by which the basic product of phonation is enhanced in timbre and/or intensity by the air-filled cavities through which it passes on its way to the outside air" (McKinney, 1994, p. 120). The vocal tract may also impede the resonation of certain frequencies produced by the vocal folds due to the vocal tract also having frequencies at which it does *not* like to vibrate; this, in turn, reduces those frequencies amplitudes. This idea is known as the source-filter theory, and it accounts for a wide variety of sounds that humans can make, given just a single source of vibratory energy (Stemple, Glaze, & Klaben, 2000; Wolfe, Garnier, & Smith; Sataloff et al., 2016).

The vocal tract may be adjusted in a variety of ways, some of which include the following: labial and lingual adjustments for the creation of vowels, velar adjustments which couple/decouple the nasal and oral cavities to varying degrees, and major laryngeal adjustments that affect laryngeal elevation/depression. Adjustments for singing may include fully raising the soft palate, lowering the larynx, and unconsciously widening of the laryngeal ventricle/pyriform

sinuses to achieve and the open throat feeling associated with the singer's "ring" or "singer's formant" (McKinney, 1994; Miller, 1996; Wolfe, Garnier, & Smith). This adjustment, though, is associated with a western classical style of singing and is not seen in every style of singing. Resonance in singing accounts for the richness and robustness of a person's sound (McKinney, 1994) and singers must learn to consciously control their resonators through careful training (Miller, 1996).

For the purposes of this paper, the processes and features of articulation itself will not be discussed. However, articulation of course plays in resonance as it pertains to the shaping of the vocal tract for speech and singing. On a more elevated level, the articulation of lyrics for vocal music must be navigated in order to maintain optimal resonance for singing. Technical mastery of respiration, phonation, resonation, and articulation all serve as a foundation for creating vocal sound to which artistry, or a person's creative skills, can be added or from which a person's existing artistry can be elaborated upon.

Professional Voice Users

The average person speaks approximately 16,000 words per day (Huynh, 2014). This equates to a large volume of voice use and laryngeal action for the *average* person. It does not represent the amount of time a professional voice user spends using their voice every day, nor does it represent the intensity of the activities in which they are engaging. Epstein reports that professional voice users are people whose livelihoods depend on their ability to produce voice and that one-third of today's workforce is comprised of such people (Epstein, Remacle, &

Morsomme, 2011). Among others, professional voice users include people such as singers, actors, and choir/voice teachers, all of whom engage in singing as a profession to some degree.

Singing Voice Professionals and Heavy Vocal Load

Professional singing voice users engage in the everyday vocal activities that other voice professionals do such as speaking, conversing with friends, etc. However, unlike many other voice professionals, singers engage in an occupation that involves heavy vocal load. Vocal load may be measured in various aspects of vocal function, including intensity, frequency, and durational features (Phyland, Thibeault, Benninger, Vallance, Greenwood, & Smith, 2013). The aspects by which vocal load is measured are greatly heightened for those who sing professionally, stemming from many hours of shows, rehearsals, practices, and other factors related to their work such as auditions, solo performances, concerts, interviews, etc. This can be problematic; while heavy vocal load does not cause issues for everybody, it has been causally associated with the development of vocal pathology. (Phyland & Smith, 2017).

Indeed, Epstein reports that there is a higher frequency of voice disorders in singers, and that voice disorders were up to 4 times higher in singers and singing teachers than in non-singers (Epstein, Remacle, & Morsomme, 2011). These disorders may initially present in similar ways to those that appear in non-singers, but they tend to cause more distress in a singer's voice, and singers may present with such problems or distress earlier than their nonperforming counterparts (Phyland, Thibeault, Benninger, Vallance, Greenwood, & Smith, 2013). Ways in which voice problems can initially present themselves include unintentional pitch changes (the voice getting deeper or squeaking higher), vocal fatigue, throat pain, breathiness, hoarseness, loss of range, and other symptoms (including excess mucus, dryness, etc.) (Carding & Wade, 2000). Voice disorders that are commonly diagnosed in singers are vocal nodules, cysts, polyps, and

hemorrhages (“Common Voice Disorders,” 2016; “Vocal Cord Disorders,” n.d.). Laryngitis and upper respiratory infections may also lead to lasting vocal pathologies in singers (Bainbridge, Roy, Losonczy, Hoffman, & Cohen 2017).

Preprofessional Singers in College-Training Programs

The discussion of voice disorders and their prevention is especially pertinent to young singers involved in collegiate professional-voice training programs. Education and prevention of vocal injury is of the utmost importance to this population, as their voices are yet to be fully developed and many expensive tuition payments may be for naught if vocal pathology occurs. Unfortunately, it appears that many collegiate-level singers do not heed the warning signs of possible voice problems, or simply choose to ignore them and push through their work. In a study of a group first-year musical theatre students, Carding and Wade (2000) discovered that there was a notable potential for vocal problems within the group, as half of the participants in the study reported having at least “one current vocal symptom.” In another study of 40 undergraduate vocal performance majors, Galloway and Berry (1981) state that only 9 students reported having no problems with speech, resonance, or tone generation. They also reported that these students seemed to overuse/abuse their voices due to pressure placed on them by their teachers, conductors, and/or themselves.

The evidence in these two studies suggest that voice problems among vocal performance, musical theatre, and other similar majors may actually be commonplace, and that young vocalists in these programs may not take care of their voices as well as they should. Commenting on solutions to this apparent problem, Galloway and Berry (1981) note that each of the voice problem areas identified in their study are able to be treated by ENT doctors and/or speech and voice therapists; however, it is reported that many vocalists are unaware of the specialty services

provided by laryngologists and voice therapists to begin with, which is poses a “major barrier” to those who would otherwise seek treatment (Mattiske, Oates, & Greenwood, 1998; Williams & Carding, 2005). Galloway and Berry also comment that giving voice students information about preventative measures, being understanding when something goes wrong, and imploring that students get help when it is necessary empowers students to be healthier vocalists and stronger protectors of their voice (Galloway & Berry, 1981).

Purpose and Goals of Research

The American Speech-Language and Hearing Association (ASHA) provides a position statement affirming that the prevention of communication disorders is one of the profession’s primary responsibilities. This position statement further elaborates that speech-language pathologists and audiologists, as a whole, should 1) play a significant role in the development and application prevention strategies, 2) perform research about the maintenance of communication abilities and the causes of communication disorders, and 3) educate colleagues and the public on how to prevent the development of communication disorders (“Prevention of Communication Disorders,” 1988). Being that there is an apparent need for improved education on the warning signs, causes, and prevention of vocal pathologies for collegiate student vocalists, CSD as a field is obligated to research into and better this phenomenon. The purpose of this study is to gain a more holistic view of the preprofessional collegiate-vocal student’s lived experience with their voices and identify if there are gaps in the practicing SLP’s voice care knowledge. The primary goals in performing this study are to:

1) better understand what pre-professional voice users think about their voice,

2) learn what pre-professional voice users know about voice,

3) learn about each participant's voice and how they take care of it, and

4) discover if voice users have knowledge of and about members of the voice care team (ENTs, SLPs) who are able to help with the prevention and treatment of vocal pathology.

This information is necessary to ask of pre-professional collegiate singers in order to enhance the profession's ability to provide them with better, targeted prevention care; without knowing what students know about voice, what they are learning about it, and if they know how to take care of it, CSD is unable to develop effective and targeted preventative techniques for this population.

Each goal of the study has a corresponding hypothesis. For hypothesis 1 (corresponding to Goal 1), we expect participants to have many varied comments about their voices and what they think about them. In regards to the latter three goals, the following was hypothesized, respectively: 2) that participants would have a "decent-to-good" voice knowledge; 3) that participants would do an "alright" job of taking care of their voices (though not always treat it the very well); and 4) that participants would *not* have much familiarity or knowledge of therapeutic and medical voice professionals and what they do. The researcher formed these hypotheses based on personal experience as a singer, but they were also informed by the researcher's experience interacting with other young high school and collegiate-level singers.

Chapter 3

Methods

A qualitative phenomenological design was used to gather information on the lived experience of preprofessional singing voice users at Penn State. First, participants answered demographic questions to gain a more holistic view of their voice and voice health. Next, all participants completed a semi-structured interview in which participants' knowledge, thoughts, and feelings surrounding their voice and its care were solicited.

Participants

Ten (n=10) Penn State University students were recruited for this study via fliers, email, and personal relationship with the researcher. All participants were completing some variety of pre-professional singing voice degrees at the time of interview. Participants cited pursuing degrees in BM Vocal Performance, BME Music Education (voice emphasis), BFA Musical Theatre, and MM Vocal Performance and Pedagogy. Participants ranged in age from 18-year old, first-year undergraduate students, to one 30-year-old master's student. The majority of participants either knew and/or were friends with the primary researcher in some capacity. The PSU department of Communication Sciences and Disorders and the PSU School of Music aided the researcher in gathering participants for this study.

Table 1: Participant Demographics

Participant Code	Singer Number	Years of Training	Hydration (oz) / day of water	Average Sleep (hours) / day	Voice Part	Time Spent Singing / week
PPV_004	Singer 1	18	60-80	6	mezzo	3-4h/day (7 days/week)
PPV_005	Singer 2	4	60	6	Soprano	11 hours/week
PPV_007	Singer 3	11	36	7.5	Soprano	2 hours/week
PPV_008	Singer 4	8	128	7	Baritone	2-3 hours/day
PPV_009	Singer 5	6	25	6	Mezzo-soprano	2 hours/day 12 hrs/ week
PPV_010	Singer 6	4.5	25	6	Soprano	2 hours/day 12 hrs/ week
PPV_012	Singer 7	1.5	40	5	Baritone	15-20hrs/week
PPV_013	Singer 8	4	120-150	6	(Bari)tenor	15-20hrs/week
PPV_016	Singer 9	1.5	24	7	Soprano	10-11hrs/week
PPV_017	Singer 10	10.5	60	8	Soprano	4hrs/week

The participant code numbers are non-sequential because singers in this study were recruited as part of a larger study including all preprofessional voice users. To ease the discussion of data, all participant code numbers were replaced with “Singer” followed by a number, according to the order in which they were interviewed. Demographic data from participants in this study can be found in Table 1. (See Appendix A for a list of the questions used to gather this data).

Procedures

The Pennsylvania State University Office of Research Integrity approved this study, and each participant’s informed consent was solicited before initiating any demographic/interview questions. The researcher trained in conducting qualitative interviews prior to initiating data collection. The researcher had some familiarity and level of comfort with each of the participants.

Each interview lasted approximately 45-60 minutes. Interviews followed a semi-structured format to enable both the researcher and interviewee to ask follow-up questions and make comments for clarification. Participants were asked to respond to a series of 13 demographic questions and 17 open-ended interview questions with sub-questions for clarification and further explanation. Questions included: “Tell me about your voice”, “How did you develop ‘your sound’?”, and “How do you use your voice?”, to name a few (see Appendix B for full list of questions).

Researcher Bias

The researcher acknowledges that he had bias in conducting this research. He has received training from the PSU Schools of Music and Theater, which provided him with a basis from which he formed his hypotheses. Furthermore, the researcher was familiar/friends with each of the participants, which may have 1) affected the way participants answered, and 2) affected the way in which the researcher interviewed each participant. The familiarity amongst the researcher and participants may have produced a positive effect – in that interviewees were more comfortable sharing more honest information with the researcher – or a negative one – in that interviewees, being familiar with the researcher’s field of study, reported what they thought the researcher wanted to hear or what they had learned through prior interaction with the researcher (and not their own thoughts). The researcher also developed his hypotheses based on personal experience and acknowledges that his interpretation of data could have been affected by his experiences.

Acknowledging the potential for bias in this study, the researcher developed his interview questions and research goals in tandem with Dr. Nicole Etter, a research professor at Penn State who has experience with voice and qualitative research design. This was done in order to guarantee that 1) there were a balance of questions, and 2) that questions were non-leading, non-biased, and appropriate. Dr. Etter also trained the researcher in conducting non-biased semi-structured interviews.

Data Analysis

All interviews were transcribed in separate documents by the lead researcher, then combined into a single document to begin the process of free coding. At this point, utterances were separated into individual nodes, or individual units of meaning – this constituted Level 1 of data analysis. Utterances were divided into nodes of meaning based on content and shifts in topic. A total of 3,870 free nodes were identified during Level 1 analysis.

In the second level of data analysis (Level 2), free nodes were organized into categories using a process called horizontalization. Categorization of nodes was performed by grouping together nodes with like meaning in the context in which they were uttered. Nodes were only placed in one category and no participants' utterances were altered. Free nodes with no meaning were deleted. Examples of deleted free nodes include, "That's basically, yeah" and "So like those people". Sequentially uttered nodes were combined if the researcher determined that each node, though varied in their specific content, contributed to a single idea. A total of 210 categories were created from the 3,870 nodes.

For the purposes of this thesis, data analysis was complete at Level 2 categorization. These data were then analyzed for content in relation to the topics set to be investigated, which included personal preventative voice care, personal rehabilitative voice care, and person "understandings" or what constitutes a "voice problem." These topics were translated into the following questions, respectively: 1) What do people do to take care of their healthy voice?, 2) What do people do to treat their 'voice problems'?, and 3) How do people classify 'voice problem'?

Chapter 4

Results

For the purposes of this thesis project, data analysis utilized Level 2 data that focused on three questions in relation to *singing* voice. The first question assessed was: What do people do to take care of their healthy voice? A list of what participants reported doing in order to take care of their healthy voice can be found in Table 2.

Table 2: What do people do to take care of their healthy voice?

What do people do to take care of their healthy voice?	
Category	Example of free nodes
1. "Antacids"	I take antacids sometimes to make sure that I don't like, you know, cause acid reflux and things like that.
2. "Overall/general health maintenance"	I think just the most important thing that like comes with having a voice is just like I said, three thousand times before is just being healthy and keeping up with yourself.
3. "Stay away from sick people"	Don't talk to people if they're sick. Stay away from the sick people.
4. "Try to use voice in a healthy way"	and I try to be as kind on my voice as I can.
5. "I avoid loud places/environments I have to shout in"	And so I really avoid like loud places and environments where I know I'm going to have to be like shouting over something.
6. "Overusing/pushing the voice is bad'"	I try really hard not to do it (to push my voice)
7. "Don't overuse/push voice when sick"	and... I don't want to push it because in the past whenever I've pushed things too far and used it too much or used it the wrong way, it takes longer to recover.
8. "You should listen to/be in tune with your	I'd say to anyone just keep- know your voice well enough to know how to keep it the way it should be to maintain it so that

voice/body to take care of your voice"	you can take the proper precautions if you do lose your voice to get it back.
9. "I try not to put weight/pressure on my voice (in various ways)"	I try to use my singing breath in order to speak so I'm not putting any weight on my voice. But sometimes I fall into it as anybody does.
10. "Pitching the voice higher to avoid injury" (speaking higher)	Just hearing from my professors, "Oh it's healthier to speak in a higher voice," I think that's influenced me quite a bit.
11. "Sleep is important/helpful for the voice" *note*… Most participants did not actually report getting enough sleep every night	Also sleeping, whenever I get a good night's sleep, I always can tell a difference. Like I said, I get like 5 hours of sleep a night.
12. "SOVTs to help the voice" *shared with third table*	And I do those first things (SOVTs), that really helps me.
13. "Water/hydation"	because when I did Heathers here at Penn State, I had been drinking water a lot that week because I was singing tenor 1 and I wanted to make sure that my voice was gonna be solid. And, I was drinking so much water, like, chugging more than my average. And I noticed after all the performances were over, my voice actually felt OK. So water is way more important than I already thought it was.
14. "Diet Factors"	1. I don't eat a lot- I don't have a lot of dairy. 2. But if things are starting to go wrong, I try to avoid the more acidic foods like tomatoes and like vinegary dressings and stuff like that, which is sad because I love both yeah 3. Caffeine doesn't bother me as much as it does some other people so I haven't been as worried about that. 4. I never drink coffee at all because caffeine is bad for my voice.
15. "Warm up/cool down helps the voice"	I warm up before I go to sing. I don't ever just like start singing without warming up because I don't want to hurt my voice.

The second question assessed was: How do people classify “voice problem”? A list of how participants used the terminology “voice/vocal problem” differently in their interviews can be found in Table 3.

Table 3: How people classify "voice problem"

How people classify “voice problem”	
Category	Example of Free Nodes
1. “Singing voice problems”	It sounds a little bit covered like the resonant space- there's some resonance issues
1. “Singing voice problems” AS “voice problems”	If someone is like slouching or something like that, that can be a vocal problem because their voice won't sound supported.
2. “Voice problems” as due to temporary/ nonserious/illness issues	And I've had other voice problems, like if I get sick before a show
3. “Voice problems” as due to more serious/lasting issues	I feel like a person that's having a voice problem should first kind of see how severe it is- like, is it just "Oh I've been singing too much lately?" or is it an actual problem like "I have nodes."

Finally, the third question assessed was: What do people do to treat their “voice problems”? A list of what participants reported doing in order to restore their healthy voice from an unhealthy state, or what they reported doing to “fix” their voice if things were not going well, can be found in Table 4.

Table 4: What do people do to treat their "voice problems"?

What do people do to treat their “voice problems”?	
1. “Voice/vocal rest”	I think rest is the biggest thing because if you- as hard as it is, I think by stopping the movement of the vocal folds, that gives your body time to heal them itself.
2. “Salt water gargle”	Gargling salt water is always a good one. That's more of like if you're, if your voice is sore. I usually use that as like a, to heal it afterwards, more of an after the fact thing. Unless it's like an emergency, which then I'll do it beforehand, but it's more of like a healing thing, like letting it like clean your throat out, you know, that kind of thing.

3. “Honey”	I'd say the honey's pretty consistent, the honey shots is a pretty consistent one. Almost daily, probably. (*coming from participant who stated they have vocal problems almost daily*)
4. “Inhaler”	I use my inhaler a lot, even if I'm not like necessarily having trouble breathing, but like if I know that my breath could be better, sometimes I use it even.
5. “Sinus rinse”	So during that time- I remember the one day I did - you really shouldn’t do this - but I did six sinus rinses in one day to really try to clear everything out and I started to be able to sing and like speak a little bit more. And I kept doing that and then after a few weeks, I finally got my voice back,
6. “Steamer/steaming/ humidifier”	and I kept steaming in my face and everything like crazy. And that's how I fixed the problem.
7. “Medications”	If it's really bad, you know, take Advil or Benadryl, Tylenol and things like that. Maybe not Benadryl but, there are medications out there that can help.
8. “Cough drops” (different kinds of cough drops specified)	I'll load up on- I never take cough drops, but load up on cough drops, (when I am sick and need to perform)
9. “Alcohol”	If you're desperate, and if you're super desperate, I know one time I was in a performance.. a shot of whiskey can help loosen things up. I was a performance two summers ago, and King Triton in Little Mermaid like lost his voice that day so they gave him a shot of whiskey to try and, like, loosen things up. Didn't really work. But like, it's still something. I have heard that now, and I don't know if I should try it, but it's apparently a thing.
10. “Change/modify voice use while sick. Treat voice kindly when voice isn’t 100%”	and just work smart and change things. You know, maybe don't belt that high note, switch it to mix or something.
11. “SOVTs to help the voice” *shared with first table*	I do semi-occluded vocal tracts throughout the week in order to kind of rejuvenate my voice.
12. “General doctor for voice issues”	probably just general medical professionals have some sort of... maybe not maybe not specialized training, but they would be able to help direct you in the right way or hear if something's a serious problem.
13. “Tea”	I've learned that- I drink a lot of tea with a lot of honey. I've learned that- that really helps my voice. Like if I'm having an off day and I need my voice for something, I'll brew a pot of tea with some honey some lemon juice. And that's really how I take care of my voice.

14. “Voice professional”	Well, they could see like an SLP or a voice teacher who might end up recommending that they go see a doctor or something, too.
15. “To get voice better, have to train certain muscles”	So it's like, in order to get better- in order to get the sound I want to have- I have to keep practicing it to strengthen those muscles.

Chapter 5

Discussion

The purpose of this study was to gain a more holistic view of the collegiate-vocal student's lived experience. The primary goal of this thesis was to learn about participants' voices and what they do to take care of them. The researcher identified three topics related to this goal, which were translated into the questions: 1) What do people do to take care of their healthy voice?, 2) How do people classify 'voice problem'?, and 3) What do people do to treat their 'voice problems'?. The following discussion will examine the categories of responses surrounding these topics as they pertain to healthy knowledge of the voice and healthy vocal hygiene. Recommendations are made where unhealthy assumptions or practices are identified.

What do people do to take care of their healthy voice?

Because voice disorders are more than 4 times as likely to develop in singers (Epstein), it is important to know what singers are doing to take care of their voices in before something goes wrong; as such, this section is comprised of categories relating to what participants did in order to maintain their vocal health (or, maintain their already healthy voice).

Positive, Vocally-Hygienic Practices

Participants reported a number of general daily behaviors as being vocally hygienic, such as

- avoiding people who are ill ("stay away from the sick people"),
- avoiding vocal abuse/overuse ("I try really hard not to do it [not to push my voice]),

- generally using the voice in a healthy way ("and I try to be as kind on my voice as I can"), and
- avoiding loud environments in which they would have to shout ("I really avoid loud places where I know I'm going to have to be like shouting").

Generally speaking, these are good practices to follow. Distancing oneself as much as possible from people who are sick or ill is shown to reduce infection rate ("Caring for Someone Sick," 2020), and using the voice healthily and avoiding misuse is always advisable ("Taking Care of Your Voice," 2018). Lastly, avoiding loud environments in which one must raise their voice above background noise prevents misuse and strain ("Keep Your Voice Sound," 2017).

Singers also noted positive effects in their voice when they were well hydrated ("So water is way more important that I already thought it was") and when they had a good night's sleep ("Also sleeping, whenever I get a good night's sleep, I always can tell a difference"). Interestingly though, a majority of participants reported only receiving 5-7 hours of sleep per night, and the average amount of water consumed by participants were 60.3 ounces per day. Pertaining to sleep, college students are a notoriously sleep-deprived population, generally receiving only 6-6.9 hours of sleep per night when it is recommended that they receive between 6-10 hours per night ("Sleep Rocks! ...Get More of It!", n.d.). Sleep deprivation, in regards to voice, may cause hoarseness, reduced breath support ("How does sleep affect my voice?," 2017) and an overall compromised vocal performance which could contribute to the development of voice disorders – studies have shown significant associations between short and long sleep durations and the development of dysphonia (Bagnall, Dorrian, & Fletcher, 2011; Cho, Guilminault, Joo, Jin, Han, & Park, 2017). Additionally, sleep deprivation may greatly contribute to "morning voice," which many participants reported experiencing (Icht, Zukerman,

Hershkovich, Laor, Heled, Fink, & Fostick, 2018). The importance of a good night's rest for singers of any age, therefore, cannot be stressed enough.

As for water intake, it is recommended that an individual consume at least 64oz of water per day (Childs, 2016). While the average number of ounces imbibed by participants closely approximates this number, it is skewed by some singers reporting very high quantities of water consumption. Indeed, 7 out of 10 participants reported drinking less than 60oz of water per day, with 5 out of 10 reporting numbers significantly lower than 64oz. Hydration, or lack thereof, is known to significantly affect vocal performance and voice quality; poor hydration leads to poor performance and quality, and good hydration leads to good performance and quality (Franca & Simpson, 2007). It is recommended, then, that student singers try to increase their water intake to 64oz per day, or as some sources cite, to at least half their body weight in ounces per day (Elkaim, 2013).

Other general behaviors in which participants reported engaging to maintain their healthy voices included maintaining their general health, "being in tune" with one's body, and trying not to put extra weight/pressure on the voice ("I try to use my singing breath in order to speak so I'm not putting any weight on my voice"). Participants also cited performing more specific behaviors/actions they performed in order to take care of their voices, such as warming up the voice before singing, doing semi-occluded vocal tract exercises, and trying not to overuse/push their voices when they were sick ("and... I don't want to push it because in the past whenever I've pushed things too far and used it too much or used it the wrong way, it takes longer to recover"). Despite this, the majority of participants *did* report pushing their voices when they were sick, ill, or injured. Reasons cited for doing so included various intrapersonal and interpersonal pressures, including "the show must go on," "but it gets to a point where like, the teacher gets really

frustrated or the director or the conductor and they're like 'you need to get this down' and then I feel the need (to push)," and "and you made a commitment (so you have to perform)." These data will be explored in future publications, but are consistent with Galloway and Berry's 1981 findings that students seem to overuse/abuse their voices due to pressure placed on them by their teachers, conductors, and/or themselves.

Hygienic, or No?

Several other general behaviors were reported as being beneficial for everyday, healthy voice care, but the responses surrounding these topics were either unclear in their stances or directly in opposition. Among these responses included those about certain dietary factors – specifically, dairy and caffeine intake – and those about pitching the voice "higher" to avoid vocal injury.

In regards to dietary intake, participants were in agreement that reducing or mitigating acid in a person's diet was generally beneficial for the voice. This is encouraging, as reducing acid is a primary means of combatting vocal issues caused by reflux (Koufman, Stern, & Bauer, 2012; "Reflux Laryngitis," 2013). On the other hand, participants' responses were not in accordance on dairy and caffeine consumption. As for dairy, Singer 5 stated, "for a while I was really scared about like dairy intake and things and when I looked it up I've never I didn't really find anything." In contrast, Singer 10 stated, "I allow tea and like one nice drink, like one like chocolate milk or something like that," suggesting that dairy served as a detriment to her voice. In fact, the former is correct, in that there is little to no evidence to support that milk or dairy is harmful to voice production or increases mucus. Reporting on statements given by Dr. Lucian Sulica in 2011, the New York Times states "There is no evidence that dairy products, especially milk, increase phlegm or the viscosity of phlegm" and "The question has been formally

investigated in studies, which demonstrated no increase in mucus production… although subjects who believed in the phenomenon reported that they did feel more mucus when they ate dairy products" (Ray, 2011). As for caffeine, Singer 6 stated "Caffeine doesn't bother me as much as it does some other people so I haven't been as worried about that" whereas Singer 8 stated "I never drink coffee at all because caffeine is bad for my voice." Although substances affect every individual differently, caffeine is shown to be drying and potentially irritating to the mucosal lining of the vocal folds; therefore, limiting its consumption is advisable for singers who wish to maintain well-hydrated vocal folds ("Taking Care of Your Voice," 2018). Amusingly, Singer 8 reported that "I never drink coffee at all because caffeine is bad for my voice," but immediately prior to this comment stated, "Tea. Throat coat, you know?", in response to what they did to take care of their voice. Many other participants cited tea as being helpful in taking care of their voice as well. Throat Coat as a brand does not report containing caffeine ("Traditional Medicinals: All Products," 2020), but many other teas do. It is unclear whether or not these participants knew that most teas contain caffeine ("How much caffeine is in your cup?," 2020), but one participant did state that, while tea was helpful, "be careful because tea can dehydrate you" (Singer 4). While hot tea's warmth may be soothing, it should be emphasized that water is the best option for voice care and overall voice health (Childs, 2016).

Finally, it was reported that pitching one's voice "higher" when speaking is beneficial in preventing injury. Singer 3 reported "Just hearing from my professors, 'Oh it's healthier to speak in a higher voice,' I think that's influenced me quite a bit." Another participant, Singer 1, stated that they did not pitch their voice higher, but that their professor does: "I'm not XXX XXX just very like 'Oh yes hello!'" mimicking the professor's higher-pitched voice. Singer 1 also stated that their voice is usually lower and more "husky," implying that using a higher voice may be

healthier for them. It is unclear whether these responses meant to convey that avoiding the habitual use of vocal fry is beneficial, or if habitually pitching one's speaking voice higher than their natural sound is beneficial. If the former is true, this is indeed a vocally hygienic practice; though some evidence suggests that the chronic use of vocal fry does not physically harm the vocal folds (Akst & Pietsch, n.d.), other doctors claim that erratic pattern of vocal fold vibration associated with vocal fry may lead to vocal injury (Williams, 2017). Therefore, erring on the side of caution and avoiding use of the fry register is recommended. The latter, however, would be a harmful assumption and is a practice that could lead to vocal injury. Speaking at a habitual pitch level that is above (or below) one's optimal pitch range does not allow for optimal vocal quality, resonance, or ease of use (Hood, 1994), and doing so can cause lasting tensions and damage ("Muscle Tension Dysphonia", n.d.). Singer 1 astutely states the following as their reason for not speaking in a higher-than-normal voice: "…As best they can [people should] try to embrace their natural voice and what's comfortable, rather than trying to affect something that they hear… because that can cause issues."

How people classify "voice problem"

This information was not asked nor purposefully elicited of participants in any way. Instead, these data arose participants being asked a variety of questions, such as "Have you ever had a voice problem?" "What should a person who is having a voice problem do?" and "Tell me about your voice." When educating singers about the prevention of vocal pathology, it is important that singers be able to distinguish what Carding and Wade (2000) describe as "vocal

symptoms" from vocal pathologies themselves, but still recognize that such symptoms need be heeded as potential warning signs of voice pathology.

The way in which participants classified problems with their voice – or "voice problems," when that terminology was explicitly used in the phrasing of a question – was especially interesting to the researcher. He intended for this terminology to refer specifically to lasting vocal pathologies, and expected participants who used the terminology in their responses to share in such a definition. However, responses from participants did not necessarily adhere to this usage. For example, when asked "Tell me about your voice," or "Tell me how your voice feels/sounds," many singers reported having what was categorized as " 'singing' voice problems." For example, in relation to their singing voice, Singer 3 reported "It sounds a little bit covered like the resonant space- there's some resonance issues," and Singer 5 reported, "I have a very interesting second passaggio around an E and an F above the C above middle C which I can't seem to break through no matter what." It is reasonable that singers describe such phenomena as "problems," considering that their majors entail the pursuit, refinement, and athletic mastery of their vocal mechanism.

Other responses expanded upon this sentiment and equated 'singing voice problems' to 'voice problems' themselves. One such participant (Singer 7) stated "If someone is like slouching or something like that, that can be a vocal problem because their voice won't sound supported." Another participant (Singer 8) stated "No voice is ever a finished product. Everything is always refining. So, voice problems can always be fixed." It is interesting to compare such statements to those that might be made about one's everyday speaking voice; if someone were to have a speaking voice that was under-energized by the breath, that could truly be a vocal problem; if someone had a voice problem, their voice would of course be undergoing

refinement. However, as noted in the results section, these data refer specifically to participants' singing voices, and such comparisons between the speaking voice and voice problems were not drawn by any of the participants. These comments elucidate a duality, a "two-voice identity" of sorts, that many participants appeared to hold about their voice – that their speaking and singing voices were different entities and not one and the same. The implications of the potential danger of such a duality will be explored towards the end of this discussion section.

Related to "'singing voice problems' as "voice problems,'" participants also reported voice problems as being due to temporary/benign issues ("I've had many voice problems. I have them all the time." / "You just learn to live with them and only, like, really freak out if it's severe, if it's crazy, ya know?") or as due to temporary/nonserious illness. The researcher considered the former – voice problems being described as due to temporary or benign issues – as being closely related to the previously discussed "singing voice problems as 'voice problems'" category. On the other hand, the researcher considered the latter category of responses – voice problems as due to temporary/nonserious illness – as a closer approximation to the notion of a "voice problem", even though the majority of such issues do not appear result in lasting vocal pathologies (Bainbridge, Roy, Losonczy, Hoffman & Cohen, 2017). Indeed, a number of participants described voice problems as being due to more serious and lasting issues, such as vocal nodules and polyps ("I've not [had a voice problem]" / "I feel like a person that's having a voice problem should first kind of see how severe it is- like, is it just 'Oh I've been singing too much lately?' or is it an actual problem like 'I have nodes'").

These data exemplify the perhaps muddled line between "vocal symptoms" and "voice problems" for singers, and indicate that minor vocal inconveniences might be perceived as sizeable stressors for people who use their voice in such an elevated and heightened manner;

nonetheless, they could also indicate a lack in knowledge of what constitutes a vocal pathology. On the other hand, the incongruity between participants' classifications of "voice problem" may have been due to differences in personal operational definitions of the term. Being as it may, that any or all of these assumptions could be true, it is important for vocalists to know that minor daily variations in voice production and voice quality are to be expected and should not be a cause for concern. Knowing this, it is also important to understanding that *persistent* deviation from an individual's norm vocal production/quality *can* be a sign of vocal pathology – recognizing associated signs/symptoms, is of the utmost importance to singers.

What do people do to 'treat' their "voice problems"?

Positive, Palliative Vocal Hygiene

Although muddied by participants' somewhat varied classifications of what defines a voice problem, they reported a number of measures they had either heard of or performed themselves in order to restore sick, ill, or injured voices. Of the measures reported, many were beneficial, some were questionable, and some were harmful.

Nearly all participants reported that voice/vocal rest was beneficial in restoring the voice when things were not going well ("I think rest is the biggest thing because if you- as hard as it is, I think by stopping the movement of the vocal folds, that gives your body time to heal them itself"). This is encouraging, as voice rest is shown to be helpful in treating a variety of voice problems ("Taking Care of Your Voice," 2018). Total or absolute voice rest, however, should be avoided (Sataloff, Cline, Lyons, Skeffington, & Rubin, 2019). Participants also reported that treating one's sick/ill/injured voice more kindly/modifying its usage was beneficial, which the

researcher interpreted as being adjacent to voice rest. A number of participants indicated that increasing water consumption, using humidifier/personal steamer, increasing sleep time, and doing semi-occluded vocal tract exercises were all beneficial in restoring their voices. These, too, are encouraging to hear. SOVT exercises are shown to have therapeutic attributes, reducing stress on the voice, and increased systemic and superficial hydration are shown to generally benefit the vocal mechanism ("Voice Disorders," n.d.; Sivasankar & Leydon, 2010; Childs, 2016). Indeed, some participants reported regular use of steaming to take care of their voice even when it was healthy. Furthermore, sleep deprivation is shown to have a negative effect on voice production and quality (Bagnall, Dorrian, & Fletcher, 2011) which makes sense because sleep is meant to restore and repair the body; getting more sleep when ill, then, should certainly have a positive effect on a singer's unwell voice ("How does sleep affect my voice?," 2017).

Helpful or Harmful?

Other measures that participants reported in order to take care of their voice problems included saltwater gargles, sinus rinses, consuming honey, using cough drops ("I'll load up on- I never take cough drops, but load up on cough drops"), drinking tea, and inhaler/other medication usage ("I use my inhaler a lot, even if I'm not like necessarily having trouble breathing" / "If it's really bad, you know, take Advil or Benadryl, Tylenol and things like that. Maybe not Benadryl but, there are medications out there that can help"). Gargling saltwater, sinus sprays/rinses, and consuming honey all are supported in being at least somewhat effective at soothing sore throats, helping with congestion, and/or relieving cough, but they do not directly treat the vocal mechanism (Moyad, 2009; Rabago & Zgierska, 2009; Childs, 2016). Still, their usages are generally seen as vocally acceptable and healthy. On the other hand, medications may be helpful with swelling and to treat the symptoms of upper respiratory tract illnesses, for example, but they

may also be drying to the vocal mucosa and increase the risk of vocal fold lesions, hemorrhages, and other problems (Altman, n.d.; "The Fluid Factor," n.d.). Furthermore, inhaler usage is appropriate for those with asthma, but their use may cause vocal fold irritation, drying, and lead to dysphonia, especially when used in excess or inappropriately (Williams, Baghat, Stableforth, Cayton, Shenoi, & Skinner, 1983; Lavy, Wood, Rubin, & Harries, 2000). The assumption that inhalers and certain medications may be used as palliatives for voice problems must then be generally cautioned against.

Cough drops and tea may be okay to consume, depending on what the specific product in question contains (Childs, 2016). Cough drops containing menthol should generally be avoided by singers due to menthol's drying and numbing qualities, but cough drops that are glycerin-based or contain pectin are safer to consume (Sataloff et al., 2016; "Cough Drops & Throat Lozenges," 2020). Singer 2 reported knowing this, stating that "I do Luden's instead of Halls or anything because they have pectin and pectin hydrates" as did two other (Singer 7 and Singer 8).

Other participants reported using cough drops to treat their voice problems but did not specify what ingredients they contained. As such, and with menthol cough drops being more widely produced ("Cough Drops & Throat Lozenges," 2020), the researcher could not assume that they had knowledge of the difference between such products. Furthermore, tea's anecdotal ability to soothe an aching throat is widely regarded. However, many tea products contain caffeine, and as previously discussed, caffeine can serve to both dehydrate and irritate the vocal folds. Products containing caffeine should be avoided when considering vocal hygiene.

One participant reported that they heard that alcohol may help with voice problems. The participant reported the following:

> "If you're desperate, and if you're super desperate, I know one time I was in a performance... a shot of whiskey can help loosen things up. I was a performance two summers ago, and XXX XXX in Little Mermaid like lost his voice that day so they gave him a shot of whiskey to try and, like, loosen things up. Didn't really work. But like, it's still something. I have heard that now, and I don't know if I should try it, but it's apparently a thing."

This is report is discouraging and frightening to hear for multiple reasons. Firstly, alcohol is a depressant, which impairs and slows down the nervous system's sending and receiving of messages, reducing sensation and motor control (Alcohol and Drug Foundation, 2020). For singers, performing with such reduced sensation and motor control may translate to a reduction or loss of vocal precision, reduced breath capacity/control, and slurred speech (Saunders, 2019). Alcohol may also cause confusion, memory problems, concentration problems, and impairments in a person's executive functioning (National Institute on Alcohol Abuse and Alcoholism, 2019). For singers, this may cause performance errors where otherwise none would have occurred, and render one unable to adjust their performance through "information updating" (Day, Kahler, Ahern, & Clark, 2015). This is a crucial piece of information; consuming alcohol may cause singers to engage in more harmful, straining, and abusive vocal behaviors during a performance, because if mid-performance technique needs to be adjusted to avoid injury, having consumed alcohol may prevent singers from integrating such information (Babor, Berglas, Mendelson, et al., 1983.) This is compounded upon by the fact that alcohol also impairs hearing; singers under its influence, therefore, will automatically begin to sing more loudly to compensate for hearing their voices more quietly (Kruszelnicki, 2016). Lastly, alcohol is a known diuretic and irritant – when consumed, alcohol may dehydrate the vocal folds and irritate its mucous membranes,

thereby affecting the quality of sound produced and increasing one's chances of vocal injury, and it may also cause or aggravate existing acid reflux that can harm the vocal folds (Anderson et al., 2009; Landman, 2018; Official NATS, 2018; "Reflux Laryngitis," 2020).

Though alcohol affects every individual differently, its potential combined effects spell a recipe for vocal disaster: reduced motor control, reduced sensation, reduced hearing, dehydration, increased acid reflux, and disinhibition of vocal behavior may all lead to vocal overuse and abuse individually – in tandem, they may be especially detrimental. Some sources cite alcohol's calming and relaxing effects as certain people's reasons to drink before singing (Saunders, 2019), but weighed against alcohol's negative side effects, it is advisable that alcohol be completely avoided before such activity. In addition, it is highly concerning that the participant who provided the aforementioned quote cited a third party "they" as "giving" the cast member alcohol before a performance. Was this third party "they" comprised of cast members? Parents? Or production/direction/creative staff? Was the cast member of legal age to drink, and did the cast member fully and willingly consent to consuming alcohol? In any case, the safeties all of performers must be ensured, especially those young performers whose voices are still developing, so this action must be condemned as highly inappropriate. Among other sources, performers' safeties can be enhanced by better education and knowledge of what actually can help a voice problem.

General Medical vs. Voice Professionals

Participants reported visiting both general doctors and voice-specific professionals for voice problems. One participant (Singer 3) stated that general doctors "would be able to help direct you in the right way or hear if something's a serious problem" but another (Singer 10) stated that their pediatrician did not have much knowledge about voice problems, saying "My

biggest issue whenever I was trying to go to my pediatrician if I was having voice issues is that they would prescribe me things that would dry me out. They wouldn't understand that like I needed my voice and that's why I was there." Other participants stated they would go to their voice teacher, an SLP, and/or an ENT for voice problems. Following more a pathological view of "voice problem," participants cited visiting SLPs or ENTs for more serious and lasting vocal issues only. Visiting one's voice teacher for voice problems, on the other hand, was often cited in relation to "singing voice problems" or "singing voice problems AS voice problems" – so, visiting one's voice teacher for what would likely be non-pathological issues. However, visiting one's voice teacher was also cited as a resource for those experiencing more serious and lasting problems. This is consistent with previous studies showing that young singers often seek out their voice teachers for advice when in vocal distress (Petty, 2012; Milo, 2014).

Finally, one participant (Singer 7) reported that, in order to improve one's voice problems, you have to practice using and strengthening certain muscles. This is interesting, again because the statement was referring to a "voice problem" as a non-pathological singing issue. Strengthening the vocal folds is commonplace in treating certain vocal pathologies such as paresis or paralysis, and strengthening muscles in the vocal folds themselves certainly plays an important role skilled singing (ex: training the interarytenoid muscles in order to achieve better vocal fold closure) ("Vocal Cord Paralysis," 2018).

Conclusion

Participants cited engaging in a number of positive and encouraging practices related to taking care of their voices. It was very encouraging that a number of participants cited having

knowledge of ENT and SLP voice professionals, as the researcher had originally postulated that many participants would not be familiar with them; many, however, did not. It also must be noted, that two of the three participants citing their knowledge of such professionals had actually visited one because of voice problems they had experienced themselves. Furthermore, other behaviors or beliefs that were questionable or overtly harmful/damaging were also reported, and future prevention efforts in CSD should target such misconceptions.

Relating untrained or undertrained singing voice qualities to having a type of "voice problem" was a recurring theme in this study. Young singers in such a college training program understandably want to achieve the best sound of quality that they in their training, or they likely would not have auditioned for and be partaking in such a major. It is important to teach them, then, that day-to-day changes and other untrained aspects of their singing voices do not equate to having a "voice problem." However, young singers must also understand the behaviors and warning signs that could lead to the development of one, which indeed could occur on a day-to-day basis.

As stated in the Results section, this study focuses on participants' comments in relation to their singing voice. The researcher often explicitly asked clarifying questions about participants' "speaking voices," as much of the time participants related the word "voice" only to their singing instrument. One participant stated:

> "I don't really care about my speaking voice most of the time, honestly… I think the only reason I care about my speaking voice is in relation to the health of my singing voice. Like I think when it comes down to it, singing voice is like all that singers really care about, you know? I don't care how my speaking voice sounds. If you can understand it, it's fine."

Other participants also provided comments such as “I've never really thought that much about my speaking voice” and “Speaking voice wise, It's not really something I notice like I talk and I just don't really hear my voice I just kind of speak.” Young singers need to understand that a person only has one voice – that a person’s speaking and singing voice are one in the same, highly inter-related – and that how a person uses and treats their voice when they speak directly affects their sound when they sing. As very astutely put by Morton Cooper, singers “must be aware of the fact that the speaking voice ... can create functional and psychological havoc in a singing voice” (1979, p. 37).

Lastly, it is important to teach young singers to appreciate and value what their voice does well. One participant (Singer 8) cited their teacher supporting this idea and stated the following:

> “… [My voice teacher] has cultivated a culture, like a mindset in which I appreciate something, like something I did well first is the biggest thing. She goes "Whenever we sing," she's like "Make sure that we tell ourselves something we did well first." You know? And I think that has made a huge impact on my mental health when it comes to singing, because- like I know the first thing after you sing, is you think of things you did wrong, things you want to improve on. But it's important to take a step back and look at the things that you did well in order to stay positive and continue wanting to grow in your voice.”

With many singers implying or outright equating “singing voice problems” to “voice problems” themselves, the reason as to why may not lie in discrepancies as to what constitutes a “voice problem”; rather, this issue may stem from singers’ insecurities and perceived issues with their

own voices. This would not be surprising, as with many participants only speaking to their singing instrument when asked about "voice," it appears that many only think of their voice as a musical instrument in need of refinement. If this is the case, teaching young singers to value their vocal strengths and constructively building upon their existing skills may improve any ill-bearings they hold towards their voice, or what their voice "should" sound like. It is important that this occurs because, as discussed in the introduction, a person's voice is deeply personal and identifying. Being overly critical of oneself can be extremely detrimental to both long-term mental *and* physical health, so teaching young singers to focus on what they do well is in the best interest of their future (Lieberman, 2018).

Limitations of the Study

A limitation of the study includes that it is limited to people who would willingly participate in it; it could speak to the relationship the participants may have had between themselves and their voices, which is a relationship that people refusing to participate may not have had. Further limitations include that that sample size is small (n=10), that the sample is drawn from only PSU students, and that the sample primarily included students who were in the BME Music Education and BM Performance majors. Finally, the personal relationship between each participant and the researcher could also be considered a limitation (though, as previously discussed, the existence of such a relationship in conducting these interviews instead may have been advantageous).

Future Directions

Future work with these data will utilize a third level of analysis in which all categories are further analyzed and placed together under common themes. This work will include an analysis of the full scope of interview questions asked and all data gathered to date. The researcher also intends on gathering more data from individuals in different majors/training programs, potentially diversifying responses and enabling the data to reach a more saturated level. Finally, the researcher intends to incorporate the novel data into his existing work by repeating data analysis steps 1-3 on the new data and publishing an article on such work. The researcher plans to continue this research because the prevention of vocal injury is of the utmost importance to professional singing voice users, and injury prevention of any kind starts with education. Therefore, the researcher also plans to continue this research with the goal of improving the education provided by collegiate training programs to their students.

Appendix A

Background/General Data Information Sheet

Date: _____ Participant Code:_____

Demographic Information	
Date of birth (Age)	
Gender	
Years of Education	
Degree being sought	
Future Professional goal	
Years of training toward current profession	
Hydration – Internal (e.g. How much water per day in ounces, how much caffeine? Alcohol?)	
Hydration – External (e.g. Do you use a fan? A humidifier?)	
Smoking history	
How many hours do you sleep per night (on average)	
If singer:	
Voice Part	
Time spent singing	Per Day: Per Week
Currently training for a show?	

Additional Notes:

Appendix B

Qualitative Questions

Qualitative Questions

1. Tell me about your voice.
2. How did you develop “your sound”?
3. How do you use your voice?
4. How much do you use your voice on a regular basis?
5. Describe how your voice feels.
6. Describe how your voice sounds.
7. Do you like your voice?
    a. (Follow-up why or why not as appropriate)
8. Describe how your voice changes throughout the…
    a. Day?
    b. Week?
    c. Year?
    d. (For singers: During and after performance)
9. What have you learned about taking care of your voice?
    a. Where did you learn about taking care of your voice?
    b. From whom did you learn about taking care of your voice?
10. Tell me what you do to take care of your voice?
11. “We’re going to slightly switch topics and talk about people who might have a voice problem”….What are some signs or symptoms a person might experience if they were having voice problems?
12. What should a person who is having voice problems do?
13. Have you ever had a voice problem?
    a. (Follow-up if appropriate) What did you do when you had a voice problem?
14. Have you ever pushed your voice to work (teach, perform, etc) when you were sick, ill, or injured?
    a. (Follow-up if appropriate) Why did you push yourself to perform?
    b. (Follow-up if appropriate) Tell me more about that time.
15. If you needed help with your voice, who would you talk to?
    a. Who else helps people with voice problems?
16. What, if anything, can be done to help a person with voice problems?
17. Is there anything you want people who study voice to know?

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ACADEMIC VITA

MICHAEL PEAGLER

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Education

The Pennsylvania State University — **University Park, PA**
College of HHD and AA, Schreyer Honors College — *May 2020*
B.S. Communication Sciences and Disorder, B.S. Dance
Minors in Spanish, Voice

Spanish School for Foreigners (through PSU) — **Ronda, Spain**
Education Abroad — *May 2018 – June 2018*

Honors

Pennsylvania State University Dean's List	2016 – present
Communication Sciences and Disorders Award	2018
President's Freshman Award	2017
Spanish Language Program Award of Outstanding Achievement	2017

Research Interests and Experience

Interests: voice and singing voice health, neurogenic disorders, communication through performance

Orofacial Physiology & Perceptual Analysis Lab (OPPAL)

- Regularly attended weekly lab meetings
- Trained in qualitative and quantitative methodologies used in the lab
- Trained to conduct labio-lingual point pressure assessments
- Trained to record and analyze speech samples

Schreyer Honors College (in tandem with OPPAL)

- Experience conducting research on a more independent basis
- Experience writing a thesis, including abstract, literature review, methods, data, data analysis, and discussion sections
- Working to publish this thesis; will obtain experience in the publication process in the near future

Observation Experience

EASTERSEALS

- Observed early intervention/pediatric care of children with autism, Down syndrome, Rett's syndrome, cerebral palsy, and various other kinds of developmental disorders. Was able to observe therapy done in an inclusive setting in one of their rooms called the Friendship Academy, and was able to observe OT, PT, and SLP work being done back-to-back in other pull-out classrooms. Learned about the importance of working on a team as an SLP and the multifaceted treatment programs that children with developmental disorders undergo. Was given the opportunity to help implement treatment
- **2901 Edgely Rd, Levittown PA**
  Easter Seals Southeastern Pennsylvania
  Andi Becker
  abecker@easterseals-sepa.org

Philadelphia Ear, Nose and Throat Associates

- Led by Dr. Sataloff. Was able to observe principals of voice therapy and voice care in an integrative voice clinic setting (ENTs, SLPs, singing-voice specialists, etc.) and voice rehabilitation as applied to caring for the singing voice. Was able to observe singing voice therapy sessions. Was occasionally asked for input into therapy and was allowed by the therapist(s) observed to participate in some of the therapy activities that occurred. Was given the opportunity to interact with clients and learn more about their individual backgrounds, therapy goals, and professional goals.
- **419 N Broad Street, Philadelphia PA**
  Bridget Rose
  brose@phillyent.com

Work History

Darden Restaurants, Longhorn Steakhouse **Bensalem, PA**
Host/Busser *June 2019 - present*

- Experience in customer service and interpersonal relations, ability to work front end, lead seating, and work cooperatively in a pressure-filled, fast-paced environment

Pennsylvania State University Residence Life **University Park, PA**
Honors Resident Assistant (RA) *August 2018 – May 2020*

- Provide guidance, academic/emotional support, policy enforcement, and campus resource information for 50 residents on assigned floor and 800 residents building-wide
- Respond to multiple emotional/psychological crisis scenarios such as suicidal ideation and sexual assault, provide resources, and follow-up as appropriate
- Employ a wide range of soft skills in interacting with residents during events and policy enforcement

SeaWorld Parks and Entertainment **Langhorne, PA**
E3 Dancer – Sesame Place Theme Park *January 2015 – January 2019*

- Dance and perform in/out of Sesame Street character costumes in temperatures up to 105°F
- Special training for live show performance, interact with & help guests have best experience possible

Pennsylvania State University **University Park, PA**
Internship – Center County Intermediate Unit (CIU) 10 *January 2018 – June 2018*
Adult Literacy Tutor

- Tutor adult ESL learners in aspects of literacy, including: speaking, listening, reading, writing, math etc.
- Attend professional development sessions and training on how to best work with learners and attend to people's needs
- Write lesson plans, update learner's charts, write progress reports; minimum of 6 hours/week inclusive

Schreyer Honors College **University Park, PA**
Orientation Mentor – Volunteer *March 2017 – August 2017*

- Worked as a part of team with a group of 40 mentors to guide 300+ mentees through orientation
- Mentored incoming freshmen honors college scholars through a 3-day orientation program

ACME Markets **Bensalem, PA**
Cashier/Bagger *June 2014 – February 2015*

- Trained and trusted in handling large amounts of money, experience in customer service and guest/interpersonal relations

Volunteer Experience

PALS Programs

Camp Counselor *July 2019, July 2020*

- PALS Programs provide a fully-inclusive, non-judgmental environment for young adults with Down syndrome and their peers to have fun, grow as individuals, and build transformative friendships.
- PALS counselors are paired 1:1 with a camper with Down syndrome for the week of camp. Counselors are responsible for staying with their camper, keeping in mind their medications and dietary restrictions, etc. They are most importantly there to create lifelong friends and memories with their campers/peers

Schreyer Honors College

Orientation Mentor *March 2017 – August 2017*

- Worked as a part of team with a group of 40 mentors to guide 300+ mentees through orientation
- Mentored incoming freshmen honors college scholars through a 3-day orientation program

PREP Sunday School Aide

- Assist the main 6th-grade classroom religious education teacher every Sunday from 9-12 in teaching about the Catholic faith and preparing students for the sacrament of Confirmation
- Provide extra assistance/help to children with special needs (cerebral palsy, Down syndrome, autism, etc.) in the form of one-on-one tutoring, extra test time supervision, and more

Extracurricular Experience

PSU Thespian Society (Club)

- Audition for musicals every semester (have performed in 2, 2 separate semesters)
- Rehearse these musicals for up to 20 hours/week
- Rehearse for 5-7 weeks and then put on 4 performances of the show

PSU School of Theatre

- Rehearse a musical for 4 hours/night, 5 nights/week for 5 weeks and perform it for the public during week 6
- Have performed in 2 musicals, 2 separate semesters with the Penn State School of Theatre
- PSU Musical Theatre is considered one of the best MT programs in the country

PSU Glee Club (8 semesters; 2016-2020)

- Sing/rehearse choral music in a choir of approximately 60 members. In class rehearsal: 2 hours and 40 minutes per week. Out of class rehearsing regularly performed as well
- Perform in extra-curricular functions such as football tailgate sings, official university-sponsored events (ex: yearly freshman welcome pep rally), semester-culminating concerts, and Glee Club national/international tours.