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### The Inclusion of Vocal Health in the School Curriculum: A National Survey of School-Based Speech-Language Pathologists and Speech-Language Pathology Assistants

Kate Mathews  
math6865@bears.unco.edu

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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

THE INCLUSION OF VOCAL HEALTH IN THE SCHOOL CURRICULUM:  
A NATIONAL SURVEY OF SCHOOL-BASED SPEECH-LANGUAGE  
PATHOLOGISTS AND SPEECH-LANGUAGE  
PATHOLOGY ASSISTANTS

A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of  
Master of Arts

Kate Elizabeth Mathews

College of Natural and Health Sciences  
Audiology and Speech-Language Sciences

August 2021

This Thesis by: Kate Elizabeth Mathews

Entitled: *The Inclusion of Vocal Health in the School Curriculum: A National Survey of School-Based Speech-Language Pathologists and Speech-Language Pathology Assistants*

Has been approved as meeting the requirement for the Degree of Master of Arts in College of Natural and Health Sciences, Department of Audiology and Speech-Language Sciences.

Accepted by this Thesis Committee:

---

Julie A. Hanks, Ed.D., CCC-SLP, Research Advisor

---

Don Finan, Ph.D., Committee Member

Accepted by the Graduate School

---

Jeri-Anne Lyons, Ph.D.  
Dean of the Graduate School  
Associate President for Research

## ABSTRACT

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The human voice is an important tool of expression and a defining quality of self. Additionally, many occupations require, at least in part, a functioning voice for job completion (Titze et al., 1997). It is not surprising, then, that a dysfunctional voice may be disruptive and have a negative impact on a person's quality of life. Unfortunately, disorders of voice are common, and perhaps even more so than many may realize (Bhattacharyya, 2014; Hartley et al., 2016; Roy, 2003; Roy et al., 2005). Several voice disorders, however, are preventable through the very same vocal health education means used in voice rehabilitation (ASHA, n.d.; Pannbacker, 1998; Van Houtte et al., 2011). This invites the question: why not deliver vocal health education to the populace as a means of preventing these disorders?

General wellness and primary prevention education in the United States occurs, at least in part, in the schools. National Health Education Standards (NHES), developed by the Centers for Disease Control and Prevention (CDC) and used as reference for health education in many states, include the knowledge of concepts which promote health and prevent disease (Joint Committee on National Health Education Standards, 2007). Vocal health education may be a significant health concept covered in schools. Established at an early age and carried into adulthood, habits which promote a functioning voice may save many the disruption and discomfort of future, preventable voice disorders.

This research surveys school-based speech-language pathologists (SLPs) and speech-language pathology assistants on current practices and attitudes surrounding vocal health education in the school curriculum. These speech and language professionals are primary voice specialists in the schools, may have insight into vocal health in the curriculum, and are therefore important groups to survey for this research. Descriptive data analysis of 115 responses to the researcher-created Vocal Health Education Questionnaire provides insight into the thoughts and feelings of these voice professionals on the inclusion of vocal health in the school curriculum.

Results show most respondents (97.4%) report vocal health is not currently included in schools in which they work. Attitude statements measured via Likert-type responses indicated respondents understand the benefits of vocal health education but also find multiple barriers to its inclusion in the schools at this time. These coupled with responses to the open-ended “Additional thoughts about the inclusion of vocal health in the schools” further indicated that schools either would not or could not include vocal health in the schools due to time or further resource constraints, other priorities in the schools such as academic standards or other curriculum requirements, and a belief that voice health is not significant for students.

The findings have implications for SLPs and other vocal health professionals. A program of this kind may indeed reduce the number of speakers suffering from voice disorders yet may face numerous challenges in implementation. This study contributes to research which supports primary prevention education for vocal health by discovering some of the possible obstacles to including such a program in the school curriculum and provides suggestions for future research.

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## **CHAPTER I**

### **INTRODUCTION**

#### **Introduction to the Research**

The voice can be a defining quality of self and arguably is one of the more important tools a person has when navigating the complexities of life. As the primary communication means for most persons, a functioning voice may seem a necessity for many in relationship building, vocational pursuits, meeting principal needs, and other norms of everyday living. It is not surprising, then, that a person suffering vocal defects may face various consequences. As an expert in communication disorders, and a primary provider of vocal rehabilitation therapy, the speech-language pathologist (SLP) is concerned with matters of voice, voice health, and vocal function. According to the American Speech-Language-Hearing Association (ASHA, 2016), it is the responsibility of SLPs not only to assess, diagnose, and treat voice disorders, but also to be an advocate for those with voice disorders and a purveyor of preventative vocal health information.

When a person's voice is of abnormal or inappropriate quality for their age, gender, or background, and/or is not meeting an individual's daily needs, one may be considered to have a voice disorder (ASHA, n.d.). Disorders of the voice vary in cause, duration, and prognosis. Some are physiological in nature, some psychogenic, and others caused by misuse and abuse of the vocal mechanism (ASHA, n.d.). Regardless of the etiology of the voice disorder, voice therapy (aimed at vocal rehabilitation and prevention of further vocal damage) often includes some aspect of patient education in the basics of healthy vocal function and vocal hygiene (ASHA,

n.d.). Indeed, this information is just as easily delivered to healthy individuals and may prevent vocal damage. Addressing vocal health at a young age may help establish the development of healthy vocal habits, largely preventing many causes of dysphonia.

This research argues voice problems resulting in part from poor vocal care may be more prevalent than many SLPs realize, that a malfunctioning voice can negatively impact various life domains, and that various causes of dysphonia may be, for many, preventable through vocal health education. General health education in primary and secondary schools introduces students to strategies and habits which might help maintain their health as they enter and traverse adulthood. Health education is predominantly based on primary prevention as students are instructed on establishing the habits which might maintain a healthy body and mind and can be utilized throughout their lifetime (Joint Committee on National Health Education Standards, 2007). The behaviors which encourage vocal health are such habits; therefore, it seems reasonable that vocal health be addressed in the schools. More research is needed to discover the extent to which this education is already in place, why or why not, and the supports perceived as requisite for the inclusion of vocal health education in the schools.

### **Glossary of Terms**

The following terms pertain to the current research study and specifically to voice, vocal health and function, and the assessment and treatment of voice disorders.

*Acoustic measures.* Qualities of sound, in this case voice, which can be objectively measured using acoustic instrumentation. This may include, but is not limited to, frequency (pitch), intensity (loudness), and jitter & shimmer (perturbation; Roseberry-McKibbin et al., 2019).

*Chronic laryngitis.* Inflammatory condition of the larynx, of infectious or non-infectious origin, which lasts longer than three weeks (Akbulut et al., 2020).

*Diplophonia.* The voice is perceived as being produced with two concurrent pitches. This may result from vocal lesion or from functional causes (Roseberry-McKibbin et al., 2019).

*Dysphonia.* Vocal diagnosis consisting of abnormal vocal production (phonation) which may include a voice which is hoarse, rough, strained, raspy, gravelly, weak, or breathy. Can vary in intensity, duration, and onset (Roseberry-McKibbin et al., 2019).

*Etiology.* The cause, or set of causes, of a disease or condition (Roseberry-McKibbin et al., 2019).

*Frequency.* Occurrence of a repeating event per second, measured in hertz (Hz). In relation to the voice, frequency refers to the rate of vocal fold vibration. This correlates directly to pitch perceived: the faster the rate of vocal fold vibration (frequency in Hz), the higher the pitch perceived (Behrman, 2018).

*Fundamental frequency.* The lowest component of a sine wave; for the voice, the frequency that is perceived as the pitch of the voice (Behrman, 2018).

*Hoarseness.* The combined result of a harshness and breathy vocal quality (Roseberry-McKibbin et al., 2019).

*Hyperphonia.* Excessive vocal loudness and/or tension within the vocal folds (Roseberry-McKibbin et al., 2019).

*Laryngeal granuloma.* An inflammatory and vascular lesion occurring on the vocal folds, either unilaterally or bilaterally, due to vocal misuse and abuse (Roseberry-McKibbin et al., 2019). Granulomas may result in a voice which is breathy and hoarse and may result in frequent throat clearing due to a globus sensation (Roseberry-McKibbin et al., 2019).

*Laryngopharyngeal reflux.* The movement of gastric contents above the upper esophageal sphincter, likely causing laryngeal tissue damage (Akbulut et al., 2020).

*Muscle tension dysphonia.* Vocal diagnosis referring to voice of disordered quality, pitch, and/or loudness in the absence of laryngeal pathology (ASHA, n.d.). May be used as a synonym to functional dysphonia but more specifically describes strain or tension within the larynx which causes the vocal apparatus to become unbalanced, preventing optimal phonation (Van Houtte et al., 2011).

*Pathology.* The cause and effect of disease, or the study thereof. However, the laryngeal pathology noted in this text (“voice of disordered quality . . . in the absence of laryngeal pathology”) refers to a structural or physical abnormality, such as edema or a lesion, which may cause dysphonia (Roy, 2003).

*Perceptual analysis.* Analyses consisting of one’s own, subjective perception. For voice this often consists of a clinician, a researcher, or medical personnel listening to the voice and drawing conclusions about what is heard (Roseberry-McKibbin et al., 2019).

*Phonation.* The process by which vocal folds produce sounds, through quasi-periodic vibration, serving as a sound source for speech and singing (Behrman, 2018).

*Reinke’s edema.* Collection of fluid in Reinke’s space of the vocal cords which causes swelling and is often caused by smoking (Martins et al., 2016; Roseberry-McKibbin et al., 2019).

*Ventricular phonation.* Phonation which uses the ventricular, or “false,” vocal folds. This phonation is atypical as ventricular vocal folds are not meant to vibrate and is often a result of increased tension in the larynx (Van Houtte et al., 2011).

*Videolaryngoscope.* Use of video technology to visualize laryngeal structures and function (Roseberry-McKibbin et al., 2019).

*Vocal folds (cords)*. Bilateral elastic muscle tissue which stretch across the larynx and can be manipulated to close over the tracheal opening (Roseberry-McKibbin et al., 2019).

Vibration of closed vocal folds, supported by the aerodynamic and controlled movement of exhaled air, results in phonation, or voice (Behrman, 2018).

*Vocal fold (cord) nodules*. Benign vocal fold growths, often occurring bilaterally, caused by voice misuse and abuse (Roseberry-McKibbin et al., 2019). Nodules cause a voice to become hoarse, breathy, and possibly lower in pitch (Roseberry-McKibbin et al., 2019).

*Vocal fold (cord) polyps*. Benign vocal fold growths, typically occurring unilaterally, believed to be caused by voice misuse and abuse. Polyps may be fluid-filled, are softer than nodules, and cause the voice to be breathy and hoarse with possible diplophonia (Roseberry-McKibbin et al., 2019).

*Vocal hygiene*. Behaviors which encourage vocal health including speaking or singing in an appropriate pitch range, avoiding excess throat clearing and coughing, maintaining adequate hydration, avoiding yelling or talking loudly for prolonged periods of time, and refraining from smoking (Roseberry-McKibbin et al., 2019).

*Vocal/voice ailment*. See “Vocal/voice problem.”

*Vocal/voice complaints*. See “Vocal/voice problem.”

*Vocal/voice defects*. See “Vocal/voice problem.”

*Vocal/voice disease*. See “Vocal/voice disorder.”

*Vocal/voice disorder*. When a person’s voice is of abnormal or inappropriate quality for their age, gender, or background, and/or is not meeting an individual’s daily needs (ASHA, n.d.). Synonym in this text: “vocal disease.”

*Vocal/voice disturbances*. See “Vocal/voice problem.”



*Vocal/voice issues.* See “Vocal/voice problem.”

*Vocal/voice problem.* General term which, depending on the context, may include non-diagnosis of voice such as general fatigue, dryness, mild discomfort, or a diagnosable vocal issue such as muscle tension dysphonia, or a combination of both (Hazlett et al., 2011). May also refer to symptoms which lead to a diagnosis (Hazlett et al., 2011). Synonyms in this text: “vocal/voice ailment,” “vocal/voice complaints,” “vocal/voice defects,” “vocal/voice disturbances,” “vocal/voice issues,” “vocal/voice symptoms.”

*Vocal/voice symptoms.* See “Vocal/voice problem.”

## **Study Purpose and Research Questions**

### **Purpose of the Study**

Given the high incidence and myriad of negative effects of a voice disorder as well as the possibility of preventing many voice disorders, it seems reasonable that vocal health be included in the school health curriculum. However, is this actually happening? If not, why is this not currently standard practice in the United States? What are the barriers to including vocal health education in the schools? The purpose of this study was to assess the current practices and attitudes of school-based SLPs and speech-language pathology assistants (SLPAs) regarding inclusion of vocal health education in the school curriculum. Research of this kind may prove vital for future implementation of high-quality health education programs which address vocal health in the schools.

### **Research Questions**

This survey research was guided by the following questions:

- Q1 What is the prevalence of basic vocal health education curricula in United States schools?

- Q2 What are the attitudes of school-based speech-language pathologists (SLPs) and speech-language pathology assistants (SLPAs) toward the inclusion of vocal health within the primary and secondary school curriculum?
- Q3 What supports are considered by these professionals as necessary before implementation of such a program?

The current literature mass shows vocal issues are prevalent and impactful (Bhattacharyya, 2014; Cantor Cutiva et al., 2013; Carding et al., 2006; Hartley et al., 2016; Kallvik et al., 2015; Mendes Tavares, et al., 2011; Roy, 2003; Roy et al., 2005; Titze et al., 1997; Vilkman, 2000). The research also demonstrates sustained vocal health can be important for overall well-being and functioning (Allard & Williams, 2007; Amir & Levine-Yundof, 2013; Cohen et al., 2006; Connor et al., 2008; Krohling et al., 2016; Lass et al., 1991; Ma & Yu, 2013; Titze et al., 1997; Verdolini & Ramig, 2001; Zacharias et al., 2013). Additionally, the literature base argues many vocal issues may be prevented through vocal health education (Aaron & Madison, 1991; Bolbol et al., 2017; Faham et al., 2016; Hazlett et al., 2011; Nilson & Schneiderman, 1983; Pizolato et al., 2013; Richter et al., 2016; Scrimgeour & Meyer, 2002). By answering the questions presented above, this research may provide a link between the current literature regarding the importance of vocal health education and the possible viability of a vocal health education program.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

#### **Impact of Poor Vocal Function**

As a primary mode of communication for most individuals, and a major means of self-expression, the voice is an important tool for navigating the complexities of everyday living. It is important, therefore, to consider the number of persons who experience afflictions of voice and the effect a voice disorder may have on a person's functioning.

#### **Prevalence of Voice Disorder**

The prevalence of a disease or disorder is the number of cases at a particular moment in time (Roy et al., 2005). These data are vital when considering the impact of an ailment as relatively higher prevalence would indicate more of an effect on the entire society. Prevalence data for voice disorders can vary widely depending on the specific description of the disorder, the method of data collection, and the subset of the population being assessed. Therefore, it is necessary to assess multiple sources for data relating prevalence to truly understand the extent of the problem. Despite variation in percentages, the literature mass seems to agree that voice disorders are indeed prevalent, and thus a concern of public health.

#### ***In the General Population***

Research reports around 8% to as high as 46% of the general population have experienced a voice disturbance of some kind (Bhattacharyya, 2014; Hartley et al., 2016; Roy, 2003; Roy et al., 2005). An inquiry into prevalence of voice disorders using the 2012 National Health Interview Survey revealed approximately 17.9 million adults in the United States, that is

one in 13, self-reported a voice problem, though only 10% of these saw a health care professional for their problem (Bhattacharyya, 2014). Of those reporting a voice problem, 13% rated the issue as moderately severe or greater and reported, on average, four more lost workdays for the year than those not reporting a voice problem (Bhattacharyya, 2014).

Roy et al. (2005) surveyed 1,326 randomly selected adults to better understand prevalence, causes, and occupational impacts of a voice disorder. Of those surveyed, 29.9% reported a voice disorder at some point in their life (Roy et al., 2005). Voice-related absence from work was reported in 7.2% and 4.3% reported their voice disorder adversely affected or made it impossible for the completion of certain job-related tasks (Roy et al., 2005). Considering these numbers, the productivity loss of an absent workforce, and rehabilitation costs related to voice disorders, the probable economic costs of this largely preventable ailment are stunning.

In a survey of 642 undergraduate students, Hartley et al. (2016) found that 46% of participants reported some sort of voice related disturbance lasting one to six days within the past year. A relatively high 34.66% reported several incidences of hoarseness occurring throughout the year and that 82.74% of cases were due to social or extracurricular activities (Hartley et al., 2016). This might indicate the vocal behaviors displayed at sporting events, social gatherings, concerts, and the like result in temporary hoarseness for this group. These behaviors, unchecked and perhaps not thoroughly understood, may eventually result in the long term and more detrimental vocal etiologies often seen by the speech-language pathologist.

### ***In Professional Voice Users***

Professional voice users are those who utilize their voice as a primary tool in their occupation. A report by Titze et al. (1997) relayed percentages from various sources, including The United States Bureau of Labor Statistics, of occupations considered to be professional voice

users. Authors identified approximately 45.05% of U.S. workers use voice as a primary tool in their trade (Titze et al., 1997). These occupations include, but are not limited to, teachers, judges, clergy, professional singers and actors, salespersons, and counselors.

Those whose voice is not able to meet the demands of their occupation may be considered to have a voice disorder (Vilkman, 2000). Vilkman (2000) argues the situation is exacerbated for professional voice users because many of these same occupations require a prolonged use of voice and often in non-ideal speaking conditions, i.e., excessive background noise or speaking across long distances with poor acoustics. Vilkman (2000) described the vocal issues of this group as repetition strain injuries which result from increased vocal fold vibrations due to greater amount of time spent phonating throughout the day. Here it is also hypothesized why more women than men experience voice problems: a higher pitched voice means more vibrations of a higher fundamental frequency, resulting in more vocal fold collisions and thus more opportunity for repetitive strain injury (Vilkman, 2000). Indeed, the research consistently reports higher incidence of voice disorders among adult females, both in professional voice users and otherwise (Bhattacharyya, 2014; Roy, 2003; Roy et al., 2005).

Vocally unfavorable conditions and the resulting effect on the voice, so-called heavy vocal loading, appear to be part of the reason professional voice users are overrepresented in the voice clinic (Vilkman, 2000). Indeed, the research by Titze et al. (1997) reported professional voice users consisted of 57.2% of voice clinic load. This indicates they are more likely to seek help and/or a disproportionate number may suffer from issues related to voice. As a result, Titze et al. (1997) argued that nearly half of the U.S. workforce identified as voice professionals represent a need for targeted campaigns of proper vocal use. Though the research by Titze and

colleagues (1997) was high-quality, and often cited, these data were over 20 years old and certainly researchers would benefit from updated numbers.

When evaluating prevalence of voice disorders specifically among occupational voice users, the research often utilizes teachers as participants. This is not without good cause: teaching may be considered an ideal example of an occupation with heavy vocal loading (Vilkman, 2000). Cantor Cutiva et al. (2013) completed a systematic review to assess the occurrence of voice disorders among teachers. Researchers searched for articles relating to teachers or the teaching profession as well as a broad definition of voice disorder which included dysphonia, voice complaints, voice disorders, and vocal disease. Returns comprised 23 articles, published in the span of almost two decades, which met the search criteria.

Reviewers organized the research into four categories based on prevalence of voice problems: currently present (point prevalence), present within a previous year (12-month prevalence), present at some point in the past (life-time prevalence), and or unknown/not specifically reported (unspecified prevalence). Data from most studies were collected via questionnaire and results show varying degrees of prevalence within and, more dramatically, across prevalence categories (Cantor Cutiva et al., 2013). Point prevalence ranged from 9-13% while 12-month prevalence ranged from 15% to a soaring 80% (Cantor Cutiva et al., 2013). Understandably, life-time and unspecified prevalence showed the most variation, ranging from 13%-94% (Cantor Cutiva et al., 2013). Reviewers found varying data collection methods and the use of general terms such as “voice symptoms” or “voice complaints” which may contribute to the wide range of reported prevalence. Furthermore, researchers point out the shortcomings of self-report, and fallacies of memory for use in that self-report upon which many of the studies relied, supporting the increased use of objective measures in future studies. Nonetheless, Cantor

Cutiva et al. (2013) concluded that voice disorders are an important health concern among teachers.

Given that teaching is not unlike other professions which utilize voice as a primary occupational tool, the conclusion from this systematic review could arguably be made, not just for teachers, but also for other occupational voice users. Considering the high prevalence of voice disorders among occupational voice users, and the potential for related professional disruptions, it surely can further be argued that vocal health and longevity are important to maintaining an active and satisfied workforce.

### ***In Children***

Voice disturbances are not specific to the adult population. In order to assess prevalence of dysphonia in children, Carding et al. (2006) examined 7,389 eight-year-old children using formal assessment by SLPs and parent report. In this group, 445 children, 6% of participants, were determined by clinician assessment to have dysphonic voices (Carding et al., 2006). Parental report identified 11.6% of study participants as “sometimes [having] a problem” with their voice (Carding et al., 2006, p. 626). Of these, 5.2% were also identified by researchers as being dysphonic (Carding et al., 2006). Researchers also discovered risk factors of voice disorder within the sample to include number of siblings, asthma, frequent conductive hearing loss, and regular upper respiratory infections. Researchers noted that most participants identified with atypical voices were male and cite other studies which confirm this finding in children (Carding et al., 2006).

In an epidemiological study of dysphonia, parents assessed their children’s vocal function via a vocal quality questionnaire (Mendes Tavares et al., 2011). The voices of these 2000 children, aged 4 to 12, were then judged through perceptual and acoustic assessments and via

videolaryngoscope. While parental judgement yielded a dysphonia prevalence of 6.1%, perceptual analysis indicated prevalence at 11.4% (Mendes Tavares et al., 2011). Acoustic measures correlated closer to perceptual analysis results than parental report results, supporting the higher numbers and indicating that parents may not be entirely reliable in identifying these health issues (Mendes Tavares, et al., 2011).

A study with similar design and results was completed in Finland (Kallvik et al., 2015) which included parent and teacher reports of 217 children and their respective degree of hoarseness. Participant voices were recorded and further perceptually analyzed by eight trained listeners. Like the Mendes Tavares et al. (2011) study, prevalence was high: 12.0% of participant voices were perceived as hoarse by the trained listeners and parents and teachers reported two or more vocal symptoms per week for 6% of child participants. Vocal symptoms were most prevalent among boys with 15.8% of male participants and 7.8% of female participants experiencing hoarseness. Furthermore, a correlation was again found between hoarseness in participants and being a younger sibling (Carding et al., 2006; Kallvik et al., 2015). The authors argue, due to a shared environment, school children should be considered a risk for voice disorders just as teachers are (Kallvik et al., 2015). The research seems to indicate that significant numbers of people across many groups are at risk, that voice disorders are prevalent, and, therefore, voice disorders are an important consideration for public health.

### **Impacts of a Voice Disorder**

Persons experiencing vocal disturbance may suffer from various related impacts on daily living and functioning. Physical and emotional detriment experienced first-hand by the speaker may be matched or even outweighed by negative perceptions of listeners with whom the speaker interacts. The World Health Organization's International Classification of Functioning,



Disability, and Health (WHO ICF) serves as a framework for classifying and measuring the health and disability of individuals or populations in relation to functioning within the context of environment (World Health Organization [WHO], 2014). The ICF was designed to be used by a variety of disciplines and has been adopted by ASHA as the framework for the scope of practice for SLPs and audiologists (ASHA, 2016). It is, therefore, through the lens of the ICF that the effects of a voice disorder might be appreciated by SLPs.

### *For Adults*

Ma et al. (2007) explained how the WHO ICF can be used to describe the effects of voice disorders on Functioning and Disability (ICF Part 1) and on Contextual Factors (ICF Part 2). The authors list various affected areas, and the corresponding ICF codes, for each of the four main categories: Body Structures, Body Functions, Activities and Participation, and Environmental Factors. The nine impact codes authors list under Activities and Participation, (which include impacted activities related to successful employment, recreation and leisure, and socializing) emphasize the importance of a normally functioning voice and the possible varied impact of a voice disorder. These fall broadly within two areas: speaker perceptions, that is, the person's own perception of how a voice disorder impacts their life, and listener perception, or the ways in which a person with a voice disorder is perceived by others specifically because of their voice disorder.

**Speaker Perceptions of Voice Disorders in Adults.** In order to assess effects of dysphonia, Cohen et al. (2006) conducted a meta-analysis of studies which used measures of voice-related quality of life. This research included 27 studies employing the Vocal Handicap Index (VHI) and 14 studies which used the Short Form 36 (SF-36). Reviewers found persons with voice disorders reported an overall reduction in quality of life, with impact on social

functioning and the ability to conduct daily activities, and subsequent mental and emotional impacts. VHI scores of dysphonic patients were significantly worse than those of non-dysphonic patients ( $p \leq .001$ ), though much variation was present between dysphonic groups (Cohen et al., 2006). Analysis of the SF-36 revealed patients with dysphonia had scores which were not unlike those of persons with other chronic illnesses of public interest (Cohen et al., 2006). Authors theorize reduction of voice disorders could have important health implications and stress the importance of improved prevention of voice disorders (Cohen et al., 2006).

To assess the extent to which voice disorders might interfere with occupational functioning, absenteeism, and future career choices, Roy et al. (2004) surveyed 1243 teachers and 1158 nonteachers, aged 20-66, from the states of Iowa and Utah. The mean number of vocal symptoms was significantly higher in teacher participants than in the general population group, 4.3 and 3.1, respectively ( $p < .001$ ), and teachers attributed more vocal symptoms to their occupations at 2.3, than nonteachers at 0.5 ( $p = .001$ ; Roy et al., 2004). A number of voice-related restrictions and disruptions were recorded as significantly different for teacher participants than for nonteacher participants. These included a higher number of days when activities or interactions were restricted, limited ability to complete job-related tasks, missing work due to voice (Roy et al., 2004). There were also significantly more teachers ( $p = .002$ ) who indicated they may need to change careers in the future as a result of vocal functioning.

**Listener Perceptions of Adults with Voice Disorders.** Allard and Williams (2007) used listener perceptions of five recorded speech samples to assess the extent to which Americans might stereotype individuals with communication disorders including those with voice disorders. Four hundred and forty-five participants rated recordings featuring simulations of various communication disorders, and one recording of an individual without a communication disorder,

using nine trait pairs across functional, social, and emotional domains. The recording featuring a voice disorder was rated significantly lower ( $p < .005$ ) than that of no communication disorder in intelligence, self-esteem, ambition, and employability suggesting negative stereotypes may be associated with malfunctioning voices (Allard & Williams, 2007). In a similar study, Amir and Levine-Yundof (2013) used recorded voice samples of dysphonic and non-dysphonic voices for perceptual analysis by 74 listeners using 12 bipolar pair attributes which included “positive-negative,” “smart-stupid,” “strong-weak,” and “aggressive-calm,” to name a few. Negative attitudes of the dysphonic voices were recorded at statistically significant levels for all 12 attributes ( $p \leq .005$ ) indicating potentially damaging perceptions towards those with dysphonia. Researchers stress the importance of education to allay stereotypes, address social attitudes, and increase awareness of communication disorders (Allard & Williams, 2007; Amir & Levine-Yundof, 2013).

### ***For Children***

The effects of a voice disorder are not limited to an adult population and, in many ways, children are uniquely impacted by limitations of voice. However, as with the adult population, these can be broadly divided into speaker perceptions of the impacts of a voice disorder and the perceptions of others about the speaker with a voice disorder.

**Speaker Perceptions of Voice Disorders in Children.** Connor et al. (2008) interviewed children with dysphonia, aged 2-18, and their parents in order to assess the impact of a voice disorder on a child’s quality of life. Interview questions covered three general domains: physical, social/functional, and emotional. Interviews were recorded, transcribed, and systematically assessed for qualitative trends. Across domains, children and parents reported the impact of voice on quality of life. Participants as young as six years old stated awareness of and concerns

about their voice (Connor et al., 2008). This is an important finding since a lack of self-awareness and/or concern has been cited as a reason the vocal health is not a priority at this age.

Some research suggests child behavior may have some relationship to voice functioning. Based on parent/guardian completion of the Child Behavior Checklist, Krohling et al. (2016) found correlation between voice complaints and aggressive behavior but also shyness, low self-esteem, and difficulties sharing feelings and emotions. The authors argue these results, though correlative, raise concern that children and adolescents with voice disorders may also be at an elevated risk for emotional and behavioral issues (Krohling et al., 2016).

**Listener Perceptions of Children with Voice Disorders.** Lass et al. (1991) assessed the perceptions of 13-year-old listeners ( $n = 19$ ) of recorded phrases spoken by children, aged 7 years 9 months to 11 years 3 months, with normal voices and with varying degrees of voice disorder as previously assessed by SLPs and according to the Wilson Voice Profile Rating System (Wilson & Rice, 1977). Participant listeners rated recordings of speakers with dysphonic voices more negatively on 15 of 22 bipolar adjective pairs (Lass et al., 1991). This indicates that peers may perceive children with dysphonic voices as less intelligent, not as confident, less happy, less attractive, sicklier, and weaker than their normal-voiced peers. The authors argue results stress the importance of education about and exposure to persons with communication disorders for the adolescent population (Lass et al., 1991).

Unfortunately, negative perceptions of children with voice disorders goes beyond those of peers. Zacharias et al. (2013) surveyed 6th through 12th grade teachers to assess perception of voice samples given by female adolescents with and without voice disorders. These researchers found a statistically significant difference between teacher attitudes towards a normally functioning voice and a dysphonic voice ( $p < .001$ ; Zacharias et al., 2013). The authors suggested

this study may illuminate a “hidden handicap” for speakers that may be at risk for educational, vocational, and social difficulties due to possible negative perceptions of teachers (Zacharias et al., 2013). Similarly, Ma and Yu (2013) assessed attitudes of teachers, SLPs, and university students about children with normal and dysphonic voices. Listeners rated recordings of six normal voices and six dysphonic voices. These adult participants consistently rated dysphonic voices more negatively when presented using a differential scale of bipolar adjective pairs as a rating system including in areas relating to intelligence, competence, honesty, integrity, and kindness (Ma & Yu, 2013). Negative perceptions from adults arguably may have a significant impact on the education and emotional stability of a child. Considering the importance of adult perceptions in childhood, and particularly in combination with the young speaker’s impacted perceptions of self and quality of life, the potential importance of a voice disorder on a person’s development should not be underestimated.

### ***For Society***

In a review of the literature, Verdolini and Ramig (2001) assessed the effects of and occupational risk factors for voice disorders. The authors synthesize this information to estimate the economic impact of voice disorders on society. Authors cited research which calculated the number of teachers in the United States as numbering just over 5 million and found that about 40% of these experienced hoarseness (Verdolini & Ramig, 2001). Of these 40%, about 15% seek treatment for voice problems (Verdolini & Ramig, 2001). Verdolini and Ramig (2001) estimated the combined costs of voice treatment and an average three days of work lost every year for dysphonic teachers in the United States, to be about \$2 billion annually. These authors argued these preliminary figures, at the very least, should stress the importance of systematic study to

achieve more exact numbers as the societal loss of this ailment may potentially be tremendous (Verdolini & Ramig, 2001).

Finally, it is important to note occupations in which safety of the public is dependent on an individual's functioning voice. Police officers, firefighters, military personnel, dispatchers, air traffic controllers, and construction supervisors all hold jobs in which a functioning voice may be key to maintaining safety, and promotion of vocal health may indeed make a difference in a life-or-death situation (Titze et al., 1997). Though this may be rare, it is surely worth considering when weighing the societal consequences of a voice disorder.

Clearly the effects of a voice disorder are multidimensional, with documented impact on quality of life, employment, perceptions of peers and self, behavior, and social and emotional well-being. Furthermore, these impact adults and children alike. Because the voice is for most a primary means of communication, and given the regularity of use, it is perhaps not surprising that a disorder of this mechanism would have such ill effects. Fortunately, many voice disorders can be lessened or prevented with proper voice care and use.

### **Primary Prevention of Voice Disorders**

Primary prevention consists of preventative measures taken before the onset of an affliction (National Institutes of Health Office of Disease Prevention, 2020). To fully consider the possible implications of a primary prevention program targeting vocal health, it is necessary to understand many causes of dysphonia result from preventable behaviors.

### **Causes of Voice Disorders**

A voice is considered to be disordered when it is not meeting a person's needs or is abnormal for a person's gender, age, or background (ASHA, n.d.). Causes of voice disorders can vary but many are considered to be either functional or organic (ASHA, n.d.).

### ***Functional Dysphonia***

A fully functional voice relies on the interaction of the respiratory, phonatory, and resonatory systems. A disturbance in any one of these can lead to vocal malfunction. Functional dysphonia refers to voice of disordered quality, pitch, and/or loudness, in the absence of laryngeal pathology, due to poor regulation of the laryngeal structure (ASHA, n.d.; Martins et al., 2016; Roy, 2003; Van Houtte et al., 2011). Voice disorders of a functional nature may include muscle tension dysphonia, diplophonia, vocal fatigue, hyperphonia, and ventricular phonation (ASHA, n.d.; Roy, 2003). Functional dysphonia comprises the most frequent diagnosis of voice disorders, at 20.5%, for persons aged 19-60 years, and the second most frequent voice disorder diagnosis in persons over 60, at 17.6% (ASHA, n.d.; Martins et al., 2016).

The “functional” label reflects the physiological nature of this dysphonia, indicating a malfunction related to the movements of the intrinsic and/or extrinsic muscles of the larynx in the absence of pathology (Roy, 2003). The cause of functional dysphonia, then, is related in some way to use of the phonatory mechanism. Dysphonia may be contributed to by psychological/personality factors, may be compensation for an underlying disease, or may be the result of misuse and abuse of the mechanism (Van Houtte et al., 2011).

### ***Organic Voice Disorders***

A number of conditions are physiologic and included in the label “organic voice disorders” (ASHA, n.d.). These include vocal cord polyps, vocal cord nodules, edema, laryngeal granuloma, chronic laryngitis, and laryngopharyngeal reflux (ASHA, n.d.; Akbulut et al., 2020; Roseberry-McKibbin et al., 2019). Martins et al. (2016) found laryngopharyngeal reflux and vocal fold polyps make up 12% and 12.5% of voice disorder diagnoses, respectively, in adults aged 19-60. In adults over 60 the most frequent vocal pathology was presbyphonia, vocal

changes associated with the natural aging of the voice, at 26.5% (Martins et al., 2016). This was followed by functional dysphonia at 17.6% and Reinke's edema at 14% (Martins et al., 2016). Children in the Martins et al. (2016) study were found to most frequently have the diagnosis of vocal nodules (59%). Plan of care for these pathologies will vary but may include surgical intervention, medical intervention, and/or voice therapy.

Just as varied are the causes of the conditions, which can indeed be diverse even for a single pathology. Some are due to progression of a neurological disease or the vocal mechanism's natural aging process (Akbulut et al., 2020; Roseberry-McKibbin et al., 2019). However, many have etiologies which may be avoided or their effects lessened through patient education and could be considered in a primary prevention program (Akbulut et al., 2020; Roseberry-McKibbin et al., 2019). Furthermore, many of these etiologies are the same as those which might result in a functional voice disorder (Akbulut et al., 2020; Roseberry-McKibbin et al., 2019).

### ***Tying it Together: Vocal Misuse and Abuse***

Though voice disorders are often differentiated as either functional or organic, Akbulut et al. (2020) point out that boundaries between the two are not always clear. The impact of one may result in the other and initial diagnoses are sometimes revised (Akbulut et al., 2020).

Additionally, any particular voice disorder may be caused or complicated by a number of factors. Chief among these are behaviors collectively referred to as vocal misuse and abuse. This includes excessive throat clearing, exposure to vocal irritants such as smoke and noxious chemicals, dehydration and/or excessive consumption of diuretics such as caffeine, yelling/screaming or trying to talk over background noise, use of excessive muscular tension around the larynx, and behaviors which may cause or worsen vocally detrimental conditions such



as gastroesophageal reflux disease (GERD), allergies, and laryngitis (Aaron & Madison, 1991; Bolbol et al., 2017; Fletcher et al., 2007; Pannbacker, 1998; Roseberry-McKibbin et al., 2019; Titze et al., 1997; Van Houtte et al., 2011). Both functional and organic voice disorders can be caused by or exasperated by vocal misuse and abuse. Therefore, voice therapy often begins with patient education about avoidance of these behaviors to return a voice to a healthy and functional state (ASHA, n.d.; Pannbacker, 1998; Van Houtte et al., 2011). However, all of these behaviors can be avoided and minimized long before any damage is done, thus preventing many voice disorders and the need for voice therapy.

## **Prevention Programs**

### ***For Adults***

Though causes of voice disorders may vary, treatment for most cases involves some degree of vocal health education (ASHA, n.d.; Pannbacker, 1998; Van Houtte et al., 2011). Indeed, many cases could arguably be prevented if a voice user had knowledge of, and used, the vocal hygiene techniques eventually presented as remedy after seeking vocal treatment. Numerous studies have assessed primary prevention of vocal disturbances and the positive effects of voice care programs are well documented (Aaron & Madison, 1991; Bolbol et al., 2017; Faham et al., 2016; Hazlett et al., 2011; Nilson & Schneiderman, 1983; Pizolato et al., 2013; Richter et al., 2016; Scrimgeour & Meyer, 2002). Hazlett et al. (2011) conducted a systematic review to discover the effect of indirect or direct voice training as a preventative means for voice disorders in professional voice users. Their search yielded 10 studies, varying in design and quality, which impressed upon reviewers the need for further research (Hazlett et al., 2011). Despite limitations of the studies included in the review, Hazlett et al. (2011) found many of the included studies suggest voice training may influence vocal quality for professional voice

users. Based on this review, Hazlett et al. (2011) state a single implication for vocal health: an emphasis on prevention rather than treatment. The team noted, “emerging universal agreement among researchers” of the importance of preventative measures for voice disorders (Hazlett et al., 2011, p. 189).

To assess the effect of vocal health educational programs on quality-of-life measures in teachers, Pizolato et al. (2013) recruited 70 teachers, 40 to receive instruction on vocal hygiene and 30 to additionally receive instruction of vocal training exercises. According to improvement in quality-of-life scores after each respective program, both groups benefited from vocal health instruction, regardless of inclusion of vocal training exercises (Pizolato et al., 2013). This indicates vocal hygiene education alone may be enough to improve the quality of life for those at risk of vocal ailment.

Richter et al. (2016) studied the effectiveness of preventative training on student teacher vocal health using three parameters: voice quality as measured by the Dysphonia Severity Index (DSI), voice-carrying capacity measured by the Vocal Load Test (VLT), and subjective judgment of handicap utilizing the Voice Handicap Index (VHI). For the 123 student teachers in the training group, voice education was integrated into the teaching education program and consisted of 15 hours of instruction over the course of the 1.5-year program. Follow-up data showed an improvement in vocal quality as measured by the DSI and maintenance of vocal quality during VLT tasks for those in the training group (Richter et al., 2016). Those in the control group, however, experienced a decrease on both the DSI and the carrying capacity tasks of the VLT (Richter et al., 2016). Interestingly, both groups reported an increased vocal handicap during subjective reporting leading researchers to conclude that vocal prevention programs have less of an effect on the perception of vocal health than on the physical correlates of vocal health

(Richter et al., 2016). This agrees with the research conducted by Duffy and Hazlett (2004) and Timmermans et al. (2004), assessed in the Hazlett et al. (2011) review, in which authors theorize an improved awareness of vocal function may lead participants to rate their voices more poorly regardless of improvements on perceptual and acoustic measures. Despite the discrepancy of subjective measures, Richter et al. (2016) argue results favor the inclusion of voice training teacher education curriculum to encourage vocal health and longevity in this population.

Faham et al. (2016) evaluated the effects a voice education program might have on the VHI scores for teachers in Iran. This semi-experimental study included 61 teachers receiving voice education and 66 teachers in a control group. Both groups completed the VHI at baseline and again eight weeks later. During this time the experimental group underwent four weeks of voice education and half of continued implementation of strategies learned. Teachers in the training program significantly improved upon their total VHI scores ( $p < .001$ ) while teachers in the control group had a decrease in total VHI (Faham et al., 2016). The authors conclude these results show the positive effect of voice education programs in reduction of vocal handicap, even in those without dysphonia (Faham et al., 2016).

Knowledge of voice care is foundational to primary prevention of functional and many forms of organic voice disorders. Instead of relying on acoustic or perceptual measures, much of the available research uses knowledge obtained as measure of successful vocal misuse and abuse prevention on the assumption that improved or maintained vocal health will be available to those who choose to use this knowledge. To assess the effect of vocal hygiene education, Bolbol et al. (2017) implemented a program for public school teachers consisting of 12, 20-minute seminars on vocal hygiene. The 156 teacher participants were compared to a matched control group of 180 university administrative workers. At three months post-intervention, the teachers showed a

statistically significant increase in awareness of vocal hygiene techniques ( $p < .001$ ), and particularly of those which were consistently practiced during the three months' time as these techniques, incorporated into the participant's life, were more readily recalled (Bolbol et al., 2017). It appears that whether outcomes are measured perceptually, acoustically, or by knowledge obtained during a primary prevention program of vocal misuse and abuse, research participants show positive outcomes which may result in prolonged vocal health.

### ***For Children***

Similar to the research conducted by Bolbol et al. in 2017, a few studies with younger subjects focus on the obtainment of knowledge to gauge successful vocal health programs. This measure is perhaps particularly important for this age group since children and adolescents are establishing the habits which can support future vocal health. Aaron and Madison (1991) implemented a vocal hygiene education program for high school cheerleaders. Half of the 36 high school cheerleaders from the research conducted by Aaron and Madison (1991) were randomly assigned to participate in a vocal hygiene program. Researchers utilized a separate-sample pretest-posttest design, administering a baseline test about vocal mechanics and abuses to the experimental group and the same test post-experiment to the control group. Results from both were compared and were favorable for the vocal hygiene program, showing a significant difference between pre- and posttest scores ( $p < .01$ ) suggesting an increase of vocal hygiene knowledge among these participants (Aaron & Madison, 1991). Though this study did not include formal data of implementation of vocal hygiene habits, anecdotal data obtained from the observations of participant advisors, as well as the positive reception of the program by the participants, additionally led the authors to conclude the participants were also implementing these techniques to maintain vocal health (Aaron & Madison, 1991).

Indeed, even young children have been shown to be receptive to vocal health education. Scrimgeour and Meyer (2002) assessed the knowledge obtained by a group of kindergarteners during a dual noise-induced hearing loss and vocal health education program “Ears for Listening, Voice for Speaking” or ELVS. The ELVS program was presented to 66 kindergarteners with pre- and post-participation questionnaires administered to all participants which showed a statistically significant increase in student knowledge after the ELVS program ( $p = .002$ ; Scrimgeour & Meyer, 2002).

A similar study looked at the effectiveness of a vocal health program for elementary children and evaluated whether classroom teachers might better be able to identify vocal health issues within their students after sitting through the program with their students (Nilson & Schneiderman, 1983). Specifically, these researchers wanted to know if children in the second and third grades would be able to retain and utilize vocal health information. Participants were 155 vocally healthy six- to eight-year-olds and their teachers ( $n = 8$ ). Student participants were orally tested via a 10-question test covering the vocal mechanism, vocal abuse, and hoarseness prior to attending four lessons on the prevention of vocal misuse. They were retested after the program and again five months later. Mean scores were significantly improved from pretest to posttest ( $p < .05$ ) indicating the program was successful in teaching the children basic vocal health and prevention of vocal abuse (Nilson & Schneiderman, 1983). Additionally, the students appeared to have retained much of the information as demonstrated by the mean score of five-month retest (Nilson & Schneiderman, 1983). This program was also shown to be beneficial to teachers. A 20-question test of awareness of vocal parameters was administered to teachers of students who completed the program and those whose students did not complete the program. Mean correct scores on the posttest were significantly higher ( $p < .05$ ) for the teachers of

students in the program indicating increased awareness of vocal abuse and hoarseness (Nilson & Schneiderman, 1983). Increased teacher awareness, the authors argue, may benefit students' long-term vocal health and was key to success of this program (Nilson & Schneiderman, 1983).

### ***The Need for Education as Primary Prevention***

Not only is vocal health education a successful preventative medicine for many voice disorders, explicit instruction appears necessary to improve the voice health of some individuals. To assess if this was the case, Fletcher et al. (2007) developed and administered a voice care knowledge questionnaire to 17 persons with non-organic dysphonia and 17 persons with healthy voices. Participants were matched across categories for age, sex, smoking habits, and predicted IQ and were excluded for previous voice therapy, formal singing or acting training, being a registered medical professional, and/or inability to comprehend written English. Results of the questionnaire revealed a lower level of voice care knowledge among the group with dysphonic voices (Fletcher et al., 2007). Additionally, this group misjudged many vocally damaging behaviors, such as alcohol consumption, coughing, whispering, throat clearing, and shouting, as being beneficial for the voice (Fletcher et al., 2007). This research supports knowledge of vocal health and knowledge of vocally beneficial habits as possible contributors to vocal function as it seems persons with less knowledge may be more likely to partake in vocally abusive behaviors.

Nor do professional voice users seem to intuitively improve vocal hygiene habits as they mature in their profession. Timmermans et al. (2003) compared vocal hygiene habits of long-time radio professionals to students studying to become radio professionals, hypothesizing the professionals might have better vocal hygiene due to "age, maturity, and professional duties" (Timmermans et al., 2003, p. 128). However, results did not support this reasoning and both the professionals and the students had equally poor vocal hygiene habits, albeit in differing ways

(Timmermans et al., 2003). Once again, the authors conclude by stressing the importance of vocal health and hygiene education for this population of professional voice users.

### ***Future Research***

Though many researchers praise the benefits of primary prevention programs for vocal health, more high-quality research is needed. In a systematic review, Ruotsalainen et al. (2008) assessed the treatment and prevention of voice disorders presented in randomized and nonrandomized control trials. Some of these same studies have already been presented above. The authors found most studies suffered from a small number of participants. Indeed, this was a primary finding of weakness in the research reviewed by Hazlett et al. (2011). Though previously reviewed research support preventative measures to promote vocal health, the need for high quality research still exists. Among the conclusions made by Ruotsalainen et al. (2008), authors stress the need for more research to assess the effectiveness of preventative programs for voice disorders.

### **The Role of Public Education in Primary Prevention**

Despite variation in jargon, a plethora of study designs, and numerous hypotheses tested, the literature tends to agree that education may be key to preventing disturbances of voice in various populations (Faham et al., 2016; Fletcher et al., 2007; Hazlett et al., 2011; Pizolato et al., 2013; Richter et al., 2016; Timmermans et al., 2003). The pervasive manner of vocal misuse and abuse, the habits that contribute to the development of many voice disorders, and the various consequences of living with a voice disorder, further make this an issue of public concern. Often in the United States, health matters of such importance are addressed in the public school system. Students are introduced to strategies and habits which might help sustain their health as they enter and traverse adulthood. Maintaining a functioning voice may be among those healthy

habits which can be established at an earlier age, then carried into adulthood. It is therefore argued here that vocal health be included in the health education curriculum.

To provide a framework for schools in developing health education curricula, the Centers for Disease Control and Prevention (CDC) developed National Health Education Standards or NHES (Joint Committee on National Health Education Standards, 2007). These support behaviors which might result in the enhanced health of students and have become the accepted reference for health education in many states, not unlike the Common Core State Standards for English language arts/literacy and math (Common Core State Standards Initiative, 2021; Joint Committee on National Health Education Standards, 2007). Originally published in 1995, and updated in 2007, the NHES includes eight standards which serve as health education benchmarks for grades 2, 5, 8, and 12 (Joint Committee on National Health Education Standards, 2007). Nearly all eight standards could apply to preventative vocal health education but standards 1, 5, and 7 are perhaps particularly applicable. Standards 5 and 7 involve building the decision-making skills which may result in enhanced health. This can include healthy eating choices or avoiding cigarettes, but surely may also include the daily decisions which promote or abate vocal health. Standard 1 of the NHES deals with comprehension of concepts which promote health and prevent disease. This standard goes to the heart of the argument made here: vocal health is a concept which promotes health and voice disorders are often preventable disease.

As an example of how states are implementing health education, in 1990 the Colorado State Senate enacted the Colorado Comprehensive Health Education Act, C.R.S. 22-25-106, which declared health education as essential in public education and that schools are providers of this education (Colorado Department of Education [CDE], 2019a). This act encourages school districts in the state of Colorado to implement health education, beginning in Pre-K and



continuing through high school, which “foster[s] healthy behaviors through increasing students’ health knowledge and skills to establish and maintain their physical, emotional, social, mental and sexual health and wellness in addition to the modification and reduction of ‘high-risk behaviors’” (CDE, 2019a, p. 1).

To meet the requirements of the Comprehensive Health Education Act, The Colorado Department of Education (CDE, 2019b) developed Comprehensive Health and Physical Education Standards which completed a six-year revision in 2018. These standards center on the decision-making process which affects physical, social, and emotional health and are part of the CDE’s Prepared Graduate Competencies: required skills and concepts to be mastered before graduation in order to “ensure their success in a postsecondary and workforce setting” (CDE, 2009, p. 8). Additionally, the Education Accountability Act of 2009 (Senate Bill 09-163) aligns school and district accountability systems and requires reporting of health and wellness indicators, and other non-tested content areas, as contributors to school performance reports (CDE, 2013). This further emphasizes the importance of high-quality health education in Colorado as a necessary component of student success.

Colorado has made health education a priority and is just one example of many states which have implemented the NHES and unique educational policies which reflect the important role of health education as purveyor of general health knowledge and primary prevention of disease (Joint Committee on National Health Education Standards, 2007; Vu, 2012). Vocal health could arguably be among those subjects deemed important to public health and necessary for preparing students for college and career. It can, therefore, be argued that it is the duty of the public school system to provide vocal health education along with other wellness and primary preventative health concepts.

## Conclusion

The literature mass conveys the importance of vocal health education as preventative medicine (Aaron & Madison, 1991; Allard & Williams, 2007; Amir & Levine-Yundof, 2013; Bhattacharyya, 2014; Bolbol et al., 2017; Cantor Cutiva et al., 2013; Carding et al., 2006; Cohen et al., 2006; Connor et al., 2008; Faham et al., 2016; Hartley et al., 2016; Hazlett et al., 2011; Kallvik et al., 2015; Krohling et al., 2016; Lass et al., 1991; Ma & Yu, 2013; Mendes Tavares, et al., 2011; Nilson & Schneiderman, 1983; Pizolato et al., 2013; Richter et al., 2016; Roy, 2003; Roy et al., 2005; Scrimgeour & Meyer, 2002; Titze et al., 1997; Verdolini & Ramig, 2001; Vilkmann, 2000; Zacharias et al., 2013). Over 30 years ago, Kahane and Mayo (1989) called for inclusion of voice science in the school curriculum after similar findings to those presented here which show the negative effects of a voice disorder and support primary preventative measures for vocal misuse and abuse. In 1994, McNamara and Perry surveyed school-based SLPs on their practices and attitudes towards voice abuse prevention in the student population. Of the 145 respondents, over 80% cited time restraints and limited importance as reasons for not implementing a voice preservation program. However, 27 respondents, mostly working within the elementary-aged population, did report implementation of such a program citing belief in the quality and effectiveness of voice prevention programs and a belief that vocal misuse and abuse is a cause of hoarseness (McNamara & Perry, 1994). This study provides helpful insight into the possible reasons voice health is not part of the curriculum. However, this study is now outdated given that practices and attitudes may have changed, especially with increasing use of technology in the schools, varying caseloads of SLPs, and adoption of the Common Core State Standards affecting curricula of many schools in the United States. The current study aimed to

update and expand on these data by surveying school-based SLPs and SLPAs regarding inclusion of vocal health education in the school curriculum.

## **CHAPTER III**

### **METHODOLOGY**

#### **Introduction**

The purpose of this study was to assess the current practices and attitudes of school-based SLPs and speech-language pathology assistants (SLPAs) regarding inclusion of vocal health education in the school curriculum. According to Creswell (2008) survey research is the best approach when the aim of a study is to describe trends and/or determine opinions. Therefore, a survey was an appropriate approach for this research which sought to understand current practices and attitudes. This study used an electronic questionnaire to collect data which were analyzed using descriptive statistics. The purpose of the questionnaire was to gather information about current and past practices of primary and secondary schools in the United States regarding vocal health education, attitudes about such an inclusion, and perceived supports required to implement a vocal health program in the school curriculum.

#### **Procedures**

The University of Northern Colorado Institutional Review Board (IRB) granted approval for this study (Appendix A). School-based SLPs and SLPAs were then recruited via electronic invitation through various platforms which are detailed below. Completed questionnaires were statistically analyzed to answer the research questions.

#### **Participant Recruitment**

As principal voice specialists in the schools, SLPs were an important group to survey for this study assessing vocal health education. Considering their training in voice production and

disorders, school-based SLPs may well be a primary advocate for, or purveyor of, such instruction. Additionally, SLPAs, as collaborative team members also certified by ASHA, were central to this research. These professionals may work with more than one SLP, and at various schools, giving them a unique insight into the inclusion of vocal health in the curriculum. Furthermore, increased caseloads of school-based SLPs have resulted in increased use of and demand for SLPAs (Paul-Brown & Goldberg, 2001). Therefore, it was important to understand the experiences and opinions of both these professionals to assess attitudes about vocal health inclusion in the school and, ultimately, make recommendations about further research based on this information.

### ***Recruitment Procedures***

In order to recruit school-based SLP and SLPA participants, an explanation of the purpose of the study and invitation to complete the questionnaire was sent via email to members of the ASHA School Issues Board and was posted on the ASHA Schools Special Interest Groups (SIG 16) message board (Appendix B). Additionally, the invitation was sent to professionals on the Colorado Department of Education (CDE) SLP electronic mailing list and was subsequently forwarded to SLP consultants in other state education departments for distribution outside of Colorado. The invitation included IRB authorization information along with URL link to access the informed consent form (Appendix C) and the researcher-created Vocal Health Education Questionnaire (Appendix D).

### ***Participant Incentive***

To successfully recruit up to 300 participants, an incentive to complete the questionnaire was offered in the form of a drawing for the chance to win one of three \$45 gift cards to Amazon.com. Funding for the Amazon.com gift cards was secured through the University of

Northern Colorado College of Natural Health and Sciences 2020-2021 Student Research Fund. After the questionnaire closed for response, three of those who indicated they would like to be considered for the drawing were selected via an online random number generator. These were then sent an electronic Amazon.com gift card along with a thank you memo (Appendix E).

### **Survey**

To survey school-based SLPs and SLPAs about current practices and opinions surrounding vocal health education inclusion in the school curriculum, an electronic questionnaire was designed and a secure link included in the invitation to possible participants. Data were collected via a researcher-designed Vocal Health Education Questionnaire (Appendix D) created with the Qualtrics software and using the Anonymous Link feature. This resulted in the exclusion of respondent identifying information, including name and email, allowing study participants to remain anonymous. However, the optional drawing entry did require the entrants to submit an email for distribution of Amazon.com gift cards. The drawing was done through Qualtrics via a second survey to keep email addresses received separate from questionnaire responses. The survey remained open for three weeks. Upon receipt of completed questionnaires, statistical data analysis was used to answer the research questions.

### ***Questionnaire***

The 23-question Vocal Health Education Questionnaire was designed as cross-sectional for quick collection of current practices and attitudes of school-based SLPs and SLPAs across the United States. Construction of the questionnaire was made following recommendations by Creswell (2008) for high-quality, clear, and unbiased questions designed to answer the research questions. Additionally, multiple drafts of the questionnaire were presented to 21 graduate students pursuing a degree in speech-language pathology for review before being sent to

potential respondents. Updates were subsequently made to assure questionnaire clarity, non-bias, and ease of completion.

The researcher-created questionnaire used for this study, which is based in part on the questionnaire used by McNamara and Perry (1994), consisted of three sections: respondent demographic information, current and past inclusion of vocal health education in the school curriculum, and attitudes towards inclusion of vocal health education in the school curriculum. Questions in Section I covered respondent demographics and were primarily intended to gain an understanding of research participants and perhaps assess trends in responses based on this information. Section II consisted of one question designed to address incidence of the inclusion of basic vocal health education in the United States school curricula thus answering the first research question.

Section III was designed to assess opinions about the inclusion of vocal health education in the school curriculum (Research Questions 2 and 3). This section begins with Likert-type responses and list ranking aimed at answering the second research question. Here respondents are asked to assign a level of agreement to 13 attitude statements regarding vocal health education inclusion as well as rank a list of professionals as most to least qualified to deal with issues of vocal health in the schools. Respondents were then asked a multi-response question regarding supports perceived as necessary for the implementation of a vocal health program in the schools. These supports included such items as “additional time in the schedule,” “additional financial assistance,” and “additional training” and were intended to answer the third research question. Finally, to gain a fuller understanding of opinions, respondents were provided the option of responding to an open-ended prompt for “additional thoughts about the inclusion of

vocal health in the school curriculum.” Responses provided here assist in answering all three research questions.

Aside from updating 36-year-old data, this survey differentiated itself from that which was used in the research by McNamara and Perry (1994) in populations of interest. The previous research assessed current practices and opinions of SLPs only. The addition of SLPAs aimed to give a fuller picture of the situation in order to assess program development feasibility. Consequently, the questionnaire developed for this study had less emphases on SLP caseload and training and instead focused on opinions about the effects of vocal misuse and abuse as well as perceptions regarding who and what are most important to vocal health inclusion in the schools.

### ***Survey Data Analysis***

Analysis of these data was intended to answer the research questions and may be used in the future for development of a vocal health educational program. Electronic questionnaire responses were investigated using descriptive statistical analysis. Sections I and II of the questionnaires involved three to four categorical responses and were analyzed using a nominal scale by assigning numerical values to each response.

Section III used multiple formats for response collection to answer the second and third research questions. Attitudes about vocal health education were first assessed via 13 statements to which respondents rated their agreement on five different levels: *strongly agree* (1) to *strongly disagree* (5). Although there is some controversy regarding the best way to treat data of this kind, these data have been regarded as ordinal due to a Likert-type question design in which questions are independently considered and no attempt is made to combine responses to describe a single trait (Boone & Boone, 2012). Therefore, non-parametric measures of central tendency and frequency are reported.



Section III of the questionnaire also asked respondents to rank a list of professionals as perceived most to least qualified to deal with vocal health in the schools. An average rank number for each professional provides insight into attitudes and helps answer Research Question 2. Also included in this section was a multi-response option to measure supports respondents felt necessary for the implementation of vocal health in the schools. Frequency counts were provided across participants and, with supplemental qualitative information as detailed below, the final research question was answered based on the responses received.

To fully capture respondent opinions, a final optional and open-ended question asked respondents to provide any additional thoughts regarding the inclusion of vocal health education in the school curriculum. Braun and Clarke (2006) recommend researchers make clear a theoretical position behind a thematic analysis as this includes expectations about the nature of the data and what they represent. This thematic analysis was based on a realist theoretical position which “reports experiences, meanings and the realities of participants” (Braun & Clarke, 2006). Furthermore, the researcher has chosen to include a thematic description of the entire data set in order to discover all important themes. However, this has been done at the possible expense of some amount of response complexity which may have been better maintained via a more limited analysis of one particular theme (Braun & Clarke, 2006). In lieu of a priori assumptions, an emergent or inductive coding scheme was employed to allow the code definitions to develop during the coding process (Braun & Clarke, 2006; Castleberry & Nolen, 2018).

## **CHAPTER IV**

### **RESULTS**

#### **Quantitative Results**

The purpose of this study was to assess the current practices and attitudes of school-based SLPs and SLPAs regarding inclusion of vocal health education in the school curriculum. There were 122 respondents to the Vocal Health Education Questionnaire. Seven of the responses were discarded because they were incomplete or the respondents were not in the target population. The resulting 115 responses were analyzed using descriptive statistics. Data were analyzed using IBM Statistical Package for Social Sciences (SPSS) Statistics (Version 27) predictive analysis software. Basic demographic information about respondents was gathered in the first section of the questionnaire. Section II addressed the first research question. The second and third research questions were addressed through both quantitative and qualitative measures in the final section of the questionnaire.

#### **Demographic Information**

The first section of the questionnaire identified basic demographic information about respondents. These data are presented in Table 1.

**Table 1***Respondent Demographic Information*

Question and Response Options	<i>n</i>	%
1. What position do you hold?		
a. Speech-language pathologist (SLP)	106	92
b. Speech-language pathology assistant (SLPA)	8	7
c. Other (please specify): _____	1	< 1
2. The grade levels served by the school where you worked are (check all that apply):		
a. Elementary (K-5)	100	87
b. Middle (6-8)	45	39
c. Secondary (9-12)	34	30
d. Other (please specify): _____	32	27
3. The school type is		
a. Public school – traditional	108	94
b. Public school – charter	3	3
c. Public school – online/alternative campus (before COVID-19)	1	< 1
d. Non-public school	3	3
4. Does your school qualify as a Title 1 school?		
a. Yes	59	51
b. No	34	30
c. I don't know	22	19
5. How long has it been since you've completed your college degree for SLP or SLPA?		
a. 0-5 years	28	24
b. 5-10 years	21	18
c. More than 10 years	66	57

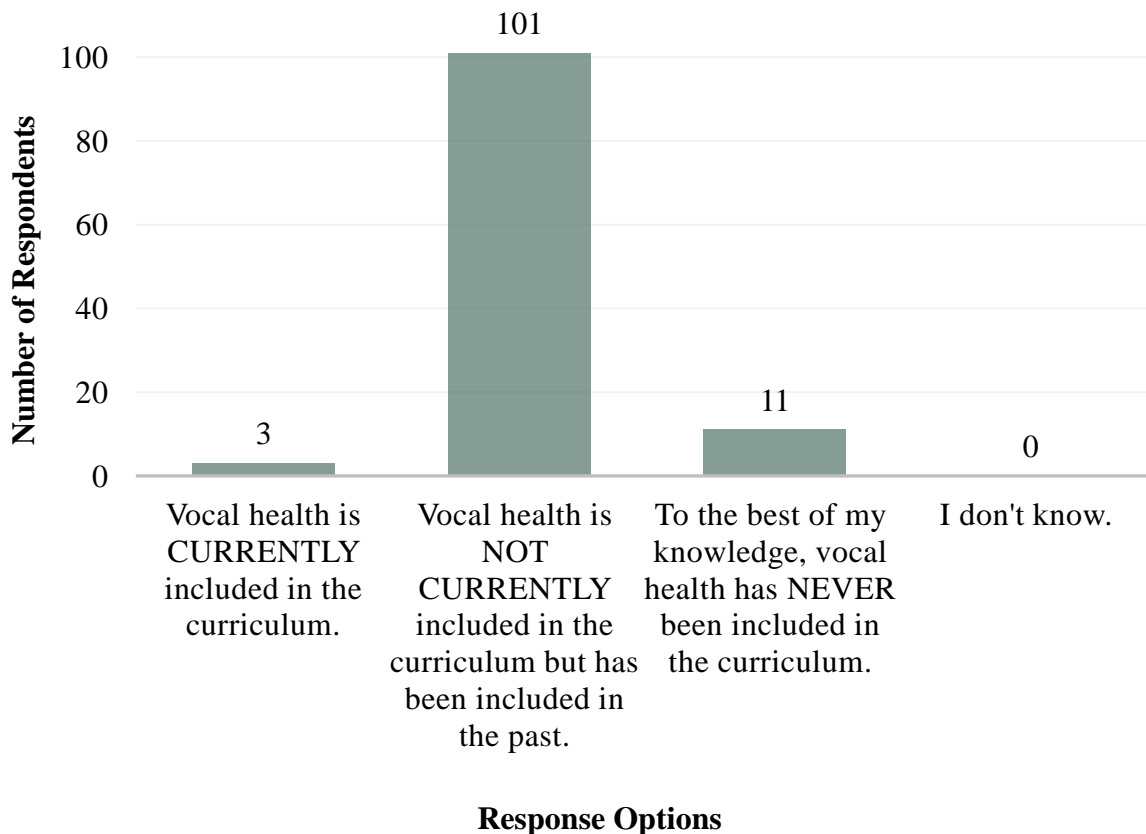
The majority of respondents were SLPs (92%). One respondent identified as “other” specifying they were completing a clinical fellowship year for speech-language pathology. For question two, multiple responses were accepted allowing for respondents to more accurately capture the population of the school(s) in which they provide services. Twenty-seven percent of respondents included “other” for the grade level(s) served by the school. Of these, 87% specified

this to be preschool, about 10% reported working at a post high school population and 3% at special education schools serving students aged 12-21. This accounts for 23%, 3% and less than 1% of the total responses, respectively.

The majority (51%) of respondents reported working in Title 1 schools, a designation for schools with high percentages of low-income families making the schools eligible for additional federal financial assistance aimed at increasing students' chances of academic success (U.S. Department of Education, 2018). Most respondents reported working in a traditional public school (94%). The majority (57%) were more than 10 years out from completion of a degree for SLP or SLPA.

### **Prevalence of Vocal Health Education**

To answer the first research question, respondents were asked to report, to the best of their knowledge, if the school in which they work previously included, currently includes, or has never included vocal health education in the curriculum. Most respondents (88%) selected "Vocal health is NOT CURRENTLY included in the curriculum but has been included in the past." Three respondents (3%) reported vocal health was currently included and 11 (10%) reported vocal health has never been included in the school curriculum. These data are presented in Figure 1.

**Figure 1***Current Inclusion of Vocal Health in the School Curriculum*

To gain a fuller understanding of the demographics of respondents who reported vocal health as currently included in the curriculum, these data were pulled and informally compared. All three respondents who reported the current inclusion of vocal health worked with the elementary grade level, though one reported also working with middle and high school students. All three reported working in a traditional public school and that their schools qualified as Title 1. This aligns with trends of the sample, 94% reporting their school type as traditional public and 51% from schools considered Title 1. One of these respondents reported being 0-5 years out from completion of their college degree while the other two more than 10 years post college

degree completion. This also may be considered typical of the sample which reported 0-5 years post degree completion and more than 10 years at 24% and 55%, respectively.

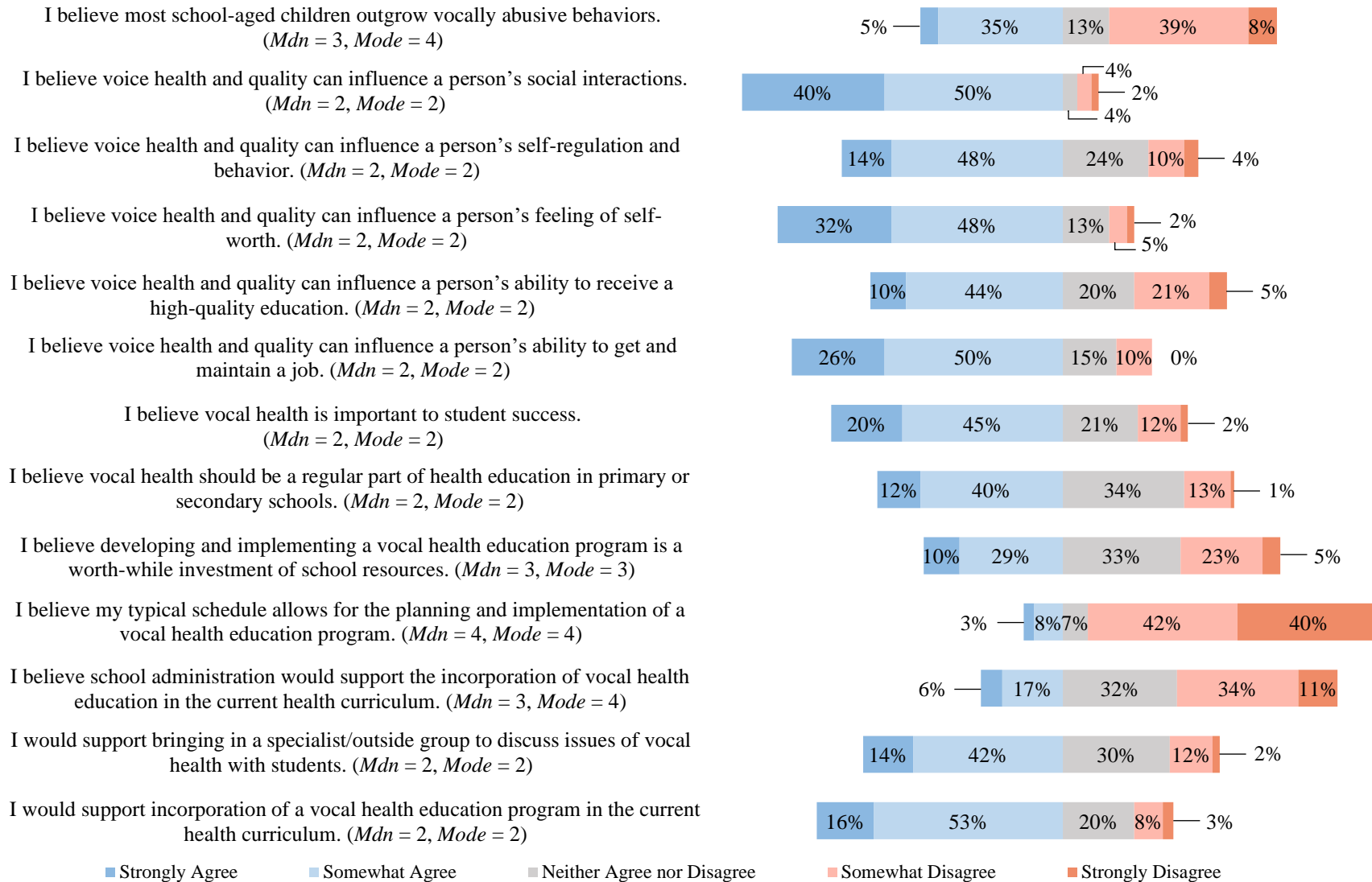
### **Attitudes Regarding Vocal Health in the School Curriculum**

In order to address the second research question, respondents' attitudes about the inclusion of vocal health in the school curriculum were assessed via level of agreement to various statements. Attitudes were also assessed by ranking of professionals in regard to perceived qualification for addressing vocal health in the schools. Attitudes were further assessed through an open-ended prompt for additional comments about vocal health in the schools; however, these qualitative data are addressed in a later section.

Despite a relatively high sample size ( $n = 115$ ), these Likert-type responses have been treated as ordinal and were consequently not assumed to fit a normal distribution (Boone & Boone, 2012). Therefore, non-parametric statistical analysis was carried out for measures of central tendency, through median and mode, and variability via frequency percentages. These data are presented in Figure 2. With "strongly agree" to "strongly disagree" represented as 1 to 5, respectively, central tendency measures of ratings indicate a general agreement with nearly all attitude statements ( $Mdn = 2$ ,  $Mode = 2$ ). Statements which median and mode indicated a disagreement included "I believe most school-aged children outgrow vocally abusive behaviors" ( $Mdn = 3$ ,  $Mode = 4$ ), "I believe my typical schedule allows for the planning and implementation of a vocal health education program" ( $Mdn = 4$ ,  $Mode = 4$ ), and "I believe school administration would support the incorporation of vocal health education in the current health curriculum" ( $Mdn = 3$ ,  $Mode = 4$ ). The statement "I believe developing and implementing a vocal health education program is a worth-while investment of school resources" received a score of "neither agree nor disagree" ( $Mdn = 3$ ,  $Mode = 3$ ).

**Figure 2**

*Agreement Rating Towards Attitude Statements Central Tendencies and Frequency Percentages*



To assess opinions regarding the person most qualified to deal with issues of vocal health in the schools, respondents were asked to rank a list of professionals from most (1) to least (8) qualified. Professionals have been ordered as those deemed most to least qualified via average rank number and presented in Table 2.

**Table 2**

*Average Ranking of Most to Least Qualified Professional to Teach Vocal Health in the Schools*

Professional	Average Ranking
Speech-language pathologist (SLP)	1.73
Outside professional	3.06
School nurse	3.64
Choir/vocal music teacher	3.68
Speech-language pathology assistant (SLPA)	3.92
Physical education teacher	5.93
General education teacher	6.17
Other (please specify)	7.86 <sup>a</sup>

<sup>a</sup> Only three respondents added anything to this field.

### **Perceived Supports**

Respondents were also asked to consider the supports perceived as necessary for the implementation of a vocal health education program in the schools. Six options were given and a seventh allowed for the respondent to add their own. Multiple selections were allowed and most (90%) marked more than one response. Four respondents added a response into the “other (please specify)” category. However, each of the four responses were previously listed. These included comments about additional research and support from administration. They are,



nonetheless, counted as a response for “other (please specify)” in Table 3 which lists the supports and the frequency of selection, ordered from most to least frequent.

**Table 3**

*Supports Necessary for Implementation of a Vocal Health Education Program in the Schools*

Support Necessary	<i>n</i>	%
Support from administration	93	81
Extra time in the schedule	84	73
Additional training	84	73
Additional financial support	59	51
Outside professional assistance	46	40
Additional research	38	33
Other (please specify)	4	4

*Note.* *N* = 115.

### Qualitative Results

In the final section of the Vocal Health Education Questionnaire, respondents were given the opportunity to include additional thoughts about the inclusion of vocal health in the school curriculum. Forty respondents (35%) included a statement. The researcher spent time becoming familiar with the data, responses were coded, and the coding process repeated four days later for intra-coder reliability which was calculated at 91% (Castleberry & Nolen, 2018). Codes were then organized into thematic maps from which five themes were named and defined (Braun & Clarke, 2006). These themes, ordered by frequency, can be viewed in Table 4.

**Table 4***Supports Necessary for Implementation of a Vocal Health Education Program in the Schools*

Support Necessary	<i>n</i>	%
Vocal health won't be incorporated in the schools	20	50
Vocal health can't be incorporated in the schools	17	43
Vocal health should be incorporated in the schools	14	35
Vocal health could be incorporated in the schools	8	20
I don't know much about this subject	5	13

*Note.* *N* = 40. b Many respondents' responses included more than one theme.

Four of the themes centered on a different auxiliary, that is, vocal health “won’t,” “can’t,” “should,” or “could” be incorporated in the schools. These themes, and the fifth theme, “I don’t know much about this subject,” consist of several sub-themes. Half of the respondents (50%) who expressed some degree of “Vocal health won’t be incorporated into the schools,” included statements about the relative rarity of voice disorders in the schools, including statement such as, “Vocal health of children is not an area of high concern as few children demonstrate problems with it.” Some cited other priorities for schools (46%): “It’s hard enough to get reading, writing and math. Our school district varies with how much it teaches social [studies], science, and additional skills like handwriting. I don’t think vocal abuse would be on the list of priorities.” Finally, one respondent expressed a belief that voice disorders resolve without intervention: “I have only had [three] cases of vocal issues and they were all boys in elementary school. When I followed up with these students in Middle School, they no longer had these issues.”

Sub-themes for “Vocal health can’t be incorporated in the schools” consisted primarily of barriers to such a program. These included reports of too many other curriculum requirements

(28%), limited time/heavy workload (24%), and more resources needed, such as funding, additional training, or support from a specialist (17%). One respondent touched on all of these sub-themes succinctly: “SLPs are stretched far too thin as it is, money is always an issue, and teacher and administrators are so concerned about testing and data that they would likely view vocal health education as ‘one more thing’ to do.” This theme also included mention of the COVID-19 pandemic as a barrier (10%), feelings that the ability to address vocal health in the schools was restricted due to slight, if any, academic impact (7%), the conclusion that the curriculum would not change without some sort of legislation or mandate (7%), and the belief that such a program would be too difficult to incorporate with any fidelity (7%).

Statements which comprised the theme “Vocal health should be included in the schools” included reference to the benefits of this type of program and of preventative wellness. An example of this is found in the statement “This is a good idea . . . to consider adding some information into a health class or to provide these tips to the general education teacher to review with students.” Statements like this contrast with those which constitute “Vocal health could be included in the schools” as the latter were statements discussing where the program might best fit: in a music, physical education (P.E.), or health class (e.g., “I believe that gen ed, pe, and choir/music teachers would be able to reach more students regarding the issue and importance of vocal health.”)

A final theme was limited knowledge about vocal health and any benefits of vocal ailment prevention in the schools. This was reported in 13% of responses, often accompanying other statements about inclusion of vocal health in the school curriculum. As one respondent stated, “In all honesty, vocal health education for school-aged children is not something I feel I

have current research on ... at least not in depth for putting it into practice.” This is an important finding which will be discussed in the upcoming chapter.

## CHAPTER V

### DISCUSSION AND IMPLICATIONS

#### Interpretation of Results

The purpose of this study was to evaluate the opinions and current practices of school-based SLPs and SLPAs in regard to the inclusion of vocal health education in the school curriculum. For this research, both quantitative and qualitative data were collected and descriptively analyzed for trends among respondents. Interpretation of these data allowed for the following research questions to be answered:

- Q1     What is the prevalence of basic vocal health education curricula in United States schools?
  
- Q2     What are the attitudes of school-based speech-language pathologists (SLPs) and speech-language pathology assistants (SLPAs) toward the inclusion of vocal health within the primary and secondary school curriculum?
  
- Q3     What supports are considered by these professionals as necessary before implementation of such a program?

#### **Research Question 1**

Section II of the Vocal Health Education Questionnaire was designed to answer the first research question. The sampled group reported inclusion of vocal health education curricula in 3% of schools. Owing to a large sample size ( $n = 115$ ) this likely reflects the broader population of schools. McNamara and Perry (1994) also found a low proportion of respondents had offered group vocal health education to children although, at 18%, this percentage was still greater than what was found through this research. It appears possible vocal health education in the schools is less likely to occur in current curriculums than it was in those even a generation earlier. In the

intervening 27 years, the curricula of schools in the U.S. have become subject to new standards through development and adoption of the Common Core State Standards (Common Core State Standards Initiative, 2021). It is therefore possible whatever vocal health education did occur in the schools when McNamara and Perry (1994) conducted their research is less likely to occur now in part because of current curricula requirements put on schools by the new educational standards. This theory is supported by responses given in the “additional thoughts” section of the Vocal Health Education Questionnaire in which 20% of those responding mention time and/or resource restraints due to academic standards. Tellingly, 18% also mention limited time in the schedule and/or heavy workload as a barrier to vocal health education implementation. Though these are clearly not the only reasons for the absence of vocal health from most respondents’ school curricula, it does appear changes in responsibilities may have made implementation of new programs highly unlikely.

The vast majority (88%) of respondents selected “Vocal health is NOT CURRENTLY included in the curriculum but has been included in the past.” Conversely, 10% of the respondents chose the response “To the best of my knowledge, vocal health has NEVER been included in the curriculum.” The lack of current inclusion of vocal health in the schools may not be a surprising finding, however reports by 88% of respondents that vocal health was previously included perhaps is unexpected. A few possible conclusions may be drawn from these results. It is conceivable that the previous inclusion of vocal health in the school curriculum is common knowledge among current school-based SLPs and SLPAs. If this is so, its current absence in the curriculum may send a strong message about a vocal health program’s viability since it would otherwise still be included in these schools. However, it is also possible this has exposed a

weakness of questionnaire construction. This possibility is arguably supported by results from the research of McNarama and Perry (1994) and will be further discussed in later sections.

## **Research Question 2**

Inspection of the attitudes of school-based SLPs and SLPAs about including vocal health education in the school curriculum allows for hypotheses to be formed and directions for future research suggested. These attitudes were assessed via quantitative and qualitative data analysis and are discussed in this section.

### ***Attitudes Measured via Agreement to Attitude Statements***

In Section III of the Vocal Health Education Questionnaire, respondents marked their level of agreement to 13 attitude statements. With a mean rating of “neither agree nor disagree” and a median of “somewhat disagree,” respondents indicated they were, overall, not in agreement with the statement “I believe most school-aged children outgrow vocally abusive behaviors.” This is an important discovery for this research since it suggested school-based SLPs and SLPAs believed vocal habits may not improve with maturity and those engaging in a misuse and abuse of the voice may require future professional intervention to reverse or prevent further damage.

The median agreement rating for statements about the impact of vocal health on a student’s emotional and social well-being (statements 8-10) was “somewhat agree.” This indicates that respondents agree with the research by Allard and Williams (2007), Cohen et al. (2006), Connor et al. (2008), Krohling et al. (2016), Lass et al. (1991), and Ma and Yu (2013) all of which pointed, in part, to the impact poor vocal health can have on a person’s social and emotional well-being. Likewise, respondents tended to “somewhat agree” with statements about the impact of vocal health on educational and vocational pursuits (statements 11-13). This is in

agreement with the research by Allard and Williams (2007), Amir and Levine-Yundof (2013), Lass et al. (1991), Ma and Yu (2013), Titze et al. (1997), Verdolini and Ramig (2001), and Zacharias et al. (2013). However, respondents tended to be less agreeable to statements which may indicate the viability of vocal health education in the schools (statement 14-19). This suggests while SLPs and SLPAs think vocal health is important to overall well-being, they do not consider it to be a priority in the school curriculum.

### *Attitudes Measured in Qualitative “Additional Thoughts”*

Many of the attitudes reported in Section III were further evidenced by responses to the open-ended “Additional thoughts about the inclusion of vocal health in the school curriculum.” Exactly half of those who provided additional thoughts included, at least in part, opinions comprising the theme “Vocal health won’t be incorporated in the schools.” Many of these (50%) expressed vocal health was a low priority. One respondent stated, in part: “I think it’s a worthy aspect to include in a health unit or choices class. But I also don’t see it being a big issue for most students. I have never had a caseload with a voice student.”

Various respondents also listed other priorities. For example, one mentioned the area of mental health as a perceived need of greater importance:

I’d like to see more mental health services allotted in the budget and emphasized more so in the health curriculum before or in addition to the inclusion of a vocal health in the school curriculum. Even as an SLP with a bias towards all things SLP-related, our mental health offerings just feel lacking comparatively.

These responses may get at the crux of the issue when considering implementation of a vocal health education program. That is, the program’s likely advocates, namely speech and language professionals, may themselves not see the program as important enough to warrant its inclusion.



It may be advantageous for these professionals to recall that “Prevention and Wellness” is among the eight service delivery domains included in ASHA’s Scope of Practice in Speech-Language Pathology (ASHA, 2016). Though those surveyed for the 2020 School Survey: SLP Caseload and Workload Characteristics (ASHA, 2020), do not specifically indicate prevention as a weekly activity, it is possible that prevention may be included in some of the pull-out services, classroom-based integrated services, collaborative consultation, or other assigned duties. However, it is unlikely this is much, if any, of the workload in light of the responses to this Vocal Health Education Questionnaire.

Another common sub-theme, found in 20% of responses, was a specific mention of academic standards as a cause of resource and/or time restraints:

The current common core state standards do not allow for addition of more concepts. The students and educators are already at a breaking point with expectations of reaching learning targets. Although this is an altruistic goal, it would be very difficult to implement with fidelity and get buy in from an education system that is already bursting at the [seams].

Further insight was provided by another respondent with the perception that “without a mandate” vocal health education would be unlikely to be included in the curriculum. As previously discussed, it is possible new academic standards have created a situation where inclusion of vocal health in the school curriculum is even more unlikely than ever before.

Across the five themes, the two most common sub-themes, both occurring in 30% of included responses, were a support for vocal health education in the schools and the experience that voice disorders are rare among the student population. Support for a vocal health education program may indicate accord with the literature regarding the importance of primary prevention

of voice disorders (Aaron & Madison, 1991; Bolbol et al., 2017; Faham et al., 2016; Hazlett et al., 2011; Nilson & Schneiderman, 1983; Pizolato et al., 2013; Richter et al., 2016; Scrimgeour & Meyer, 2002). This was also evidenced in agreement levels to the attitude statements.

However, citing the relative rareness of voice disorders among school-based SLPs' caseloads may suggest a misunderstanding of the purpose of this research; that is, vocal health education as a preventative measure of voice disorder across the lifespan. This is discussed further in the limitations of the study.

Many of the statements of support for vocal health education were found in responses which also mentioned various barriers. This resulted in responses which included, all at once, the themes of vocal health "should," "can't," and "won't" be included in the school curriculum. These responses often began with a similar refrain, in which the respondent first acknowledged the potential for a vocal health education program, but then went on to argue against such a program, listing one or more obstacles to its implementation. This was arguably an important trend of these qualitative data and was again evidence of a possible internal strife for school-based speech and language professionals when presented with the possibility of a vocal health education program. Specifically, as purveyors of vocal health in the schools, they may appreciate the preventative potential of such a program but feel the barriers are too great to pursue what is perceived as low priority when time and resources are already near depletion.

A few respondents, however, did not follow their statements of support with a list of impediments. Despite the number of respondents who stated vocal health education may face a number of barriers in the schools, 10% of those who included additional thoughts expressed unconditional support. One respondent referenced the current global pandemic by writing, "Especially with COVID and over extended use of your voice, this is so important to be talking

about!” There are indeed those who appear to endorse vocal health education in the school curriculum. However, these appear outnumbered by those that find the issue a low priority and not worth overcoming any barriers to implementation.

Yet another finding in the “additional thoughts” responses was that 13% of those contributing reported limited knowledge about vocal health. This indicates that SLPs and SLPAs, despite being vocal health professionals, may simply be unaware of the research (such as has been presented here) which shows the importance and preventability of voice disorders. This lack of knowledge may have important implications for future research, as is discussed in a later section.

### ***Ranking of Professionals***

Attitudes of school-based SLPs and SLPAs regarding the inclusion of vocal health in the school curriculum were further assessed via ranking of professionals as most to least qualified to deal with issues of vocal health in the schools (question 20). Respondents chose SLPs as the most qualified. This may not be unexpected given that SLPs are specially trained in vocal health and were also the primary respondents to this questionnaire. It is interesting to consider these results coupled with common themes in the open-ended “additional thoughts” responses. This group deems themselves most qualified to deal with vocal health education in the schools and yet perhaps does not feel vocal health is a priority in the schools. This provides further insight into the uphill battle which might be faced by those advocating for vocal health inclusion in the school curriculum.

The professional deemed by respondents as least qualified was “other (please specify),” with an average ranking of 7.86. This question allowed for respondents to add and rank an otherwise unlisted person, which three participants did by adding “gen ed paraprofessional” and

“health teacher.” Two respondents added “health teacher” and ranked this selection as fourth and fifth most qualified. It is possible that future research may discover these professionals ranked much higher if they were included in the list by title.

### **Research Question 3**

Supports which are considered necessary for implementation of a vocal health program were formally assessed via a multi-response question and, informally, via themes of responses to the open-ended “additional thoughts” prompt. Most respondents (71%) marked three or more supports in the multi-response question. This indicates a vocal health education program would possibly necessitate several supports before implementation. This again hints at the potential complexities of addressing vocal health education in the school. Support from administration was the most frequently included response. Indeed, it may be difficult to imagine the inclusion of vocal health in the school curriculum without first securing support from administration, after which many other necessary requisites may follow.

Extra time in the schedule and additional training tied for second-most selected necessary support response. Considering respondents stated vocal health is not a priority in their responses to the prompt for “additional thoughts about the inclusion of vocal health in the school curriculum,” if there were to be extra time in the schedule, it is likely it would not be given to vocal health unless school professionals were convinced of the program’s importance. Essentially, it appears there are currently many obstacles to the inclusion of vocal health in the school curriculum.

Selected by 51% and 40% of respondents, respectively, additional financial support and outside professional assistance may represent supports which are, in part, mutually dependent. As an example, one respondent noted in the free response, in part:

I also know that voice is not my area of expertise and typically isn't for school-based SLPs so I would feel like a specialist would need to come in in order to provide that information. Schools don't have the funding for that and teachers aren't going to buy into giving up more of the little time they have to fit in teaching all the standards that they have to.

Additional financial support in the schools could result in a number of additional supports coming to fruition in order for development of a new program. Some sort of outside professional help, whether for training purposes or the hiring of these professionals to take charge of such a program, may be a likely use for additional funds. Another respondent mentioned involvement of an otolaryngologist, less formally known as an Ear, Nose, and Throat doctor or ENT: "For me to feel comfortable addressing a voice disorder, I would first want a clean bill of health from an ENT with scoping. I don't believe that our school district would support financing outside specialist exams." This, however, hinted at another weakness of the novel Vocal Health Education Questionnaire which will be discussed in the next section.

### **Limitations of the Study**

The current study is not without its limitations. Cross-sectional survey research suffers from an inherent response bias which should always be considered when assessing research which utilizes this method of data collection (Tellis & Chandrasekaran, 2010). Additionally, data collected via Likert-type responses may be fraught with numerous biases including a central tendency bias, acquiescence bias, and social desirability bias as well as suffering from a lack of reproducibility (Bertram, 2006).

A major limitation to this research was the novel questionnaire utilized which was created by the researcher. Despite following guidelines for clear question development and an

extensive outsider review for questionnaire quality, weaknesses in the Vocal Health Education Questionnaire became apparent through response analysis. For example, though 88% of respondents may have indeed known of previous inclusion of vocal health in the school curriculum, this number is quite high, especially considering responses to a similar question in the research by McNamara and Perry (1994). It may be that some should have instead selected the alternative response “Vocal health has NEVER been included in the curriculum.” An alternative response wording or different questionnaire construction may have alleviated an issue that calls into question the validity of the current data used to address the first research question.

An additional issue with the questionnaire was revealed through analysis of the qualitative data collected. Instead of considering the inclusion of vocal health as preventative health education, many respondents seem to have assumed the benefits of this program would be limited to students currently experiencing vocal issues. If consideration is only given to school-aged students receiving speech and language services for voice disorders, the argument of low priority is quite understandable. However, this research centers on prevention of future vocal health issues. Given the lifetime prevalence of preventable voice disorders, this distinction makes a program of this kind meaningful to a much wider population than merely the few school-aged students dealing with voice disorders. The missed opportunity to gather opinions about the importance of vocal health education as preventative knowledge for use across the lifespan is regrettable. This may have been avoided with a more thorough explanation of research purpose, through alternate questionnaire wording, or via use of a previously validated questionnaire.

### **Clinical Implications and Directions for Future Research**

Vocal issues are prevalent and impactful in many populations (Bhattacharyya, 2014; Cantor Cutiva et al., 2013; Carding et al., 2006; Hartley et al., 2016; Kallvik et al., 2015; Mendes

Tavares, et al., 2011; Roy, 2003; Roy et al., 2005; Titze et al., 1997; Vilkman, 2000). There was research which proposed sustained vocal health could be important for overall well-being and functioning (Allard & Williams, 2007; Amir & Levine-Yundof, 2013; Cohen et al., 2006; Connor et al., 2008; Krohling et al., 2016; Lass et al., 1991; Ma & Yu, 2013; Titze et al., 1997; Verdolini & Ramig, 2001; Zacharias et al., 2013). Likewise, the literature base argued many vocal issues may be lessened or prevented entirely through vocal health education (Aaron & Madison, 1991; Bolbol et al., 2017; Faham et al., 2016; Hazlett et al., 2011; Nilson & Schneiderman, 1983; Pizolato et al., 2013; Richter et al., 2016; Scrimgeour & Meyer, 2002). It followed that the inclusion of vocal health education in the school curriculum as primary prevention of voice disorders could be meaningful. Perhaps this would be presented as a single day's material in a required health class during which all students learn the basics of vocal hygiene and vocal misuse and abuse avoidance. Perhaps SLPs might offer a school-wide vocal health in-service which might benefit students and teachers simultaneously. According to the literature, a program of this kind could be impactful for many people at a time in their youth when life-long habits of health are being established.

This research has shown that school-based SLPs and SLPAs tend to agree with much of the literature regarding the impact a voice disorder can have on a person's well-being as well as a person's ability to receive a high-quality education and get and maintain a job. However, vocal health education does not appear to be currently included in most school curricula. Furthermore, the professionals surveyed here do not appear to feel a program of this kind is a priority. Despite a literature mass which seems to argue the benefits of a national vocal health program aimed at primary prevention of voice disorders, other concerns in the schools may be far too great to make such a program viable at this time.

Before implementing a vocal health education program in the schools, it may be necessary to address concerns such as those raised by the speech and language professionals surveyed for this research. Researchers wanting to assess the impact of such a program may achieve most success with an efficient and pre-packaged course delivered to schools and thus requiring no additional training or energy from school personnel. Even with this, it is likely funding and precious hours in the school day may be allocated elsewhere as many programs may be more successfully argued as a higher importance. It would, therefore, be insightful to survey adult voice users on perceived importance of vocal health education. Given the social, economic, and emotional impacts of a voice disorder, do adults feel this type of preventative health education would have a positive influence on their quality of life? Do occupational voice users wish they had received more vocal care instruction before starting a career as a lawyer, teacher, administrative assistant, salesperson, counselor, or any other job requiring a functional voice? Since a number of respondents admitted to limited knowledge of vocal health and how this might be addressed in the school curriculum, perhaps future research may also focus on increasing awareness of the prevalence, impact, and preventability of voice disorders. This may help build the support needed to implement vocal health education in the school curriculum for future generations. Prevention of voice disorders and continued vocal wellness would be the goal of a program which addresses vocal health en masse at the primary or secondary school level. This research adds to the body of evidence which might support a program such as this and which may be valuable for all voice users.



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**APPENDIX A**  
**INSTITUTIONAL REVIEW BOARD APPROVAL**



## Institutional Review Board

Date: 10/21/2020

Principal Investigator: Kate Mathews

Committee Action: **IRB EXEMPT DETERMINATION – New Protocol**

Action Date: 10/21/2020

Protocol Number: [2009011182](#)

Protocol Title: The Inclusion of Vocal Health in The School Curriculum: A National Survey of School-Based Speech-Language Pathologists and Speech-Language Pathology Assistants

Expiration Date:

The University of Northern Colorado Institutional Review Board has reviewed your protocol and determined your project to be exempt under 45 CFR 46.104(d)(702) for research involving

Category 2 (2018): EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR. Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: (i) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; (ii) Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or (iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 45 CFR 46.111(a)(7).

You may begin conducting your research as outlined in your protocol. Your study does not require further review from the IRB, unless changes need to be made to your approved protocol.

**As the Principal Investigator (PI), you are still responsible for contacting the UNC IRB office if and when:**



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**Institutional Review Board**

- You wish to deviate from the described protocol and would like to formally submit a modification request. Prior IRB approval must be obtained before any changes can be implemented (except to eliminate an immediate hazard to research participants).
- You make changes to the research personnel working on this study (add or drop research staff on this protocol).
- At the end of the study or before you leave The University of Northern Colorado and are no longer a student or employee, to request your protocol be closed. \*You cannot continue to reference UNC on any documents (including the informed consent form) or conduct the study under the auspices of UNC if you are no longer a student/employee of this university.
- You have received or have been made aware of any complaints, problems, or adverse events that are related or possibly related to participation in the research.

If you have any questions, please contact the Research Compliance Manager, Nicole Morse, at 970-351-1910 or via e-mail at [nicole.morse@unco.edu](mailto:nicole.morse@unco.edu). Additional information concerning the requirements for the protection of human subjects may be found at the Office of Human Research Protection website - <http://hhs.gov/ohrp/> and <https://www.unco.edu/research/research-integrity-and-compliance/institutional-review-board/>.

Sincerely,



Nicole Morse  
Research Compliance Manager

University of Northern Colorado: FWA00000784

**APPENDIX B**

**INVITATION TO PARTICIPATE AND QUESTIONNAIRE LINK**

Dear school-based SLPs and SLPAs

My name is Kate Mathews and I am a graduate student in speech-language pathology at the University of Northern Colorado. I am investigating practices and attitudes surrounding the inclusion of vocal health education in the primary and secondary school curriculum. I am contacting you because I would value your opinion for this research. I would like for you to share your experiences, opinions, and perceptions via an electronic Vocal Health Education Questionnaire which should take about 10 minutes to complete.

A link to the consent form and questionnaire via Qualtrics is provided here:

[https://unco.co1.qualtrics.com/jfe/form/SV\\_51KuOMEsaox6rpr](https://unco.co1.qualtrics.com/jfe/form/SV_51KuOMEsaox6rpr) (questionnaire password: voice). Answers are anonymous and there will be no attempt to gather follow-up information. The survey will remain open until February 22, 2021. Upon completion, you will be offered the opportunity to enter a drawing for one of three \$45 Amazon.com gift cards as a thank you for your time and expertise. Should you choose to enter the drawing, an email address at which you can be contacted is required.

This project has been approved by the University of Northern Colorado's Institutional Review Board under ID #2009011182.

Thank you for your consideration to participate in this research.

Best,

Kate Mathews, B.S., M.A. student in Speech-Language Pathology  
Audiology & Speech-Language Sciences  
College of Natural and Health Sciences  
p: (970) 351-2734 e: [math6865@bears.unco.edu](mailto:math6865@bears.unco.edu)

Faculty advisor for this research:  
Julie Hanks, EdD, CCC-SLP  
Professor and Department Chair  
Audiology & Speech-Language Sciences  
College of Natural and Health Sciences  
p: (970) 351-2087 e: [Julie.Hanks@unco.edu](mailto:Julie.Hanks@unco.edu)

**APPENDIX C**  
**INFORMED CONSENT**



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### Informed Consent Form for Participation in Research

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**Title of Research Study:** The Inclusion of Vocal Health in The School Curriculum: A National Survey of School-Based Speech-Language Pathologists and Speech-Language Pathology Assistants

**Researcher(s):** Kate Mathews, B.S., Audiology & Speech-Language Sciences

Phone Number: (970) 351-2734      email: [math6865@bears.unco.edu](mailto:math6865@bears.unco.edu)

**Research Advisor:** Dr. Julie Hanks, EdD, CCC-SLP, Audiology & Speech-Language Sciences

Phone Number: (970) 351-2087      email: [Julie.Hanks@unco.edu](mailto:Julie.Hanks@unco.edu)

**Procedures:** We would like to ask you to participate in a research study. If you participate in this study, you will be asked to complete a survey that will take about 10 minutes to complete. The primary purpose of this study is to investigate practices and attitudes surrounding the inclusion of vocal health education in the school curriculum. The survey will remain open for response for three weeks and you may receive up to two reminder emails during this time. Upon completion, you will be entered to win a \$45 Amazon.com gift card as a thank you for your time. please note that the data you provide may be collected and used by Amazon as per its privacy agreement. Additionally, this research is for residents of the United States over the age of 18; if you are not a resident of the United States and/or under the age of 18, please do not complete this survey. Speech-language pathologists (SLPs), speech-language pathology assistants (SLPAs), teachers, other school professionals, and primary and secondary students will be the populations who most benefit from this research.

**Questions:** If you have any questions about this research project, please feel free to contact Kate Mathews at [math6865@bears.unco.edu](mailto:math6865@bears.unco.edu) or (970) 351-2734. If you have any concerns about your selection or treatment as a research participant, please contact Nicole Morse, Research Compliance Manager, University of Northern Colorado at [nicole.morse@unco.edu](mailto:nicole.morse@unco.edu) or 970-351-1910.



**Voluntary Participation:** Please understand that your participation is voluntary. You may decide not to participate in this study and if you begin participation you may still decide to stop and withdraw at any time. Your decision will be respected and will not result in loss of benefits to which you are otherwise entitled.

**Please take all the time you need to read through this document and decide whether you would like to participate in this research study.**

If you decide to participate, your completion of the research procedures indicates your consent. Please keep this form for your records.

**APPENDIX D**  
**VOCAL HEALTH EDUCATION QUESTIONNAIRE**

## VOCAL HEALTH EDUCATION QUESTIONNAIRE

## SECTION I: Identifying and Demographic Information

We realize that SLPs and SLPAs often work at more than one school. Please answer the following questions based on the school where you spend the majority of your time.

1. What position do you hold?
  - a. Speech-language pathologist (SLP)
  - b. Speech-language pathology assistant (SLPA)
  - c. Other (please specify): \_\_\_\_\_
  
2. The grade levels served by the school where you work are (check all that apply):
  - a. Elementary (K-5)
  - b. Middle (6-8)
  - c. Secondary (9-12)
  - d. Other (please specify): \_\_\_\_\_
  
3. The school type is:
  - a. Public school- traditional
  - b. Public school- charter
  - c. Public school- online/alternative campus (before COVID-19)
  - d. Non-public school
  
4. Does your school qualify as a Title 1 school?
  - a. Yes
  - b. No
  - c. I don't know
  
5. How long has it been since you've completed your college degree for SLP or SLPA?
  - a. 0-5 years
  - b. 5-10 years
  - c. More than 10 years

## SECTION II: Current and Past Inclusion of Vocal Health Education

6. Please choose the statement which is most fitting for the school in which you work.
  - a. Vocal health is CURRENTLY included in the curriculum.
  - b. Vocal health is NOT CURRENTLY included in the curriculum but has been included in the past.
  - c. To the best of my knowledge, vocal health has NEVER been included in the curriculum.
  - d. I don't know.

SECTION III: Attitudes Regarding Inclusion of Vocal Health in the School Curriculum  
(choose level of agreement: “strongly agree,” “somewhat agree,” “neither agree nor disagree,”  
“somewhat disagree,” “strongly disagree”)

7. I believe most school-aged children outgrow vocally abusive behaviors.
8. I believe voice health and quality can influence a person’s social interactions.
9. I believe voice health and quality can influence a person’s self-regulation and behavior.
10. I believe voice health and quality can influence a person’s feeling of self-worth.
11. I believe voice health and quality can influence a person’s ability to receive a high-quality education.
12. I believe voice health and quality can influence a person’s ability to get and maintain a job.
13. I believe vocal health is important to student success.
14. I believe vocal health should be a regular part of health education in primary or secondary schools.
15. I believe developing and implementing a vocal health education program is a worth-while investment of school resources.
16. I believe my typical schedule allows for the planning and implementation of a vocal health education program.
17. I believe school administration would support the incorporation of vocal health education in the current health curriculum.
18. I would support bringing in a specialist/outside group to discuss issues of vocal health with students.
19. I would support incorporation of a vocal health education program in the current health curriculum.

20. Please rank most qualified (1) to least qualified (8), the person you feel is most qualified to deal with issues of vocal health in the schools.
- Nurse
  - Speech-language pathologist (SLP)
  - Speech-language pathology assistant (SLPA)
  - Physical education teacher
  - General education teacher
  - Choir/vocal music teacher
  - Outside professional (for example: university professor, doctor, voice specialist, etc.)
  - Other (please specify): \_\_\_\_\_
21. Which supports do you feel are most necessary for implementation of a vocal health education program in the schools? (check all that apply)
- Extra time in the schedule
  - Additional financial support
  - Additional training
  - Outside professional assistance
  - Support from administration
  - Additional research
  - Other (please specify): \_\_\_\_\_

Additional thoughts about the inclusion of vocal health in the school curriculum:

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Thank you for participating in this research! As a thank you for your time and expertise, you have the opportunity to be entered into a drawing for a chance to win a \$45 Amazon.com gift card. Please note that this is voluntary, the only contact you may receive will be notification of an award, and the email address will not be used for any other purpose.

Would you like to enter the drawing for a chance to win a \$45 Amazon.com gift card?

- YES (completes survey and links to different survey for email collection)
- NO (completes survey)

**APPENDIX E**

**AMAZON.COM GIFT CARD DRAWING NOTIFICATION**

### AMAZON.COM GIFT CARD DRAWING NOTIFICATION

The following notification was electronically sent with the Amazon.com gift card to the three respondents randomly selected in the drawing:

You completed the Vocal Health Education Questionnaire to further research about voice education in the schools. Your email was randomly selected to receive a \$45 Amazon.com gift card. Thank you for participating in this research!