

5-2011

A Systematic Analysis of Risks to Adolescent Vocal Health

Debra P. Anderson

Columbus State University, anderson_debra12@columbusstate.edu

Follow this and additional works at: https://csuepress.columbusstate.edu/theses_dissertations



Part of the [Music Education Commons](#)

Recommended Citation


Anderson, Debra P., "A Systematic Analysis of Risks to Adolescent Vocal Health" (2011). *Theses and Dissertations*. 88.

https://csuepress.columbusstate.edu/theses_dissertations/88

This Thesis is brought to you for free and open access by the Student Publications at CSU ePress. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of CSU ePress.

A SYSTEMATIC ANALYSIS OF RISKS TO ADOLESCENT VOCAL HEALTH

Debra P. Anderson



Digitized by the Internet Archive
in 2012 with funding from
LYRASIS Members and Sloan Foundation

<http://archive.org/details/systematicanalys00ande>

The undersigned, appointed by the Schwob School of Music at Columbus State University, have examined the Graduate Music Project titled

A Systematic Analysis of Risks to Adolescent Vocal Health

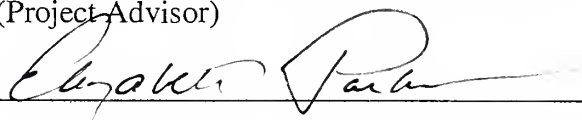
presented by Debra P. Anderson

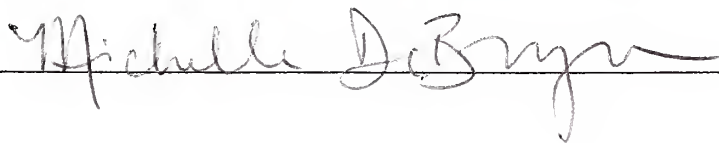
a candidate for the degree of Master of Music in Music Education

and hereby certify that in their opinion it is worthy of acceptance.



(Project Advisor)





Columbus State University

A Systematic Analysis of Risks to Adolescent Vocal Health

By

Debra P. Anderson

A GRADUATE MUSIC PROJECT

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF MUSIC IN MUSIC EDUCATION

Schwob School of Music

Columbus, Georgia

May 2011

Abstract

The purpose of this study was to identify and analyze risks that threaten adolescent vocal health. Qualitative interviews revealed risks associated with vocal over-use, lack of scientific vocal pedagogy, poor tonal ideals, inadequate choral procedures, and vocal difficulties in high school musical theater productions. Anonymous student surveys (N=60) from two rural high schools in West Georgia revealed over-use and lack of knowledge about chest voice singing as risky to adolescent vocal health. Anonymous choral director surveys (N=2) from the same high schools indicated that choral directors may be uncomfortable teaching chest voice production, allowing students to use their chest voice unsupervised. Related studies indicate that a lack of depth in secondary choral education training is associated with an increase in adolescent vocal problems. When systematically analyzed, the data and related studies suggest that the K-12 general certification standards foster limitations in the curricula for Bachelor of Music Education degrees, compromising training for choral educators. More research is necessary to validate the conclusions of the evidence exposed in this study. Recommendations are presented to assist middle and high school choral directors in developing a healthy vocal approach.

Table of Contents

Chapter 1	Introduction.....	4
Chapter 2	Related Studies.....	6
Chapter 3	Qualitative Methodology and Findings.....	8
Chapter 4	Quantitative Methodology and Findings.....	20
Chapter 5	Discussion of Risks.....	28
	Risk 1: Adolescent Vocal, Physical, and Psychological Development	
	Risk 2: Lack of Appropriate Tonal Models and Conflicting Tonal Ideals	
	Risk 3: Vocal Over-Use and Symptoms of Vocal Distress	
	Risk 4: Poor Choral Procedures and Environments	
	Risk 5: High School Musical Theater Productions	
	Risk 6: Lack of Consensus on Teaching Belting/Chest Voice Singing	
	Risk 7: Skill Deficiencies in Choral Music Educators due to General Certification	
Chapter 6	Discussion of Possible Solutions.....	48
	Solution 1: Healthy Pedagogy and Adolescent Vocal Development	
	Solution 2: Audiation, Tonal Ideals and Tonal Models	
	Solution 3: A Pro-active Approach to Vocal Over-Use and Vocal Hygiene	
	Solution 4: Purposeful Choral Pedagogy	
	Solution 5: Making High School Musicals Healthier	
	Solution 6: Reclaiming the Chest Voice as a Teaching Tool	
	Solution 7: Re-thinking Certification and the Bachelor of Music Ed Degree	
Chapter 7	Analysis Summary.....	75
Chapter 8	Resources.....	78
Chapter 9	Bibliography.....	81
Chapter 10	Appendixes.....	87
	Appendix A: Student Survey	
	Appendix B: Choral Director Survey	
	Appendix C: Student Responses to Survey Question 7	

Chapter 1: Introduction

The adolescent years present unique challenges to young singers with regard to maintaining vocal health. In 2002, Emily S. Tepe, Ellen S. Deutsch, Quiana Sampson, Stephen Lawless, James S. Reilly, and Robert Sataloff reported that “vocal difficulty is common among young choral singers, with older adolescents particularly at risk” (p. 250). Valerie Trollinger (2007) states vocal problems in students K-12 are increasing. Based on statistics presented in 2004 by the Neuromusculoskeletal Committee at the Health Promotion in Schools of Music Conference in Fort Worth, Texas, “thirty-five to sixty-five percent of K-12 students involved in music suffered from neuromusculoskeletal problems that could be attributed to music performance, including singing” (as cited in Trollinger, 2007, p.27).

Though there is research that explores the immaturity of the adolescent vocal mechanism and the risks it may present to healthy singing (Skelton, 2007; Yarnall, 2006; Fuchs, Meuret, Geister, Pfohl, Thiel, Dietz, and Gelbrich, 2008)), other issues may negatively impinge on adolescent vocal health. High school choral singers are often the same students who participate in theatrical productions, cheerleading, debate team, and other activities that require heightened use of the voice, creating an environment for serious over-use (Bastian, 2002). Students often use their developing voices in these activities with very little individual training. Furthermore, students may fail to integrate the positive vocal training they may have received in the choral setting into all of their vocal activities. They may use one vocal technique in musical theater or when singing along with their favorite popular artist, and a different vocal technique in their choral ensembles, resulting in a lack of integration in the use of the muscles of the developing vocal mechanism. Disagreements among choral teachers about the use of chest voice (Spivey, 2008), (also known as heavy mechanism or, in recent years, thyroarytenoid-dominant production) may lead to a choral approach that intentionally disconnects the inner workings of the vocal mechanism. Poor tonal models and haphazard

choral methods may inadvertently create vocal tension that contributes to vocal distress in adolescent singers.

With the aid of research, surveys, interviews, and personal experience, this project will explore risks that compromise and endanger the vocal health of young singers. When analyzed together, a new approach to middle and high school choral programs may be necessary to truly emphasize, encourage, and maintain adolescent vocal health.

Chapter 2: Related Studies

Since the late 1800's, researchers have investigated the changing adolescent male voice (Skelton, 2007). In recent years, research regarding adolescent vocal production has boomed and expanded that body of knowledge into the twenty-first century. The work of Lynne Gackle (1991) brought to the forefront female adolescent vocal development. Henry Leck (2009) and Patrick Freer (2010) document how vocal educators continue to wrestle with issues related to male vocal development.

Concurrently, voice science has become more sophisticated and clarified the inner workings of the human vocal mechanism. Scott McCoy (2006) has quantified how objective study of physiology and acoustics apply to the aesthetic qualities of tonal ideals and vocal sound. James C. McKinney (2005) is well-known for his guidance on diagnosing and correcting vocal problems. Though there are still some vocal mysteries, we are not in the dark ages regarding how humans produce vocal sounds.

The gains in voice science have enhanced understanding regarding vocal health and adolescent vocal development. Kevin Skelton (2007), Debra Spurgeon (2004), and Fuchs et al. (2008) have begun a serious discussion about how current scientific knowledge about the human voice can and should mold adolescent vocal pedagogy. Susan Yarnall's work (2006) addresses the implications of the effects of adolescent psychological development on vocal health.

The development of choral pedagogy, particularly the work of Brenda Smith and Robert Sataloff (2003) and James Jordan (2005), has exposed how poor choral environments and procedures affect vocal health. Rhonda Fuelberth (2003) studied how some conducting gestures create tension in choral singers. The negative effects of intensive choral work on vocal health, such as All-State choral events (Daugherty, Manternach, & Price, 2011) and summer choral camps (Bowers & Daugherty, 2008) has been documented. The explosion of

young singers performing musical theater and other kinds of commercial singing has spawned relevant critique. The American Academy of Teachers of Singing published a statement “promoting vocal health in the production of high school musical theater” (2004, p. 223). Norman Spivey (2008) has addressed the on-going debate regarding whether singing in musical theater can be healthy. Robert Edwin (2007) and others who teach vocal techniques for commercial music have led the charge that belting and chest voice singing are “legit” (p. 215).

Dr Robert Bastian (2002) has focused on the medical perspective of vocal health and how over-use contributes to vocal problems. Valerie Trollinger (2007) discusses how current understandings of pediatric vocal development should impact the content of vocal instruction. Fuchs et al. (2008) are evaluating “a proposed classification system to assess the nature and extent of voice use in young singers to support diagnostic routines and treatment of voice disorders” (p. 649). *The Pilot Survey of Vocal Health in Young Singers* addresses “the incidence of vocal complaints in young singers, the vocal habits and hygiene of young choral singers, [and] the relationship between pediatric voice problems and subsequent voice dysfunction in adulthood” (Tepe et al., 2002, p. 244).

In spite of access to accurate information and data on the topic of adolescent vocal health, Valerie Trollinger (2007) reports that vocal problems in K-12 students are actually increasing. What could cause such a high percentage of K-12 students involved in music to suffer from injuries attributed to music performance, including singing (p. 27)? What are we missing? Perhaps it is not that we are *missing* anything. Is it possible that we have all the pieces we need to solve the puzzle but have not yet put them together correctly? Could it be that what we are lacking is a different way of looking at the evidence that already exists? This project undertakes a systematic analysis of the contributing factors to poor vocal health in adolescents to consider how what we already know may require a new perspective.

Chapter 3: Qualitative Methodology and Findings

“Qualitative research seeks to understand the world from the perspectives of those living in it” (Hatch, 2002, p. 7). Qualitative interviews can effectively document information that comes from individual life experiences and provide valuable insight regarding the scope of an issue in the real world. For this project, student interviewees were chosen based on the specific nature of experiences that had an impact on their vocal health.

Themes have emerged from the interviews that indicate specific risks to adolescent vocal health. Though each isolated risk may be significant, the true extent of the effects on adolescent vocal health cannot be fully evaluated until the risks are examined together.

Research is needed to examine the larger threat that this analysis brings into focus.

Interview Participants and Interview Protocols

All of the students who agreed to be interviewed for this project were either private students from my private voice studio or social acquaintances. Their experiences provided the early motivation in my desire to examine adolescent vocal health. All students understood the purpose of this project and that they would participate anonymously. Though I recognize that it is impossible to remove the bias of my association with these students, I believe their experiences speak for themselves. Formal and informal structures were used to conduct the interviews. Due to the individual nature of their experiences and how their vocal health was affected, a unique format was developed for each student. Three interviews were conducted via email, and five were conducted in person.

Interviews and Indicators

Interview Student A.

Student A is a 16-year-old white female. She has been a private student in my studio for three semesters. She sings in her high school mixed choir and participates in women’s trio competition of the Georgia High School Association Literary Meets. She has consistently

made All-State Choir and All-City Choir in middle and high school. She also sings in her praise band at church. When she first came to me, Student A used a breathy head voice sound in her classical singing. She had an un-naturally shaped mouth due to the fact that the lower jaw was over-extended and the lips were overly rounded. The tongue had a deep groove in the center. This resulted in the sound being airy and back in the throat, and she had limited access to higher pitches. In her praise band singing, she used a brighter, but heavy chest-voice sound in a limited one and a half octave range. Jaw tension created problems in both modes of production. I chose to interview Student A because of this dichotomy of vocal production. I asked her to compare the two techniques.

Question 1: How is singing in choir at school different from singing in your church band? *“In choir you are dependant (sic) on others and you have to blend with the other singers. On the other hand in band I am independent and I am able to do whatever I would like with my voice. Singing in church bands I usually stay in my chest voice and occasionally going into head when needed. In choir, I sing alto 2 so I am in my chest for some but when it's only SSA singing I am in my head voice more than half the time.”* Question 2: Are there any similarities in singing in choir at school and singing in the band at church? *“I can't really think of any particular similarities in the two of them.”* Question 3: Do you use the school choir singing technique at church? Do you use the church band singing technique at school? *“I believe that I sing a lot more in my head voice in choir than in band. I have learned to blend by singing softly and not strong and rich like it should be. I sing completely differently at school than at church; when I sing at school I can tell the difference in the quality of my voice. In choir it is much softer than in band which is much stronger; but she would not want me to bring that chest into her choir. It might be too heavy for what she is looking for.”*

Question 4: Which type of singing means the most to you, and why? *“Singing in my band is*

very important to me. It is what I put most of my time into. Being a part of the church bands gives me confidence. I also like it because I feel as though I am better at it."

Student A expresses the reality of her lack of integration of vocal technique in different singing activities. She does not experience her choral singing as "strong and rich;" however, she realizes that her high school choral director would not like her "to bring that chest into her choir." Student A is ultimately left to her own devices to determine how to use chest voice and at the same time, is encouraged to sing in an airy head voice sound at school. It results in quite a schizophrenic vocal approach.

Interview Student B.

"Student B" is a 17-year-old white female who attends my church. She considers herself a musical theater "belter," but also sings "legit" when singing more standard choral repertoire. At school, she participates regularly in Mixed Choir, Elite Ensemble, the Georgia High School Association Literary Women's Trio Competition, the spring musical, and Thespian Club. In the community, Student B sings regularly in church choir and performs in dramatic and musical productions at the local professional theater. I chose to interview Student B after her mother came to me and asked if I had any "quick fixes" for laryngitis. This is her story.

Student B was cast in "Opening Number" for the 2011 Georgia Thespian Conference. "Opening Number" is a twenty-minute musical theater production that opens the annual Georgia Thespian Conference. It is quite an honor, as only forty to fifty students are cast from high school Thespian Clubs throughout the state of Georgia. The "Opening Number" rehearsal schedule included eight consecutive hours on two Saturdays, and a four-hour dress rehearsal on the day of the performance. Student B identified the teaching staff for the rehearsals as a high school theater director, a choreographer and her assistant, a Georgia Thespian staff member, and two college-aged assistants.

At the first eight-hour rehearsal, the goal was to learn all the music for the “Opening Number.” The day’s agenda stated 5-6 hours of ensemble singing and sectionals, an hour of choreography, and an hour for lunch. Students were allowed to choose which voice part they would sing. Though she sings Soprano 2 in school and church choir, Student B offered to sing alto for “Opening Number” ensemble “because there were not enough altos cast.”

Student B further stated that vocal warm-ups for this rehearsal were scheduled at 7:30 AM, but students were not required to attend. Since the travel time from Columbus to their destination was significant, Student B and others in her car pool decided to skip the warm-ups. During opening remarks at the beginning of rehearsal, students were informed that they should “be professional.” If they were not able to “keep up,” they could be and would be replaced. “Student B” believed these comments required her to sing at performance level for the entire day. She did not recall anyone suggesting that students could sing lightly. She did not remember any reminders about vocal hydration. The only vocal admonitions she could remember were “Make sure your soft palate is up,” and “Use tight vowels.” They were told *where* to breathe, but not *how* to breathe.

It was during this first eight-hour rehearsal that Student B noticed problems with her voice. During the lunch break, she began coughing and was unable to clear her throat. In the last forty-five minutes of the rehearsal, she had no upper range, and could only sing notes below middle C. Her speaking voice was hoarse as she traveled back to Columbus that night, and by the next morning phonation was not possible. Her speaking voice returned to normal in two weeks. Her singing voice took a full month to recover.

It is not difficult to understand why Student B lost her voice after this kind of supervised vocal abuse. Her constant singing at performance level for six hours encouraged serious over-use and abuse of her voice. Singing outside of her normal range added to the vocal stress. The apparent disregard by the staff for the safety of the students’ voices made it

the responsibility of the students; however, even with all her experience in performing, Student B did not recognize the dangers of the requirements of this rehearsal. The threat of being removed from the show insured her compliance.

Interview Student C.

Student C, a 15-year-old white female, has been a student in my private voice studio for almost 2 years. She also participated in the Georgia Thespian Conference “Opening Number” performance. She confirmed details of the rehearsal experience and reported two days of extreme vocal fatigue following the first Saturday eight-hour rehearsal.

Interview Student D.

Student D is a 17-year-old African American male who participated in the same Georgia Thespian Conference “Opening Number” rehearsal. He, too, lost his voice. His speaking and singing voice required more than a month for recovery.

Interview Student E.

I chose to interview Student E because of his middle school experience with the Broadway Junior musical theater series. Now a 19-year-old white male, Student E first came to me for coaching at 12 years of age. He had been assigned the role of *Jeffrey* in his middle school’s production of the Broadway Junior version of *Godspell*. *Godspell* was originally composed by Stephen Schwartz in a rock musical style. As this character, Student E was the soloist in *We Beseech Thee*, one of the up-tempo production numbers. *We Beseech Thee* was in the key of B-flat in the Broadway Junior *Godspell*. The middle school theater director required Student E to sing in the baritone range (D3 to D5) with an unchanged voice; furthermore, it forced Student E to try to sing notes out of his range, to negotiate chest voice, and to move into his head voice at the loudest part of the song. Though the popularity of the Broadway Junior Series is understandable, the attempt by middle school students to implement them is not.

Setting aside the absurdity of his vocal assignment in *Godspell*, Student E's Broadway Junior experience clearly inspired him. He eventually came to me for private lessons and was in my studio for two years. After these initial years of private vocal study, Student E was accepted into a private boarding school for the performing arts. He attended this school in Boston during his junior and senior high school years. He is currently in a college musical theater degree program and is planning on a career in professional musical theater. I asked Student E to discuss his recent vocal training, and to reflect on his earlier middle school vocal experience.

1) Did you take private lessons in the private arts school you attend? *Yes, I took private voice at private high school and now college.* 2) How helpful has studying privately been for you while in high school? *Very! It gave me a general introduction to my voice and how to start training it as it continued to change.* 3) What kind of attention do the teachers at the private boarding arts high school give to vocal health? In what specific ways do they address it? *Depending on how active you are in the department, the more attention is given. For example, when I was running ensemble roles in shows I didn't really get many talks on conservation and how to stay healthy. However, as roles got more demanding, the staff and my voice teacher continued to drill stamina techniques and good vocal technique.* 4) I know that you were cast in a middle school production of *Godspell* when you were young. What role did you play? What is your perspective on this experience now that you have had extensive musical theater training? *I played Jeffery and sang We Beseech Thee. It's amazing how much I know now compared to then. Being so young, it was hard to really use my voice and to recognize the workings of the vocal instrument. But for someone so young, I was lucky to get vocal attention from the very beginning. While my singing wasn't the greatest, I knew what steps I had to take to become better and what habits I had were pointed out to me from the start.*

Interview Student F.

Student F is a 20-year-old white female who studied privately with me from age 14 to age 17. When she first came to me, she had an airy, covered, almost inaudible head voice sound. She was involved in her high school mixed choir; however, she was also interested in theater. A lot of gentle work in the chest register was used to begin the vocal muscular integration. Blending exercises in both descending and ascending patterns began to balance the registration and strengthen the head voice. Within a year, she could more easily move from chest voice to head voice and back again. She continued to participate in mixed choir and became a member of the Girl's Trio, competing at the Georgia High School Association Literary Meet. During the spring of her senior year, Student F was cast in the lead role in the high school musical. I chose to interview her to document the lack of instruction she received *at school* while actively using her chest voice and to quiz her about the vocal instruction she received regarding chest voice and belting in her musical theater degree program in college.

Student F reported that she remembered only one reference to chest voice in high school which was, "Altos, get out of your chest voice. It sounds too manly." High school choral warm-ups were "generic scales and sight reading" that seemed to purposefully ignore chest voice use.

Student F was accepted into a musical theater degree program at a small South Georgia college. She reported that she saw her voice teacher for one-half hour every other week. This teacher only tried to blend the registers from the bottom up and avoided trying to smooth the break. After one semester, the break in Student F's voice became very noticeable and she transferred to a different school.

Student F voluntarily expressed concern that her younger sister, currently in middle school, uses her chest voice in theatrical environments, but is getting no chest voice instruction in choral class or any other school setting.

Interview Student G.

Student G is 23-year-old white female who was a student in my private studio from age twelve through eighteen. Her lovely instrument sounded mature at a young age. At twelve, she sang solos at her church and was active in middle school musical theater productions. In spite of her natural talent, early vocal challenges included a potentially dangerous combination. Onsets were not coordinated with the breath, tension increased when using chest voice production on higher pitches, and she was resistant to using her head voice. With much encouragement and a broadening of her understanding of female Broadway roles, Student G began to see the value of integrating the registers and made excellent progress in doing so. However, in the spring of her sophomore year, I became concerned when she came to a lesson and could not make a clean tone. She said that she felt like she couldn't clear her throat. After quizzing her about her activities, she told me that for several weeks, she had been rehearsing a play at school that required her to scream. I immediately referred her to be evaluated for possible vocal fold injury. The results were positive for vocal nodules. I chose to interview Student G to explore how having vocal nodules has affected her musical theater work in college and beyond.

Student G reported that "all her vocal problems" started the year she was cast in the role of *Suzanne* in the non-musical play called *Dearly Departed* by David Botrell and Jesse Jones. *Dearly Departed* was her high school's entry in the One Act Competition sponsored by the Georgia High School Association. *Suzanne* was a high energy, hysterical, comedic character who screamed a lot. Student G reported that her high school drama director thought her screaming was funny and kept asking for more. He gave no instructions about how to

scream during the four to five week rehearsal period. Unfortunately, there were no vocal specialists giving input about healthy vocal use at rehearsals. Around the same time, Student G was diagnosed with hearing loss, making it more difficult for her to judge the volume of the sound she was producing.

Student G was referred to a local ear, nose and throat specialist who initially diagnosed her with a vocal polyp. He then sent her to the Emory Voice Center in Atlanta. Their examination confirmed the injury as vocal nodules. Treatment did not require complete vocal rest, but included a series of speech exercises, along with the recommendation to continue her private vocal work regarding supported onsets and balancing the registers. After almost two years of treatment, the nodules were significantly smaller, but did not completely disappear. During her senior year in high school, Emory released Student G to play the role of *Belle* in her high school's musical production of *Beauty and the Beast*. Her voice responded beautifully to this role, in which she used both head and chest registers. Later that year, she was accepted into a college musical theater degree program in Alabama. While there, she played the roles of *Crystal* in *Little Shop of Horrors*, the *Witch* in *Into the Woods*, and *Rona* in *The Twenty-Fifth Annual Putnam County Spelling Bee* with no increase in the size of her nodules. Student G graduated with a musical theater degree in December of 2010. She just completed her first lead role in a professional musical theater production.

I asked Student G to describe the vocal and psychological effects of having vocal nodules. She reported that her voice tires easily. Her warm-up regimen takes an hour of gentle singing. When she has tried to "push through" without a lengthy vocal warm-up, she reports that she is hoarse by the end of the day and unable to phonate in pitches between B4 and E5. She takes care of her voice by being vigilant with her warm-ups, getting ten to twelve hours of sleep each night, inhaling steam, and avoiding alcohol. She reports that her lack of confidence in the durability of her voice is her biggest concern. She has dreamed of a career

in the professional musical theater, but is unsure of the long-term effects of the vocal fatigue she already experiences. She is exploring other possible career choices, but finds it depressing to think that she may not be able to do what she loves.

Interview Student H.

Student H is a 19-year-old white male who was in my private studio during his sophomore through senior years of high school. He was not a choral student, and was only involved in theatrical activities. He had common adolescent vocal issues such as cracking and limited range. He also presented a jutting jaw, raised larynx, and serious throat tension. Through the use of posture alignment, falsetto exercises, and brightening of the chest voice sound using closed vowels, great progress was made. Student H gained vocal freedom and flexibility. During his senior year, he chose to audition for college musical theater programs at a unified audition in Chicago. He was accepted into several different programs, but chose to attend Boston Conservatory. I chose to interview Student E because of the positive influence of private lessons on his vocal progress and musical theater experience, and to more fully explore the kinds of vocal instruction he received in his high school drama activities.

1) What activities were you involved in at school that used your voice (i.e. choir, musicals, debate team, and straight plays)? *At my high school, I was in a few straight plays and couple of musicals. I did not do choir, however I was on Student government and gave speeches fairly regularly.* 2) How many years did you study voice privately while in high school? *I believe, by the time I graduated I had 3 years of formal training under my belt.* 3) Which musicals did your high school produce? What roles did you play? *Strictly at my High School I was in Edges (Man 1- High Modern Belting), Bye, Bye Birdie (Mr. MacAfee-Belting, part singing), How to Succeed in Business... (Ensemble- Low Belt in Parts), and I did a straight play called "Oh Dad, Poor Dad..." (Jonathan -Lead, never left stage, lots of*

dialog and yelling). However most of my performing experiences during my high school years were outside of high school at either community theaters or professional companies.

4) Which teachers were involved in directing your high school musicals (Not their names, but their positions--drama teacher, choral teacher English teacher, etc.)? *Drama Teacher directed the shows and designed technical elements, Chorus Teacher did the musical direction, and a Student typically choreographed.* 5) Did they give instruction regarding vocal technique? If so, what concepts did they deal with (i.e. breathing, resonance, posture, head voice, chest voice, etc)? *The chorus teacher typically wouldn't address the voice very often; on occasion she would touch base on certain concepts. For instance she would ask that girls sing in the belt, mix or head for particular parts, which often times amateur performers aren't aware of how to use, to which she would then give instructions on. Lots of placement concepts, "Think of landing on top of the note, as opposed to reaching up for it."* 6) How did this instruction compare with the concepts that you learned in private voice lessons? Were they similar? If so, how? Were the concepts taught at school ever in conflict with what you were learning in private lessons? If so, how? *Typically there were never conflicts with concepts being taught, because what I was learning in voice lessons was at such a rapid pace and so much was progressing and I felt that it was such productive time spent on my voice, whereas with a chorus teacher in a show, I was mostly focusing on learning my music and not too many techniques were taught. Often times if a part of the music sounded bad she would give assists in making it sound better, typically by using concepts of placement, which were always very basic and never conflicting with what I was learning in lessons. I was blessed with a good chorus teacher.* 7) Was vocal health a concern when working on musicals? If so, please give specific examples of ways that you were told to take care of your voice. *I think for the boys it was fairly simple. We were often told, do not yell, talking less throughout the day will help give us a healthy voice for show night, water never hurts, etc. However for some of my*

friends that are girls, they would sometimes be told to spend their days speaking in their head voice to warm up the higher tones and keep the stress off of their cords. Health was never much of a concern for high school teachers, as much as sound. We were told simply, "Whatever it takes to make the sound." which I can't blame a theatre teacher for, because they of course are concerned with the sound of their production and not the long term vocal health of their performers. 8) Do you consider private vocal study in high school to be valuable? Why or why not? ABSOLUTELY! As someone who performed a lot in high school, and continued my study of the voice into a higher level and am slowly making it into a career path, the time that I spent in high school focusing on my voice and healthy techniques of using it is priceless. I certainly wouldn't be where I am today without the things that I learned in my private lessons. I doubt I would have gotten into the Musical Theatre programs that I did, had it not been for that weekly one hour. The amount that I learned in that time frame is stunning, I feel. I am constantly speaking very highly of private lessons to my friends who are younger performers, because if you plan to make it into a career the time in your youth that you have to begin correcting problems is so valuable. Practice makes perfect!

Student H reported a lack of specific vocal instruction in answering Question 5. His detailing of the differences in how males and females were admonished about vocal health is significant. Males were told to talk less, don't yell and drink water. Females were told to speak in their head voice. Finally, the perception that the theater teacher was more concerned with sound than with vocal health is particularly alarming.

Chapter 4: Quantitative Methodology and Findings

To balance the qualitative nature of the interviews, anonymous student and choral director surveys were developed. The purpose of the student survey was to gain quantitative information regarding student behavior by gathering data regarding vocal use and over-use, possible tonal ideals, and how much and what kinds of vocal distress students have experienced. The purpose of the choral director survey was to gain quantitative information regarding teachers' awareness of issues related to vocal health by gathering data regarding training, pedagogical approaches, possible choral tonal ideals, and awareness of vocal distress in their students.

Student Survey Instrument

The student survey questions were designed to: (1) Document the number of vocal activities and hours per day of vocal use (not including conversation) as possible indicators of the potential for vocal distress. Vocal activities listed were Mixed Chorus, Women's Chorus, Men's Chorus, Vocal Jazz/Show Choir, Musical Theater, Church Choir, Gospel Choir, Debate Team, Cheerleading, Drama/Thespian Activities, and Other; (2) Assess from whom choral students get most of their information regarding vocal pedagogy by quantifying how many students receive private vocal instruction; (3) Determine a basic indicator of student understanding regarding the vocal mechanism through their self-reported use of "chest voice" and "head voice" in their vocal activities; The choice of terminology was deliberate, as "head and chest voice" are still more commonly used than the more technical language. (4) Explore possible tonal ideals as indicated by their favorite singers; (5) Determine the prevalence of symptoms of vocal distress in the last year and the student's perception of the vocal activities that preceded the symptoms. (See Appendix A.)

Student Survey Participants

Participants in the student survey were anonymous public high school choral students

from two rural counties in West Central Georgia. No student was required to participate; all were volunteers. Surveys were completed during their choral rehearsal period and administered by their choral directors. From School A, only 4 students volunteered to participate. From School B, 56 students volunteered to participate.

Student Survey Results

Due to the small number of volunteers from School A, survey responses were analyzed collectively (N=60). Aggregated by sex, 47 female students and 13 male students participated. The table on page 22 shows the raw numbers of student responses and percentages.

Trends from student responses suggest several areas of concern that merit further research. First, the reporting of 264 instances of vocal distress in the last year is alarming. It is also disturbing that the number of instances of vocal distress due to singing is comparable to the number due to sports activities and cheerleading. Only 13% of the total number of students reported no vocal distress in the last year.

Second, though a larger percentage of males are involved in 3 or more vocal activities and a larger percentage of males use their voices for more than 2 hours per day, females have overwhelmingly more instances of vocal distress--twelve times more than males due to singing activities, and seven times more than males due to non-singing activities. Furthermore, among the eight individual students who reported seven or more instances of vocal distress in the last year, one is male and seven are female. The possibility that females are more at risk for vocal distress is indeed troubling.

Third, among these eight students with significant instances of vocal distress, the number of vocal activities in which they are involved ranged from one to five; however, the number of hours of daily use was consistently four or more. This may indicate that the number of hours of vocal use per day is more significant than the number of activities.

Fourth, though it is not surprising that the majority of students do not receive private vocal instruction, it becomes a matter of concern when coupled with the high percentages of the use of chest voice, particularly among females. 78% of females report use of the chest voice “sometimes, often or always” in all types of activities. 43% of females report use of chest voice in singing activities. 2% of females report exclusive use of chest voice. This may indicate that females are using chest voice without supervision or instruction from a vocal professional.

Chest voice should be the normal mode of vocal production for adolescent males; however, only 69% of males report use of chest voice in singing activities. 13% of females and 15 % of males did not know if they used chest voice. 11% of females did not know if they used head voice. These responses may be indicative of confusion about registration terminology. Though it cannot be stated that this confusion is a result of poor choral instruction, more research should be conducted to rule this out.

The fifth concern pertains to the responses to the question regarding their favorite singer. All named singers were either artists from popular culture or personal friends. Performers from country, rock, rap, and musical theater genres were mentioned. Though one student listed “operatic” as their favorite singer, no specific classical singer or singing group was listed. Research is needed to determine exactly how adolescent listening habits affect their tonal ideals and the singing tone they, themselves, produce. (See Appendix C.)

Table 1 Student Survey Results

# of Vocal Activities	Male (N=13)	Female (N=47)
1-2	6=46%	30=64%
3-4	4=31%	14=34%
5 or more	3=23%	2=4%
Daily Use	Male (N=13)	Female (N=47)
No response	0	2=4%
< 1 hour	0	1=2%
1-2 hours	2=15%	17=36%
2-3 hours	2=15%	9=19%
3-4 hours	8=62%	9=19%
> 4 hours	1=7%	9=19%
Private Lessons	Male (N=13)	Female (N=47)
Never	12=92%	40=85%
< 1 year	1=8 %	3=6%
1-2 years	0	2=4%
2-3 years	0	1=2%
> 3 years	0	1=2%
Chest Voice Use	Male (N=13)	Female (N=47)
Don't Know	2=15%	6=13%
Never	1=8%	4=8%
Sometimes	2=15%	25=53%
Often	6=46%	11=23%
Always	2=15%	1=2%
Head Voice Use	Male (N=13)	Female (N=47)
Don't Know	0	5=11%
Never	0	1=2%
Sometimes	4=31%	11=23%
Often	7=54%	25=53%
Always	2=15%	5=11%
Vocal Distress Due to Singing	Male (N=13)	Female N=47
None	3	5
Vocal Fatigue	3	58
Hoarseness	0	21
Loss of Voice	1	14
Throat Pain	3	27
Nodules	0	0
Total	10	125
# of Instances of Vocal Distress Due to Non-singing	Male (N=13)	Female N=47
Vocal Fatigue	4	20
Hoarseness	5	38
Loss of Voice	5	38
Throat Pain	6	43
Nodules	0	0
Total	20	139
Total # of Instances of Vocal Distress	27	264

Choral Director Survey Instrument and Survey Participants

The questions in the choral director survey were designed to examine:

(1) Types of repertoire as a possible indicator of choral tonal ideals; (2) Their awareness of student involvement in private lessons; (3) Comfort level regarding the pedagogical use of chest voice; (4) The number of hours of vocal use in choral rehearsals; (5) How often the choral director discusses vocal health with their students; (6) Their awareness of the prevalence of vocal distress in their students; and (7) Primary instrument and level of post-secondary education; (8) Involvement in the high school musical and the kinds of musicals that are produced. (See Appendix B.)

The choral directors from both schools voluntarily participated in the anonymous choral director's survey (N=2). Both completed their survey during choral rehearsal while supervising the administration of the student survey.

Choral Director Survey Results and Indicators

Though admittedly a small sample, the Choral Directors' responses still may indicate issues that require further research. The trend that is of most concern is the lack of familiarity with chest voice pedagogy. Both Choral Director A and B rated their comfort level the lowest possible in regards to teaching about the chest voice. When asked to describe how they approach chest voice pedagogy, Choral Director B did not respond. Choral Director A wrote this regarding treble voices:

My treble singers generally use the "bel canto" technique. I make them aware of the two registers and at times experiment with chest, but it is minimal. They hear and sing it on their own based on their popular culture icons whose use of chest voice is predominant and pushed, causing intonation issues, etc. I am a traditionalist when it comes to vocal ped and have no intention of changing. I see too many problems with over use of chest voice in the choral classroom.

Choral Director A made no references to her teaching approach regarding the use of chest voice in males. This may be more evidence of confusion regarding registration terminology, or could be evidence of an unscientific understanding of laryngeal muscles. Either way, it is of particular concern when juxtaposed with the large number of student responses regarding chest voice use. Misinformation cannot facilitate healthy vocal production. Coupled together, these responses indicate that students are probably using or experimenting with chest voice technique without adequate instruction.

It is interesting to note both Choral Director A and B are involved in their high school musical production. Each listed a musical that includes a traditional belting role for females. In *Once Upon a Mattress*, the lead role of *Winnifred* was originally played by Carol Burnett (Rodgers & Barer, 1995, p. 2). In *Annie Get Your Gun*, the lead role of *Annie Oakley* was originally played by Ethyl Merman (Berlin, 1967, p. iii). If the Choral Directors are not comfortable or experienced in the use of chest voice, exactly who is instructing the students who are cast in these roles?

Both report that they discuss vocal health with their students every day. No attempt was made to evaluate the quality of their instruction about vocal health, only to examine if they address it. In regard to instances of vocal distress, the survey asked for the number of students who have experienced different kinds of vocal distress. Choral Director A gave generic responses of 2-5 students in each category. If this 2-5 number span is averaged, 3.5 students experienced vocal fatigue, hoarseness, loss of voice, and throat pain for a total of 14 students. Choral Director B reported her numbers as percentages of her total number of students. When these percentages were converted to actual numbers, the total number of students who experienced vocal fatigue, hoarseness, loss of voice, and throat pain over the last year is 42. It cannot be assumed, however, that they were all *different* students. The same student may have had more than one type of vocal distress. Choral Director A also offered

this comment, "I do note that my cheerleader choral students are the ones who consistently complain of vocal issues and complain that their range is limited and that they cannot 'sing high;' usually following the big games and pep rallies." Referrals for medical evaluation throughout their career were 4 (averaged 3-5) for Director A and 1 for Choral Director B. Though difficult to compare the numbers in a scientific manner, it is of interest that the choral directors' numbers regarding vocal distress are much less than those reported by students.

Both Choral Directors A and B listed classical repertoire as the type of music that their choirs perform the most. Choral Director A added the word, "minimal," to describe her use of musical theater repertoire and arrangements of popular music. These responses point to a more traditional choral tonal ideal and approach.

Both reported an average of one hour per day of choral singing. Choral Directors A and B were both aware of one student in their choir who was taking private lessons, indicating that the overwhelming majority of students get most of their vocal information and instruction from the choral director.

Both Choral Director A and B received undergraduate Bachelor of Music degrees and Masters in Music Education degrees with an emphasis in voice. These degree programs would assume a rather traditional approach to vocal pedagogy. Choral Director A listed "piano" as her major instrument. Choral Director B listed "voice" as her major instrument.

Table 2 Choral Director Survey Results

	Choral Director A	Choral Director B
Repertoire Most Performed	Classical Folk	Classical Spirituals
to Least Performed	Musical Theater (minimal) Popular Arrangements (minimal)	Popular Arrangements Musical Theater
Number of Students in Choral Program	125	90
Number of Students Who Take Private Lessons	0	1
Comfort with Instruction Regarding Chest Voice 1=least comfortable 5=most comfortable	1	1
Average # of Hours Singing per Day	1	1
How Often Vocal Health Is Discussed	Every day	Every day
Awareness of Vocal Distress in Choral Students		
Vocal Fatigue	2-5 (avg. 3.5)	10% of 90=9
Hoarseness	2-5 (avg. 3.5)	15% of 90=15
Loss of Voice	2-5 (avg. 3.5)	10% of 90=9
Throat Pain	2-5 (avg. 3.5)	10% of 90=9
Vocal nodules or polyps	0	0
Referrals for medical evaluation during career	3-5 (avg. 4)	1
High School Musical Involvement	First year to be involved. To Be Produced in the Spring of 2011	Yes
Titles	Annie Get Your Gun	1940's Radio Hour Bye, Bye Birdie Once Upon a Mattress

Chapter 5: Discussion of Risks

The indicators of risks to adolescent vocal health gleaned from the qualitative and quantitative methodologies in this study have provided guideposts for more exploration. The following discussion will demonstrate how research may provide evidence of a systemic existence of endemic threats to safe adolescent vocal development.

Risk 1: Adolescent Vocal, Physical, and Psychological Development

Much has been written about the changing adolescent voice. The issues of male vocal development have been addressed extensively since 1885 when Behnke and Brown wrote *The Child's Voice* (as cited by Skelton, 2007, p. 538). Research by Duncan McKenzie, Irvin Cooper, Frederick Swanson, and John Cooksey has expanded our knowledge about the stages of vocal maturity in adolescent males and created accepted vocal pedagogical approaches (as cited by Freer, 2010, p. 29). Lynne Gackle's (1991) work has shown that female adolescent voices go through similar, though less dramatic stages (p. 18).

The rapid growth of cartilages and the lowering of pitch are present in both males and females. The vocal breaks change throughout the development of both male and female vocal mechanisms, and there is vocal instability. According to James C. McKinney (2005), there may be a period in the adolescent voice development "...when the interarytenoid muscles cannot or do not close the back one-third of the glottis; this results in a gap between the vocal processes of the arytenoid cartilages" (p. 85). The gap is called the mutational chink and results in an unavoidable breathy tonal quality. Though the mutational chink is found in both males and females, the condition is more prevalent in females. Research points to laryngeal immaturity as the developmental cause for the mutational chink (Skelton, 2007, p. 539).

Susan Yarnall (2006) noted that the development of the adolescent singing voice is dependent on other factors besides the changes in the vocal apparatus. Rapid brain development can make mental concentration difficult. Awkward physical skills due to large

skeletal growth affect self-image and self-confidence. Psychological changes due to poor self- image or lack of self-confidence can affect posture, which has direct implications for breath capacity and tonal quality. Aural awareness of the diminished quality of their sound can create embarrassment and negative thoughts about their music-making (p. 82).

But does all this put students at more risk for vocal distress or injury? Is vocal instruction risky at this age? Should we avoid serious pedagogy during this stage of development? Kevin Skelton points out the controversy that exists regarding the content of vocal instruction when teaching young singers. He quotes John Cooksey, Leon Thurman and Graham Welch:

...on one hand, someone may celebrate an adolescent boy's capability of 'singing solo songs and choral music skillfully and expressively.' On the other hand ... one feels obliged to include a warning such as 'During voice transformation, with the rapid growth of cartilages, ligaments, and other tissues, the larynx is particularly susceptible to misuse and abuse.' (Skelton, 2007, p. 537)

According to Skelton (2007), most voice pedagogues are comfortable with the idea of teaching children to sing, but worry about how instruction can be effective and safe. He says that there is little scientific evidence of more vulnerability during this time and supports teaching young voices with care, but without fear. He believes the voice at all ages is "delicate, but resilient, [and] there is no reason not to teach children to sing with a healthy, supported, and resonant sound" (p. 542)

Not everyone agrees. Sarah MacDonald (2011), director of the Ely Cathedral Girl's Choir, voices her concern regarding the female adolescent voice:

...those in charge of teenaged girl choirs must understand the effects of puberty on the adolescent voice in order to avoid vocal damage. As well as the expected increase in size of the larynx, vocal tract, and vocal folds, girls also experience increased

breathiness, huskiness, hoarseness, voice cracking, noticeable register breaks and decreased and inconsistent ranges. Most importantly, singing often feels more effortful and difficult through a girl's teenage years. (p. 47)

In their work to develop criteria to assess vocal use in young singers, Michael Fuchs et al. (2008) suggest that it is over-use and incorrect use of the voice that leads to vocal distress and injury in young voices:

Voice problems or functional disorders in this age group often stem from unsuitability of the voice and lack of training. They also result from incorrect singing techniques which many adolescents use in order to adapt to conditions and demands of this new phase of life. (p. 650)

They blame "mechanical stress" or vocal tension in phonation, particularly in high pitches, as creating the most potential for damage to all voices; however, they also state that there is "heightened vulnerability of the epithelium of the vocal folds in the phase of pubescent voice change and behavioral characteristics can increase the probability that vocal disturbances may arise" (p. 649).

Incorrect adaptive singing techniques may include creating a forced sound in order to control the instability of their maturing vocal apparatus, sticking their chin out for high pitches, or pulling the chin down into their chest for low pitches; all of which create rigid vertical movement in the larynx. This type of maladaptive behavior during singing can become habitual and very difficult to correct. Some singers carry this rigidity into adult singing. In general, the longer it continues, the more it may contribute to vocal problems. (Trollinger, 2007, p. 21)

In their *Pilot Survey of Vocal Health in Young Singers*, Tepe et al. (2002) report that late adolescent singers are more at risk for vocal problems. Their survey results pointed to

age as a more important predictor of vocal problems than over-use or lack of private instruction. Possible explanations include:

...the cumulative effect of unhealthy habits or techniques, an increase in vocal demands associated with a more mature repertoire, increased vocal abuse related to social and recreational activities other than singing, the effects of concurrent physiologic changes of puberty, or other factors. (p. 249).

In addition to these indicators, vocal difficulties were not less common among singers who reported having taken voice lessons. Their survey made no attempt to evaluate the quality of voice lessons or to document the training and skill of the teacher. Tepe et al. concluded that “a history of ‘voice lessons’ does not ensure good vocal practice and does not appear to be associated with a decreased risk of vocal difficulties” (p. 250).

So where does risk to adolescent vocal health begin--with the changes in the vocal apparatus or the content or lack of the vocal instruction? Have these two issues become so intertwined that it is impossible to separate them?

Risk 2: Lack of Appropriate Tonal Models and Conflicting Tonal Ideals

The connection of tonal models and tonal ideals to the production of healthy vocal sounds cannot be underestimated. A tonal ideal is a mental concept of sound that becomes the standard by which vocal sounds are produced and evaluated (McKinney, 2005, p. 13). But what determines how singers create tonal ideals? How do they encourage or discourage vocal health?

Robert Piernay (2007) states that these sound concepts are ideas that singers consciously and unconsciously develop early in their lives. The creation of tonal ideals is influenced by many factors.

Formative influences include quality of home life, location of home while growing up, positive parental guidance or dismissal, care about spoken language, love and

appreciation of poetry and of art in general, chance encounters of an eye-opening kind, enlightened music teachers at school...who nourished the appetite and curiosity of their charges for exploring the world of sound. (p. 425)

Adolescent tonal ideals may be created by listening to sounds made by their favorite rock star, Broadway performer, or the latest American Idol contender. Student responses to this project's survey showed their preferences for country, rock, and rap tonal models. These tonal models powerfully influence how adolescents imagine and make sound. They will also try to reproduce the kind of sound that they think is pleasing, popular, or acceptable by their peers. These popular tonal models may encourage imitation of poor vocal production or vocal production that is inappropriate for the developing adolescent vocal mechanism.

After working with hundreds of young adults for over 40 years, I am convinced that very few have any conception at all how their voices should sound or, for that matter, how any well-trained singer or speaker should sound. If they have a model in mind, it usually is drawn from the pop or rock singers heard 24 hours a day on radio and television, many of whom are prime examples of what vocal abuse can do to the human voice. (McKinney, 1997, p. 153)

Furthermore, Susan Yarnall (2006) uncovered a connection between how young students hear their voices and their inability to accurately identify subtleties in tone color, showing that students may not be fully aware of the quality of the sounds they are creating. This inability to aurally discriminate means that the sounds they make are not necessarily the sounds they *think* they are making, thus making it more difficult for students to learn to evaluate when a sound is healthy (pp. 83-84).

Choral tonal ideals are formed the same way individual tonal ideals are formed--through experience and listening. Choral directors use their choral tonal ideal and choral models to imagine and create choral sound. In his choral methods book, *The School Choral*

Program, James Jordan (2008) points out the necessity for vocal professionals to maintain positive, healthy choral tonal ideals. “Without external models of sound and musicianship, we tend to get lost in the sounds of our own ensembles and, slowly, but surely, our sense of a performance standard (“what is good”) slowly slips away” (p. 320). Recall in the survey that the repertoire most performed by the choirs of Choral Directors A and B was decidedly traditional. Traditional repertoire determines a certain type of choral tonal ideal; but can we assume that it results in *healthy* choral tone? Recall Student A. Her choral sound was breathy, her jaw unnatural, and the tongue had a deep ridge in the middle. It was definitely a sound made in an unhealthy manner, but she believed it was the sound that her choral director was seeking. Was it miscommunication, her inability to discriminate, or was it the sound the choral director taught? Either way, the student had learned to lower the tongue to an unhealthy position and to create tension in the lips and jaw to create choral sound.

What happens when a student’s personal tonal ideal is in opposition to the choral director’s tonal ideal? Robert Edwin (2010) warns about the dangers in allowing personal and pedagogic aesthetics to inhibit acceptance and respect of musical diversity. Elitist attitudes on the part of vocal professionals or students can create an environment where constructive conversation regarding vocal sound is thwarted and the possibility of helping students create healthier sounds is diminished (p. 575). Adolescents may then feel the need to hide the true ways that they use their voices. In private teaching, this author has encountered high school students who are aware that their personal tonal ideals may not be consistent with those that they learn about in their choral programs. They have often been hesitant to reveal all the ways that they use their voice. Student A is a good example.

When Student A came to me for voice lessons, I only knew of her choral singing at school. She brought her Italian Art Song Book to her first lesson. For weeks we worked on this repertoire while working towards a more forward sound; but she seemed distant, and

would sometimes weep in the middle of her lessons. We worked for a full semester before she was comfortable sharing with me the type of singing that was the most important to her—her Praise Band singing. She didn't want to be working on classical sound or repertoire.

Her interview responses show that she saw no relationship between her singing at school and her singing in Praise Band. Her interview does not merely indicate a lack of integrating consistent singing technique in all singing activities, but an active effort to keep them separated. Her airy choral sound and her heavy chest voice Praise Band singing were totally opposite tonal ideals. Her hesitancy to communicate her true desires regarding singing may have been further indication of the depth of the conflict. This conflict in tonal ideals actually encouraged Student A to use the vocal mechanism in an un-balanced, inefficient, and unhealthy manner both at school and in her Praise Band.

Risk 3: Vocal Over-Use and Symptoms of Vocal Distress

Dr. Robert Bastian (2002), an accomplished singer and a medical specialist in voice disorders in Chicago, defines vocal over-use in three ways—"amount, loudness, or pressed-ness" (p. 412). If a singer develops a pattern of over-using the voice in any of these ways, the risk for vocal injury is multiplied.

Vocal over-use is so common that Dr. Bastian (2002) has coined a new diagnosis: the Vocal Overdoer Syndrome (VOS). In his practice, people with nodules, polyps, or other vocal fold injuries, almost always fulfill the criteria for VOS. Moreover, he has found a higher correlation between VOS and chronic injuries of the vocal folds, than injuries associated with allergies, acid reflux, tobacco use, insufficient fluid intake, and even poor vocal production. A full 80% of Dr. Bastian's patients who fit the VOS criteria had vocal fold injuries (p. 412).

Trends from the Student Survey show a relationship between the amount of vocal use and the incidence of vocal distress in adolescents as well. Using Dr. Bastian's definition of

vocal over-use, concerns for adolescent singers begin to develop. Regarding the amount of vocal use, 57% of females and 84% of males who completed the Student Survey reported an average of more than two hours of vocal use per day. 38% of females and 54% of males reported being involved in more than two vocal activities. Among these students, 229 instances of vocal distress were reported. The stories of Students B, C, D, and G are anecdotal evidence relating vocal over-use to vocal injury. Regarding the amount and loudness of vocal use, recall Student B, C, and D. All experienced significant vocal distress due to the Georgia Thespian “Opening Number” rehearsal. Regarding pressed-ness and loudness, recall Student G who developed vocal nodules due to screaming in rehearsals for her one-act play. These indicators show that all types of vocal over-use cited by Dr. Bastian may be experienced by adolescent singers.

James C. McKinney (2005) discusses signs and symptoms of vocal distress. He cites the most common symptom as hoarseness. Loss of range after small amounts of singing may indicate so much tension that the voice quickly loses its ability to function (pp. 87-88). Dr. Bastian (2002) discusses vocal swelling as a common over-use injury that results in delayed onset of phonation and/or loss of the uppermost soft falsetto. Any chronic huskiness, delayed phonation, and air escape which increase in severity as the pitch ascends may indicate vocal nodules or polyps. Nodules are caused by misuse, over-use or abuse. Polyps can result from trauma due to extreme voice use such as screaming or unusually difficult coughing or sneezing (pp. 411-413). Morton Cooper “identifies the causes of vocal abuse and misuse as lack of correct vocal knowledge, lack of proper vocal training, poor vocal models, emotional difficulties, and/or psychological problems” (as cited by McKinney, 2005, p. 88) as components of the risks to adolescent vocal health.

Students completing the Student Survey reported experiencing hoarseness, pain, and loss of range or complete loss of voice due to many different kinds of vocal use, including

singing. The sheer number of reported instances of these symptoms in the survey is indicative of the effects of over-use. More data is required to determine how vocal over-use intersects with lack of training, poor tonal ideals, and emotional health to cause vocal damage in adolescent singers.

Risk 4: Poor Choral Procedures and Environments

Adolescents are involved in choral activities not only at school, but at church and theatrical venues. The choral setting may be the only place where adolescents receive vocal instruction. Student Survey results support this trend. 92% of males and 85% of females responding to the Student Survey say they have never received private vocal instruction.

Brenda Smith and Robert Sataloff (2003) discuss how choral activities present their own challenges for maintaining vocal health in young singers. Since choral pedagogy is a new “academic field in performing arts medicine” even choral directors who are singers, may not be adequately informed about its effect on vocal health (p. 233). There are four key areas that require a closer look.

The Choral Environment.

The choral environment either sets the tone for an atmosphere of relaxed healthy singing, or promotes stress and vocal fatigue. Choral conductors must evaluate their presence and their discipline measures. If the conductor is a dictator, resentment may be persistent. Making corrections with negativity and accusatory language creates panic if a singer makes a mistake. Anticipating a conductor’s outburst keeps the singer in a state of fear and inhibits the inability to let go and sing freely. A disrespectful, demanding demeanor may gain compliance, but it does not facilitate healthy, communicative choral sound.

Warm-up Procedures.

Warm-up procedures should get the vocal mechanism ready for singing. Exercises should be chosen carefully to bring about this readiness. Regrettably, attention to a

comprehensive warm-up procedure is often lacking, or warm-up procedures may not be employed at all. Many choral conductors may be instrumentalists or keyboard players with little knowledge of the vocal apparatus. Howard Swan (as cited by Smith & Sataloff, 2003), the founder of the Choral Conductor's Guild says,

Choral conductors, even more so than teachers of singing, are divided in their opinions concerning vocal technique. Some refuse to employ any means to build voices. Either they consider such procedures to be unimportant, or they are afraid to use an exercise which is related to the singing process. Sometimes the choral director cloaks his own ignorance of the singing mechanism by dealing directly with the interpretive elements in a score and thus avoids any approach to the vocal well-being of the individuals in his chorus. (p. 233)

Choral singers should be able to imitate good vocal production from the choral conductor. If the conductor's vocal training is limited, poor vocal modeling may result in poor vocal sounds from choral singers. If singing preparation depends on piano use only, singers may create a forceful vocal attack in response to the piano's percussive quality. The result is tension in the pharyngeal and laryngeal areas. Not separating the execution of vowels and consonants during warm-ups can lead to jaw and neck tension which can last for the entire rehearsal (Smith & Sataloff, 2003, p. 234).

Warm-up procedures should connect to vocal challenges in repertoire, such as melodic and rhythmic motifs or harmonic structure. Singers must have the opportunity to improve their ability to audiate, meaning to hear the pitches and vocal sounds before they phonate (Jordan, 2005, p. 20). If text is used as a substitute for rhythmic understanding, singers are frantically trying to read text, rhythms and pitches all at the same time, and vocal fatigue and neck and jaw tension are certain to occur.

Choral directors may try to balance the choral sound by asking singers to sing in a different section. Though an occasional use of a voice outside of its range is acceptable, asking choral singers to sing outside of their comfortable range for long periods of time can result in vocal fatigue or injury (Smith & Sataloff, 2003, p. 237). Inappropriate repertoire that requires voices to sing outside their typical range must be avoided.

Posture.

By compromising the efficiency of the vocal systems, poor posture makes it impossible for free choral sound to be produced. Choral conductors may not be attentive to the details of balanced posture while singers are standing and sitting. Commands such as “Stand up straight” may actually create rigidity instead of the desired buoyancy required for singing (Conable, 2000, p. 15).

Where singers sit can contribute to vocal distress in a number of ways. An inability to see the conductor creates tension through poor neck and head position. Chairs that are too close together can cause claustrophobia and result in upper body and throat tension. Strong singers may over-sing as they try to lead weaker singers who sit near them.

Effects of Conducting Techniques.

Conducting style and gestures are directly related to the quality of choral sound (Jordan, 2008, p. 87). Tension may be created in singers by the use of poor conducting gestures. Rhonda J. Vieth Fuelberth (2003) has researched the relationship of tension in singers specific to left hand gestures. A fist ed gesture and a stabbing gesture both were rated as creating rigid posture and muscular tension. A sideways phrase-shaping gesture had the lowest tension score. Even the level of tension in the conductor’s facial expressions, and body position can create inappropriate vocal tension in choral singers (p. 20).

A conductor’s breathing also influences choral sound. If the breath is held and the conductor does not release air, singers’ air flow is restricted as well. Smith and Sataloff

(2003) speak of the importance of using the “breath gesture.” When the conductor inhales and releases the breath in preparing the choir to sing, singers can coordinate audiation (hearing the pitch and imagining the vowel shape) in their breath preparation. Without this indication from the conductor, singers may gasp for breath, compress the throat, and then try to produce tone (pp. 236-237). Unfortunately, not every choral conductor has been taught this skill.

Intensive Choral Activities.

In addition to choral procedures in the classroom, intensive choral activities present distinct risks to maintaining adolescent vocal health. Mass choir experiences are common high school events. Extended rehearsals in a compressed schedule lead to unforgettable music making that fosters excitement and commitment to choral singing

Not surprisingly, Daugherty et al (2011) reported that students experienced progressive vocal fatigue throughout a three-day All-State choral event. Prolonged rehearsal schedules were typical. Effects of sleep deprivation and vocal over-use during *non-rehearsal* periods were noted. Perhaps even more significant, was the lack of proactive attention to vocal hygiene. Voice care was not emphasized by event leaders (pp. 361-362). Inattention to vocal hygiene displays poor modeling by choral professionals and gives tacit approval for students to ignore their vocal health and de-emphasize the effects of over-use. Bowers and Daugherty (2008) focused on risks to vocal health at a choral summer camp. Teacher responsibility and student vulnerability were two themes highlighted by their findings. Teachers may not adequately plan the event for vocal safety. Regrettably, no formal guidelines exist to define the restrictions that should be placed on prolonged adolescent vocal use. Students’ inability or unwillingness to protect their voices makes it paramount for teachers to exhibit leadership. The obligation for teachers to show the way is emphasized by students’ inexperience and limited understanding of vocal hygiene (pp. 42-43).

Risk 5: High School Musical Theater Productions

According to a statement from the American Academy of Teachers of Singing (2004), the annual high school musical is one of the most popular events on the high school calendar. It generates enthusiasm among students and often raises money for arts programs when funding is inadequate. It is usually a collaborative effort among all the fine arts departments and encourages a level of school spirit equal to sports or social events. In spite of these positive results, high school musical theater productions can create possibilities for serious damage to adolescent voices (p. 223).

Musical theater is written for adult professional singers and actors who have moved through the vocal transition of adolescent years. Often, the music is written with the skills of particular professional actors/singers in mind, requiring extended ranges in belting and “legit” roles. Young students cannot be expected to have the vocal development required to meet these kinds of demands (White, 1978, p. 28).

Publishing companies have developed musical theater scores of Broadway shows specifically marketed for young singers in middle and high school programs. Music Theater International (MTI) publishes its *Broadway Junior* and *Broadway Kids* series for elementary, middle, and high school arts programs. The purchase of the show packet provides complete resources for producing the musical, including scripts, vocal scores, CD accompaniment, choreography, and set design. The packet even includes ways to tie the experience to academic goals (MTI Broadway Junior What's in the Box, n.d.). According to promotional materials on its web site, the popularity of this resource has reached a phenomenal level of distribution. There are *Broadway Junior* festivals in major cities where schools can enter competitions, see what is new in the *Broadway Junior* product line, and go to workshops led by “Broadway and West End professionals.” A list of current titles includes *The Music Man*,

Pirates of Penzance, Guys and Dolls, Into the Woods, High School Musical, and Godspell (MTI Broadway Junior Collection, n.d.).

The MTI *Broadway Junior* website (n.d.) reports that these adapted musicals are cut to a running time of 70 minutes, and that the keys have been changed to be “vocally appropriate” for students at each school level; however, a closer look reveals the difficulties for the young untrained voice. A comparison of the Broadway Junior score of *Into the Woods* (Sondheim & Lapine, 2002, pp. 38, 48) to the original Broadway score of *Into the Woods* (Sondheim & Lapine, 1989, pp. 31, 39) shows that when a key has been altered, it has been lowered by as little as a major second and as much as a minor third. While this may remove the problem of negotiating the upper register, it extends the range on the lower end. Student E’s experience in his middle school’s production of *Godspell, Broadway Junior* (Schwartz, 2003) is a real life example of what is required of young singers doing Broadway repertoire. The pitches, even in the adapted version of the music, are out of the range of the average twelve year old boy. Not to mention, the child was encouraged to execute appropriate style. MP3 files of songs from the shows available for perusal (MTI Broadway Junior Collection) seem to be performed by adults, giving young students poor tonal models for their performance. It is unfortunate that drama teachers and drama club advisors may assume that a product marketed for young singers is appropriate for their vocal development.

For nearly a half-century, professional musical theater productions have been electronically amplified, and many require electronic instruments. Unfortunately, in high school productions, students often rehearse without amplification. Schools with fewer resources may not even provide amplification for the performances. Students must then try to project their voices over taped or live accompaniment. If a high school drama director continues to complain that the students cannot be heard, the likelihood of over-singing increases. Over-singing assures vocal fatigue, or worse, vocal injury (White, 1978, p. 33).

Not all people who work with young voices are aware of the dangers related to producing musical theater with adolescent performers. The experiences of Student B, C, and D show what this lack of awareness can do in one eight-hour musical rehearsal. Students' excitement, motivation, and commitment are admirable, but what is the cost?

Risk 6: Lack of Consensus on Teaching Belting and Chest Voice Singing

One cannot speak of Musical Theater productions without approaching the subject of belting. Though belting is common among adolescents involved in musical theater, belting is also used in popular, gospel and contemporary Christian singing. Some teachers (and students) use "belting" and "chest voice" synonymously. No matter what it is called and which music requires it, the debate among professionals regarding belting is articulated well by Norman Spivey (2008).

There is a group that emphatically believes belting to be abusive behavior that compromises the voice and ultimately leads to its demise. The other cadre promotes belting as an altogether viable voice mode that is nothing more than an organic outgrowth of energized speech. Who is right? Can both groups be addressing the same sound? The same voice production? (p. 607)

A combination of primary sources and quotes about belting from many different professionals are cited to lay out the reasoning behind each point of view. This article shows a clear lack of agreement about its safety, about how to teach it, and even about what it is. Though the term, belting, can refer to male or female singing, the fear of vocal damage is mostly associated with female belting. Classical pedagogues are more likely to denigrate belting and may lack objectivity when making aesthetic judgments of the belting sound. Though he allows for the possibility that any kind of poorly executed singing--including opera--can damage the voice, Spivey draws no definitive conclusions on the subject of belting (pp. 607-612).

Robert Edwin (2007), a proponent and teacher of belting techniques, says that belting has been “looked on as ‘low brow,’ commercial, and somewhat the bastard child of authentic singing” with its origins in “minstrel and riverboat shows, burlesque, vaudeville, dance halls, and other popular venues” (p. 213). Lisa Popeil (2007) defines belting as singing “that is speech-like or yell-like in character and is the style used in much of today’s music theater” (p. 77). Both agree that belting is thyroarytenoid-dominant vocal production (chest voice) and that popular voice techniques require it.

Bias against belting or chest voice exists in academia today (Edwin, 2007, p. 213). This bias was indicated by Choral Directors A and B who reported their discomfort and lack of expertise in addressing the use of the chest voice. Choral Director A wrote adamantly of her refusal to change her approach towards chest voice use. If Robert Edwin is correct about academia’s bias, one can assume that Choral Directors A and B received no information about this type of vocal technique in their academic training. It is normal to fear what we don’t understand, but shortsighted to perpetuate a lack of training so indispensable to maintaining adolescent vocal health.

As the debate rages, one thing is clear: adolescent singers use chest voice. Data from the Student Surveys support how common it is. Both males and females may be creating heavy belting vocal sound with no advice, no instruction, and no idea about how to evaluate its safety. If their high school choral director dismisses or ignores the use of chest voice, like Choral Director A and B seem to do, students are left to their own devices.

Student F’s experience is a reminder that adolescent singers are caught in the middle of this debate. She, herself, got no instructions in the school setting about chest voice use, except “don’t do it.” It was only an accident of fate that she got information from private study regarding the technique. Her concerns about her younger sister repeating the same

experience are legitimate. As the debate over chest voice and belting lingers, the effects on adolescent vocal health continue to be protracted.

Risk 7: Skill Deficiencies in Choral Music Educators due to General Certification

The symbiosis of Risks 1-6 and their common thread of lack of training related to vocal health require a careful scrutiny of teaching certification standards and their affect on music education degree curricula. The content of curricula is deeply rooted in state guidelines for music teacher certification. "The music education undergraduate curriculum is influenced, if not controlled, by the requirements and recommendations for a teaching license in each state and by program approval (accreditation) by state and national organizations" (Colwell, 2006, p. 19).

The most recent study of state by state certification was published in 2005. Using data from the year 2001, certification practices for music teachers in all fifty states were analyzed. This study showed that 29 states, including Georgia, certify music teachers in all music subjects for K-12 (Henry, 2005, p. 48). What are the ramifications of this broad certification?

In his article for *The Arts in Education Policy Review*, Dr. Robert Cutietta (2007) discusses the inherent problems in attempting to train music educators to be qualified to teach across such a wide spectrum. He proposes that the general nature of curricula for music education degrees has remained stagnant for decades, putting music grossly behind other professions that are moving toward more specialization.

It has long been known that a K-12 music certification was not realistic and certainly not one of high standards. There is no school that could train an individual to be the highest quality teacher in everything musical from kindergarten to twelfth grade. Yet, everyone has allowed our profession to be demeaned by pretending that it could be done. (p. 15)

The wisdom of a K-12 all encompassing certification has been questioned for many years. Thirty years ago, Charles Leonard (1985) stated powerfully that it creates a music educator who is “a less than adequate performer, deficient as a music scholar, lacking basic musicianship...[and] who is unprepared to relate music to the total school program” (p. 11). Charles Hoffer (1987) focused on the implausibility of undergraduate music education students meeting competency in music, education, and general knowledge within an expected four-year degree program, claiming that proficiency in all areas is jeopardized (p. 28). Eleven years ago, Haack and Smith (2000) made approximately the same observation.

The training that music educators receive is no more lengthy or extensive than that of other teachers, yet too often they are certified to teach K-12 instrumental, choral and general music, in short, virtually every aspect of in-school music. So with a broad yet limited course of preparation, music educators are awarded full licensure. (p. 24)

But how is this problem a risk to vocal health in adolescent singers? The risk lies in the fallible assumption that certification equals competency.

Though Smith and Sataloff (2003) do not address a direct relationship of training deficiencies to incidences of vocal distress and injury, they do discuss the obligation for choral conductors to be more knowledgeable about the field of choral pedagogy and its relevance to vocal health. Despite its pertinence, Dr Cutietta (2007) suggests that this crucial information would be “relegated to one class in choral methods in which the student also examines rehearsal techniques, recruiting, the changing voice, budgeting, programming, and so on” (p. 12). The general curriculum required for a K-12 certification continues to jeopardize proficiency today, and in turn, jeopardizes adolescent vocal health. The consequences of this neglect may be underestimated, as suggested by Fuelberth (2003), Daugherty et al (2011), and Bowers and Daugherty (2008).

Debra Spurgeon (2004) addresses the need for vocal pedagogy skills for the undergraduate choral conductor, but her research shows that most universities do not require a class in vocal pedagogy for a bachelor's degree program in music education. A random sampling of ten large university undergraduate music education degree programs revealed that only one did so. Spurgeon also assessed common choral methods textbooks to determine what percentage of content actually dealt with the act of singing. Assessment criteria included "physiology, exercises for voice building, and techniques for working with young voices." Her review of seven popular textbooks showed that only 4--16% of the overall book content dealt with the assessment criteria related to actual singing (pp. 31-33).

Some states are making changes. Henry's (2005) analysis of the remaining 21 states shows some combination of grade-level and/or specialty certification. Of these 21 states, only 15 have separate certification for vocal and instrumental instruction. Of these 15 states, only 3 have separate certification for choral, instrumental and general music. South Carolina has the most specialized certification which includes separate choral, instrumental, piano, voice and violin certification for grades K-12 (p. 50). Still, Dr. Cutietta (2007) asserts that though these states allow for more specific certification, it may not go far enough to make a difference in the content of music education curricula.

Reviews of music education curricula across the country find few that are out of the mold. Although there have been some changes around the fringes, essentially a college curriculum in music education would not look substantially different from a curriculum of forty years ago. (p. 15)

Richard Colwell (2006) reports this overly inflexible standardization of content is due to several factors. He cites administrative convenience and imitation of respected programs as reasons for conformity. Furthermore, legislation can require course work to address social and educational issues. These requirements, along with legislative caps on the number of

hours that can be required for a degree program, are powerful influences on the lack of variety in music curricula content. The accreditation standards of the National Association of Schools of Music (NASM) though comprehensive, admirable, and in actuality flexible, have also created conformity in curriculum content. NASM sees the required competencies as equally important. This forces institutions to prioritize the competencies themselves as they try to address all competencies in a four-year curriculum; however, there is not enough time in a four-year curriculum to teach the NASM competencies in depth. In trying to address everything, it may be difficult to address anything well (pp. 22-23).

Though there is insufficient data to show the extent of the effects of the lack of specialization in the undergraduate music degree curriculum on adolescent vocal health, the implications are disturbing. Adequate training is fundamental for effective instruction. The general curriculum of K-12 certification may not provide adequate training. This could be the common denominator for other risks to adolescent vocal health examined in this project.

Chapter 6: Discussion of Possible Solutions

With research showing an increase in vocal problems in adolescents (Trollinger, 2007), risks to their vocal health cannot be dismissed. The threats are significant and require serious consideration of solutions to show both detailed and panoramic perspectives.

Solution 1: Healthy Vocal Pedagogy and Adolescent Vocal Development

Where does the risk to adolescent vocal health begin--with the changes in the vocal apparatus or the content of the instruction? Perhaps this unproductive circular thinking process can be avoided by remembering that adolescent vocal changes happen. It is a part of becoming an adult. Choral music educators can (and should) understand this maturation process, but they cannot prevent it from happening. Adapting pedagogy to address the inevitable results leads back to the only thing within our control--instructional content. How can choral music educators positively facilitate adolescent vocal maturation? What are the components of a "healthy vocal pedagogy," and how does it encourage vocal hygiene in adolescent singers?

In an attempt to define "healthy vocal pedagogy," the lack of standardization in the methods of vocal pedagogy and in the language regarding vocal sound must first be addressed. There may be as many ways of teaching as there are teachers. James C. McKinney (2005) discusses problems related to standardization of language, sound quality, individual sensations related to singing, and the multiplicities of approaches to teaching vocal technique.

At its best, the act of describing vocal sound is an inexact science; at its worst, it is a mishmash of flowery phrases, illogical terminology, and apocryphal statements that contain scattered elements of truth—a veritable semantic maze. (p. 30)

Regarding standardization of sound quality descriptors, McKinney says:

The following terms...are sometimes used by teachers to describe various tone qualities: warm, white, dark, light, round, reedy, spread, focused, covered, swallowed,

forward, ringing, hooty, bleaty, plummy, mellow, pear-shaped, and on and on. The real problem lies in knowing what the terms mean. Where teacher and student both understand what they mean, such terms can be an effective means of communication; however, care does need to be exercised concerning their standardization. (p. 31)

He discusses the difficulty of standardizing vibratory sensations:

The main guides of the singer are sensations...Describing these subjective sensations to another person in such a way that the person can duplicate the same kind of sound is a most difficult task—there are too many intangible elements present and too many variables. (p. 31)

Finally, McKinney points out the limitations of narrow teaching approaches.

...problem[s] may arise from the mechanistic and psychological controls employed in the act of singing. Extreme advocates of the mechanistic approach believe that singing is largely a matter of getting the right parts in the right place at the right time...At the other extreme are those who believe...that singing is a matter of producing the right mental images of the desired tone...As is often the case, the truth lies between these two extremes, and is a composite of both approaches. (p. 31)

It would be easy to allow this lack of standardization to override the importance of preserving and encouraging adolescent vocal health. To steer clear of this digression, perhaps the work of Fuchs et al. (2008) and the work of Valerie Trollinger (2007) can provide some direction about the basic components of “healthy vocal pedagogy.” Both of these studies connect poor vocal training and vocal tension to vocal health problems in adolescent singers. If their conclusions are accepted, then poor training and vocal tension must be avoided in a “healthy vocal pedagogy.” Therefore, it could be said that, no matter the teaching method, “healthy vocal pedagogy” should have two fundamental components: 1) good training, that is

instructional content based on scientific information; and 2) vocal and choral music educators should be able to identify and relieve vocal tension.

The first component-instructional content based on scientific information-is critical. Accurate information regarding the systems that support singing—respiration, phonation, resonance, and articulation—is available. The work of James C. McKinney (2005), Scott McCoy (2006), Barbara Conable (2000), and many others can help teachers insure that their teaching methods are based on science. As science reveals new understandings of the vocal mechanism, choral directors and vocal instructors must continually evaluate and deepen their understanding of how human beings make singing sound.

Vocal music educators should examine their use of outdated and misleading language. For example, the terms “head voice” and “chest voice” are still often used to identify resonance. In reality, they are interactions of the laryngeal muscles during phonation that produce specific qualities of sound. Scott McCoy (2006) has an exceptional scientific explanation.

The thyroarytenoid muscle [TA] is the primary muscle in the production of low-pitched sound, and is strongly associated with the quality often referred to as *chest voice* or *modal register*. Contraction of the thyroarytenoid is also used to thicken the vocal folds while singing high pitches, thereby widening the contact patch between the folds during oscillation, increasing loudness and enhancing the production of harmonic overtones. The cricothyroids [CT] are the primary muscles of high-pitched sounds, particularly those associated with the vocal qualities identified as *head voice*, *light mechanism*, and *falsetto*. In singing, there is a constant interplay between the TA and CT muscles as pitch rises and falls. (p. 117)

Cornelius Reid says, "To sing is to coordinate" (as cited by Bentley, 2002, p. 141).

Roland Bentley (2002), a protégé of Reid's, agrees that the TA and CT muscles must coordinate for efficient, healthy vocal production in both female and male voices.

Located within the larynx, two primary muscle systems affect the opening and closing of the vocal folds at a regulated rate per second, yielding the pitch (frequency) intended by the singer. These muscle systems, under a thinning and stretching process, account for all tonal gradations within the limits of the human voice. One, thinner and longer, produces higher pitches and the other, thicker and with more mass, initiates the lower pitches. Admittedly, this is an oversimplification, but it is a means of understanding the basic mechanics of a very complex system of muscular interrelationships...From the two muscle systems evolve all tonal variations produced by all voice types, male and female. (p. 138)

The interaction of the vocal muscle systems is based on the concept of opposing muscular tension. The terms used by Scott McCoy (2006), "thyroarytenoid-dominant production (TDP)" for chest voice and "cricothyroid-dominant production (CDP)" for head voice or falsetto, reinforce this concept and how it correlates to tone production (pp. 65-66). James C. McKinney (2005) concurs.

Opposing groups of muscles often are brought into use simultaneously to stabilize some part of the body so that it may function more efficiently. This is particularly true in the process of maintaining body equilibrium and in the act of singing. (p. 42)

Knowing this kind of scientific information makes it easier to understand why the rapid growth of the laryngeal muscles during adolescence affects the tone quality of young singers. Balancing muscular function during this time is difficult, but *care must be taken not to unintentionally (or intentionally) unbalance the two muscle systems*. Student A's tone demonstrates how a lack of muscular integration results in a breathy, quiet head voice tone

(CDP) for choir and a heavy, loud chest voice tone (TDP) for Praise Band. The longer Student A reinforces this kind of imbalance and lack of coordination, the more work it will require to correct it. Muscle memory is powerful.

Scientific understanding of respiration, resonance and articulation are equally important. Though coordination and balance of these systems are the purview of a mature voice, pedagogical work with adolescent voices should support moving into vocal maturity with ease, not make it more difficult by having to overcome maladaptive vocal behavior.

The second component--vocal music educators should be able to identify and relieve vocal tension--requires visual and aural skills. Some vocal tension is indicated by visual clues such as a jutting chin or clenched jaw. Other kinds of vocal tension are only evident in the vocal sound. To practice "healthy vocal pedagogy," vocal professionals must be able to identify tension visually and aurally by *relating vocal sound to vocal function*. According to Cornelius L. Reid (2000), relating vocal sound to vocal function requires a special kind of listening. He draws a distinction between using "aesthetic listening" and "functional listening" to evaluate vocal sound.

Aesthetic listening relies too heavily, if not exclusively, on personal taste, involving such variables as musicality, a sense of singing, and a psychological predisposition to like certain types of tone qualities over others. Functional listening is the ability to make a proper distinction between the tonal product, its name, and the probable mechanical processes that result in its appearance. Functional listening minimizes individual tastes and preferences and seeks to coordinate what is heard with the physiological events taking place at the sound source. (p. 37)

Debra Spurgeon (2004) makes use of functional listening when relating lip and jaw tension to vowel unification and tone quality.

In an effort to unify vowels, some choral conductors instruct the choir to round the lips and hold a static, vertical shape for all vowels. The result is usually a falsely mature and darkened tone quality with loss of vowel integrity...A young singer who sings with a dark tone quality and exaggerated mouth shape may develop intonation and/or tension problems later. This is just one example of a situation that demands a deeper understanding of how voices work rather than a quick-fix approach. (p. 29)

Vowel unification is essential in unifying and tuning choral sound. James Jordan (2005) maintains that “vowel color...is one of the most effective tools for not only immediate improvement of choral sound, but also long-term health of the choir” and advocates that all vowel sounds should be “spacious, high, and forward.” Closing the vowels encourages singers to establish the acoustic fundamental of the pitch and the core of the vocal sound (pp. 77-78). The use of closed [e] instead of open [ɛ] or the schwa [ə] for unaccented syllables are two examples of vowel closure.

Roland Bentley (2002) makes use of functional listening when he suggests that register breaks are indicative of an imbalance between the chest voice (TA) and head voice (CT) muscles.

A register is a vocal tonal range dominated by the primary activity of one laryngeal muscle system...The healthy, well-coordinated voice shows little aural evidence of this obvious shift between the register systems because the energy is gradually shifted or transferred to the other register, changing the balance of energy between the two muscle systems. However, in a voice dominated by one register (usually the chest) and unrelieved by a gradual transition to the other, nature’s provision is a sudden involuntary shift of energy to the alternate muscle system. This event, the “register break,” occurs. (p. 145)

How the register break “sounds” is a clue to understanding which muscles are dominating. Does the voice break into a lower pitch made in thyroarytenoid-dominant production (chest voice) or does it flip to a higher pitch in cricothyroid-dominant production (head voice)? This indicates which muscles are stronger. Using the concept of opposing muscular tension, strengthening the opposite set of muscles will encourage more balance. For example, if the voice “breaks” into chest voice, the thyroarytenoid muscles (TA) are dominant. The use of a descending five note pattern using head voice (CDP) through the break, so-fa-mi-re-do on the [i] and [u] vowels, will strengthen the head voice muscles and, eventually, create more balance. Visual analysis of jaw jutting and other body tension must be employed in tandem with evaluating the sound.

Functional listening must be employed in diagnosing vocal tension and developing interventions to positively affect vocal function. Without this skill, and the corresponding understanding that it implies, a choral music educator cannot practice “healthy vocal pedagogy.” Valerie Trollinger (2007) recognizes the importance of this skill, particularly when working with young singers (p. 26). In combating vocal tension, limited ranges and use of the middle voice must be common considerations in choosing repertoire and vocal exercises. Adolescents must not be asked to do more than they are capable of doing. If a student says they are having difficulty, teachers should believe them.

The bigger challenge, of course, is helping students remain calm, interested, and safe as they journey to vocal maturity. “Achieving a higher level of coordination [of the vocal mechanism] can be a long and winding road (Robert Edwin Studio).” Healthy vocal pedagogy must embrace patience and encourage students to appreciate that vocal progress can only happen in its own time—a difficult concept in the current atmosphere of reality television shows and instant fame.

Solution 2: Audiation, Tonal Ideals and Tonal Models

“The term, *audiation*, coined by Edwin Gordon, is the process by which we hear and recall music” (as cited by Jordan, 2008, p. 367). Some educators may colloquially refer to the ability to audiate as “having a good ear.” Some may think that a student either has a good ear or does not; however, audiation—the ability to listen and formulate a tonal ideal—is a skill. It may be the most important skill for choral educators to acquire and to impart to their students. Gordon shows us the depth of learning associated with audiation and how it is different from mere imitation.

Audiation is an active response....It involves forward thinking. What is audiated plays a formidable role in how one learns. What we audiate is never forgotten. It becomes a component of more complex audiation. In cognitive terms, the structure of audiation is deep and serves in background conception. The structure of imitation, on the other hand, is superficial and serves simply as foreground perception. (p. 364)

Developing tonal ideals requires serious effort. To create a tonal ideal is to create the essence of how sound is formulated, internalized, and executed; therefore, we cannot allow it to be developed haphazardly or in isolation. Choral educators must know what is possible and connect to students through sound.

Effectiveness and success in the choral classroom depends on a teacher’s ability to connect to students through beautiful sound, taught by a teacher who believes the students can make those sounds. A teacher’s number-one job is to affirm human spirits every minute of the rehearsal using one’s knowledge of vocal technique and the knowledge of how to teach choirs to hear. (Jordan, 2008 , p. 321)

For choral educators and other vocal professionals to affect students’ awareness of how they create sound, a true dialogue must begin. The sounds that students already audiate and possess must be understood. The psychological connections to their tonal ideals may

permeate their vocal identity. If their tonal ideals are dismissed as irrelevant, they may feel that *they* are being dismissed (Piernay, 2007, p. 427), and the possibility of a schizophrenic, reactionary, and unhealthy response is set in motion. Because of her conflict regarding tonal ideals, Student A created a superficial imitation of choral sound and isolated her deepest vocal identity from any possible influence of healthy production.

To encourage students to buy into *creating* healthy vocal sounds, they must be invited to participate in *evaluating* healthy vocal sounds. Their growth in aural discrimination and their ability to accurately identify subtleties in tone color must be carefully nurtured. Susan Yarnall (2006) emphasizes the regular use of sound and video recordings of students' own singing. This helps students compare their perceptions of sound to something more concrete (p. 83). Incorporating the sounds of popular singers in the classroom would allow students to compare and contrast the quality and vocal production of differing tonal ideals. If vocal educators are open to this kind of dialog, an environment of reciprocity can be developed where depth of learning can occur. Students may feel more accepted and become more open to listening to and evaluating healthy sound. Only then will they be able to integrate high standards of healthy choral and vocal sound.

Choral educators must be vigilant when evaluating their own choral and vocal ideals to insure that standards remain high. They must continually refine their tonal concepts using recordings and attending live performances of outstanding adolescent singing (Jordan, 2008 , p. 320). The *Choral Performance Models* CD included with the Jordan's choral methods textbook, *The School Choral Program* is a superb reminder that adolescents can sing skillfully, musically and healthily. It is through exceptional choral sound that students can experience music's transforming power.

Music well and honestly taught through performance immediately transcends all racial and social barriers. Words do not and simply cannot effectively do this; but

sound can do this in the most powerful and profound way. Those who raise the banner of words over sound do not understand the power of choral sound and its effect on the human spirit...That ability to sing can be put in motion only by the affirmation of every individual spirit in the room and by a conductor's ability to both understand the voice and know how to teach people to sing...and to listen. (Jordan, 2008 , p. 321)

Solution 3: A Pro-active Approach to Vocal Over-Use and Vocal Hygiene

Choral professionals in the high school setting must be proactive and specific about how students can protect their vocal instruments. Addressing vocal health regularly, even daily, will help students begin good habits early. Setting a good example of how to practice good vocal hygiene is a critical component of effective instruction.

Using Dr. Bastian's (2002) criteria for VOS can help identify students who may be at high risk of developing chronic vocal fold injuries. Dr. Bastian begins with a self-rating questionnaire regarding a subject's inherent predisposition to talk. "On a seven point scale of intrinsic talkativeness, where one represents a person of few words, four an averagely talkative person, and seven an unusually talkative person, where would you place yourself?" Most people place themselves accurately on this scale. Based on this alone, those who answer six or seven become possible candidates for VOS. This self-rating scale, coupled with a few questions about social activities, phone use, hobbies, and family communication style, are enough to get a clear picture regarding vocal over-use (pp. 411-412).

Choral directors can use the criteria for VOS to increase student awareness and encourage them to evaluate and manage their behavior. Increased self-awareness can motivate students to space voice use at sensible intervals, schedule voice breaks into their rehearsal periods, and give attention to the amount and type of personal voice use.

All students should be made aware of guidelines for general good health and how it supports vocal health. The following guidelines are based on information from Radford University (Castonguay, n.d.).

(1) Maintain good general health—avoid viral colds. Wash hands often to avoid infections in the vocal tract.

(2) Emotional and physical stress increase vocal stress. To reduce all stress, exercise regularly. Get 7-9 hours of sleep.

(3) Eat a balanced diet. Avoid salt, refined sugar, spicy foods, caffeine, and alcohol. Avoid overeating. Gastro-Esophageal Reflux Disease (GERD), acid reflux, and Laryngo-Pharyngeal Reflux (LPR) are common pre-cursors to vocal problems.

(4) Maintain body hydration. This keeps lubrication at good levels in the larynx. 6-8 glasses of water are usually the minimum. Remember, hydration is not about external wetting of the vocal folds by swallowing water. It is about hydrating the cells of the vocal folds. Avoid dry indoor climates. Body moisture is lost in low humidity environments.

(5) Do not smoke. Besides its obvious associations with cancer, cigarette smoke is one of the most dangerous substances to come in contact with your vocal folds. It changes their physical characteristics and causes constant swelling. Avoid breathing second-hand smoke. It is not significantly different than actually smoking.

(6) Do not sing while using any product such as Chloroseptic or Parke-Davis Throat Discs that anesthetize the vocal folds. You may be injuring your voice and not be aware of it.

(7) Some pharmaceuticals, such as progesterone dominant birth control pills and other steroids, can cause changes in the larynx and vocal folds. Other hormonal imbalances, such as low thyroid function, can lower the pitch of a voice. Always inform your doctor that you are a singer, and ask about the effects of all medications when beginning new medical treatments.

The following specific guidelines for vocal hygiene are based on advice from Dr. Richard Stasney in Houston, Texas (Texas Voice Center, n.d.).

(1) Sing well. Use correct technique. Don't over-sing or under-sing.

Avoid singing beyond your range and comfortable loudness. It is very common for a young singer to try to project the belt sound of pop and Broadway music without amplification.

Avoid neck, tongue and facial tension.

(2) Speak well. Use correct breath support when speaking. Avoid breathiness, monotone speaking, or speaking in an abnormally low, authoritative or mono-tone voice. Allow your pitch and loudness to vary naturally. Avoid trying to speak while exercising.

(3) Avoid holding your breath while formulating a sentence. Do not speak beyond your natural breath cycle. Have plenty of air to finish your sentences. Breathe and speak naturally.

(4) Avoid strenuous vocal use such as yelling, screaming, or cheering. Instead, try whistling or clapping at a sporting event. Do not try to converse in loud environments such as nightclubs and bars.

(5) Avoid throat clearing, phonated sneezing, or violent coughing. To remove thick mucus, take in a deep breath, momentarily hold the breath, and produce a sharp, silent "H" sound to expel the air and mucus.

(6) Be evaluated for possible reflux disease. Symptoms include: lots of phlegm in the morning; waking up with a dry, scratchy or irritated throat; waking up with a deep or husky voice that improves during the day; waking up with a bitter taste in the mouth; always trying to clear your throat or coughing.

It is the choral professional's responsibility to monitor the health of their students. Dr. Bastian (2002) recommends regular use of the Loyola Voice Institute's "swelling tests" to determine if a voice requires attention. These tests are done with an un-warmed voice. Test 1

is ascending by half-steps using the first phrase of “Happy Birthday” using a light, clear, falsetto sound without vibrato. Females should sing this phrase above C5. Men should perform the test between flat B3 and sharp C 4. Test 2 is a five-note descending staccato pattern using “yo-ho-ho-ho-ho-ho-ho-ho-ho” on so-so-so-so-so-fa-mi-re-do. If delayed onsets or loss of falsetto are found, a singer should reduce vocal use until the swelling tests are normal. Intermittent swelling is not necessarily indicative of a serious problem, and recovery can happen quickly; however, if vocal use is not monitored and the folds are not allowed to recover, permanent vocal injury is possible (pp. 412-413).

A feeling of being unable to clear the throat, a persistent throat “tickle,” chronic huskiness, or the loss of ability to phonate in a specific pitch range may indicate more serious problems. Do not “wait and see” if these signs of vocal distress disappear. These symptoms require immediate investigation by a professional laryngologist. Always err on the side of caution.

Solution 4: Purposeful Choral Pedagogy

The choral rehearsal is a primary environment for adolescent singing development. As such, the middle or high school choral director should be purposeful, focused, and mindful of their influence in facilitating a healthy choral sound. From repertoire to warm-up procedures, from discipline to conducting style, every choice made by the choral director either prompts a healthy vocal sound or does not. No choices are innocuous.

Affirmation and the Choral Environment.

The choral experience can capture the power of intense musical awakenings and create community among diverse people. Choral directors must be aware that this kind of potent music making is only possible if singers believe in their ability to achieve it. The students’ belief originates in the tone set in the rehearsal by the choral conductor. “Belief in the human spirit’s ability to accomplish what is necessary should be central to all that we do

as conductors (Jordan, 2008, p. 4).” Positive discipline procedures will create openness for learning in the rehearsal process. Using respectful language and honoring each contribution allows singers to let go of fear and apprehension, so that healthy singing can evolve.

Authentic music making focuses on the integrity of the music, its meaning and beauty, not on individual personalities. In affirming the value of each individual singer, authentic music making is feasible. It is the magnificence of ensemble singing.

Warm-up Procedures.

James Jordan (2005) believes so deeply in the pedagogical purpose of the choral warm-up that he has dedicated an entire book to its study. *Evoking Sound: The Choral Warm-up* is a comprehensive text infused with a philosophy of choral pedagogy dedicated to creating healthy choral sound. Many choral directors and singers, alike, believe the warm-up is intended to simply get the voice moving. The actual objective of the choral warm-up should be “to establish, reestablish, and reinforce the basic elements of good singing in every rehearsal” (p. 21). Generic warm-ups cannot facilitate this purpose. Howard Swan says,

There are...those conductors who insist upon using only the techniques learned from a favorite teacher. These are applied regardless of the nature of the problem or the desired solution. Finally, there are some who, without an orderly plan of procedure, utilize a great number of vocalises, devices, and methods taken from many sources with the desperate hope that the tone of their chorus will show a marked improvement. (as cited by Jordan, 2005, p. xix)

The choral warm-up is the first opportunity to positively affect choral sound. The choral conductor must be clear about the purpose of the warm-up and the skill they are addressing. An effective warm-up will cultivate correct and healthy singing, expedite aural discrimination, and thoroughly relate both to the repertoire being taught. The efficacy of the

choral warm-up will establish the success or failure of any rehearsal or performance (Jordan, 2005, p. 20).

To prompt healthy singing, the choral director must phase out use of the speaking voice and phased in the use of the singing voice. If this shift is not made, singers will continue to use poor speaking techniques in their singing. Vowel production will be colloquial and breath will be under-energized, resulting in an unhealthy, uninspiring and out of tune choral sound. Facilitating aural discrimination creates harmonic context so that the singers can internalize a collective harmonic understanding of the choral repertoire.

Without harmonic immersion, a choral ensemble audiates passively—that is they hear the music but for many reasons focus only on their part and learn it devoid of context (both harmonic and musical context). When a rich harmonic environment is provided at all times...the choir moves from passively audiating without musical understanding to a level of active audiation, where harmonic context is established through active listening—that is, listening to everything except themselves. (Jordan, 2005, p. 117)

It is the choral conductor's responsibility to create and reinforce healthy choral sound that is appropriate for each type of repertoire. The sequence of the warm-up exercises should remain constant, though the exercises themselves will vary. Jordan suggests “an intonation exercise, an interval exercise or exercises, a tuning or aural warm-up exercise, and representative examples from the choral literature” (p. 119). When the choral warm-up directly relates vocal and aural skills to specifics of the repertoire being taught, music is learned more quickly and retained for longer periods of time.

Posture.

Healthy singing cannot take place if posture is compromised. Posture affects the

efficiency of the breathing mechanism and, therefore, all other systems of the vocal apparatus. Choral directors must not assume that students know what “good posture” is. In preparing the vocal mechanism for singing, attention to posture should be a regular component of the choral warm-up.

Barbara Conable (2000) has recognized the correlation between body awareness and posture as the framework for vocal technique. She discusses the necessity for “re-mapping (p. 13)” singers’ body awareness to expel tension and create the possibility for singing with freedom. Remember the automatic rigid response, noted earlier, that singers often have to the common instruction, “Stand up straight.” The phrase, “Sing from your diaphragm,” often causes misalignment when people push their abdomens out, thinking that they are activating the diaphragm for singing. In actuality, this contradicts the true up and down movement of the diaphragm and may actually restrict its movement, making it harder to access the breath. Conable’s re-mapping exercises are comprehensive and transforming; however, it may require more than simply reading to truly grasp their power. One must *experience* bodily alignment to internalize its buoyancy and freedom.

Effects of Conducting Techniques.

Since gestures have the power to induce tension or freedom, each conducting choice must be evaluated by its effect on vocal freedom. Choral sound is the most reliable indicator of the level of tension in conducting gestures. Therefore, a conductor’s ability to evaluate freedom in the choral sound is critical and must be a skill purposefully developed in choral pedagogy for high school choral directors. The breath gesture and the freedom of the conductor’s breath and body are the basis for a symbiotic creation of sound between the conductor and the choir. If the conductor is tense or disconnected or thinking of something else, the choir, too, will be disconnected from their sound. If the conductor is aggressive, the

sound will be aggressive (Jordan, 2008, pp. 85-88). Fuelberth's (2003) work underscores the necessity to create awareness of this phenomenon of the relationship between gesture and the ensemble. Conducting gestures must *mirror* freedom to *elicit* freedom. Vocal health depends on it

Intensive Choral Experiences.

Intensive choral experiences must be redesigned with vocal health as the priority. Attention to vocal hygiene by conference leaders will model good behavior and avoid tacit approval that vocal over use is acceptable. The studies by Daugherty et al (2011) and Bowers and Daugherty (2008) show the necessity of finding a balance between creating meaningful choral experiences and monitoring students' vocal health.

The training that adolescent singers receive in the choral hall may be the only experience they have to construct their understanding of vocal sound and how to produce it. The development of their vocal perceptions and their vocal abilities must not be left to chance or a lack of training. Understanding of the true influence of the choral director is a profound reminder of why purposeful choral pedagogy is a requirement, not an option.

Solution 5: Making High School Musicals Healthier

When considering producing a high school musical, the health of the adolescent singers rests in the hands of those professionals who are in charge. If the "truly critical problem of voice abuse" in high school musicals recognized by The American Academy of Teachers of Singing (2004, p. 225) is going to improve, strategies must be engaged that support vocal health. The following guidelines are suggested.

(1) Know the students' abilities before choosing the show. Carefully coordinate their vocal and dramatic abilities with the vocal and dramatic parameters of the musical. Evaluate vocal ranges, choral demands, and the requirements of dancing while singing. If students'

abilities are limited in a given year, choose a show that is suitable. Be sensible about how much improvement a student can make during the rehearsal period. Consider potential cuts and alterations ahead of time that can lessen vocal strain without damaging the quality of the show (White, 1978, p. 28). This would also apply to versions specifically adapted for young voices, such as the *Broadway Junior* series (MTI Broadway Junior Collection, n.d.).

(2) Vocal ability should be the priority in casting. Casting a student with the “right look,” but the wrong vocal ability, is shallow thinking and a good recipe for vocal distress. Hold auditions in the performance space, and use the sound system that will be used in the performance. This allows volume to be de-emphasized as criteria for casting. Double or triple cast leading roles to allow for vocal rest by alternating casts (American Academy of Teachers of Singing, 2004, pp. 224-225). Alternatively, rehearse the understudy sufficiently to step into the role in case of an emergency. Provide competent vocal instruction *before* staging begins so that healthy singing is already internalized, and students are not asked to work out vocal challenges while incorporating blocking.

(3) Be prepared. Work out staging before rehearsals begin. Determine specific goals for each scheduled rehearsal. Limit students to no more than two hours of singing per day. Do not rehearse demanding scenes every day. Incorporate vocal rest into the schedule by not requiring the same students to sing at all rehearsals. Ensemble numbers and principal numbers can rehearse on alternate days (White, 1978, pp. 30-31). Encourage students to “mark” their singing when learning choreography, saving performance energy for important run-throughs. Use vocal-friendly staging that encourages good posture and allows access to proper breathing techniques.

(4) Use adequate vocal amplification when the orchestra is large or is amplified. Make sure good monitors are available so that singers have accurate feedback about how loudly they are singing. Poor monitor placement and the resulting inability to hear is a prime source

of vocal exhaustion. Hire a qualified sound engineer to set levels for the speakers and monitors. Instrumentalists may need to be reminded about balance and supportive dynamics (American Academy of Teachers of Singing, 2004, p. 225).

Many of these guidelines require the expertise and attention of the school choral director or other vocal professional. Drama teachers and theater directors, while highly trained in their field, may not be aware of the threat posed to adolescent singing voices. If the school choral director is not comfortable or familiar with the musical theater style of singing, find a qualified vocal instructor. Be mindful of healthy vocal use in speaking roles. Poor vocal production in speaking can be even more damaging than over-singing.

Finally, keep the lines of communication open so that students are comfortable letting the staff know that they may be having problems. Remember, they are not professionals. They are *student* performers who look to their mentors for guidance in monitoring and protecting their vocal health.

Solution 6: Reclaiming the “Chest Voice” as a Teaching Tool

In many pedagogical circles, the pejorative use of the term “chest voice” has obscured its meaning and diminished its importance in balanced vocal production. Those who equate “chest voice” with “belting” add to the controversy surrounding its negative connotation. Further confusion is caused by misuse of the term to describe registration or resonance. Given these misunderstandings, one could hypothesize that eliminating the term altogether is best, replacing it with its scientific equivalent--thyroarytenoid dominant production. However, without re-defining what chest voice is, eliminating the term may not guarantee elimination of the prejudice against its usefulness as a teaching tool.

It is difficult to ascertain the origins of the biases against the pedagogical use of the chest voice as exhibited by the survey responses of Choral Directors A and B and by the debate examined by Norman Spivey (2008). Many of the “Thumbs Down” comments in

Spivey's article assume that chest voice is inherently unhealthy and will always result in serious vocal problems such as nodules (pp. 608-609). Choral Director A's comments presuppose that chest voice use will be pushed and unusable. These viewpoints could be considered illogical if one considers the fact that maturing male singing voices *should* be produced with chest voice mechanism. Of course, not all males get nodules as a result of using the chest voice, and not all male vocal sound is pushed.

Patricia O'Toole (1998) has recognized a gender factor regarding the use of the full spectrum of vocal sound. She notes that it is such an accepted part of our profession's consciousness that it is seldom questioned. Males are encouraged to explore their full vocal mechanism, including falsetto; however, females are discouraged from using their lower ranges due to the fear of vocal damage and accepted wisdom of appropriate feminine sound (p. 21). Robert Edwin (2008) echoes O'Toole's concern and discusses how gender bias may affect vocal pedagogy.

...separate voice training approaches for males and females...may be based more on gender and cultural bias than on good pedagogy. If the pedagogic point is to have men singing "like men" (low) and women singing "like women" (high), then only voice techniques that reinforce such a mindset may be employed (i.e. no falsetto for men and no chest voice for women). (p. 74)

Choral Director A's response to survey Question 4 appears to manifest this gender dynamic. Though Question 4 did not specify gender, Choral Director A only addressed her *female students' use of chest voice* in her response. Student F recalled her high school choral conductor saying not to use her chest voice because it sounded "too manly."

In an effort to embrace the safety of the chest voice and reclaim its usefulness, Robert Edwin (2008) suggests contemplating the vocal mechanism as an integrated muscular system

in males *and* females. To support this idea, he cites Richard Miller from *The Structure of Singing*.

‘It is pedagogically convenient to call a vocal register in which the thyroarytenoids are predominant, *the heavy mechanism*, and to call those registers in which the cricothyroids are predominant, *the light mechanism*, so long as it is understood that there are not actually two separate mechanisms, but changing dynamic balances among the laryngeal muscles.’ (p. 21)

Perhaps this explanation allows consideration of the pedagogical importance of the chest voice, not just as a quality of sound used in Broadway belting, but as a *muscular function* that affects classical sound, as well.

With regards to classical vocal technique, Dr. Sheila Allen (2004), Chair of Vocal Studies at Texas Christian University’s School of Music in Fort Worth, Texas, recognizes that development of the chest voice in a balanced vocal approach adds depth and fullness *throughout the female vocal range* (emphasis added). She supports the introduction of chest register reasonably early in voice study for females, on an individual basis, of course (p. 269). Freda Herseth (2004), Associate Professor and Chair of the Voice Department at the University of Michigan agrees.

Chest mixtures are a natural, expressive and beautiful component of the female voice. These mixtures should be used when the expressive intent of the character of music requires it. This technique adds color, *aids in acoustic output at the least vocal cost*, (emphasis added) and enhances a beautiful, resonant line. (p. 372)

So is resistance to considering the positive use of the chest voice solely based on gender bias? An examination of Scott McCoy’s self-stated biases gives insight into how deeply other assumptions about chest voice and belting, (terms often used interchangeably), affect vocal pedagogical work. When asked questions regarding the safety and teaching of

belting, Scott McCoy's (2007) response had been "a resounding, 'I don't know'" until he decided to do further research (p. 545).

McCoy's research examined twelve female students from Robert Edwin's voice studio in order to compare the closed quotients (CQ), larynx position, and acoustical differences between belting and classical voice production. McCoy (2007) defined closed quotient (CQ) as "the ratio of the time the glottis is closed versus open during each cycle of oscillation" of the vocal folds. It has been generally accepted that the CQ of chest voice is greater than the CQ of head voice. However, using an electroglottograph, it was discovered that 75% of the 12 singers in the study belted with closed quotients within the *same general range used by classical singers*. The EGG transducer used to measure the position of the larynx while a student was belting showed *little or no elevation of the larynx above its resting point*. In comparing the acoustic spectrums of belting and classical singing, belting showed strong harmonics through 10 kHz, compared to head voice, where harmonics above 4 kHz are comparatively weak. This accounted for the brightness of the belt timbre (pp. 546-548). In addition to his objective measurements, McCoy made subjective observations.

Almost all of my preconceptions of belting were false. In my naivety, I assumed that belting was nothing more than "bottom-up" voice production that pushed the heavy mechanism beyond its natural upper boundary... Instead, I heard one singer after another produce a scale that was light and slender on the bottom, increasing in energy and becoming more speech-like through the middle, and ending in a clear, strong open top. The voices displayed uniform timbre with no apparent vocal seams or register changes... I had also expected to see obvious physical signs of vocal distress. Once again, I was wrong... I now understand these physical manifestations only are found in *incorrect* belting, just as they are only found in *incorrect* classical singing. (p. 548)

Scott McCoy's (2006) eminent scientific work in his book, *Your Voice: An Inside View*, lends credibility to his findings. Nevertheless, many high school choral directors, such as Choral Director A, may still formulate their vocal pedagogy using many of the same assumptions about chest voice. An empirical approach based on a perpetuated misunderstanding of the chest voice will maintain choral directors' inability and hesitancy to integrate the laryngeal muscles. In order for high school choral directors to incorporate chest voice into healthy functional pedagogy, the term "chest voice" must be re-defined to include muscular function so that its ultimate replacement with scientific terminology can be successful.

For those unfamiliar with incorporating chest voice use in females, it is comforting to know that many aspects of vocal technique remain the same. Proper breathing and lack of tension are consistent to all healthy vocal production. Using closed vowels lightens and balances the chest mechanism. Initial work with the chest voice in females should be limited to five or ten minutes a day, as voices can tire easily (Edwin, 2004, p. 287).

Conversely, use of the falsetto may help to integrate the laryngeal muscles in males. James C. McKinney (2005) cites the work of C.A. Clippinger and William Vennard as advocates of the use of falsetto exercises as a means to help the male singer find freedom and balance in the upper modal voice (pp. 190-191). Robert Edwin (2008) calls this "cross training for the voice" and agrees with Allen, Herseth, Clippinger, and Vennard that balancing the use of head voice and chest voice results in improvements in "strength, flexibility, coordination, and endurance, as well as artistic and aesthetic boundaries" for both classical and contemporary commercial music singers (p. 76).

Here are several specific exercises designed to balance the vocal musculature. Exercise 1 is for adolescents, male and female, who need to engage the chest voice muscles. Ask the student to use more speech like sound on a descending mi-re-do pattern. Use [i],

making sure that the vowel remains constant as the pitch descends. There should be a sensation in the sound that the pitches are all in the same horizontal plane. For males, try beginning the descending mi-re-do pattern no lower than E3, and no higher than A3. For females, begin no lower than C4 and no higher than E-flat 4. If the vowel does not remain constant, use a slide going the distance of the descending major third on a single vowel to highlight the vowel consistency. To counter a jutting chin, it can be helpful to ask the student to execute the vocalise looking at the floor, making sure the chin is not continuing to jut.

Exercise 2 is for males and females whose chest voice mechanism is too heavy. Sing “yoo-hoo” using the interval of a minor third, so-mi, in head voice or falsetto, taking a breath between the two notes. Encourage the student to use all of their air. For females and possible tenors, begin “yoo-hoo” on C5. For possible baritones, begin “yoo-hoo” on G4. Continue minor thirds in a descending pattern singing “yoo-hoo” until it is not possible to continue in head voice/falsetto (CDP). Both males and females may crack as the pitches get lower. Keep encouraging head voice/falsetto production only. Remind the student that this is a *functional* exercise and that they are not yet making the desired singing sound yet. This vocalise should encourage a relaxed jaw, a more spacious vocal tract, and should activate the head voice muscles. Once completed, the student may attempt Exercise 1. Counter any jutting of the chin by looking at the floor or placing the student’s hand on their jaw so they can feel when it is tense.

Exercise 3 is for females only to encourage a balanced transition from chest voice to head voice. Use an octave jump, do to do, with the lower do in chest voice on the vowel [i] and the upper do in head voice on the vowel [u]. This should require no conscious adjustments or resetting of the vocal mechanism. Encourage the student to move through the octave “on the breath,” using all of their air. As always, vowels should be closed, and the jaw relaxed. There should, again, be a sensation in the sound that the pitches are in the same

horizontal plane. Any sense that the pitches are in a vertical plane indicates poor coordination. Try starting this exercise on pitches between B-flat 3 and D4 only.

The experience of Student H shows how this type of approach can help the maturation process move toward integration and balance. The exercises above, and others like them, were used to create a more balanced chest voice for musical theater, to successfully correct a jutting jaw, to release other neck and facial tensions, and to develop more tone colors for expressive singing. In three years of study, Student H was able to let go of an externalized musical theater tonal ideal and find an authentic and healthy vocal quality, facilitating his transition to a more mature singing juncture.

Solution 7: Re-thinking Certification and the Bachelor of Music Education Degree

Dr. Robert Cutietta (2007) makes a convincing case for more specialization in teacher certification and the corresponding changes it would require in the undergraduate music education degree curricula. The trend towards specialization in other professions points out the short-sightedness of a general K-12 certification that assumes music educators can be adequately trained to “teach everybody everything there is to know about music” (p. 12).

We have fallen behind just about every other discipline in our refusal to accept that we can and should, educate music specialists in music education. We have argued against this in our action, which call for a common core for all musicians and courses that seat jazz, pop, choral, symphonic, and wind students next to each other in the vast majority of their music and music education courses. We need to acknowledge that quality and depth of knowledge will win out over generic broad and shallow knowledge in most new paradigms. (p. 18)

Can an elementary school general music teacher and a high school orchestra conductor gain essential knowledge in their different areas of proficiency by taking the same core

curriculum, or should music education specialists have an extensive education in a particular area of music, defined either by “genre, instrument, or function” (p. 14)?

Richard Colwell (2006) suggests that changes in certification are not necessary to make music education curriculums more effective. His alternative is to allocate methods courses and conducting classes as elective, allowing music education students to choose those courses that fit their interests. This could also speak to the lack of standardization in sequencing music education courses. He describes the curricula specific to music education as “a series of introductory courses.” As a result, it is up to the new teacher to link content to successful teaching (p. 32). The merit of this is doubtful, as electives would not guarantee a beginning and advanced sequence, and music educators could still be under-qualified for a general certification of K-12. Colwell also recommends the elimination of student teaching, noting its documented ineffectiveness. Its removal from the curriculum would permit another semester of course work. Some states are already supporting mentoring programs as a replacement for student teaching (p. 31). Though controversial, this may be a satisfactory solution to the limitations of completing the Bachelor of Music degree in four years. Shorter, but more numerous, student teaching experiences might allow for more reflection and assessment of effective teaching methods.

To endorse sweeping changes at the state certification level would require agreement and coordination among university policy makers, state departments of education, and music school faculties. Professional organizations such as the National Association of Schools of Music (NASM) and The National Association of Music Educators (MENC) would need to provide forums for productive debate. In spite of the vastness of such a paradigm shift, Dr. Cutietta (2007) simply says, “It becomes a question of whether it is realistic to continue to teach watered-down content (developing the generalist) or teach substantive content in focused areas” (pp. 15,17)

Though all stakeholders would have a point of view, choral professionals and university music school faculty must quantify this issue through the filter of adolescent vocal health. Methodologies must be constructed to gather data and compare the incidence of vocal distress in states where certification is currently more specialized to the incidence of vocal distress in states where certification continues to be generalized. If research can show that a lack of training is pervasive and at the root of the increase in vocal problems in young singers as noted by Trollinger (2007) and Tepe et al (2002), it requires a significant and global response. Institutionalized negligence cannot be condoned. Vocal health must be a priority.

We need to start with examining our assumptions. These are so well ingrained in our collective psyche and professional practices that we can hardly see them anymore. We need a new pair of glasses to examine whether our assumptions are valid and appropriate for the type of teacher we hope to develop...We need to develop teachers who are truly educated for the slice of the profession they want to enter. Only then can we attain the level of expertise necessary to truly provide excellence of music instruction the children of America deserve. (Cutietta, 2007, p. 18)

Chapter 7 Analysis Summary

When combining evidence from this systematic assessment of risks to adolescent vocal health, a common theme emerges. Each risk points to a lack of depth of knowledge of the vocal mechanism and a limited understanding of healthy vocal sound. This inadequacy is so insidious that it is difficult to separate one risk from another. Choral professionals receive their initial training in the Bachelor of Education degree. Curricula content is the responsibility of university degree programs. Since these curricula are dictated by certification standards, the generic K-12 certification logically appears to be the root of this deficiency in training. This systematic analysis recommends that certification standards become more specialized so that choral educators can develop adequate skills to cultivate healthy singing in adolescents.

In order to cultivate healthy singing, a newly designed Bachelor of Education degree would allow choral specialists to develop a “healthy vocal pedagogy” that includes the ideas stated in Solution 1. Instructional content must be based on scientific information regarding respiration, phonation, resonance, and articulation. Vocal sound must be tied to vocal function. This is the foundation for evaluating vocal problems and devising solutions. Listening only for an aesthetically pleasing sound is insufficient for building healthy vocal sound. Debra Spurgeon (2004) has aptly articulated the necessity of providing a deeper knowledge of the physiology of the human voice for choral conductors:

“First Do No Harm.” This phrase from the physician’s Hippocratic Oath equally applies to the choral profession. Elementary and secondary choral conductors must understand how the human voice works in order to develop age-appropriate methodologies or they could unintentionally cause singers to develop unhealthy singing habits. (p. 29)

There are those who believe that undergraduate vocal students can gain these skills through their own applied study. However, applied lessons focus on one's own singing technique and on more advanced repertoire, and, therefore, cannot provide the amount of time required to attain a depth of knowledge regarding vocal pedagogy (p. 31). Nor do applied lessons provide opportunities to hear and evaluate different manifestations of vocal sound and no actual contact with adolescent singers. Such experiences are vital to acquiring an understanding of the limitations and boundaries of adolescent voices and the necessary diagnostic skills to decipher the difference between those limitations and actual vocal problems. Insuring vocal health in adolescents would require a curriculum that includes significant study of vocal physiology and enough opportunities to work with actual young voices, so that pedagogical understanding can be connected to vocal sound--that is developing "functional listening" (Reid & Reid, 2000, p. 37).

A continuous and frank dialog with adolescents about tonal ideals and tonal models must be in place to integrate their performance practices. The entire spectrum of vocal sound must be accessible to aid their understanding of the common roots of healthy singing. Adolescents must be partners on this journey to vocal health. They must not conceal the scope of their vocal use due to perceived biases or fear of being reprimanded.

Due to choral students' involvement with different singing styles, familiarity with commercial singing techniques would be a necessary component of a holistic curriculum for choral and vocal specialists. Robert Edwin's (2004) observation that the model for vocal pedagogy at most colleges and universities continues to employ only classical techniques and repertoire, points out a serious limitation for vocal and choral professionals who have never been exposed to the science of commercial singing techniques. A new pedagogy must be in place to effectively address the vocal health issues associated with non-classical singing. "Teachers not intimate with contemporary styles of singing will be, at best, mediocre

pedagogues, and at worse, potentially damaging influences in the vocal lives of their non-classical students” (p. 285). Middle and high school choral directors should have a clear understanding of musical theater singing in order to be able to contribute to a healthier environment for high school musicals.

In a specialized music education curriculum, choral pedagogy and its influence on vocal health would be embedded throughout the four-year program. Choral methods classes would address choral pedagogy separately from the mechanics of choral programs and recruiting. The necessity for healthy choral tonal ideals would be included in *introductory* classes, and more fully developed in subsequent courses. The distinctiveness of choral conducting techniques would be acknowledged and taught separately from orchestral conducting skills. The effects of conducting gestures on choral sound and vocal tension would be common knowledge. The incorporation of audiation as the basis for conducting choices would be achievable. The “breath gesture” (Smith & Sataloff, 2003, p. 236) and the correlation between the conductor’s breath and a healthy, vibrant choral sound would be basic content in an adequate curriculum for high school choral specialists.

In short, specific certification for choral specialists would allow universities and music schools to allot the proper amount of time for choral specialists to learn to recognize healthy vocal sounds and be competent to teach them. Anything less is unacceptable.

My concern is for all of us to tend the vocal health of our choirs, regardless of their level of development. Aside from giving the gift of music to the people we teach, we are charged with a higher responsibility: to give them vocal “tools” to use for the rest of their lives to enjoy the miracle of singing. (Jordan, 2005, p. xvii)

Chapter 8 Resources

The following resources are reliable sources of choral pedagogical information that contain specific exercises for healthy choral development. Those resources with aural components are listed first, since it is imperative that these skills be built in relation to vocal and choral sound.

James Jordan's *Evoking Sound Series*, is a must. It consists of *Evoking Sound: The Choral Warm-Up* and *Evoking Sound: The Choral Rehearsal, Volumes 1 and 2*. This series is most attentive to healthy choral sound and covers all aspects of choral preparation. Jordan has also written *The School Choral Program: Philosophy, Planning, Organizing, and Teaching*. All have aural components to support true understanding of the concepts presented (James Jordan: Evoking Sound). These books are published by GIA Publications, Inc. Jordan's web site, www.evokingsound.com, contains links to purchasing these books and other materials, including appropriate octavos for young singers.

Group Vocal Technique: The Choral Ensemble Warm-up and *Ensemble Diction: Language and Style, Principles and Application* are companion videos that explicitly address effective exercises for choir building at any level. Published by Hinshaw Music, Inc is an excellent aural and visual resource. This series is also by James Jordan, but in collaboration with Craig Denison, Vincent Metallo, and Constantina Tsolainou. This is available at www.hinshawmusic.com.

The Structures and Movement of Breathing: A Primer for Choirs and Choruses by Barbara Conable is essential for understanding the tensions that come with poor posture, poor body mapping, and muscle memory. There is no video or aural component, but excellent pictures and explanations are included. To make effective use of this information working *in person* with a qualified instructor is preferred. This book is available from various on-line book sellers such as www.amazon.com.

Smith and Sataloff's *Choral Pedagogy* is also an outstanding resource. Published by Singular Publishing Group in 2000, it is available from on-line book sellers such as www.amazon.com. This is a comprehensive text written from a medical perspective. Section One includes information on anatomy and physiology, voice disorders and treatments, the aging voice, and the effects of choral practices on vocal health. Section 2 has specific information regarding diction, choral rehearsal techniques, posture, and seating.

Though not as comprehensive as those previously listed, the following resources are informative since one can respond to *actual* sound, as opposed to written language *about* sound. The first two DVDs feature treble voices. Some of the modeling by the students may require clarification. The third DVD features adolescent and adult amateur choirs.

Vocal Techniques for the Young Singer is a demonstration of basic vocal techniques as taught by Henry Leck, the founding artistic director of the Indianapolis Children's Choir. It features Leck's treble choir using aural, visual and movement exercises to improve vocal sound. Steven Rickards, countertenor, is the vocal model. This resource is available through www.musicinmotion.com.

Also available from www.musicinmotion.com, *Daily Workout for a Beautiful Voice* is a detailed series of vocal exercises for treble choir. Charlotte Adams developed this vocal warm-up for the Cherry Creek High School Girls'21 Choir in Colorado. Since Ms. Adams suggests using the regimen exactly as shown, it is not easily adaptable for individual purposes.

Finally, Rodney Eichenberger, Professor Emeritus at Florida State University, has developed two DVD's that feature his approach to movement and choral sound. *Enhancing Musicality Through Movement* shows the effects of movement on vocal sound. The video is structured so that vocal sound can be compared before and after the use of movement. *What*

They See Is What You Get addresses the effect of conducting movements on choral sound.

Both are available through www.musicinmotion.com.

Chapter 9 References

- Allen, S. (2004). Female Chest Voice. *Journal of Singing* , 60 (3), 267-269.
- American Academy of Teachers of Singing. (2004). Promoting Vocal Health in the Production of High School Musical Theater. *Journal of Singing* , 60 (3), 223-225.
- Bastian, R. W. (2002). The Vocal Overdoer Syndrome: A Useful Concept From the Voice Clinic. *Journal of Singing* , 58 (5), 411-413.
- Bentley, R. B. (2002). The Emerging Adult Voice. *The Modern Singing Master: Essays in Honor of Cornelius Reid* . (A. Bybee, & J. E. Ford, Eds.) Maryland: Scarecrow Press.
- Berlin, I. (1967). *Annie Get Your Gun*. Milwaukee, WI: Hal Leonard Corporation.
- Bowers, J., & Daugherty, J. F. (2008). Self-Reported Student Vocal Use at a High School Summer Choral Camp. *International Journal of Research in Choral Singing* , 3 (1) , 39-44. Retrieved from <http://www.choralresearch.org>.
- Castonguay, D. O. (n.d.). *Maintaining Vocal Health*. Retrieved October 3, 2010, from [www.radford.edu: www.radford.edu/~dcastong/ARTARCH/vocal.html](http://www.radford.edu/~dcastong/ARTARCH/vocal.html)
- Colwell, R. (2006). Music Teacher Education in This Century: Part II. *Arts in Education Policy Review* , 108 (2) , 17-29. Retrieved from <http://wf2dnvr9.webfeat.org>.
- Conable, B. (2000). *The Structures and Movement of Breathing: A Primer for Choirs and Choruses*. Chicago, IL: GIA Publications, Inc.
- Cutiotta, R. (2007). Content for Music Teacher Education in This Century. *Arts Education Policy Review* , 108 (6) , 11-18. doi: 10.3200/AEPR.108.6.11-18 .

- Daugherty, J. F., Manternach, J. N., & Price, K. K. (2011). Student Voice Use and Vocal Health During an All-State Choral Event. *Journal of Research in Music Education*, 58 (4), 346-367. doi: 10.1177/0022429410387145.
- Edwin, R. (2007). Belt Is Legit. *Journal of Singing*, 64 (2), 213-215.
- Edwin, R. (2004). Belt Yourself. *Journal of Singing*, 60 (3), 285-288.
- Edwin, R. (2008). Cross Training for the Voice. *Journal of Singing*, 65 (1), 73-76.
- Edwin, R. (2010). Personal and Pedagogic Aesthetics. *Journal of Singing*, 66 (5), 575-577.
- Freer, P. (2010). Foundaton of the Boy's Expanding Voice: A Response to Henry Leck. *Choral Journal* , 50 (7), 29-35.
- Fuchs, M., Meuret, S., Geister, D., Pfohl, W., Thiel, S., Dietz, A., et al. (2008). Empirical Criteria for Establishing a Classification of Singing Activity in Children and Adolescents. *Journal of Voice* , 22 (6) , 649-657. doi:10.1016/j.jvoice.2007.02.004.
- Fuelberth, R. J. (2003). The Effects of Conducting Gesture on Singer's Perception of Inappropriate Vocal Tension. *International Journal of Research in Choral Singing* , 1 (1) , 13-21. Retrieved from <http://www.choralresearch.org>.
- Gackle, L. (1991). The Adolescent Female Voice: Characteristics of Change and Stages of Develoment. *Choral Journal* , 31 (8), 17-25.
- Haack, P., & Smith, M. V. (2000). Mentoring New Music Teachers. *Music Educators Journal* , 87 (3), 23-27.
- Hatch, J. A. (2002). *Doing Qualitative Research in Education Settings*. Albany, NY: State University of New York Press.

Henry, M. (2005). An Analysis of Certification Practices for Music Education in the Fifty States. *Journal of Music Teacher Education* , Spring (47), 47-61. Retrieved from <http://www.menc.org/documents/journals/jmte/JMTEspring2005.pdf#page=47>.

Hoffer, C. (1987). Tomorrow's Direction in the Education of Music Teachers. *Music Educator's Journal*, 73 (6), 27-31.

James Jordan: Evoking Sound. (n.d.). Retrieved March 25, 2011, from <http://www.evokingsound.com/>: <http://www.evokingsound.com/>

Jordan, J. (2008). *Evoking Sound: The Choral Rehearsal: Inward Bound* (Vol. 2). Chicago, IL: GIA Publications, Inc.

Jordan, J. (2005). *Evoking Sound: The Choral Warm-up*. Chicago, IL: GIA Publications. Inc.

Jordan, J. (2008). *The School Choral Program: Philosophy, Planning, Organizing, and Teaching*. Chicago, IL: GIA Publications, Inc.

Leck, H. H. (2009). The Boy's Expanding Voice: Take The High Road. *Choral Journal* , 49 (11), 49-60.

Leonard, C. (1985). Toward Reform in Music Teacher Education. *Bulletin of the Council for Research in Music Education* , 81 (Winter), 10-17.

Leonard, G., & Herseth, F. (2004). Female Chest Voice. *Journal of Singing* , 60 (4), 367-372.

McCoy, S. (2007). A Classical Pedagogue Explores Belting. *Journal of Singing* , 63 (5), 545-549.

McCoy, S. (2006). *Your Voice: An Inside View: Multimedia Voice Science and Pedagogy*. Princeton, NJ: Inside View Press.

McDonald, S. (2011). U.K. Report. *The American Organist*, 45 (4), 47.

McKinney, J. C. (2005). *The Diagnosis and Correction of Vocal Faults: A Manual for Teachers of Singing*. Long Grove, IL: Waveland Press.

McKinney, J. C. (1997). The Three Ages of Voice: The Singing/Acting Young Adult from a Singing Instruction Perspective. *Journal of Voice* , 11 (1), 153.

MTI Broadway Junior Collection. (n.d.). Retrieved February 6, 2011, from <http://www.Broadwayjr.com>: <http://www.broadwayjr.com/default.asp>

MTI Broadway Junior What's in the Box. (n.d.). Retrieved February 6, 2011, from <http://www.Broadwayjr.com>:
<http://www.broadwayjr.com/store/showkit.asp?url=201142172754>

O'Toole, P. (1998). A Missing Chapter from Choral Methods Books: How Choirs Neglect Girls. *Choral Journal* , 39 (5), 9-32.

Piernay, R. (2007). Some Thoughts on Tonal Image. *Journal of Singing* , 63 (4), 425-430.

Popeil, L. (2007). The Multiplicity of Belting. *Journal of Singing* , 64 (1), 77-80.

Reid, C., & Reid, D. S. (2000). Eighteenth Century Registrational Concepts. *Journal of Singing*, 56 (4), 31-38.

Robert Edwin Studio. (n.d.). Retrieved October 19, 2010, from <http://robertedwinstudio.com>:
<http://robertedwinstudio.com/articles-exercises.htm>

Rodgers, M., & Barer, M. (1995). *Once Upon a Mattress*. Milwaukee, WI: Hal Leonard Corporation.

- Schwartz, S. (2003). *Godspell, Broadway Junior Piano/Vocal Score*. New York, NY: MTI Enterprises, Inc.
- Skelton, K. D. (2007). The Child's Voice: A Closer Look at Pedagogy and Science. *Journal of Singing* , 63 (5), 537-544.
- Smith, B., & Sataloff, R. (2003). Choral Pedagogy and Vocal Health. *Journal of Singing*, 59 (3), 233-240.
- Sondheim, S., & Lapine, J. (1989). *Into the Woods*. New York, NY: Music Theatre International.
- Sondheim, S., & Lapine, J. (2002). *Into the Woods, Broadway Junior*. New York, NY: MTI Enterprises, Inc.
- Spivey, N. (2008). Music Theater Singing...Let's Talk. Part 2: Examining the Debate on Belting. *Journal of Singing*, 64 (5), 607-614.
- Spurgeon, D. (2004). Vocal Pedagogy Skills for the Undergraduate Choral Conductor. *Journal of Music Teacher Education* , Spring (33), 28-34. Retrieved from <http://www.menc.org/documents/journals/jmte/JMTEspring2004.pdf#page=28>.
- Tepe, E. S., Deutsch, E. S., Lawless, S., Reilly, J. S., & Sataloff, R. (2002). A Pilot Survey of Vocal Health in Young Singers. *Journal of Voice*, 16 (2), 244-250.
- Texas Voice Center. (n.d.). (Advice for Care of the Voice) Retrieved April 30, 2011, from www.texasvoicecenter.com: <http://www.texasvoicecenter.com/advice.html>
- Trollinger, V. (2007). Pediatric Vocal Development and Voice Science: Implications for Teaching Singing. *General Music Today*, 20 (3), 19-25. Retrieved from <http://web.ebscohost.com/ehost/detail?vid=15&hid=111&sid=497cd52b-7f3b-4362->

9b2c-

1c07e203e358%40sessionmgr113&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#d
b=a9h&AN=26129328.

White, R. C. (1978). High School Musicals-Accentuate the Musical and Eliminate the Voice Abuse. *Music Educator's Journal*, 64 (9), 26-33.

Yarnall, S. (2006). Vocal and Aural Perceptions of Young Singers Aged Ten to Twenty-One. *Journal of Singing*, 63 (1), 81-85.

Chapter 10 Appendixes

Appendix A: Student Survey

1. (Circle one.) I am a: male student female student

2. I am involved in the following activities at school or elsewhere: (Check all that apply.)

Mixed Chorus _____	Women's Chorus _____
Men's Chorus _____	Vocal Jazz/Show Choir _____
Musical Theatre _____	Church Choir _____
Gospel Choir _____	Debate Team _____
Cheerleading _____	Drama/Thespian Activities _____
Other _____	

3. I use my voice for an average of _____ hours per day for vocal activities.
(Do not include regular conversation.)

4. I have taken private voice lessons for how many years? (Choose one)

Never	less than 1 year	1-2 years	2-3 years	more than 3 years
-------	------------------	-----------	-----------	-------------------

5. I use my chest voice or belting voice.

Never	Sometimes	Often	Always	Don't know
-------	-----------	-------	--------	------------

 During which activities? _____

6. I use my head voice or falsetto.

Never	Sometimes	Often	Always	Don't know
-------	-----------	-------	--------	------------

 During which activities _____

7. My favorite singer is _____

8. In the last year, how many instances of each have you had? If none, write 0.

Did you experience these after a particular kind of vocal activity? After which vocal activities?	
a. Vocal fatigue _____	a. _____
b. Hoarseness _____	b. _____
c. Loss of voice _____	c. _____
d. Throat pain _____	d. _____
e. Vocal nodules or polyps _____	e. _____

Appendix B: Choral Director Survey

1. My choral group's repertoire consists of the following:
(Rate 1-5, with 1 being the most performed and 4 or 5 being the least performed)

classical music _____	musical theatre selections _____
gospel music _____	arrangements of popular music _____
other _____ (what kind?) _____	

2. How many choral students are in your program? _____
How many of your choral students take private vocal lessons? _____

3. I am comfortable teaching belting and chest voice singing to my students.

Disagree	1	2	3	4	5	Agree
----------	---	---	---	---	---	-------

4. Briefly describe how you approach teaching chest voice or belting. (Use the back of this sheet.)
5. My students sing an average of _____ hours per day for choral activities.

6. I discuss vocal health with my students.

Never	Sometimes	Often	Every week	Every day
-------	-----------	-------	------------	-----------

7. In the last year, I have been aware that my students have had:

(Indicate # of students)

a. Vocal fatigue _____
b. Hoarseness _____
c. Loss of voice _____
d. Throat pain _____
e. Vocal nodules or polyps _____

8. Over the span of my career, I have referred _____ students for a medical evaluation for a vocal problem (Indicate total # of students)
9. My undergraduate degree is _____
My post graduate degree(s) is/are _____
My principal instrument is _____

10. Are you involved in vocal instruction for the high school musical? Yes No
If yes, please list the titles of your last three musical shows.

Appendix C: Appendix C: Student Responses to Survey Question 7**Responses from Females**

No response: 8

Popular, Jazz, Rock, Country, Hip-Hop, Rhythm & Blues: 37

Adele	Keshia
Chloe Agnew	Avril Lavigne
Jason Aldean	Amy Lee
Dave Barnes	John Mayer
Beyonce: 3	Craig Owen
Sarah Brightman	Dolly Parton
Michael Buble	Jazmine Sullivan
Mariah Carey	Taylor Swift: 7
Celtic Woman	Raven Symone
Kelly Clarkston	Tarja Turunen
Chris Daughtry	Keith Urban
Celine Dion: 3	Carrie Underwood
Ella Fitzgerald	Haley Williams
Keri Hilson	

Religious, Gospel: 3

Mindy Gledhill
Mandessa
Tenth Avenue North

Personal: 3

Aunt
Bianca Alomar
Naliyah

Responses from Males

No Response: 0

Popular, Jazz, Rock, Country, Hip-Hop, Rhythm & Blues: 13

BFMV	Lil Wayne
John Brooks	John Mayer
Michael Buble	Bon Scott
Jason Derulo	Josh turner
Cee-lo Green	Luther Vandross
Buddy Holly	Stevie Wonder
R. Kelly	

Personal: 3

Mariah Hollist
MJ
Operatic

