THE USAGE OF VOCAL AND CHORAL PEDAGOGIES IN THE CHORAL
REHEARSAL: PERSPECTIVES OF HIGH SCHOOL AND COLLEGIATE CHORAL CONDUCTORS

A Dissertation in
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by
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ABSTRACT

The purpose of this study was to describe choral conductors’ perceptions regarding voice pedagogy and choral pedagogy. It also empirically investigated the degree to which those perceptions differed by educational preparation.

Descriptive data were collected from a sample of active high school and collegiate choral conductors. A questionnaire was designed by the researcher to collect data. Some questions collected demographic information from the participants. The remaining questions asked choral conductors to reveal their understanding of voice and choral pedagogies, their usage of voice and choral pedagogies in the choral rehearsal, and their assessment on how choral singing affects solo voice technique and health.

Four research questions were posed: What are choral directors’ perceptions regarding aspects of voice and choral pedagogy that are supported by vocal and choral pedagogues? To what degree do most choral directors use solo vocal training techniques in choral rehearsals? To what degree do choral conductors perceive that choral singing alters the solo singer’s vocal technique and/or affects the solo singer’s vocal health? Do perceptions among choral conductors differ by educational preparation of the choral director (conducting degree, music education-voice concentrate, music education-non voice concentrate, voice performance degree, voice pedagogy degree, other degree)?

Results indicated that a majority of choral conductors agreed with most consensus statements of vocal pedagogues regarding voice and choral pedagogies. The majority of choral directors used solo vocal training techniques most of the time in their rehearsals. The majority of choral conductors believed choral singing had no negative effect on solo singing technique or vocal health, and finally, no statistically significant differences were found among the four
groups of educational preparation on any of the 11 techniques used in rehearsals. In conclusion, results from this study suggest that choral conductors and voice teachers, who share no statistical difference in training, essentially share the same perspectives on vocal and choral pedagogy and strive to maintain good vocal health and technique by teaching the same principles of proper vocal production in voice lessons and the choral rehearsal.
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CHAPTER ONE

Introduction

Background of the Study

Singing is a universal means of human expression that can be profoundly simple or complex. Some persons sing tunes in a seemingly passive way while going about their everyday routines while others actively participate in singing at various levels of intensity. For example, some sing along with songs on the radio spontaneously or might sing nursery tunes to children; yet others, such as a studio voice teacher who teaches singing, likely continues his/her love for musical engagement by singing a solo role professionally with a local opera company. For a vocal musician, focused singing may occur through solo singing or participation in choral ensembles (Paulk & Vest, 2009). Training for this level of singing typically occurs through instruction from voice teachers and choral conductors, both of whom possess at least some knowledge about voice pedagogy.

Voice pedagogy most basically can be defined as how to teach singing. However, Kiesgen (2005) claimed that vocal pedagogy is a combination of discussions about how the voice works (vocal physiology) and how one can apply that information through teaching and singing. He purported that the content of those discussions is based on science. Richard Miller, vocal coach/instructor/choral conductor, proposed that pedagogy goes beyond learning only the technical aspects of vocal production. For him, vocal pedagogy is more comprehensive, “Musicianship, style and interpretation, career preparation and development, efficient vocal function, and conservation of vocal health are all parts of vocal pedagogy” (Miller, 1996, p. 1).
Therefore, for purposes of this study, voice pedagogy explains the singing process, the science of how singing works, and how singing techniques and musical concepts are understood, refined, and accomplished in vocal performance.

Choral conductors and voice teachers knowledgeable in voice pedagogy typically offer instruction for singing through one of three settings or a combination of settings:

1. *Individual Lessons* involve the teacher and the student (sometimes an accompanist). Lessons are comprised of vocal and physical warm-up exercises, the teaching of techniques of vocal production and their application to song literature, the learning of vocal solo literature, and aspects of performance practices (Boytim, 2003).

2. *Voice Class* is a group of students taught generally by one instructor. Some differences between individual and group lessons (voice class) would include the rate with which the teacher progresses in teaching concepts given the multiple singers in the class as well as the individual attention given to each student (Greschner, 2009).

3. The *Choral Ensemble* is a group of students, often comprised of a variety of voice types, who sing together typically under the direction of a conductor. The choral conductor, also the vocal instructor for this ensemble, ideally has been trained to teach ensembles comprised of varying combinations of voice types. The literature sung in this setting is music chosen by the conductor of the ensemble that utilizes different combinations of voice types dependent upon the voices available in the ensemble (e.g. soprano, alto, tenor, bass (SATB), or just soprano, alto (SA) or just tenor, bass (TB), etc.). The choral conductor teaches basic aspects of vocal production with modifications based on the conductor’s concept of sound and interpretation (Olson, 2010).
Due to the varying nature of these three settings, teachers of singing generally assume different roles depending on the setting in which they are teaching (Skelton, 2004). Although most voice teachers and conductors have themselves received vocal training to some degree through formal education, such as undergraduate schooling or through lessons with professional singers, most will pursue more specialized training based on their area of professional interest. For example, those wishing to teach voice lessons and/or voice class might undertake more training in solo vocal performance and/or voice pedagogy. Those more interested in working with voices as a part of an ensemble might pursue more study in choral conducting. It is not uncommon, however, for the teacher of singing to be involved in all three areas. Job descriptions for college and university teaching positions sometimes require an individual who is qualified to teach solo voice (studio teaching) and conduct choirs.

Typically, the conductor simultaneously deals with multiple voice types and larger numbers of singers than the private voice teacher. In addition, the conductor has to consider the collective sounds made by sections of singers (tone quality), those made by all the sections singing simultaneously (blend), the group attacks and releases, the overall section and group intonation, balances between sections, and the group production of notes in challenging ranges.

Given the differences in training for these various settings, teachers of singing (in the individual or voice class setting) and choral conductors might approach vocal instruction differently:

1. Some studio and choral instructors claim that these additional considerations make singing in the choral setting different from solo singing; that these additional items of vocal production, although similar, represent a separate pedagogy (Olsen, 2010; Vennard, 1964). Smith and Sataloff (2006) claimed that
choral pedagogy seeks to bridge the gap between choral conducting and choral singing and that choral conductors and singers alike need to recognize the principles of voice pedagogy and voice science and how they apply to the study and performance of choral music.

2. Other teachers feel that the instruction for basic vocal production is the same in both settings but that solo singers and choral singers use their technique in different ways, “Choral singing and solo singing, while related, are distinct art forms. Both utilize the human voice as a primary instrument, but in entirely different ways” (Olson, 2004, p. xv).

3. Finally, others feel no real differences exist and that good vocal technique simply needs to occur in both the solo and choral environments (Davids & LaTour, 2012).

Some studio voice teachers find student participation in the choral ensemble problematic, “Many voice teachers have a firm conviction that singing in ensembles is not healthy for developing voices” (Davids & LaTour, 2012, p. 6). Of those, however, some feel that certain musical aspects of ensemble singing can be good for students. Von Ellefson (1996), for instance, suggested although certain aspects of choral singing help develop musical skills, in the final disposition of the developing voice, choral singing will “…be detrimental at some point…” (p. 37).

The concern of some voice teachers is not the detrimental aspects of choral singing, but rather the learning of undesirable techniques of vocal production through association with less trained singers:
In my opinion, young people with the potential of being singers, in the finest sense of that word, should stay far away from intense and prolonged involvement in the choral ensemble. A young singer of potential should be consumed in the business of training his or her individual voice without having to submerge himself in the sounds and habits or other singers, without having to be part of the scheme of a director to do his own thing, and without having to contribute so much to the public relations department of a college. Choral experience is irrelevant for the process of becoming a solo singer. (Wrolstad, 1979, p. 123)

All voice teachers do not share these views. Miller (1995) stated that, “There is a history of conflict in American academic circles between the training of the solo voice and what is expected of a singer in the choral ensemble. Such a conflict need not exist” (p. 31). Olson (2010) shared Miller’s view that both parties need to have an open dialogue about the problem in order to deal with it effectively: “If voice teachers and choral conductors can freely admit that solo and choral singing are distinct and separate art forms—and concurrently, that these art forms are very similar—an amicable discussion can take place about the real differences between them, and the challenges that each presents to young singers” (p. xviii).

Solo and choral singing have co-existed for a long time. It is interesting to note that the first attempts at teaching singing in Western Europe, in historical terms, occurred through group singing (i.e. choral) in the church. An intense solo pedagogy was not even considered until the development of Opera in the late 16th century. It seems logical that vocal instruction through the choral ensemble could remain a viable practice in the 21st century. Therefore, the purpose of this study was to describe choral conductors’ perceptions regarding voice pedagogy and choral pedagogy.
The Development of Vocal Pedagogy

Human beings appear to always have sung. “Singing, the vocal production of musical tones, is so basic to man that its origins are long lost in antiquity and predate the development of spoken language” (Koopman, 1999, p. 1). The earliest singing was simply man’s attempt at imitating the sounds of nature. These sounds were an important step in the development of language (Jesperson, 1922). In this earliest period of civilization, scholars and musicians had no basis upon which to address production in singing because the scientific principles of singing, or pedagogy of sound production, had not yet begun to evolve. According to the New Grove Dictionary of Music and Musicians (1980), although there is evidence that the ancient Greeks made observations about singing, no documented evidence of a process or system for the teaching of singing existed.

The first evidence of the development of any type of voice pedagogy system was in the 13th century through music treatises written by monks in the Roman Catholic Church. The church was the center of intellectual study during this early period, so it was here that monks first studied the process of singing for use in worship (Stark, 2003). Two that were well documented were Jerome of Moravia and Johannes de Garland (Lamperti, 2012). They identified three vocal registers - chest, throat, and head-that continued to be recognized throughout the thirteenth and fourteenth centuries. In the fifteenth century, singing became prevalent in the aristocratic courts. Particularly in the Burgundian and Franco-Flemish Schools, attention to vocal resonance, breath support, diction, and tone quality became common (Marek, 2007). One of the earliest publications that addressed these elements of good singing technique was Giulio Caccini’s Le Nuove Musiche, published in 1602.
In the late 16th century, the development of Opera (*Dafne* 1597 by Jacopo Peri) created a need for a more definitive approach to singing. As a result, the first formal voice training method was developed in the area, now Italy, and became known as *bel canto*. This approach to voice training developed during the mid-seventeenth century and continued to evolve through the eighteenth century (Duey, 1951). The 1968 edition of the *Harvard Dictionary of Music* indicated that the golden age of *bel canto* began in the mid-seventeenth century and continued through the early nineteenth century. The *New Grove Dictionary of Music and Musicians* (2001) extended original *bel canto* teaching through the mid-nineteenth century. Even during the 21st century, many voice teachers continue using the *bel canto* principals (Marek, 2007).

*Bel canto* technique is considered to be the first formal vocal method for training the classical singer (Pilotto, 2009). Although not founded on scientific principles, it was more specific than previous voice training procedures in that it focused on the refined use of “laryngeal, respiratory, and articulatory muscles in order to produce special qualities of timbre, evenness of scale and register, breath control, flexibility, tremulousness, and expressiveness” (Stark, 1999, p. xxii).

Focus given to these specific areas in vocal training made *bel canto* the leading pedagogical approach of its day; however, even with *bel canto*, descriptions of vocal function were vague and possibly incorrect because they were not based on scientific principles. That changed in 1855 when a voice teacher named Manuel Garcia II invented the laryngoscope, a device that included an angled mirror allowing the vocal folds to be viewed by the human eye (Duey, 1951).

Garcia claimed that the laryngoscope verified his speculation about the anatomy and function of the vocal folds. “Garcia’s observations of the larynx with the laryngoscope marked
the beginning of a scientific approach to the singing which affected the entire dynamic of vocal history” (Stark, 1999, p. xxii). From this point forward, these new voice scientists became more concerned with isolating specific physiological, acoustical, and aerodynamic aspects of the voice rather than older pedagogical techniques such as those identified in bel canto. Fortunately, over time traditional teachers of the voice and vocal scientists have come to accept each other’s expertise concerning traditional pedagogical techniques and scientific understanding (Pilotto, 2009).

Authors of textbooks on voice pedagogy in the 20th and 21st centuries recognized both bel canto and scientific principles concerning the teaching of vocal production. Some leading authors on this topic have been provided in Appendix A. The areas of technique that appear regularly in these texts of voice pedagogy include posture, respiration, phonation, resonance/singer’s formant, timbre, coordination, vibrato, diction, onset/release and vocal registration.

Choral Pedagogy

The word choral infers a relationship to a choir or chorus, “of or relating to a choir” (Merriam-Webster, 2013, para. 1). “Choral pedagogy, a union of vocal pedagogy, choral conducting, and voice science, seeks to provide the materials and methods necessary for the preservation of healthy vocalization and the promotion of the choral art” (Smith & Sataloff, 2006, p. 7). Therefore, choral pedagogy might be defined as the study of the art and science of choral instruction and can be used in the teaching of singing within the choral ensemble. Choral pedagogy refers to professionally accepted techniques used by the singer when singing in a choral ensemble.
Unlike voice class, where singers are being taught to sing as independent singers, in a choral setting singers are being taught to sing as members of an ensemble of singers. Different from the independent singer who controls his/her own performance after being taught proper technique and interpretation, a choral ensemble depends on its choral director to provide guidance to them to incorporate group techniques to achieve acceptable performance results. The vocal instructor in this case is the choral conductor; therefore, it is the rehearsal techniques of the choral conductor and the art of conducting that plays a significant role in defining the product of choral pedagogy (Smith & Sataloff, 2006). As such, choral pedagogy may be thought of as a synthesis of voice pedagogy, choral conducting, rehearsal techniques, and voice science.

Choral pedagogy seeks to bridge the gap between choral conducting and choral singing.

Choral conductors and singers alike need to recognize the principles of vocal pedagogy and voice science and how they apply to the study and performance of choral music.

(Thomson, 2006, p.viii)

Although authors of most choral conducting textbooks provide some discussion or reference to either a voice or choral pedagogy, these texts are primarily concerned with aspects of conducting technique. Textbooks dealing specifically with choral pedagogy are fairly recent. Some authors who have written specifically on this topic include Julia Davids (2012), Wilhelm Ehmann (1982), Frauke Hausemann (1982), James Jordan (2013), Stephen LaTour (2012), Margaret Olson (2010), Robert Sataloff (2005), Brenda Smith (2006), Ingo Titze (2012), Clifton Ware (2002).

Comparing Vocal and Choral Pedagogy

Much material in textbooks and articles that reference choral pedagogy focuses on the same techniques used in vocal pedagogy. In general, these include posture, respiration,
phonation, resonance/singer’s formant, timbre, coordination, vibrato, diction, onset/release and vocal registration. It appears that the studio teacher and the choral conductor seem to focus on the same techniques for good singing.

Singing as a soloist and singing as a part of a choral ensemble are different (Olson, 2010). Although the choral performer uses some of the same aspects of vocal techniques as the solo singer, the choral performer makes adjustments to that technique to produce a choral outcome acceptable to the conductor. Those adjustments are a result of changes to the application of vocal technique but not changes to the technique itself (Miller, 2004).

The solo singer has complete discretion in controlling all aspects of vocal production when performing. How a singer deals with the breath for a phrase, the amount of emphasis on a particular consonant, the timbre used to enhance expression, etc., are all within the singular control of the solo performer (Davids & LaTour, 2012). The choral singer, however, does not have complete discretion in controlling all of these various aspects when singing as a member of an ensemble. Although the trained choral singer will make adjustments in a performance venue based on what they are hearing and experiencing in the group setting, it is the choral conductor who is ultimately tasked with controlling the final product of the choral ensemble.

Meeting those demands would seem to require adjustments to vocal technique. The posture of a choral singer, for instance, may need to be a bit different than that of a solo singer. As an example, holding printed music involves the use of arms and hands and a refocusing of the head through the use of the neck. Generally, the solo vocal singer performs from memory and is therefore not encumbered with holding music. The ensemble singer, on the other hand, generally does hold music. Adding to this problem in many cases is that the choral singer holds music while standing on choral risers. In doing so, additional tension is produced in the hands, arms,
shoulder, back, and neck muscles. The ensemble singer adjusts holding the music in such a way as to reduce as much tension as possible (Olsen, 2010).

Although basic technique for respiration and phonation are the same in both settings, the choral singer is required to adjust technique for respiration and phonation in order to achieve an appropriate choral outcome. For example, many times choral composers write musical phrases that are longer than a singer can perform with a single breath. When this occurs, choral conductors may request singers stagger their breathing and phonation in order to achieve the collective singing of these longer phrases. This requires the choral singer to make adjustments to respiratory and phonation techniques that are not normal applications for the solo singer. For instance, in staggered breathing, a singer may take a breath before expending his full supply of air; or, a singer may adjust phonation when re-entering in the middle of a phrase so as not to draw attention to his re-entrance.

Singers’ formant refers to peaks of sound frequencies that determine the acoustical makeup of a vowel. It is generally expected that a solo singer will sing with as much formant as possible at all times when performing (Miller, 2004). This creates a natural sameness to the timbre of sound for the solo singer regardless of the historical style used. Although the choral singer is generally expected to sing with good formant as well, choral singers are sometimes asked to make adjustments to timbre in order to blend their sounds with other singers to produce a singular “choral” timbre to meet the demands of the choral conductor, who is generally trying to produce the stylistic characteristics of a particular historical period (Smith & Sataloff, 2006).

Vocal science has revealed that vibrato is a natural function of the singing voice that develops as the voice matures and, as such, indicates a healthy use of the voice (Titze, 2000). The solo singer typically sings all solo classical vocal literature with a natural vibrato. The
choral singer, on the other hand, is sometimes asked by the choral conductor to sing with minimal vibrato in order to achieve historical style characteristics or a choral blend that produces a particular type of timbre (Olson, 2010). The use of minimal vibrato (i.e. eliminating as much vibrato as is possible by the singer) is sometimes referred to as “straight tone” (McCoy, 2013). Scientific studies support the conclusion that a truly “straight tone” (sustained pitch frequency) in singing does not exist because there is always some variation in pitch and/or amplitude in a tone that is sung (Davids & LaTour, 2012). Titze (2008) concurred that “straight tone” may be perceived by the listener even though it is not physiologically attainable.

Onset (the beginning of a musical sound) and release (the termination of sound) are achieved the same way for both the soloist and the choral singer; however, for the choral singer the need for group coordination in onset and release is essential for a good choral outcome (David & LaTour, 2012). The solo singer need not be concerned, for instance, with coordinating the placement of a consonant with other singers during onset. Theirs is a singular attack. For a choral ensemble, however, that consonant placement during onset requires great coordination both among singers and between singers and the conductor who initiates that onset. The choral singer learns to adjust technique to coordinate onset (or release) with many other singers (sometimes numbering hundreds) and a single conductor. Furthermore, when onset or release in a choir involves consonants, the technique for producing those consonants has to be adjusted to affect volume and intensity.

In summary, studio voice teachers and choral directors teach the same vocal techniques; however, since the choral conductor is teaching many singers of different voice types at the same time, he/she may make changes to the application of vocal technique in order to produce a good choral outcome.
Statement of the Problem

Certain aspects of solo vocal technique, when employed in choral singing, require different approaches in their application. The question that arises is whether these various approaches are completely different from solo vocal technique (i.e. a new technique) or whether they represent adaptations to those techniques. Olson (2004) claimed that she utilizes singing technique differently in both settings. Emmons and Chase (2010) claimed that choral singing requires a modified vocal technique. Smith & Sataloff (2006) agreed with Titze (2003) that solo singing and choral singing are compatible, but their application within their respective settings is different.

Near the end of the 20th century, the American Academy of Teachers of Singing expressed significant concerns over some of the differences regarding applications of vocal technique to choral singing. They claimed that singing in choral ensembles might be detrimental to the solo technique and/or the vocal health of the student. In a “Pronouncement” printed in the 1994 Journal of Singing, the following statement was made in reference to vibrato,

It is cause for serious concern to the voice teaching profession when conductors, either choral or instrumental, require qualities of vocal tone that may contradict the principles of healthy voice production. (p. 21)

In reference to choral tessitura the following statement was made,

It is common knowledge that a great many teachers of singing hesitate to permit their pupils to participate in choral singing because experience has proven that, due to the unusually high tessitura dominating the arrangements of many choral works, harm is done to the voice. (p. 22)
The fact that many solo studio teachers are also choral conductors results in further confusion. College and University job advertisements often request applicants who can teach both studio voice and conduct choral ensembles. If the statements made by the American Academy of Teachers of Singing are credible, it is possible that some who teach in both the vocal studio and the choral setting teach a proper solo vocal technique in the studio setting and then alter that technique in the choral ensemble. But it is also possible that choral directors, trained in choral pedagogy, may be teaching in the studio as well. Emmons and Chase (2010) suggested that concern for the solo singer in the choral setting is only a problem if the conductor lacks knowledge of voice pedagogy. Davids & LaTour (2012) supported the value that choral singing has for the solo voice and encouraged participation in ensembles if the conductor understands the principals of good voice pedagogy. Therefore, it becomes apparent through this discussion that a significant area for concern might be that practicing choral conductors do not have a thorough understanding of voice pedagogy and that vocal teachers who may be conducting a choir do not have a thorough understanding of choral pedagogy.

The choral conductor needs to have the same thorough knowledge of basic voice pedagogy as the studio vocal teacher in order for appropriate technique, not harmful to the voice, to be applied in the choral rehearsal. Decker & Herford (1973) suggested that when a conductor follows the principals of voice pedagogy, voice training occurs in the choral setting. Davids & LaTour (2012) supported a similar philosophy:

We believe knowledge of good vocal technique applies to all singing and all singers deserve the opportunity to sing well. Focus on vocal technique can assist singers in meeting these demands and help conductors to communicate more clearly how to achieve the results that they desire. (p. 1)
Ehmann & Haaseman (1981) claimed the natural function of the voice should be stressed in both solo and choral singing. This approach follows the natural science of singing.

Evidence that choral singing is detrimental to technique or abusive to the voice thus far has lacked scientific exploration and support. Previously stated claims are based only on human observation and speculation:

The available literature on the topic of the solo singer in the choral setting imparted various scientific facts and opinions of music professionals, but included little in the way of conclusive scientific studies, statistical research data, or practical advice. (Smith & Sataloff, 2006, p. 10)

The fact that choral conductors do ask their singers to sing with minimal vibrato at times in order to satisfy stylistic demands and the fact that some compositions for choral ensembles have demanding tessituras for the singer does not necessarily mean that this type of singing is abusive to the voice or that it compromises good vocal technique:

Not much scientific research has clarified how the voice is used in a group as opposed to a solo environment. Studies have measured differences in pitch quality, intonation, intensity, and acoustic load, but without reaching indisputable conclusions. (Olson, 2010, p. xv)

The American Academy of Teachers of Singing first published their concern with this issue in 1964 with subsequent statements published in 1994 and 2005. Since 2005, the issue has also been addressed through panel discussions at conferences of the National Association of Teachers of Singing (NATS) and the American Choral Director’s Association (ACDA). Scott McCoy (2012), chairman of panels from NATS, stated the urgency of the problem:

Clearly, this is a hot topic. Each of the panels I have cited included a mix of singing
teachers and conductors, who spoke to capacity crowds. We panelists acknowledged strong differences of opinion and ongoing conflicts that exist between our two disciplines... The better we understand the concerns, ideas, and vocal expectations of our colleagues on both sides of the aisle, the more our students will benefit. (McCoy, 2012, p. 287)

Thus far, solo studio teachers rather than choral conductors have participated in most of the discussion on this issue. Specific claims have been made that singing in a choral ensemble could be detrimental to a solo singer’s technique and/or could be physically damaging to the voice. A paucity of research exists that represents the perspective of the choral conductor on the issue. If singers who are training in the solo vocal studio are expected to take up the role of a chorister, it follows that the credibility of good technique in choral singing needs to be addressed by the choral conductor.

In recently published articles in *The Choral Journal*, some members of ACDA have recognized that a problem exists. Allen Henderson (2014) confirmed the choral director’s concern, “Is the voice teacher-choral conductor conflict in higher education fantasy or fact? There are places where such conflict does exist” (p. 3). Henderson, along with other notable conductors and/or voice teachers such as Sharon Hansen, Scott McCoy, Donald Simonson, and Brenda Smith have begun investigating the problem and participating in discussions with members of the National Association of Teachers of Singing (NATS) in order to resolve the conflict.

The purpose of this study was to describe the choral conductors’ perceptions regarding voice pedagogy and choral pedagogy. The degree to which these perceptions differ by
educational preparation (choral conducting degree only, voice degree only, both choral conducting and voice degree, or other degree) was also of concern.

The following four questions were examined:

1. What are choral directors’ perceptions regarding aspects of voice and choral pedagogy that are supported by vocal and choral pedagogues?

2. To what degree do most choral directors use solo vocal training techniques in choral rehearsals?

3. To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

4. Do perceptions among choral directors differ by educational preparation of the choral director (conducting degree, voice degree, both conducting and voice degrees, other degree)?
CHAPTER TWO

Review of Related Literature

In reviewing literature for this chapter, four related categories emerged. This chapter is organized around those categories. In the first section I discussed the historical foundation upon which 21st Century vocal pedagogy is based. In the second section I identified and provided definitions for those aspects of singing recognized and taught by 20th and 21st Century vocal pedagogues as proper and healthy vocal technique for the solo singer. In the third I identified techniques specific to a choral pedagogy and research studies that have investigated efficacy of those techniques including the conductor’s use of choral pedagogy. The fourth section is focused on a comparison of the two types of pedagogies with a focus on those areas of choral singing that are of most concern regarding the health of the singer as well as concerns to voice teacher.

Historical Foundation of Vocal Pedagogy

Although singing most likely took place in ancient civilizations, the earliest record of an ordered approach to the teaching of singing occurred in the Roman Catholic monasteries in the 13th century. The need for singing as a part of public and private worship came about as a result of the intellectual thought and contemplations of monks during the period (Grove, 2001).

Johannes de Garlandia and Jerome of Moravia, two monks of the period, were among the first to address a vocal pedagogical system, which considered vocal registers, vocal resonance, voice classification, tone quality, and diction. Their approach was simplistic and geared toward an acceptable product for use in the church. They identified the voice registers of chest, throat, and head voice (falsetto, at that time). Garlandia, a contemporary of Leonin in the Notre Dame School, addressed basic voice classification, tone quality, and diction out of a matter of necessity
for the performance of organum in worship services. Purity of tone and the ability to understand text for the appropriate worship of God created the first need to consider a particular quality in tone and articulation in singing.

In the Renaissance Period singing was additionally used in the secular setting. Although masses and motets were written in great abundance during this period, composers in the Burgundian and Franco-Flemish schools encouraged the writing of secular song that appeared mainly in the forms of the chanson and madrigal (Reese, 1959).

During this time period, the geographic center of artistic activity moved due to political instability. Burgundy encompassed that area today known as northeastern France, Belgium, and part of the Netherlands. Its prominent composers included Dufay, Binchois, and Dunstable. The Franco-Flemish School later expanded that area to the north and south and significant composers of both sacred and secular music lived in these regions, such as Ockeghem, Obrecht, and Josquin des Prez. Nobles of the court in these areas encouraged secular song (Ulrich & Pisk, 1963).

A more developed civilization with better understanding and more widespread intellectual curiosity in the Arts emerged in the Renaissance. A continued need for the ability to understand text and appropriate tone quality existed. However, actual training in singing was still occurring only in the church. Those singing secular songs were trained in church schools with the same training as had occurred in the 13th century. Therefore, although the quality and sophistication of music advanced during the period, any notable advancement of vocal pedagogy was not realized during this time (Stark, 1999).

The expectations required of the voice changed dramatically in the early 17th century with the rise of opera. Given the demands of operatic composition for the voice, a greater need arose
for a more in-depth understanding of the mental and physical processes of singing. This emerging pedagogy became known as *bel canto* (Grove, 2001).

*Bel canto* has different meanings. The earliest usage of the term refers to the cantabile style of Italian opera in the 1630s and 1640s (Hass, 1929). To singers and teachers of singing, however, *bel canto* is a singing technique that originated during this period and is referred to often as the Old Italian singing tradition.

Two Italian singers/composers that marked this more involved level of sophistication in technique were Giulio Caccini (1551-1618) and Lodovico Zacconi (1555-1627). Caccini’s book of songs entitled *Le nuove musiche* (1602) contains solo songs with specific instructions on, for instance, how tone quality and articulation might be performed for different types of song. In *Prattica de musica* (1592), Lodvico Zacconi made specific demands for the use of chest, head, or falsetto registers to be used for certain songs and also makes reference to the usage of a ‘stinging’ or ‘biting’ quality in the resonance of the voice (Pilotto, 2009). From this beginning, *bel canto* became an evolving pedagogy. 18th century singers/teachers Pierfrancesco Tosi (1647-1727) and Giambattista Mancini (1716-1800) began the argument on vocal registers and also the concept of blending tone quality of the registers into one.

*Bel canto* in the 19th century developed into a more detailed vocal method. Two schools became more popular than others during this period- the Lamperti School and the Garcia School.  

**The Lamperti School**

Francesco Lamperti (1813-1892), a highly respected singing teacher active at the Conservatory of Milan, founded the Lamperti School. His teaching was a culmination of *bel canto* technique up to that time. His teaching did not include the physiological aspect of singing with which others of that period were beginning to experiment. These would have been
techniques that flirted with those that would soon be justified through scientific understanding. Lamperti felt that this type of emphasis would steal from the musical and expressive aspects of singing (Liljas 2007).

Lamperti taught his son, Giovanni Bastista Lamperti (1830-1910), who also became a fine singer. Giovanni eventually took over for his father as teacher at the school. Giovanni’s students met with great success and sang in some of the most prestigious opera houses of the day including those in Milan, Paris, Dresden and Berlin. Giovanni honored his father through the usage of the same teaching model, also excluding any physiological explanations in singing. In the Lamperti method, “…the pupil, under careful supervision, will learn what is the true character and the capabilities of his own voice; he will know what music to sing, how to render his singing elegant, and remedy defects of intonation. In this, in my idea, lies the great secret of the art of singing” (Francesco Lamperti quote by Stark, 1999, p. 101).

The Garcia School

The Garcia School, traditionally associated with Manuel Garcia II (1805-1906), was actually founded by his father, Manuel del Populo Vicente Garcia (1775-1832). As with the Lamperti approach, the older Garcia, an outstanding singer of opera, also taught in the Old Italian tradition. Manuel Garcia II’s father taught him in the Old Italian tradition. But, unfortunately, due to excessive singing of demanding roles, the younger Garcia developed physical problems with his voice.

Manuel Garcia II then began working in a hospital and developed an interest in vocal anatomy. Having observed the anatomy of people that required surgery due to neck injuries, Manuel Garcia II became familiar with the physiology of the larynx. This lead him to develop an instrument with a mirror attached called a laryngoscope. He inserted this instrument down a
singer’s throat to observe the physical functioning of the larynx that was in the process of phonation. According to Garcia, the laryngoscope confirmed his speculation about the anatomy and function of the vocal folds. For those who taught in the Old Italian tradition, this discovery would verify some beliefs and dispel others about the functions of the voice. With this knowledge, teaching vocal production could now be founded on scientific principles rather than mere conjecture (Stark, 1999).

*Bel Canto* and Science

The use of a scientific method to explain many of the functions of vocal production did not mean the end of the Old Italian teaching method (*bel canto*). It simply meant that many of the physiological aspects of singing could now be verified scientifically. This has lead in modern day to the changes and refinements of the teaching approaches with regard to specific aspects of singing. By and large, the same basic principles of vocal production are still being taught today.

In the modern G. Schirmer publication of Giovanni Battista Lamperti’s book *The Technic of Bel Canto* (1905), he categorized aspects of singing into major sections. Some of those listed include:

- Position of the Body
- The Breathing
- Tone-attack and Resonance
- Studies on Tone
- Exercises for Steadying the Vocal Attack
- Vocal Development, and Blending of Registers
- Vocal Agility (Coloratura)
The Trill

Detached Tones: Staccato

Sustained Tones, and the Messa de Voce

The Portamento

Observations on Change of Register

The Technics of Speech and Song

Care of the Voice. Hygiene

These techniques, once taught as the Old Italian tradition were also taught as *bel canto*. The difference that grew between the two at this point in time was that the Old Italian tradition continued without regard for physiological function whereas *bel canto* recognized the scientific justification for the way the voice worked.

It should be noted that *bel canto* does not apply only to one stylistic era, nor is it a single way of using the voice or a specific set of stylistic conventions. Rather, it is based upon certain irreducible vocal techniques that set it apart from other kinds of singing. These techniques can be adapted to a wide variety of musical styles from several historical epochs without losing their integrity as fundamental vocal principles. *Bel canto* techniques continue to be taught by many teachers in the present day. (Stark, 1999, p. xxv)

*20th and 21st Century Solo Vocal Technique*

Beginning in the 1940s, many singing teachers began using information in their teaching that was derived from findings in medical science regarding the physical aspects of singing. The use of science in the teaching of singing was not a replacement of *bel canto* principles. Rather, it afforded the teacher the opportunity to better inform the student about how physiology affected the functions of singing regardless of the method of teaching used.
Various aspects of singing can be explained from this scientific viewpoint. Richard Miller (1996) claimed that the singing process is comprised of respiratory, phonatory, and resonatory actions. The human physiological process that brings about these actions are breathing and phonating. Miller (1996, p. xx) divided these functions as follows:

1. an energizing system, comprising the mechanism of power, consisting of the inhalatory-exhalatory system housed in the head and torso
2. a vibratory system, being the laryngeal mechanism itself
3. a resonator system, made up of a series of cavities in changing relationships with laryngeal tone
4. an articulatory system, activated by the lips, the teeth, the cheeks, and the tongue, which must coordinate and modify the activities engendered by the rest of the respiratory-phonatory complex.

These functions are accomplished through learning more specific aspects of singing that make up the foundation of vocal technique, including posture, respiration, phonation, resonance, registration, tone quality, onset, coordination, diction, and vibrato. These aspects of vocal technique have been defined by 20th and 21st centuries voice teachers and scholars through teaching practice and publications. A discussion on posture, respiration, phonation, resonance, registration, tone quality, onset, coordination, diction, and vibrato will follow in this chapter.

Each generalized explanation has been based on the published works of a number of vocal pedagogues including Ingo Titze, William Vennard, Richard Miller, James McKinney, Johan Sundberg, Scott McCoy, Leon Thurman, and Graham Welch.

The work of these scholars was chosen because each has written at least one book on singing; each has published research on singing, and each is a teacher of singing. It can be
assumed by the reader that each generalized explanation is collectively representative of all pedagogues unless clarifying statements are made to the contrary.

Posture

The maintenance of correct singers’ posture is important mainly because it alleviates muscle tension and provides a framework in which unencumbered breathing can occur. It is impossible, however, to eliminate all tension from the body. Tension in certain muscles is required in order to stand and sit (McKinney, 1994). The singer, however, must eliminate excessive tension in order for the singing apparatus to function in the most effective and efficient manner.

Body alignment can be achieved by thinking of maintaining a straight line from the top center of the head and extending through the center high point of the hip bone and ending at the bottom center part of the foot. The feet should be slightly apart with one foot slightly in front of the other in order to help maintain balance and to prevent any rocking motion of the body to occur. The rocking of the body results in unwanted muscular tension in the legs that can trigger tension in the upper parts of the body. The knees should never be locked and feel loose at all times.

The hips will align with the imaginary vertical line only if the buttock is slightly tucked in so that the top of the hipbone falls back slightly. Shoulders will be pulled back slightly to conform to a vertical imaginary line. This action will slightly raise the rib cage, allowing the abdomen to be in a relaxed state. This allows the breathing apparatus (lungs, diaphragm, abdominal, and intercostal muscles) to work most effectively.

Seated posture is rarely a concern for the soloist as s/he rarely is seated when singing. If seated positions should be needed, however, the support for the body comes from the chair rather
than the feet. All aspects of standing posture from the hips up continue to apply when singing in the seated position. The middle to front part of the chair is most recommended by most voice teachers, although McKinney (1994) advocated sitting on the back part of the chair for better balance. Placement of the feet is the same as for the standing position, i.e. one foot slightly forward in order to maintain balance.

Respiration

Natural breathing is an involuntary act and involves an inspiratory and an expiratory process. Breathing for speech and breathing for singing are controlled processes. They bear some similarities but the process for singing is much more involved.

Breathing for singing involves an inspiratory and an expiratory process and adds phonation during the expiration process. After inspiration, a slight subglottic pressure occurs just before phonation is initiated. Phonation can and usually begin with the start of expiration but can begin some other time during the expiration process.

According to singers and teachers from the Old Italian school (bel canto) that pre-dates the physiological explorations of Manuel Garcia II, skilled and effective breathing was referred to as appoggio. “Efficiency in the physical coordination of breathing produces just the necessary breath pressure and airflow for skilled singing and speaking” (Thurman & Welch, 2000, p. 303). Miller (1996) added that appoggio “…cannot narrowly be defined as ‘breath support’, as is sometimes thought, because appoggio includes resonance factors as well as breath management. Appoggio is a system for combining and balancing muscles and organs of the trunk and neck, controlling their relationships to the supraglottal resonators, so that no exaggerated function of any one of them upsets the whole” (Miller, 1996, p. 23).
Breathing for singing becomes an involved physical process. During inspiration and expiration, the diaphragm, the intercostal and abdominal muscles become much more active (Sundberg, 1987). Miller (1996) stated that:

In singing, phrase upon phrase will occur in which the breath cycle is drastically prolonged, especially in its expiratory phase. To accomplish skillful control of the breath management for singing, special coordination of the phases of the breath cycle (inhalation, onset, phrase duration, release) must be learned. (p. 20)

According to Sundberg, two types of intercostal muscles are attached to the ribs - the inspiratory group and the expiratory group. When the inspiratory intercostal muscle contracts, they expand the rib cage that allows air to enter the lungs. During that process, the dome shaped diaphragm flattens and pushes out on the abdominal muscles. After the lungs reach the desired volume, subglottic pressure occurs before phonation. Phonation occurs when the expiratory function begins. Expiration occurs through the action of the abdominal and expiratory intercostal muscles (Sundberg, 1987). Scott McCoy (2012), who stated the same basic process, refers to the inspiratory group as the external intercostal muscles and the expiratory group as the internal intercostal muscles.

McKinney (1994) stated that, in breathing for singing, four stages take place (1) inhalation, (2) suspension, (3) exhalation, and (4) recovery. In order for the process of breathing to be effective, the chest must be held high, the upper abdominal muscles should be relaxed, and the lower abdominal muscle should be pulled in comfortably.

During inhalation, the singer takes in a large volume of air quickly. According to McKinney, as the lungs fill, the downward movement of the diaphragm expands the front, sides, and back of the midsection (although most expansion is noticeable in the front). Suspension
occurs at the very peak of inhalation. *Suspension* is that brief moment between inhalation and exhalation where the singer is “to prepare the breath support mechanism for the phonation that follows” (McKinney, 1994, p. 50). The third stage is *controlled exhalation*. Controlled exhalation, when coordinated with the vocal cords, initiates phonation. The singer controls the intensity of exhalation based on the length and volume of the phrase. The final stage, *recovery*, is that point at the end of exhalation where the muscles used in breathing relax briefly before the process begins again.

*Phonation/Onset*

Phonation is the creation of vocal sound through the vibration of the vocal folds. The initiation of that sound is referred to as vocal onset (Vennard, 1968).

Sound is created through vibration. The sound of the wind instrument is created through pressurized air passing through a vibrator. On a clarinet that vibrator would be a reed; on a trumpet it would be buzzing lips against a mouthpiece. Likewise, the sounds source for phonation is housed in the larynx (Vennard, 1968). The vibrator is the vocal folds.

The two vocal folds are complex, multi-layered tissue in the larynx. When breathing naturally, the vocal folds lie in a v shape in which the folds do not touch one another. The opening area is known as the glottis. When sound is initiated, the glottis closes, i.e. the vocal folds come together eliminating the open space. The closing of the vocal folds is known as adduction. When sufficient air pressure is created beneath the folds to overcome the muscular tension that is holding the folds in a closed position, air passes between the folds. After the initial burst of air, this fast passage of air through the vertical opening forms a zone of low pressure, drawing them shut again, only to be opened again through additional air pressure. This rapid closing and opening of the folds is known as vocal fold vibration. This recurring wave-like
motion created along the vocal folds is referred to as the Bernoulli Effect. The number of openings and closing per second produces a frequency of vibration that determines the pitch of the sound created.

The quality of the sound produced is affected by the degree of firmness of the vocal fold closure. We control the muscles that control the closure. The posterior cricoarytenoids open the vocal folds. Closure is done through the combination of the lateral cricoarytenoids and the interarytenoids. If the closure is too firm, the sound will be a strained quality. If the folds are together too lightly, the sound will have an airy quality. Titze (2000) stated that the folds do not reach the optimal mode of vibration unless the folds are brought together properly.

Phonation begins with three types of onset, or attack. These include (1) hard attack, (2) soft onset, and (3) balanced onset. The hard attack is known as the glottal attack, or *coup de glotte*, as Manuel Garcia II called it. With the hard attack, the glottis is completely closed before phonation and there is a great degree of subglottic pressure. When the air is released, it is shot through the glottis with great pressure and is known as the glottal plosive.

When the singer uses soft onset, the adduction of the vocal folds is only partial. Miller (1999) called this the aspirated onset as the vocal sound has a breathy quality.

The most preferred type of onset is balanced onset. In balanced onset, the breath is taken and then coordinates the exhalation process with the closure of the glottis. This also involves coordination of the abdominal muscles and the intercostal muscles since they control the flow of air in exhalation. When using this form of onset, some singers actually begin the flow of air before the glottis closes. When coordinated onset is correctly initiated, the larynx relaxes. Sundberg (1987) called this “flow phonation”.

*Resonance/Formant/Tone Color*
Resonance is the quality and intensity of sound that is produced by the physical resonating cavities that occurs as a result of phonation. Timbre (tone color) is dependent on the conditions that affect resonation (McKinney, 1994). Formants are peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity (Miller, 1996).

Over the years, teachers of singing have thought resonance could emanate from various areas of the body including the chest, the tracheal tree, the larynx, the pharynx, the oral cavity, the nasal cavity, and the sinuses. Although the upper chest and tracheal tree are resonators, they are located on the wrong side of the vocal folds to affect resonance as heard through the act of phonation (McKinney, 1994). Most pedagogues agree that resonance from phonation is created in the vocal tract. The vocal tract begins with the larynx itself and extends forward to the articulators (lips). McCoy (2012) stated that the vocal tract is divided into six separate regions in which free resonance occurs: the laryngopharynx (glottis to epiglottis); the oropharynx (epiglottis to soft palate); the nasopharynx, (passageway from soft palate to nose); the nasal cavities; and the piriform fossa (hollow space surrounding base of larynx). Free resonance occurs when a sound wave enters a hollow space and is transmitted freely into the atmosphere.

Miller (1996) referred to a resonator tube that is made up of the pharynx, the mouth, and to a lesser degree, the nose. McKinney (1994) identified the main resonator areas as the larynx, the pharynx, the oral cavity, the nasal cavity, and the sinuses. All are in agreement that most resonance is produced in the area of the pharynx. It is questionable as to how much resonance comes from the nasal cavity and the sinuses. It is thought that the nasal cavity mainly effects resonance for nasal consonances such as m and n.
Resonating frequencies and timbre changes when the size and shape of the vocal tract changes. “Specific vocal tract configurations, therefore, can be directly associated with vowel differentiation” (Miller, 1996, p. 51). Besides the size and shape of the vocal tract itself, the position of the tongue, soft palate, and shape of the lips at the oral opening contribute significantly to the color of sound produced.

The solo singer’s goal is to sing with the most resonant tone possible (Vennard, 1968). Resonating frequencies of vowels are also greatly affected by the size and shape of the vocal tract. The most resonant tone (formant) is realized when the sound produced is in the sound range of 2500-3200Hz (Sundberg, 1977). Although Vennard (1968) earlier identified this desirable tone as the ‘resonant factor’ or “2800 factor”, Sundberg (1981) specifically stated the process for its attainment:

Acoustically, it [the singer’s formant] can be described as a peak in the spectrum envelope appearing somewhere in the neighborhood of 3 Hz. In this frequency range, then, the partials radiated from the lip opening are particularly strong. Articulatorily, the singer’s formant can be generated by adjusting the pharynx width so that it is considerably wider than the area of the entrance to the larynx tube. If this is done, the formants number three, four, and probably five are clustered and the ability of the vocal tract to transport sound in this frequency is much improved. The result, of course, is that the voice source partials in this frequency range gain in amplitude… (p. 13)

In summary, the overall quality of the tone is greatly affected by the parameters of the vocal tract at a given time. The degree of resonance in a tone as well as the color of that tone is greatly affected by the size and shape of this main resonating cavity.

Registration
A precise definition of vocal registers is difficult to achieve. The word itself means different things to different people. The earliest pedagogically recognized definition for the word comes from a master teacher of *bel canto*. Manuel Garcia provided the following definition:

By the word register we mean a series of consecutive and homogeneous tones going from low to high, produced by the development of the same mechanical principle, and whose nature differs essentially from another series of tones, equally consecutive and homogeneous, produced by another mechanical principle (Garcia, 1847).

Scott McCoy (2012) drew attention to three key elements in the definition:

1. A register is composed of contiguous pitches
2. Pitches within any given register are produced in the same physiological manner
3. Pitches within any given register share the same basic timbre.

McCoy’s generalization is similar to an earlier definition by McKinney (1994) who stated that vocal register is “…a particular series of tones, produced in the same manner by the same vibratory pattern of the vocal folds: and having the same basic quality” (p. 97).

In general, vocal registers fall into four categories. Various names have been assigned to these areas by vocal pedagogues stated in Appendix A:

1. Vocal Fry, Pulse, Glottal Fry, Click Mode, Glottal Rattle, Glottal Scrape, Strohbass
   This register is produced with a loose glottis and is an extremely low pitch.
   Vennard states its frequency at around 36.4 Hz.
2. Modal Voice, Natural Voice, Normal Voice, Mixed Register
   The modal voice represents the normal speaking and singer register. Most voices can sing two or more octaves in this register. Some pedagogues recognize a change of
sound resonance in this register, referred to as head voice, that occurs around E4 (Miller, 1996).

3. Falsetto, Light Mechanism, Loft Mechanism. Feigned Voice

The Falsetto register is higher than and overlaps the modal register. The sound is light and flute-like. When falsetto is produced, the whole vocal cord is not involved. Only the ligamentous edges of the vocal folds become engaged in the vibratory pattern. Falsetto frequently is used by the male singer, especially in the choral setting.

4. Whistle, Flageolet, Flute, Small, Bell Register

This is the highest phonational register. The sound is produced through the passage of air through a triangular shape created by the arytenoid cartilages (Miller, 1996).

In summary, of the four general areas of registration, Modal Voice is the register used most in singing. The male singer uses falsetto more often than the female singer. Other registers are used infrequently.

Articulation

Phonation occurs through a combination of the vibrator, or vocal folds and the resonating system. When these actions are so shaped through skeletal and muscular movement that recognizable speech sounds are formed, the articulatory process has been successful. The main moveable articulators include the tongue, the lips, the pharynx, the jaw, and the soft palate (McCoy, 2012). The lips, jaw, and the tongue must be tension free to be most effective as articulators. The movement of those articulators in conjunction with the teeth, the alveolar ridge, and the hard palate allow us to produce the sounds of speech, namely vowels and consonants.
Consonants are divided into voiced and unvoiced consonants. They can be classified by the way the sound is produced and by the physical space in which it is formed. A sound created by a stream of air passing through a narrow aperture is called a fricative. This would include consonants like v, f, or z. When the sound is formed through the explosion of compressed air in the mouth, they are called plosives. Examples of plosives would include p, t, and k. When air passes through the nasal cavities to produce sound, they are called nasals, and a breathy consonant is called an aspirate.

Consonants created by closing the lips are called bilabials, such as b, p, or m. When the lower lip touches the upper teeth, they are called labiodentals and include such consonants as v and f. Dentals refer to the sound created by the tip of the tongue touching the upper teeth. When the tongue touches the alveolar ridge, they are called alveolars. These would include d, t, or l. The velars are sounds made when the back of the tongue touches the soft palate such as hard g or k; and glottals are created when the glottis is nearly closed such as an h.

Unlike most consonants, vowels are generally sustained sounds that we would be considered voiced (unless they are whispered). The particular colors of vowels can be changed depending on the shape and size of the vocal tract and can be affected by the movement of the articulator.

**Coordination**

Good vocal technique in its most simple terms is the result of a coordination of breath, tone, and articulation. Vocal pedagogues continually advocate the repetitive practicing of all aspects of vocal production. Breathing exercises, vocalizations that emphasize onset and release, resonance, vowel color and diction, and singer’s formant are all necessary in order that the singing apparatus as a whole can reach the epitome of accuracy and effectiveness.
Coordination cannot be completely taught by another person. Each individual, through the constant practicing of individual aspects of vocal production needs to learn how to coordinate all of the parts through a process that is unique and effective for them.

Furthermore, neurological factors largely influence coordination in singing (Miller, 1996). Wyke (1982), who has studied the laryngeal neuromuscular control systems in singing, states the following duties of the teacher of singing:

Thus it is that the skilled singing teacher must aim to do two basic things simultaneously with his pupils. First, he must train the intellectual processes through which the aspiring singer acquires (against the background of his genetically endowed musical ability) increasingly efficient and elaborate cortically programmed control over his respiratory musculature and over the prephonatory tuning of his laryngeal muscles; and second, he must improve the operational efficiency of the reflexogenic systems that are responsible for the continuous intraphonatory modulation of the laryngeal musculature. In theory, then, the voice teacher’s global objective should be to develop the efficiency of the entire neuromuscular control system of his pupil, and not merely that of one or more specific components of that system. (pp. 141-142)

**Vibrato**

Vibrato is a natural occurrence that develops as a singer physically matures and is enhanced with proper vocal instruction (Titze, 1994). From a physiological perspective, vibrato is a stabilized physiologic tremor that takes place during singing in the laryngeal muscles (Ramig & Shipp, 1987). Schultz-Coulon and Battmer (1981) described it as a periodic modulation of the
phonation frequency. Vibrato is produced as a result of the combined action of the cricothyroid and thyroarytenoid muscles (Titze, 1994).

Sundberg (1987) called vibrato an undulation of phonation frequency and breaks the action into two parameters: rate and extent of undulations. Rate indicates the number of undulations per second. Extent measures the rise and fall of phonation frequency. Sundberg referred to the combination of these parameters as the vibrato rate. He stated that less than 5.5 undulations per second is slow enough that two separate pitches were heard. His acceptable range and most desirable rate is between 5.5 and 7.5 undulations per second. Titze stated the acceptable range between 4.5 and 6.5, although he recognized that some great singers sang higher than this range (Caruso, for instance, at 7.0). Miller (1996) supported 6.0 as the most desirable rate for vibrato and also states that higher than 8.0 would be perceived as a tremolo. Seashore (1938) claimed that great artists of his day had vibrato rates between 5.9 and 7.8. Vennard (1967) states that 6.0-7.0 is most common but rates as slow as 5.0 (his own rate) and as high as 8.0-10.0 do occur.

It should also be noted that the rate of vibrato is affected by musical demands. Titze (1994) observed that vibrato rate decreases with fast moving notes. He also stated that vibrato rate increases with notes sung in higher ranges and that emotion affects the rate. For instance, excitement or nervousness generally increased the rate. Finally, he stated that unsupported sound to the degree of breathiness makes it impossible to create vibrato.

In summary, vibrato is natural development that occurs in the singing of a student that uses proper vocal production techniques. A vibrato rate between 5.0 and 8.0 would be an acceptable range for the mature singer.

Choral Pedagogy
“Choral pedagogy, a union of vocal pedagogy, choral conducting, and voice science, seeks to provide the materials and methods necessary for the preservation of healthy vocalization and the promotion of the choral art” (Smith & Sataloff, 2006, p. 7). It is incumbent on the choral conductor and solo singer to recognize the principals of vocal production and voice science and apply them to the choral rehearsal and performance. Choral pedagogy includes various perspectives of vocal/choral production. The usage of choral pedagogy, however, also incorporates other aspects of vocal/choral methodologies. In the sections below, literature providing insights into choral pedagogy practices and their effectiveness are reviewed.

**Perspectives of Choral Pedagogy**

Research by Hansen, Theimer, & Thurman (2001) concludes that the focus of teaching in the choral rehearsal from the early part of the twentieth century through to the 21st century (a time period in which voice science gradually emerged), was not focused on vocal or choral production but rather on general music skills, interpretation, and rehearsal techniques. Their results showed that in the 1960s, the focus changed to musicological analysis and stylistically accurate practice in Western choral music. The reason for the change during this period was because training in colleges had changed their focus to these study areas in choral conducting degree programs.

In the 1980s, choral conducting degrees again refocused on: (1) rehearsal methods that focused on musical characteristics, (2) learning and performing choral literature of diverse Western styles and authentic performance practices, and (3) learning standardized gestural conducting patterns. Choral singing was simply thought of as singing correct pitches at the correct time in the music using correct dynamics, good tone color and correct style, but still not on vocal/choral production.
All these things were taught in absence of how to use their voices. Hansen, Theimer, & Thurman refer to this as putting the ‘Cart before the Horse’. They make analogous references to this order suggesting that it would be like a football coach teaching defensive strategy before teaching tackling or a home economics instructor teaching quilt design before instruction on how to use a needle. They state that it wasn’t essentially until the 21st Century that significant emphasis began to be placed on vocal and choral production.

With more attention now focused on vocal and choral production, choral pedagogy was considered a process leading to quality choral performance. If that process leads to a quality choral performance, it would be reasonable to assume that the choir responded positively and accurately to the teachings of the conductor. Is choral performance, however, the only goal of the choral conductor; for instance, what about music education in this process?

Freer (2011) argues that choral conductors are working on two goals simultaneously- the first is the path to quality choral performance, and the second is the quality of music education that occurs during the path to quality performance. He explored the problem as a paradox that choral conductors have dealt with for many years. The important question the choral conductor has to consider is whether either is preeminent.

One might argue that a third possibility exists, and that would be both goals are achievable through simultaneous instruction. As Freer argued, the teaching of choral music is, “…guided by both performance and pedagogical goals, with neither more important than the other (2011, p. 8). His statement suggested that music education and performance exist as one. Choral pedagogy is wholly tied to the principals of music education and choral conductors and choristers balance the usage of the two in any performance. Depending on circumstances, equal time may not always be given to each area, but in the end, a balance of the two is the goal. Freer
contended that balancing the two ultimately leads to working within the paradox that in turn leads to the satisfaction of both goals in which quality choral performance is the result of a combination of choral pedagogy and music education.

Another consideration for a quality choral performance is the maintenance of a healthy voice. Daugherty (2013) stated that given the large number of singers in choral ensembles in this country, it is imperative that choral conductors receive certified medical training in vocal health so that they can run rehearsals in a healthy way and diagnose vocal health problems. Smith & Sataloff (2003) stated that choral conductors are divided on their opinions concerning vocal technique and that some are incapable of presenting choral voice building exercises to a choir in a healthy way. They also pointed out that although some choral conductors may receive vocal pedagogy training, collegiate music schools rarely offer a choral pedagogy course.

In order to maintain good vocal health in singing, results from research by Smith & Sataloff stated that learning an effective warm up and cool down method is an essential process for health singing and must be included as a process in choral pedagogy. They stated that the purpose of any healthy choral warm-up is:

- to adjust the voice from speaking to singing
- to align the body and free the breathing mechanism for the act of singing
- to create a physical awareness of the vocal mechanism being used correctly
- to stretch gently and exercise the skeletal muscles used in phonation following the principles of muscle physiology that highlight the importance of muscle warm up prior to any athletic activity.

This can only be done by a conductor with a satisfactory knowledge of the process of vocal production and who is also familiar with those vocal procedures that affect vocal health. Equally
important for the health of the singer is a cool down process for the voice. Exercises such as sighs from high to low relaxing the throat and neck, transitioning from a soft, sustained passage to speech will help relax muscles the same way that athletes relax muscles after physical activity.

Two related areas of choral pedagogy that has received an increasing amount of interest in the 21st Century has been in the area of body movement and body mapping. Both are aides to proper and healthy vocal and choral production.

Choral conductors have supported the use of body movement in the choral rehearsal and have found it effective (Briggs, 2012). The use of movement in a rehearsal refers to the use of the whole body or a part (or combination of parts) of the body in order to enhance musical and/or voice production concepts to the singers (Chagnon, 2001).

One recognized approach to movement in the rehearsal is Dalcroze Eurhythmics. “Eurhythmics incorporates body movement into musical performance, and indeed, views the human body as a musical instrument unto itself” (Daley, 2012, p. 4). Singers using this technique not only use their voices to sing, but use their whole body to sing.

Benson (2011) claimed that that the notion of whole-body teaching and learning is highly relevant to the field of choral pedagogy. Wilhelm Ehmann, prominent German choral conductor and a student of Dalcroze, called choral singers “dancers on the spot” and the choral conductor the “leader of the dance’ (Ehmann, 1968, p. 2, p. 78).

Briggs (2012) measured the perceptions of singers though a questionnaire regarding the incorporation of Eurhythmics into the rehearsal. A majority responded positively to the use of Eurhythmics if the conductor informed them of the purpose and rationale behind the exercise before being asked to do it. A majority of participants who experienced conductor driven movement exercises reported enjoying the experience and felt that it helped them better improve
their vocal production. Although all choral conductors do not incorporate movement into their rehearsal, the results above suggest that the use of movement in the choral rehearsal can be a viable a part of choral pedagogy.

Body Mapping for music in general has to do with the teaching of accurate information about the movement of the body during performance. In the case of a choral ensemble, it would refer to effective body movement that supports proper vocal/choral production. The ultimate goal of body mapping centers on freedom of expression through poised dynamic musical movement. Because vocal/choral sound production involves the use of the entirety of the body, and in the choral ensemble also involves the coordination between singers as well as the individual, body mapping can be a viable and effective pedagogical technique.

The purpose of Body Mapping is the realization of freedom of expression through poised and dynamic musical movement. When done effectively, Body Mapping is thought to eliminate the possibility of bodily injury during music production and leads to more effective sound production. In Body Mapping, detailed information is taught about breathing, of particular importance for singers and choral musicians. Excellent breathing technique depends on three specific conditions: freedom from tension throughout the body; lively, continuous body awareness; and an accurate body map of the structures and movement of breathing (Buchanan, 2005). When choral ensembles embrace the concept of Body Mapping, or the coordination of movement that enhances good vocal/choral sound production, the physical body movement occurring in the ensemble becomes noticeable in performance. Conable (2000), Jordan (2002), and Smith & Sataloff (2002) have conducted studies investigating body mapping in the choral ensemble.

Choral pedagogy is not limited to the technical aspects of vocal and choral production.
In order to become comprehensive choral musicians, choral conductors need to expand choral repertoire in such a way as to provide opportunities for different forms of choral expression. Choral improvisation is a part of choral pedagogy that enables the choral musician to explore new avenues of expression in choral music. The first three National Standards (2014) -Creating, Performing, and Responding - can be addressed through improvisation (NAfME, 2014)). Freer (2010) stated, “Being at the conscious ’edge’ of musical creation while in performance provides musicians and listeners with opportunities to gain insights into the nature and value of the musical experience” (p. 4).

From the educational perspective, improvising enables a musician to explore new expressions of what it means to be ‘musical’. Azzara contended that improvisation can be broadly defined as a process of (1) spontaneously expressing musical thoughts and feelings, (2) making music within certain understood guidelines, and (3) engaging in musical conversation (Freer, 2010).

Benefits to engaging in improvisation include:

1. The absence of notation makes it accessible to all singers without the prerequisite of formal music study
2. It provides the opportunity for music to be a democratic and social endeavor as much as a musical one.
3. It promotes music pedagogy that promotes the concept of “sound before sight”. This is central to the methodologies of Heinrich Pestalozze, Lowell Mason, and Edwin Gordon. Gordon states that "To be taught content before being exposed to the foundation that context provides introduces many debilitating problems that seriously impede learning music, particularly learning to improvise" (2003, p. 9).
Choral conductors that include this highly creative element reveal a part of choral pedagogy that is truly unique in choral performance. It is the responsibility of conductor to work cooperatively with singers through a plan for instruction that helps singers experience the process of taking the abstract to a series of concrete, connected ideas that allow the singer to experience a totally unique choral creation.

Equally unique in 21st century choral repertoire is the increasing contribution of multicultural choral music. As our culture in this country continues to become more diverse, all music educators are commissioned with the task of providing education in music of all cultures. The inclusion of multicultural music in the school music curriculum is beneficial to students because it broadens the students’ musical and cultural experiences, increases the value placed on unfamiliar music and cultures thereby promoting deeper cultural understanding, and cultivating open-mindedness (Yoo, 2017).

A characteristic in the performance of indigenous musical idioms is rooted in cultural traditions. While also utilizing Western-style harmonies and music notations, a Nigerian composer named Atkin Euba claimed that performance utilizing Western-style harmonies and indigenous musical idioms makes the music intercultural. The use of traditional singing techniques sometimes calls for throaty vocal sounds and unique timbres that are not indicative of western choral pedagogy; consequently, many times western choir performances are tempered with the more refined vocal sounds typical of the western ideal of healthy singing. Nevertheless, Yoo encouraged that conductors use musical idioms to create culturally valid music experiences for their students. American music philosopher David Elliott stated that, “music is a major means of distinguishing identifying and expressing differences” (1989, p. 12). Therefore, choral
directors are encouraged to perform music from different cultures and to attend to the unique cultural and stylistic components.

In an attempt to approach and perform multicultural music in a correct and authentic way, Barrett, McCoy, & Veblen designed the Facets Model (1977). The three tenets of the Facet Model are to promote comprehensive study of multicultural pieces, to help students experience works from different perspectives, and enhance musical understanding and performance. The Facets Model supported eight strategies that lend to authenticity of performance:

1. Sing multicultural choral music using a tradition singing style
2. Accompany the piece using traditional instruments
3. Incorporate folk dance into rehearsals and performances of the piece
4. Learn the music aurally
5. Consider musical idioms understood in the context of a particular culture
6. Discuss the differences between the original and an arranged version of the piece,
7. Teach the piece’s historical and cultural background
8. Experience the audience behaviors associated with the piece.

Choral music educators have the responsibility, based on standards that date back as far as the Tanglewood Symposium (1967), to expose their students to multicultural choral music in a traditional way and to teach the unique musical styles of various cultures. The use of these eight strategies in the choral rehearsal should provide the student a more in-depth understanding of diverse musical styles and encourage acceptance of this music as part of the standard of choral repertoire.

*Choral Tone/Sound Considerations*
Advances in voice science have also changed the focus of choral pedagogy, particularly in the teaching of voice and vocal/choral production techniques. This has lead to a renewed interest in choral tone and sound production. Equipped now with new knowledge based on science, choral conductors are experimenting with many new approaches to choral tone/sound.

Daugherty (2001) suggested that in the most general sense, singing is singing. Singers recognized the basic tenets of vocal production (respiration, phonation, resonance, and articulation) and employ their techniques in the same basic way when singing as a soloist or as a member of a choral ensemble. The soloist produces a single sound that is then molded into a unique sound through techniques taught by the voice teacher. Since choral ensembles are made up of many singers, a single vocal is not possible; however, Daugherty claimed that the multiple voices in a choral ensemble create a unique conglomerate sound.

Choral pedagogy deals with group techniques that control and enhance these conglomerate sounds. In this section I discuss approaches to group techniques in choral singing and then concentrate on three concerns of voice teachers regarding choral pedagogy.

**Choral Phonation**

Ford (1999) claimed that individuals in a choral context do not phonate the same way as the solo singer. According to Ford, choral singers tend to sing with less formant (lessening of partials) within the choral context, therefore emphasis in sound is on the fundamental in order to achieve a better blend in choral sound.

**Choral Sound**

Pursuant to Ford’s claim, Swan (1973) stated that choral sound is primarily a summative event dependent on individual voices, i.e. the tonal elements in each single voice relates directly to the tonal elements in the chorus, or, the whole is the sum of its parts. The basic premise is that
choral sound is the product of the individual sound sources that contribute to it. This carries with it the assumption that if those individual tonal elements are of high quality, then the choral sound will also be of high quality. Voice teachers, however, argue with this philosophy because it is their belief that singers deal with vocal production differently in groups than they do as individuals: therefore, excellence in solo singing does not necessarily translate to excellence in choral singing.

Ternström (1989) differed from Swan regarding the nature of conglomerate sound production. Ternström claimed that the overall combination of vocal sounds created a random sound that was independently unique and could be disassociated from the independent voices from that produced it. Ternström called this the “chorusing effect”.

*Unified Choral Sound*

Smith (2002) suggested two approaches for achieving a unified choral sound. The first is the ‘blending voices’ approach and the second is called the ‘balanced voices’ approach. He claimed that they are based on the vocal and acoustical ramifications of each approach. The blending voices approach suggests that the singer not sing in full voice as a solo singer would thus eliminating the upper formants from the sound. This approach also supports singing with minimal vibrato or straight tone. The other approach to achieving a unified sound, according to Smith, is the ‘balanced voices’ approach. In this approach, singers sing with full voice achieving a full range of formants in the sound. A unified choral sound is achieved in the ensemble through the balancing of the intensity of each singer’s sound.

*Acoustics of Venue*

Additional factors, other than the singers, influence the production of choral sound. Kramme (1978) claimed that the acoustical aspects of the performance or rehearsal venue was as
much a part of the vocal instrument as the human resonators because acoustics affect decisions made by the singer and conductor regarding vocal production techniques to be utilized to perform effectively in that space. For instance, he suggested a room with dry acoustics signals the singer to raise the larynx in order to sing with a brighter sound as opposed to singing with a lower larynx or darker sound in more reverberant acoustics.

**Choral Formations**

Another factor that influences choral sound is choral formations or seating patterns of the singers. Brinson (1996) claimed that different sectional seating arrangements of voice parts create entirely different overall sounds. Although conductors may have specific goals such as intonation or specific sound concepts in mind, one cannot expect that a specific seating arrangement will create the same results consistently from all choral ensembles using it (Goodwin, 1980). A particular seating arrangement is effected by a number of conditions including the overall acoustic conditions in the rehearsal/ performance space, the sound production quality of individual singers within the seating formations, and the quantity of singers within sections. A conductor cannot claim that a specific formation, for instance, will solve balance problems for all choirs or will solve intonation problems for all choirs. In general, one such fallacy that is often supported by conductors is that mixed formation, or singing in quartets, improves ensemble intonation. Although this may be true if the circumstances mentioned earlier are favorable, this is not always the case (Coleman, 1994). Research suggests that although choral formation can play a role in improved choral sound and intonation, studies support that there are no statistically significant sound differences or improved intonation between sectional and mixed formations (Daugherty, 1996).

**Choral Spacing**
Research indicates that the spacing of individual singers within sections on choral step-risers positively supports a desirable nuance to choral sound and aids in intonation. Daugherty (1999) experimented with close, lateral, and circumambient spacing on risers. Singers preferred lateral spacing of two feet between singers and a circumambient spacing of one step between rows of singers claiming that this arrangement improved the ability to hear themselves and the rest of the choir thereby resulting in better sound and intonation. These results were strongly supported by most singers and conductors. Those not comfortable with this arrangement were less experienced singers.

Research done by Ternström (1994) supports Daugherty’s finding that when voices are too close together in a standing or seated arrangement, singers cannot hear themselves and the overall result is a less desirable sound and poorer intonation. Ternström called this proximity of singers the “Self-to-Other Ratio” (SOR). SOR supports the concept when singers are placed too close together, the overall volume of sound from the choir as a whole overcomes the individual singer’s ability to hear his/her vocal output resulting in poorer intonation and less control of individual vocal production.

*Nonverbal Conductor Communication*

The choral conductor, through verbal instruction, plays an important role in the previously mentioned areas of choral pedagogy. In choral performance, however, conductor communication cannot be verbal. Unlike the solo singer who is at liberty while performing to make decisions regarding vocal production and style, the choral singer, to an extent, is dependent on the choral conductor to mold choral sound, suggest adjustments to intonation, and provide stylistic interpretation and expression while performing. One might question to what degree conducting gesture and technique has on the choral ensemble during a performance.
Research suggests the degree to which conductor movement, facial expression, and gesture effect choral singers in a performance is very high. Eichenberger & Thomas (1994) claim that the conductor’s whole body is a conducting gesture and that whatever the singer sees is what you get from the choral ensemble in performance. Gehrken (1919) has shown that choral conducting relies on the assumption that singers have an innate tendency to copy (mimic) conductor’s actions, many times without even being aware of it. Jordan (1996) found that choirs mirror the posture of their conductor.

Brunkan & Daugherty (2013) sought to determine to what degree singers, without prior prompting, would mimic the conductor’s nonverbal gesture. Their strategy was to determine whether singers performing the first phrase of Mozart’s *Ave Verum Corpus* would mimic a conductor’s rounded lips on two /u/ vowels. Results indicated that through photo comparisons and through changes in choral sound (less formant due to lip rounding), over 90% of singers would consistently mimic the conductor’s lip gestures for that vowel in performance. These studies suggest that conductor movement and gesture is very important in choral performance.

*Accommodation of Vocal Technique to Choral Singing*

As mentioned earlier, techniques of solo vocal production apply to groups of choral singers as well; however, because one is dealing with a group of people trying to initiate a vocal technique at the same time, a certain degree of control is needed to coordinate the efforts of the group. This is where the role of the conductor becomes significant through coordinating the process and providing guidance pertaining to accomplishing the technique as a group. Following are a number items in choral pedagogy that deserve attention:

*Posture*

Using correct posture makes breathing easier and reduces tension thereby making singing
less tiring (Hanson, 2014)). Characteristics of good posture for the choral singer are the same as for the solo singer; however, three obstacles affecting posture for the choral singer include: (1) body adjustments in order to see the conductor, (2) singing while in the seated position, and (3) holding music.

The choral singer, unlike the soloist, needs to see the conductor, and in some cases, other singers. Because choral ensembles consist of groups of singers where members of a group vary in size that stand or sit in arrangements on a flat floor, on risers, or on steps, singers make adjustments with their bodies in order to have a clear view of the conductor. If, through changing body position, the head is aligned improperly, the rest of the body tends to compensate, thereby creating unwanted tension in areas of the singing mechanism (Bunch, 1995). The jaw, for instance, if raised, puts strain on the larynx. Lowering the chin too far puts excessive pressure on the larynx producing a “woofy” sound (Vennard, 1967). The singer needs to look straight ahead comfortably with a clear view of the conductor with the head in such a position that allows the muscles around the larynx to remain in a relaxed state (Olson, 2010).

In most cases, turning and positioning the entire body, rather than twisting the body, in order to see the conductor will alleviate tension (Davids and LaTour, 2012). In some case, experimenting with standing arrangements might solve the problem for the entire choir. For instance, if on choral risers, the conductor might try wider horizontal spacing between the singers, or skipping steps on risers in order to provide more elevation between rows of singers (Daugherty, 2001).

When singers are seated, most aspects of standing posture also apply. In order to remain in a relaxed state, most choral pedagogues recommend sitting toward the front edge or center of the seat with legs in front with one foot slightly ahead of the other for support (Henderson,
McKinney (2005), however, suggested sitting on the back part of the seat in order to be better balanced and therefore more relaxed in the upper portion of the body. In either case, the same techniques for good posture continue to apply for the upper portion of the body.

Since choral singers hold music, tension can also be created if the singer holds the music too high or low and/or too far from the body (Gumm, 2009). Holding music too high and away from the body causes tension in the upper arms and shoulders. Holding the music in a low position requires that the singer tilt the head down, thereby putting pressure the larynx. Sizes and shapes of bodies vary greatly, so providing one remedy for everyone is not possible. The singer simply needs to find a holding position that allows the arms, shoulder, and neck muscles to remain in as relaxed a state as possible. One recommendation is to focus on keeping the upper arm and adjust music position by raising and lowering the forearm (Garretson, 1998).

Choral Tone, Blend, and Balance

Many similarities in the physical production of resonance, formant, and timbre occur between the individual members of the choral ensemble and solo singing; however, the parameters of each are used in a more controlled way in the choral setting. Assessments of choral sound dating back to the earlier part of the 20th century beginning with the Christiansen concept to sound were based on unification of sound through vowel color and blend.

More recent approaches to choral sound, however, have moved away from the concept of blending through vowel modification only (Langner, 2002; Smith, 2002). Research suggests vowel uniformity, vibrato, choral formation, and strategic placement of singers influence choral tone and choral blend (Atkinson, 2010). Vowel uniformity has been the traditional approach used by conductors in past years.
Historically, the solo singer endeavors to create an abundance of resonance that leads to singer’s formant that determines timbre at any given point in time (McKinney, 2005). In the choir setting, the conductor attempts to unify the sound of many singers into one choral sound (Decker & Herford, 1973). The conductor, through instruction and conducting gesture, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound. Smith and Sataloff (2000, p. 139) outlined the components of a blended sound:

1. Color: no individual voices are identifiable. Also, a distinct sound quality typifies each section and the whole choir.

2. Balance: individual choral sections are balanced within the tonal texture.

3. Tuning: voice leading is accurate, resolving points of tension clearly, and pitch is accurate and consistent among sections.

4. Diction: vowels and consonants are pronounced uniformly and can be understood by an audience.

This blending of sounds requires the choral conductor work with the sound production of members of the choir in a way that transforms the individual sounds of the singers into a homogeneous sound. This involves the process of manipulation of the singer’s resonating tract and articulator until a similar choral tone is created (a blended sound) (Knutson, 1987). The final part of the process is to balance that modified choral tone throughout the sections of the choir. Through sound modification of this type, the use of vibrato is virtually eliminated.

Faster vibrato rates and wider vibrato extents make it more difficult to achieve tone Unification; some conductors replace vibrato with the concept of using straight tone (minimal vibrato). Vibrato and straight tone are subjects of disagreement and will be discussed at length in the next section of this manuscript.
A recent approach to the development of choral tone and blend involves the usage of choral formation and strategic placement of singers (Atkinson, 2010). This approach encourages the singer to use the same voice techniques taught in the private voice studio, e.g., full voice singing with formant.

One first part of the approach suggests specific placement of voices within the ensemble based on voice compatibility. Tone, formant, and vibrato are considered. The conductor of the ensemble listens to combinations of singers until he/she feels that they have acoustically matched all voices of the choir based on solo singing voice. The results suggest that matching in this manner enhances blend, phrasing, and overall tone quality (Willis, 2000).

The spacing of singers within an ensemble should also be considered (Daugherty, 2001; Atkinson, 2010). This concept also involves full solo voice singing. In both studies, the researchers evaluated the sound differences in terms of resonance from placing singers at different distances both laterally and vertically. Both studies using this method suggest that creating the larger distances of 24 inches laterally and 24 inches vertically between singers allow singers to hear themselves better and therefore make adjustments to sound in order to blend, balance, and tune with other members around them.

**Coordination of Breath, Onset, and Release**

The technique of coordination for the solo singer is an individual effort. The solo singer coordinates breath and onset and through careful listening to accompaniment coordinates release according to individual judgment. In a choral ensemble, groups of singers require the collective coordination of respiration, onset, and release. It is through conductor gesture that all singers of the ensemble take their breath in a coordinated manner in order to arrive at collective onset and release of tone (Miller, 1994). Smith (2006) referred to this respiration as a corporate breath,
stating that the conductor has the responsibility of indicating the timing and nature of the breath and onset appropriate to the musical and expressive demands of the repertoire.

The conductor also influences the intensity of group phonation and coordinates articulation through a group approach in which the primary factor is precision (Olson, 2010). Enunciation of word syllables has to be carefully placed by all singers. Diphthongs and groupings of consonants have to occur with collective precision in order to be understood, all coordinated through conducting gesture (Con, 2015). These are obviously not considerations for the solo singer.

*Vocal Concerns About Choral Singing*

In recent years, members of the National Association of Teachers of Singing (NATS) and members of the American Choral Directors Association (ACDA) have come together for discussion on the concerns expressed by voice teacher regarding voice students singing in choral ensembles, holding sessions with each other’s members at both national and regional conferences. In 2012, Scott McCoy, associate editor of the *Journal of Singing* and professor of voice and pedagogy at The Ohio State University stated that:

*Clearly, this is a hot topic. Each of the panels I’ve cited included a mix of singing teachers and conductors, who spoke to capacity crowds. We panelists acknowledged strong differences of opinion and ongoing conflicts that exist between our two disciplines…The better we understand the concerns, ideas, and vocal expectations of our colleagues on both sides of the aisle, the more our students will benefit*. (Journal of Singing, January, 2012)
A number of concerns have emerged more prominently than others as a result of these discussions. These concerns include vibrato/straight tone, vocal fatigue, and choral tone and blending.

**Vibrato**

The use of vibrato and straight tone in choral singing continues to be an issue in 2017. Voice pedagogues support the position that vibrato occurs naturally in the singing voice after a certain level of vocal maturity is achieved and should be used in all singing. Shipp, Doherty, & Haglund (1990) explored how the cricothyroid muscle coordinated vocal function. They claimed vibrato that is a result of free and coordinated muscle function is ‘laryngeal mediated vibrato’.

Olson (2008) concurred that healthy vibrato is produced as a result of a combination of released laryngeal musculature and free flowing air. Miller (1996) stated that an even vibrato resulting from relaxant laryngeal function is a natural characteristic of a freely produced sound and should be practiced by solo and choral singers.

These statements might lead the reader to believe that vibrato is either an “on or off” option for the singer, i.e. that either one sings with vibrato or without vibrato. This is not the case. As stated earlier in this chapter, vibrato is made up of two components - “rate” and “extent”. Vibrato rate refers to the number of oscillations of pitch that occur per second (cycle). Vibrato extent refers to how far above and below the center of the pitch the voice deviates in one cycle.

Prame (1997), Nair (1999), and Bretos & Sundberg (2003) have all conducted studies describing parameters of performance practice on vibrato rate and vibrato extent. They have shown that the most acceptable vibrato rates range from 4.5-6.5 cycles per second. Regarding
extent, Prame’s study of ten professional singers revealed an extent range of 34 cents to 123 cents.

In a study with undergraduates in a music degree program, Mitchell and Kenny (2010) investigated the vibrato rate and vibrato extent of students throughout their degree program. They found that through voice study over time, the vibrato rates of these students decreased as vibrato extent increased. Dromey, Carter, and Hopkins (2003) tried to match singer’s vibrato rate and vibrato extent to a stimulus tone and were successful, leading to the conclusion that vibrato rate and vibrato extent are controllable by the singer. As singers learn to control vibrato rate to the point of matching a stimulus tone, intonation improves and timbre becomes more vibrant.

Nix (2013) addressed the teaching of vibrato and also explored how vocal fatigue factors into singing with vibrato and without vibrato. Participants (n=350) from 8 countries completed a survey to ascertain whether or not they had received explicit instruction in how to sing with vibrato or non-vibrato from their voice teachers or choral directors. Data analysis revealed 23.1 percent responded “yes”, they received direct instruction; 59.4 percent responded “no”, they only indirectly addressed it; and 17.4 percent responded “no”, they never mentioned it. When asked specifically from whom they received instruction, of those that answered “yes”, 70.4 percent indicated that it was from a voice teacher, 2.1 percent said from a choir director, and 27.2 percent responded “both”. When asked if they received explicit instruction regarding singing without vibrato from their voice teachers or choral directors, 22.3 percent responded “yes”; 62.0 percent responded “no”, they only indirectly addressed it; and 15.7 percent responded “no”, they never mentioned it. When asked from whom they received explicit instruction in singing without vibrato, 19.5 percent indicated it was from a voice teacher; 53.2 percent said it was from a choir
director; and 27.3 percent responded “both”. In summary, the explicit instructor of vibrato singing was the voice teacher and the explicit instructor of non-vibrato singing was the choral director.

Participants were then asked whether they had ever been asked to adjust their vibrato by a voice teacher: 54.2 percent answer “yes” and 45.8 percent answer “no”. When asked how they were to adjust vibrato, the responses were (1) adjust the vibrato rate, (2) sing without vibrato on selected notes, and (3) sing without vibrato at the onset of notes, but allow vibrato on notes that were sustained. When asked whether they had ever been asked to adjust their vibrato by a choral director, 78.4 percent answered “yes”, and 21.6 percent answered “no”. When those that answered yes were asked how they were to adjust vibrato, very difference answers were given than with voice teachers. Participants were allowed to choose more than one type of instruction in their response: 81.7 percent were instructed to sing without vibrato entirely, 60.4 percent were instructed to sing without vibrato on selected notes, and 29.9 percent were instructed to sing without vibrato at the onset of notes, but allow vibrato on notes that were sustained. Since voice teachers have stated their concern for vocal damage through singing without vibrato, it is understandable why they do not teach non-vibrato singing, but if vibrato is controllable by the singer, it is unclear why more choral directors do not teach vibrato singing.

Straight tone is singing with minimal vibrato. Choral directors often justify the use of straight tone because of historical considerations (Skelton, 2004). Some claim that Renaissance and Baroque choirs were made up of boys who sang with straight tone and to have authenticity in performance, singing with minimal vibrato was necessary.

Others advocate straight tone (or minimal vibrato) because they feel that the elimination of vibrato leads to better intonation and blend (Mann, 2014). Ironically, some vocal teachers
claim that straight tone will lead to inaccurate tuning, “It is better to have a slightly breathy tone with an even vibrato and good focus rather than a crystal clear, strident sound with no fluidity. The latter tone often sounds slightly under pitch because the air is getting pushed through the resonance tract” (Doscher, 1989, p. 27).

If vocal health is in jeopardy using straight tone, is seems unwise for choral directors to continue the practice. Doscher (1994) later claimed that straight tone involves an over-abundance of air passing through the vocal folds during adduction that can actually be damaging to the voice. Olson (2008) concluded that there is not a healthy way to sing with straight tone according to classical teaching technique.

In summary, these findings suggest that controlling vibrato rate and extend is ascertainable by singers in choirs. If choir members develop this ability, it is reasonable to assume that they would be better equipped to deal with intonation and blend problems that arise from undesirable vibrato rates and vibrato extents. But to what degree choral directors and voice teachers are knowledgeable about vibrato rate and vibrato extent and, if they are knowledgeable, whether they teach the concept to their students or not is unknown.

Vocal Fatigue

Vocal fatigue from choral singing is another area of concern for voice teachers. Vocal fatigue in the choral setting can be caused by extensive periods of rehearsal time over a relatively short period of time. Further, vocal fatigue can be brought on through specific vocal usage including singing with minimal vibrato and using excessive ranges and dynamics.

The claims made previously by Doscher (1998) are based on action that occurs within the interior of the larynx leading to vocal fatigue. Later it was found that, from a physiological standpoint, other areas in the vicinity of the larynx should also be observed. Nix (2013) explored
this possibility, based on studies by Titze (1999). Nix concluded that vocal fatigue can originate from three areas physiologically - in the lamina propria of the vocal folds, in the intrinsic muscles of the larynx, and in the extrinsic muscles of the larynx.

Nix found, through the use of videoendoscopy, various areas of the singing mechanism both inside and outside the larynx experience oscillations that are in sync with vibrato. These include the laryngeal depressor muscles (sternothyroid and sternohyoid muscles, the lateral pharyngeal wall, the velum (soft palate), the base of the tongue, and the epiglottis. According to Hirano (1995), synchronous oscillations of this type help with the avoidance of tightness and rigidity within the vocal tract. It is reasonable, therefore, to assume that a consequence of singing with vibrato for an extended period of time helps to prevent muscular tension both internal and external to the larynx thus leading to less vocal fatigue.

Iwata and Large (1971) conducted a study focused on air flow fluctuations that occur in synch with intense vibrato. They found that air flow rates for vibrato were 10 percent higher than for non-vibrato tones. Reduction of air flow results in increased glottal resistance from muscles that are used to prevent vibrato from occurring thereby leading to weakened muscles and vocal fatigue. In a similar study done by Gauffin & Sundberg (1989), it was concluded that if there is a reduction of glottal adduction for vibrato singing, then impact to the lamina propria (outer layers of the vocal folds), could be reduced and could result in less phonation-related fatigue to the vocal folds.

Nix (1989) surveyed singers who were asked to sing using no vibrato to learn how long a recovery time there was for them if they experienced symptoms of vocal fatigue. He first had to find out if they, in fact, experienced symptoms. The list to which singers responded were:

- A change in overall vocal quality
• A change in dynamic range
• Difficulty with singing softly
• A change in vocal pitch range
• Difficulty in moving through register bridges
• Experiencing unexpected voice breaking/cracking
• An increase in effort to sing or speak
• Discomfort within the larynx (painful to speak or sing
• Discomfort outside of the larynx

If the singers indicated that they suffered from any of these fatigue symptoms, they were then asked to indicate how long it took them to recover: (1) five minutes or less, (2) within one hour, (3) one day, and (4) more than one day. Most responses were in the “five minutes or less” and “one day” periods. Less than 10% fell into the “more than one day” range.

Vocal fatigue is also the result of singing too much over a short period of time. In a 2011 study, Daugherty, Manternach, and Price revealed the effects on the voice due to vocal fatigue that resulted from long periods of voice usage during a three-day All-State music festival. The participants in the study were high school age students (N=250) who participated as singers in the festival. The focus of the study was vocal fatigue that resulted from voice use over the three-day rehearsal period. Data were collected through daily surveys, phonation duration data, analysis of rehearsal voice use behaviors, and field notes.

Although the study used a number of measures, two of those used were of particular interest in which the degree of phonation was the major observation. Since phonation involves the colliding of the vocal folds (an internal laryngeal action), the more vocal fold collision that occurs, the more the possibility of fatigue and possible damage to the voice.
The first measure used an Ambulatory Phonation Monitor (APM). This device is a battery powered electronic device that was worn by two students (only two due to cost of the unit) around their necks over their larynx area that monitor the number of phonation cycles that occurred during singing and talking from the beginning of the three day festival to the end of the festival. At the conclusion of the festival, student 1 had 7,592,338.0 vibratory cycles and student 2 had 5,552,963.0 vibratory cycles. This number of cycles was far beyond normal usage.

In the other measure, students were surveyed at different times in the festival to determine what their perceptions were regarding their singing quality at designated points in time. Through comparing the surveys done on Day 1 and the final surveys on Day 3, four questions showed significant declines in voice quality due to long hours of phonation both in and out of rehearsals.

1. Today, I feel like I’m straining when I sing; p=.0014
2. Today, my voice feels tired; p=.0001
3. Today, my throat hurts when I sing; p=.0001
4. Today, my voice is hoarse; p= 0001

In summary, the focus of this study was to investigate the degree of vocal fatigue that resulted on high school student participation in a three-day All-State choral festival. The use of an APM recorded excessively high levels of phonation cycles during the course of the festival that lead to potentially damaging levels of vocal fatigue. In the other part of the study that surveyed student perceptions of their own vocal health at intervals throughout the festival, results indicated that 5 of 7 students experienced significant declining changes in voice health over the three-day period due to vocal fatigue.

Choral Tone and Blending
Rossing (1986) stated that choral singing and solo singing are two distinctly different modes of musical performance. Hansen, Threimer, & Thurman (2001) suggested that voice teachers at the college/university level believe that the only correct way of singing is the way one sings Western opera. This becomes clear through the observation of tone in solo singing and choral singing. Solo singing technique includes singing with a well-supported, robust sound containing a full range of singer’s formant. Singers in the choral setting, on the other hand, are concerned with developing choral tone and choral blend that have different characteristics and are influenced by many other things including vowel uniformity, dynamics, vibrato, choral formations, and the placement of the singer within those formations.

In choral singing, blending the sound of singers leads to a unified ensemble sound. In order to achieve the desired sound for blending, the singer does not sing in full voice and thereby surrendering their full vocal timbre (elimination of upper formants). The other technique involved with blending is the use of straight tone (minimal vibrato). Using a combination of straight tone with less intense singing allows ensemble singers to achieve a similar tone quality, generally referred to as a unified choral sound (Smith, 2002). Since the less intense sound is lacking in the upper partials, singers can focus more on the fundamental tone and therefore a product of this unified sound is better intonation (Ternstrom, 1999).

The other general approach to achieving a unified sound is through the balancing of voices. This approach most likely garners much more support from voice teachers. In balanced approach, the choral singer sings with a full voice that would include a full spectrum of formants. Tone color in the ensemble is accomplished the same as in an orchestra, i.e. each instrument balances the intensity of output in sound so that no one instrument “sticks out”. One would
anticipate that if full voice singing accomplished the goal of a unified sound, then this would be a desirable plan.

Using this concept, the true color of the voice could be utilized and vocal health could be maintained; however, orchestral instruments are man-made and each like-instrument is constructed with precise specifications that produce instruments that are exactly alike. Every voice, on the other hand, has not been manually crafted to be exactly the same and each has unique physiological differences. Therefore, each will have much more variation in color than instruments. Smith (2002) contended, however, that singers can adjust their individual timbres through the manipulation of sound via the resonating areas of the voice and the articulators (mainly the lips) to achieve a sameness of timbre representative of a unified choral sound.

Fagnan (2008) described an approach (Chiaroscuro) to choral timbre that supports balancing of voices within the ensemble. Bel Canto technique includes singing full voice with a low larynx and high sound placement. “Chiaro” means bright or clear and “oscuro” means dark. In the Bel Canto style, Chiaroscuro refers to the combination of the brightness in the voice that results from singing with singers’ formant and the dark sounds that come from the lower pharynx area when the larynx is low in the throat. Fagnan supported the idea set forth by Perry that singing with full voice and coloring sounds through the use of the resonating areas of the voice and listening for balanced volume is a better approach to the unification of choral tone and intonation than using a blending approach.

Chapter Summary

Three major concerns about choral singing include the use of vibrato, vocal fatigue, and choral tone and blending. Each area is of major concern to voice teachers regarding the health of the singing voice - a concern that hopefully is shared by all choral conductors.
Research indicates that vibrato is a natural function of the mature voice (Miller, 1996). Studies have also shown that the elimination of vibrato from singing, or the use of straight tone, can be damaging to the voice (Doscher, 1989). Choral conductors have used straight tone to reproduce choral sounds for authenticity in style for Renaissance and Baroque compositions and to help create better choral blend and intonation. Some also use straight tone because they believe it helps create better choral blend and intonation. Studies have been conducted regarding the parameters of vibrato rate and extent (Bretos & Sundberg, 2003; Nair, 1999; Prame, 1997). Dromey, Carter, and Hopkins (2003) concluded that singers could change vibrato rate and extent to match a stimulus tone concluding that vibrato rate and extent were controllable by singers and therefore they were teachable. Nix (2013), in a study investigating who taught vibrato, found that more voice teachers teach vibrato than choral directors. He also found that more choral directors teach students how to vary their vibrato rates and extents for choral performance.

Vocal fatigue in singing can be a result of singing too much over a short period of time (Daugherty, 2011) or from singing without vibrato. Nix (2013) discovered areas of the singing mechanism that oscillate and are in sync with vibrato. According to Hirano (1995), these synchronous vibrations help with the avoidance of tightness and rigidity within the vocal tract, supporting the concept that singing with vibrato for an extended period of time helps to prevent muscular tension in the larynx that results in less vocal fatigue.

Excessive singing over a short period of time can result in severe vocal fatigue. Daugherty, Manternach, and Price (2011) revealed the effects on the voice due to vocal fatigue that resulted from excessive singing in a three-day All-State festival. Results from this study indicated that 5 of 7 students experienced significant declining changes in voice health over the three-day period due to vocal fatigue.
Choral Conductors are concerned with developing choral tone and choral blend. Choral tone and blend can be influenced by vowel uniformity, dynamics, vibrato, choral formations, and the placement of the singer within those formations. (Smith, 2002) suggested two approaches to achieving a unified choral sound, the ‘blending voices’ approach and the ‘balanced voices” approach. The ‘blending voices’ approach combines minimal vibrato singing with less intense singing and allows ensemble singers to achieve a similar tone quality. In the ‘balance voices” approach, the singer sings with full formant, balancing intensity the same as an instrument in a section of the orchestra balances sound being careful to not “stick out”. Fagnan (2008) described a similar approach to balanced technique based on Bel Canto singing technique referred to as Chiaroscuro in which singers also use the full voice concept in achieving choral tone and blend. Daugherty (2001), Langner (2002) and Atkinson (2010) suggest that the strategic positioning of singers can help singers find compatible sounds among ensemble singers that can be useful with the blended or balanced approaches.

It is clear through these studies that voice teachers have legitimate concerns about how these problem areas are being approached in the choral rehearsal. It seems choral conductors are not consistent in their approach to these problems. Hopefully, the results from this study will reveal the perspectives of choral conductors regarding these areas and consequently provide solutions and consistent handling of the problems.
CHAPTER THREE

Methodology

The Purpose of the Study

The purpose of this study was to describe choral conductors’ perceptions regarding voice pedagogy and choral pedagogy. The degree to which these perceptions differ by educational preparation (choral conducting degree only, voice degree only, both choral conducting and voice degree, or other degree) was also of concern.

The following four Research Questions were examined:

1. What are choral directors’ perceptions regarding aspects of voice and choral pedagogy that are supported by vocal and choral pedagogues?

2. To what degree do most choral directors use solo vocal training techniques in choral rehearsals?

3. To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

4. Do perceptions among choral directors differ by educational preparation of the choral director (conducting degree, voice degree, both conducting and voice degrees, other degree)?

Research Design

In order to answer the research questions adequately, a descriptive research design was selected as most appropriate. According to Issac and Michael (1995), the purpose of descriptive research designs is “to describe systematically the facts and characteristics of a given population
or area of interest factually and accurately” (p. 50). In the case of this study, the population of interest was high school and college/university choral directors.

Descriptive research is intended to accumulate data that are solely descriptive and not to necessarily seek relationships, test hypotheses, or make predictions. The value of this design was to collect detailed information that describes an existing area of inquiry that is purposeful. The use of the descriptive research design to address the problem of assessing choral directors’ perceptions of various aspects of voice pedagogy and choral pedagogy, as they relate to usage in the choral ensemble, is fully aligned.

Data Collection Tool

With descriptive research designs, one appropriate data collection tool is a questionnaire. In order to collect relevant data, an original questionnaire needed to be developed to measure the choral conductors’ perspectives regarding various aspects of voice pedagogy and choral pedagogy as they relate to usage in the choral ensemble. At the time of this study, the researcher was not able to identify a previous instrument used to measure the extent of the research questions. Therefore, a questionnaire was designed to gather data to provide information for this purpose (see Appendix C).

The first section of the questionnaire, General Information, includes the date that the questionnaire was completed and the geographic area in which the participant teaches. By using date of completion, answers to the questionnaire by early and late responders can be compared for similarity in answers. If the answers from early and late responders were similar, there was support for an unbiased sample. Geographic information can be used to assess whether respondents form an unbiased sub-sample in the event that a substantial portion of persons contacted do not respond to the survey. The geographic distribution of respondents and that of
non-respondents can be compared. If they are similar, there is a good chance that respondents do not form a biased sample.

The second section of the questionnaire, Background of the Choral Director, requests information about the vocal and choral training of the participants. This question asked respondents to indicate whether their training involved a degree in choral conducting, voice, both choral conducting and voice, or other degree. This question was being presented so that differences in perceptions among the respondents by educational preparation could be tested for Research Question 4.

The third section of the questionnaire presented 18 items on Vocal and Choral Techniques to the respondent (See Appendix B). The content of these questions addressed Research Question 1. Dichotomous response scales were selected for measurement because the researcher felt that the research questions regarding these items on the questionnaire could be more accurately answered using a two-level response as opposed to a multi-level response. The responses are either Agree versus Disagree/Don’t Know.

The fourth section of the questionnaire assessed the choral conductors’ perceptions about statements focused on specific items of Solo Vocal Training Technique including posture, inhalation, onset, resonance, formants, phonation, coordination, and vibrato. These areas were addressed in Research Question 2. Content used for those questions was based on the consensus of processes of proper vocal production as defined by vocal pedagogues (see Appendix A).

The fifth section of the questionnaire involved the conductors’ perception regarding Concluding Posture or the impact of choral singing on the solo singer’s vocal technique and/or the singer’s vocal health. This focuses on Research Question 3.

*Validity of Instrument*
To determine the content validity (CVI) of the questionnaire, a panel of experts comprised of two choral conductors and one voice teacher were chosen to review and evaluate the questions used on the questionnaire. Originally two voice teachers were chosen to participate in the review; however, at the time the panel of experts was engaged in reviewing the instrument, one voice teacher became ill and had to excuse himself from the study. Consequently, only one voice teacher but two choral conductors reviewed the questionnaire.

The panel of experts was invited to participate via email. A copy of the questionnaire in which each question was accompanied with a brief statement of rationale for the usage of the question was made available to each member of the panel via the web-based service known as SurveyMonkey (c.2013) soliciting their expert advice.

Nine questions were included on the questionnaire. Numbers 1, 2, 3, 4, 5, 8, and 9 were not measurable statistically. If the panel of experts felt that the usage of these questions were appropriate for usage in the questionnaire, they answered “Usage of the question is appropriate”. An additional response of “Comments, suggestions” was provided if the panel of experts’ member felt that alterations and/or additions needed to be made to the question or to state that the question was not appropriate. No member of the panel of experts indicated that any question was inappropriate for usage. A number of suggestions concerning sentence structure and/or updated vocabulary usage were made. Corrections and updates to vocabulary were made.

Items 6 and 7 of the questionnaire were measurable for content validity and provided quantitative support for the content validity of the instrument.

These questionnaire items were measured on a five-point rating scale:

1 = No relevance to construct

2 = Minimal relevance to construct
For the two sets of questions that were content-based, no ratings were below a 3.00 or Moderate relevance to construct. The majority of mean ratings were above 4.00 or High relevance to construct. These statistics indicate that the content experts viewed the items on the instrument favorably with respect to content validity. Here are the supporting data.

The first set of questions (number 6) contained 18 statements about vocal and choral pedagogy. Responses to these statements indicate that these are valid according to perceptions among content experts regarding solo vocal pedagogy and choral pedagogy. There were no ratings of minimal or no relevance. Minimum and maximum ratings given for each question as well as measures of central tendency are provided in Table 3.1.
Table 3.1
Vocal and Choral Pedagogy

<table>
<thead>
<tr>
<th>ITEM STEM</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Good posture can be achieved by maintaining an imaginary straight line from the top center of the head, extending through the center high point of the hip bone and ending at the bottom center part of the foot.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>2. During inhalation, the lungs fill creating a downward movement of the diaphragm that results in an expansion of the front, sides, and back of the midsection.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>3. The most preferred type of onset is balanced onset.</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>4. Resonance is the quality and intensity of the sound that is produced by the physical resonating cavities as a result of phonation.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>5. Formants are peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.</td>
<td>4.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.33</td>
<td>0.47</td>
</tr>
<tr>
<td>6. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>7. Good vocal technique is the result of a pedagogically correct coordination of breath, tone, and articulation.</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>8. Vibrato is a natural occurrence that develops as a singer matures physically and with proper vocal instruction.</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>9. Usage of straight tone, i.e., singing with minimal vibrato by singers in the choral ensemble can be damaging to the voice.</td>
<td>3.00</td>
<td>4.00</td>
<td>3.00</td>
<td>3.33</td>
<td>0.47</td>
</tr>
<tr>
<td>10. Singers have a limited number of hours in the day in which they can healthily sing.</td>
<td>3.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.33</td>
<td>0.94</td>
</tr>
<tr>
<td>11. Singing in a choral ensemble using a tessitura, dynamic range, or vocal color that is excessively taxing on the voice can cause damage especially to the inexperienced singer.</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>12. Singing choral repertoire that is too difficult for a maturing singer can be harmful to the voice.</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>13. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>14. Breathing exercises, vocalizations that emphasize onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of accuracy and effectiveness.</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
15. Choral conductors should be well-versed in vocal pedagogy.  

16. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.

17. Suspension is that brief moment between inhalation and exhalation where the singer is preparing the breath for phonation.

18. The conductor, through instruction and conducting gesture, attempts to control resonance, formant, and timbre in order to create a 'blended' choral sound.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Rating</th>
<th>Rating</th>
<th>Rating</th>
<th>Rating</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Choral conductors should be well-versed in vocal pedagogy.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>16. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>17. Suspension is that brief moment between inhalation and exhalation where the singer is preparing the breath for phonation.</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>18. The conductor, through instruction and conducting gesture, attempts to control resonance, formant, and timbre in order to create a 'blended' choral sound.</td>
<td>3.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.33</td>
<td>0.</td>
</tr>
</tbody>
</table>

The second set of questions (number 7) represents 11 statements about vocal pedagogy with vocal training techniques that would be taught to the solo singer. Participant responses document the degree to which choral directors use those same solo vocal training techniques in the choral rehearsal. The responses to these statements are an indication of validity. There were no ratings of minimal or no relevance. Please see Table 3.2 for minimum and maximum ratings given for each item as well as measures of central tendency.
Table 3.2

**Vocal Training Techniques**

<table>
<thead>
<tr>
<th>ITEM STEM</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Posture</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>2. Breathing Technique</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>3. Phonation</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>4. Balanced onset</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>5. Resonance</td>
<td>4.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.33</td>
<td>0.47</td>
</tr>
<tr>
<td>6. Tone Color</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.67</td>
<td>0.47</td>
</tr>
<tr>
<td>7. Formant</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
<tr>
<td>8. Coordination</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.00</td>
</tr>
<tr>
<td>9. Vibrato</td>
<td>3.00</td>
<td>4.00</td>
<td>3.00</td>
<td>3.33</td>
<td>0.47</td>
</tr>
<tr>
<td>10. Straight Tone</td>
<td>3.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.33</td>
<td>0.94</td>
</tr>
<tr>
<td>11. Vocal health</td>
<td>3.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>0.82</td>
</tr>
</tbody>
</table>

**Pilot of the Questionnaire**

The purpose of the pilot study was to determine the reliability and clarity of the researcher-designed questionnaire. Participants in the pilot study were 20 randomly chosen high school and college/university choral directors from the Pennsylvania Music Educators Association District 7 membership. The random sample was created using the random selection function on Microsoft Excel that creates random samples from Excel data. A request was made of the Pennsylvania State University IRB to review and approve the pilot study. After receiving that approval, the Pilot Study was executed.
Data collection for the pilot study was completed utilizing the revised research-designed Questionnaire (see Appendix D). Participants accessed and completed the questionnaire electronically using a web-based service called SurveyMonkey (c. 2013). A letter of invitation to participate in the pilot study was sent to the participants via e-mail. I provided an electronic link in the letter of invitation to participate that directly connected the participant to the questionnaire hosted by SurveyMonkey. Instructions for completion of the questionnaire were included in the SurveyMonkey document in the introductory section entitled “Welcome to My Questionnaire”.

After one week (7 days) from e-mailing the initial invitation, a second invitation to participate was e-mailed to all participants as a reminder and to encourage them to participate if they had not already done so. Two weeks (14 days) after the initial invitation, I accessed the information on SurveyMonkey to analyze the results. Three questionnaires were left incomplete; all these participants stopped at the same page break in the questionnaire. In order to give those three participants the opportunity to complete their questionnaires and to encourage more response, I decided to extend the opportunity to participate to a third week. Three weeks (21 days) after the request to participate in the survey, the study was closed and the responses were analyzed. Of the 20 participants invited, 6 completed the entire questionnaire and 3 additional participants partially completed the questionnaire. The three partially completed questionnaires were not used; therefore, approximately 30% of those invited provided usable data. A web-generated thank you response was set up through Survey Monkey for all those who participated.

**Results**

The data collection instrument was tested for reliability using the Cronbach’s Alpha coefficient for the 31 items on the tool. The reliability coefficient was very satisfactory at $r=.73$. 
Through an item-by-item examination of participant answers on the questionnaire, I developed concern about the amount of clarity provided in some questions that might have prevented the participants from answering accurately. In question number 6, for example, the statements to which participants were responding were consensus statements from major vocal pedagogues. Participants well versed in vocal pedagogy would answer each question with “agree”. Although I acknowledge that the participant may in fact not have known the answer to the question and responded with “Disagree, Don’t Know”, I decided that if “Disagree, Don’t Know” received 50% or more of responses to a question on the pilot study, I should review the pedagogical question stated to determine whether enough clarity had been provided for the participant to answer the question accurately.

In addition, I also carefully reviewed the format of the questionnaire to determine why three participants initially stopped at the same place. Since SurveyMonkey did not allow all questions to be viewed in one continuous page, the questionnaire contains a total of 6 pages. I felt that, since each participant in the pilot study who had an incomplete questionnaire stopped before the same page break, perhaps they did not realize that they had not finished completing the questionnaire. To help assure that participants in the main study advance to all pages of the questionnaire, thus completing all questions, the following outline of the questionnaire was added to the introductory page of the questionnaire for clarity:

Thank you for participating in my study by completing this questionnaire!

Your feedback is important; therefore, please be sure to answer all questions. Incomplete questionnaires cannot be used in the study. The average time to complete the questionnaire is 5 minutes. There are six pages in the questionnaire. You will need to
click "NEXT" to advance to each page. The following represented the format of the questionnaire:

P. 1  Introduction
P. 2  General Information- 2 questions
P. 3  Background of the Choral Conductor- 3 questions
P. 4  Vocal and Choral Techniques- 1 questions with multiple responses
P. 5  Vocal Techniques in the Choral Rehearsal- 1 question with multiple responses
p. 6  Concluding Postures- 2 questions

A revised version of the Questionnaire was designed based on the pilot study results (Appendix E). Within section 6 on the questionnaire, the statements receiving mixed responses were numbers 3, 5, 9, 10, 12, and 17. In numbers 5, 9, 12, and 17, less than 50% of the responses for each statement were different from the others. This led me to believe that the statement was not due to clarity in understanding the statement but simply not knowing the answer. If the participant was well-versed in vocal pedagogy and read the questions accurately, he should be lead to only one answer- “Agree”, and therefore no edits to the questions were made.

The statements receiving a higher number of mixed responses in this section and therefore indicating possible clarification issues were numbers 3 and 10. In number 3, the question is stated, “The most preferred type of onset is balanced onset”. The intent of the question is to determine whether the participant knows that balanced onset is the most accurate form of onset according to vocal pedagogues; therefore, I changed the question to “The most accurate form of onset is balanced onset”.
In number 10, the question is stated as “Singers have a limited number of hours in the day in which they can sing before compromising healthy technique”. The original intent of the question was to also include the effect extensive singing in one day has on vocal health; therefore, in order to address the effects on both vocal technique and vocal health, a question was added that states “Singers have a limited number of hours in the day in which they can sing before compromising vocal health”.

The last questions examined were questions 8 and 9 on the questionnaire. The intent of these questions was to determine if participants felt that choral singing resulted in negative effects to vocal technique and if choral singing is damaging to the voice since certain members of NATS have made the assertion that choral singing can be detrimental to good solo singing technique and can be damaging to the voice. In order allow the participant to answer in an unbiased manner, and to garner as much clarity as possible through responses to these questions, I changed to using a Likert scale for both answers, the responses being ‘much positive impact, some positive impact, no impact; some negative impact; much negative impact’. In addition, an optional response box was provided for each question so that participants could provide comments and/or clarification if they wished.

**Main Study**

**Sample**

Participants for the main study were choral conductors who direct either high school and/or college/university choirs in the United States. A list of potential participants of choral conductors was compiled using the spring 2017 membership rosters from the American Choral Directors Association (ACDA). ACDA is a professional organization for those who teach choral
music in public and private schools K-12, colleges and universities, and churches and communities.

These lists included only U.S. Postal mailing addresses for high school and collegiate choral conductors from every state in the United States; email addresses are not available. Only high school and collegiate choral conductors will be recruited as participants (N=2614). Using a confidence level of 95%, with a 5% margin of error, the required sample size for an effective measurement would be 336 (n=336). The sample was computer generated using Microsoft Excel’s random sampling formula. This computer program utilizes a form of systematic sampling. Those who participated in the pilot study were not included in the main study sample.

Procedures

Data collection for the main study was accomplished through the use of the researcher-designed questionnaire that was revised based on the results of the pilot study (Appendix E). Participants accessed and completed the questionnaire electronically using the web-based service called SurveyMonkey.

Participants received an initial invitation to participate in the study via the U.S. Postal Service ground mail. Regular U.S. Postal mailing was used rather than e-mail invitations due to an ACDA policy that prohibits the use of ACDA membership e-mails by parties other than ACDA. The invitation included instructions for accessing and completing the questionnaire using an electronic address (URL) to the questionnaire through the web address for Survey Monkey. A follow-up invitation was sent to all participants two weeks later via U.S. Postal Service ground mail to remind them of the initial invitation and to encourage their participation. A web-generated thank you response was set up through SurveyMonkey for all those who
participated. One month after the initial mailing of the invitations to participate (31 days), the survey was closed and the responses analyzed.

Data Analysis

Upon reaching the end of the participation period of one month, the survey was closed and the questionnaire responses compiled for analysis. The variables under study were named and values assigned for data analysis. Descriptive data obtained from the questionnaire was generated using the Statistical Package for the Social Sciences (SPSS).

In order to answer the research questions, the following data analyses were performed. For the following three research questions, descriptive statistics were generated. These statistics include percentages of responses on each of the items in Sections Four, Five and Six of the questionnaire.

The independent variable was choral directors with six categories based on educational preparation: conducting degree, music education voice degree, music education non-voice degree, voice performance degree, vocal pedagogy degree, or other degree. The dependent variables were all responses on the questions posed in Sections Four on Vocal and Choral Techniques (18 questions), Section Five on Solo Vocal Training Techniques (11 questions) and Six on Concluding Posture (2 questions) on the questionnaire. To test for statistical differences between the two groups of choral directors, Chi Square analyses were executed. The probability for determining statistical significance was set at p<.05.
CHAPTER FOUR

Results

The purpose of this study was to describe choral conductors’ perceptions regarding voice pedagogy and choral pedagogy. It also empirically investigated the degree to which these perceptions differed by educational preparation. Four Research Questions were posed:

1. What are choral directors’ perceptions regarding aspects of voice and choral pedagogy that are supported by vocal and choral pedagogues?

2. To what degree do most choral directors use solo vocal training techniques in choral rehearsals?

3. To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

4. Do perceptions among choral directors differ by educational preparation of the choral director (conducting degree, music education-voice concentrate, music education-non voice concentrate, voice performance degree, vocal pedagogy degree, other degree)?

Background of the Respondents

Three-hundred-thirty-six high school and collegiate choral directors were recruited for the study; 70 responded but of those 7 only provided demographic information. Therefore, 63 actually completed the questionnaire resulting in a response rate of 18.75%. Demographic information about the participants was analyzed first. The respondents’ professional training varied (see Table 4.1).
Table 4.1

**Degrees of the Choral Directors**

<table>
<thead>
<tr>
<th>Training</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choral Conducting</td>
<td>8</td>
<td>11%</td>
</tr>
<tr>
<td>Music Education</td>
<td>28</td>
<td>40%</td>
</tr>
<tr>
<td>Choral Direction and Music Education</td>
<td>19</td>
<td>27%</td>
</tr>
<tr>
<td>Voice Performance</td>
<td>13</td>
<td>19%</td>
</tr>
<tr>
<td>None of the above</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100%</td>
</tr>
</tbody>
</table>

The level of choirs that the choral directors conducted was fairly evenly divided between high school (54%) and collegiate (46%). The years of experience as a Choral Conductor varied widely (see Table 4.2). Thirty-seven percent (n=26) of the choral directors had more than 30 years of experience. On the other hand, nine percent (n=6) had five or fewer years.

Table 4.2

**Years of Experience of the Choral Directors**

<table>
<thead>
<tr>
<th>Years</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>6</td>
<td>9%</td>
</tr>
<tr>
<td>6-10</td>
<td>7</td>
<td>10%</td>
</tr>
<tr>
<td>11-15</td>
<td>10</td>
<td>14%</td>
</tr>
<tr>
<td>16-20</td>
<td>9</td>
<td>13%</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>26-30</td>
<td>9</td>
<td>13%</td>
</tr>
<tr>
<td>More than 30</td>
<td>26</td>
<td>37%</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Results**

*What are choral conductors’ perceptions regarding aspects of voice and choral pedagogy that are supported by vocal and choral pedagogues?*
To answer this question, 19 statements were presented to respondents about voice or choral pedagogy. The dichotomous response options were either Agree or Disagree/Don’t Know. Percent agreement with each of these statements is reported in Table 4.3.
Table 4.3
Perceptions of Choral Directors Regarding Solo Voice Pedagogy and Choral Pedagogy: Percent of Agreement (From Highest to Lowest)

<table>
<thead>
<tr>
<th>Agreement with the 19 Statements</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.</td>
<td>62</td>
<td>98%</td>
</tr>
<tr>
<td>2. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.</td>
<td>59</td>
<td>94%</td>
</tr>
<tr>
<td>3. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.</td>
<td>59</td>
<td>94%</td>
</tr>
<tr>
<td>4. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.</td>
<td>58</td>
<td>92%</td>
</tr>
<tr>
<td>5. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.</td>
<td>58</td>
<td>92%</td>
</tr>
<tr>
<td>6. Choral conductors should be well-versed in voice pedagogy.</td>
<td>57</td>
<td>91%</td>
</tr>
<tr>
<td>7. Singers have a limited number of hours in the day in which they can sing before compromising vocal health.</td>
<td>51</td>
<td>90%</td>
</tr>
<tr>
<td>8. Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.</td>
<td>55</td>
<td>87%</td>
</tr>
<tr>
<td>9. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.</td>
<td>55</td>
<td>87%</td>
</tr>
<tr>
<td>10. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.</td>
<td>54</td>
<td>86%</td>
</tr>
<tr>
<td>11. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.</td>
<td>52</td>
<td>83%</td>
</tr>
<tr>
<td>12. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.</td>
<td>52</td>
<td>83%</td>
</tr>
<tr>
<td>13. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.</td>
<td>50</td>
<td>79%</td>
</tr>
<tr>
<td>14. The conductor, through instruction and conducting gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.</td>
<td>49</td>
<td>78%</td>
</tr>
<tr>
<td>15. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.</td>
<td>43</td>
<td>68%</td>
</tr>
<tr>
<td>16. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.</td>
<td>41</td>
<td>65%</td>
</tr>
<tr>
<td>17. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.</td>
<td>40</td>
<td>64%</td>
</tr>
<tr>
<td>18. The most accurate type of onset is balanced onset.</td>
<td>36</td>
<td>57%</td>
</tr>
<tr>
<td>19. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.</td>
<td>29</td>
<td>46%</td>
</tr>
</tbody>
</table>
It is clear that three of four (or a majority) of the choral directors believe that:

- Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.

- During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.

- Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.

- Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.

- Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.

- Choral conductors should be well-versed in voice pedagogy.

- Singers have a limited number of hours in the day in which they can sing before compromising vocal health.

- Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.

- Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.

- Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.

- Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.

- Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.

- The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.

- The conductor, through instruction and conducing gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.
At least one-third has the following perceptions:

- Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.
- Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.
- Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.

Two areas emerged as having less agreement: 57% agreed with the statement, “The most accurate type of onset is balanced onset”. Forty-seven percent of the participants felt that “Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.”

*To what degree do most choral directors use solo vocal training techniques in choral rehearsals?*

To answer this question, 11 voice techniques in the Choral Rehearsal were presented to respondents. The possible responses were Every Rehearsal, Most Rehearsals, Few Rehearsals and Never. Percentage of responses to each question is presented in Table 4.4. Clearly, Breathing is the most frequently used technique as 97% use it almost always. Tone Color, Phonation, Body Alignment, Resonance and Vocal Health are used very often by three of four choral directors. The solo vocal training techniques used less frequently are Coordination, Balanced Onset, Formant, Vibrato and Straight Tone.
Table 4.4
Frequency of Usage of Solo Vocal Training Techniques in the Choral Rehearsal

<table>
<thead>
<tr>
<th>Techniques</th>
<th>Every Rehearsal</th>
<th>Most Rehearsals</th>
<th>Few Rehearsal</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1. Breathing</td>
<td>62</td>
<td>76%</td>
<td>21%</td>
<td>3%</td>
</tr>
<tr>
<td>2. Tone Color</td>
<td>62</td>
<td>57%</td>
<td>39%</td>
<td>3%</td>
</tr>
<tr>
<td>3. Phonation</td>
<td>62</td>
<td>52%</td>
<td>32%</td>
<td>8%</td>
</tr>
<tr>
<td>4. Body Alignment</td>
<td>62</td>
<td>50%</td>
<td>37%</td>
<td>13%</td>
</tr>
<tr>
<td>5. Resonance</td>
<td>62</td>
<td>47%</td>
<td>37%</td>
<td>15%</td>
</tr>
<tr>
<td>6. Vocal Health</td>
<td>62</td>
<td>44%</td>
<td>34%</td>
<td>21%</td>
</tr>
<tr>
<td>7. Coordination</td>
<td>62</td>
<td>34%</td>
<td>34%</td>
<td>24%</td>
</tr>
<tr>
<td>8. Balanced onset</td>
<td>62</td>
<td>21%</td>
<td>29%</td>
<td>36%</td>
</tr>
<tr>
<td>9. Formant</td>
<td>62</td>
<td>16%</td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td>10. Vibrato</td>
<td>62</td>
<td>10%</td>
<td>40%</td>
<td>37%</td>
</tr>
<tr>
<td>11. Straight Tone</td>
<td>62</td>
<td>8%</td>
<td>24%</td>
<td>49%</td>
</tr>
</tbody>
</table>

To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

Two survey questions addressed these issues:

- In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous question will alter solo singing technique?
- In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous question will be damaging to vocal health?

The percentage of responses from choral directors about their perceptions as to whether choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health are presented in Table 4.5. Basically, the perception that the usage of the techniques will have a positive impact on the solo singing technique and will not be damaging to vocal health is shared.
Table 4.5
Perceptions of Choral Directors Regarding Impact of the Usage of Techniques

<table>
<thead>
<tr>
<th>Impact</th>
<th>n</th>
<th>Much %</th>
<th>Some %</th>
<th>None %</th>
<th>Negative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the choral rehearsal, impact that the usage of the techniques referenced in the previous question will <strong>alter</strong> solo singing technique</td>
<td>60</td>
<td>45</td>
<td>37</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>In the choral rehearsal, impact that the usage of the techniques referenced in the previous question will be <strong>damaging</strong> to vocal health?</td>
<td>57</td>
<td>25</td>
<td>23</td>
<td>45</td>
<td>7</td>
</tr>
</tbody>
</table>

**Comments about Altering Solo Singing Techniques**

Participants were given the opportunity to write additional comments regarding altering the solo singing technique. Respondents felt that it depended on a combination of factors including training, maturity and vocal development. In terms of damaging vocal health, the choral directors felt that pedagogical techniques in the choral rehearsal would not have a negative impact on vocal health if they were taught and practiced correctly. All responses may be found in Appendix F.

**Do perceptions among choral directors differ by educational preparation of the choral director?**

Participants reported multiple areas of educational preparation. For the purpose of this study, respondents were classified into four groups.

1. Choral Directing
2. Music Education
3. Choral Direction and Music Education
4. Voice Performance
Chi Square Analyses were executed on the 19 areas that measured the Perceptions of Choral Directors Regarding Solo Voice Pedagogy and Choral Pedagogy to determine if differences existed based on educational background. No statistically significant differences were found among the four groups on any of the 19 statements that measured perceptions regarding solo voice pedagogy and choral pedagogy (Table 4.6).

Table 4.6
Educational Preparation and Perceptions of Choral Directors Regarding Solo Voice Pedagogy and Choral Pedagogy:

<table>
<thead>
<tr>
<th>19 Statements</th>
<th>$X^2$</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.</td>
<td>2.62</td>
<td>3</td>
<td>.46</td>
</tr>
<tr>
<td>2. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.</td>
<td>2.86</td>
<td>3</td>
<td>.41</td>
</tr>
<tr>
<td>3. The most accurate type of onset is balanced onset.</td>
<td>5.38</td>
<td>3</td>
<td>.15</td>
</tr>
<tr>
<td>4. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.</td>
<td>2.03</td>
<td>3</td>
<td>.57</td>
</tr>
<tr>
<td>5. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.</td>
<td>6.07</td>
<td>3</td>
<td>.11</td>
</tr>
<tr>
<td>6. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.</td>
<td>2.81</td>
<td>3</td>
<td>.42</td>
</tr>
<tr>
<td>7. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.</td>
<td>2.44</td>
<td>3</td>
<td>.49</td>
</tr>
<tr>
<td>8. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.</td>
<td>2.12</td>
<td>3</td>
<td>.55</td>
</tr>
<tr>
<td>9. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.</td>
<td>6.82</td>
<td>3</td>
<td>.08</td>
</tr>
<tr>
<td>10. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.</td>
<td>1.30</td>
<td>3</td>
<td>.73</td>
</tr>
<tr>
<td>11. Singers have a limited number of hours in the day in which they can sing before compromising vocal health.</td>
<td>6.31</td>
<td>3</td>
<td>.10</td>
</tr>
<tr>
<td>12. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.</td>
<td>6.74</td>
<td>3</td>
<td>.08</td>
</tr>
<tr>
<td>13. Singing choral repertoire that technically or musically is too</td>
<td>2.08</td>
<td>3</td>
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difficult for a developing singer can be harmful to the voice.

14. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.

15. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.

16. Choral conductors should be well-versed in voice pedagogy.

17. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.

18. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.

19. The conductor, through instruction and conducting gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.

\[ p < .05 \]

Next, Chi Square Analyses were executed on the 11 areas that measured solo vocal training voice techniques. No statistically significant differences were found among the four groups on any of the 11 techniques.

Table 4.7

<table>
<thead>
<tr>
<th>Educational Preparation and the Frequency of Usage of Solo Vocal Training Techniques in the Choral Rehearsal</th>
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<td>Techniques</td>
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<td>Body Alignment</td>
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<td>Vocal Health</td>
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Results showed that none of the participants had a degree in voice pedagogy so that category was eliminated. Two participants chose the category, My degree(s) are not in choral
conducting, music education, voice, or vocal pedagogy. Although this number is reported in the study, it was too small to be compatible with the other groups using the Chi-Square measurement, so it was also eliminated from statistical measure.
CHAPTER FIVE

Summary, Discussion, Recommendations

Summary

Background of the Study

Singing is a means of human expression that can be practiced by all people. Those who seek training in singing may receive training from knowledgeable teachers who are well-versed in voice pedagogy; others may receive vocal training while participating in a choral ensemble. Voice pedagogy explains the singing process, the science of how singing works, and how singing techniques and musical concepts are understood refined, and accomplished in vocal performance. Students of singing might participate in formal training through individual voice lessons, voice class, or the choral ensemble (Boytim, 2003). In the choral ensemble the choir director is typically the voice teacher. It is common in many cases that a voice teacher is also a choral conductor and is actively involved in both teaching roles simultaneously (Olsen, 2010).

Although singing has occurred throughout history (Koopman, 1999), the first formal method of voice instruction, referred to as bel canto (Pilotto, 2009), was developed with the rise of Opera in the 16th century but was not based on laws of science. In 1855, Manuel Garcia II invented the laryngoscope, a device that included an angled mirror that allowed the vocal folds to be view by the human eye for the first time (Duey, 1951). The laryngoscope made development of a voice pedagogy based on the laws of science possible.

Vocal teachers over time developed a pedagogy that emphasized aspects for correct singing that included posture, respiration, onset, tone, resonance, formant, articulation, and vibrato. When practiced correctly, these aspects of singing lead to good vocal technique and healthy singing. Choral conductors generally aspire to the same items of technique when
teaching in the choral setting; however, since the conductor is simultaneously dealing with multiple voice types and larger numbers of singers, he/she might approach vocal instruction in a different way, i.e. through choral pedagogy.

Choral pedagogy is a combination of voice pedagogy, choral conducting, and voice science (Smith & Sataloff, 2006). In order to produce a quality sound using precise rhythmic articulation, the choral ensemble is dependent on the conductor to coordinate many of the vocal techniques that the solo vocalist controls himself. Some items of voice technique that choral conductors may treat differently include posture, respiration, phonation, tone color, vibrato, coordination and onset.

Statement of the Problem

Some voice teachers are critical of how choral conductors teach voice technique in choral performance. A contingent of voice teachers over the past few decades feels strongly that singing in ensembles is not healthy for developing voices (Davids & LaTour, 2012). In 1964, the American Academy of Teachers of Singing stated in a “Pronouncement” in the Journal of Singing that singing in choral ensembles might be detrimental to the technique and/or vocal health of the student. This premise continued to be supported in 2005 when the National Association of Teachers of Singing (NATS) updated the pronouncement.

Many voice teachers are also choral conductors and vice versa. Some may teach proper voice techniques in the voice studio and then alter those techniques in the choral rehearsal and some choral conductors may teach proper choral pedagogy to their ensembles and alter techniques in the voice studio. This brings to light a significant area for concern - practicing choral conductors may not have a thorough understanding of voice pedagogy and vocal teachers who are conducting choirs may not have a thorough understanding of choral pedagogy.
Although voice teachers have stated their concerns in this matter, choral directors have not. Therefore, the purpose of this study was to investigate and describe choral directors’ perceptions regarding voice pedagogy and choral. The following research questions were examined:

1. What are choral directors’ perceptions regarding techniques of voice and choral production supported by vocal and choral pedagogues?

2. To what degree do most choral directors use solo vocal training techniques in choral rehearsals?

3. To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

4. Do perceptions among choral directors differ by educational preparation of the choral director (conducting degree, voice degree, both conducting and voice degrees, other degree)?

**Methodology**

*Design.* A descriptive research design was appropriate for this study because it describes the facts and characteristics of a population in an ordered way (Issac and Michael (1995)). A questionnaire was used to survey a sample of experienced high school and collegiate choral conductors to investigate their perceptions of voice and choral pedagogy and to determine the degree to which these perceptions differ by educational preparation.

*Participants.* The participants for the study were active high school and/or collegiate choral conductors who are current members of the American Choral Directors Association (ACDA) (as per 2017 membership roster).
Data collection tool. A questionnaire, consisting of 11 questions, was designed by the researcher to collect data. The first 5 questions collected demographic information from the participants. The last 6 questions required the choral conductors reflect on their training to answer questions regarding their understanding of voice and choral pedagogies, their usage of voice and choral pedagogies in the choral rehearsal, and their professional assessment as to how choral singing affects solo voice technique and vocal health.

To determine the content validity (CVI) of the questionnaire, a panel of experts comprised of two choral conductors and one voice teacher was chosen to review and evaluate the questions used on the questionnaire (see Appendix C). Nine of the questions were not measureable for content validity because they collected demographic data. On questions involving demographic data, the panel of experts was requested to evaluate the question based on whether or not the question was appropriate for usage. All nine questions were unanimously deemed appropriate for usage. A number of suggestions concerning sentence structure and/or updated vocabulary usage were made to these questions.

Content validity was measureable on two questions, both of which contained multiple responses. The panel responded to the appropriateness of these questions by using a five-point scale: (1) No relevance to construct, (2) Minimal relevance to construct, (3) Moderate relevance to construct, (4) High relevance to construct, (5) Very high relevance to construct. No rating below 3.00 was used for the two sets of questions that were content-based. The majority of mean ratings were above 4.00 or High relevance to construct, thereby indicating that the content experts viewed the items on the instrument favorably with respect to content validity.

A pilot study was conducted using a random sample of active high school and/or
collegiate choral conductors (n=20) from the Pennsylvania Music Educators Association (PMEA) to determine the reliability and clarity of the researcher-designed questionnaire (Appendix D). Participants were sent requests to complete the questionnaire three times over a three-week period. Nine participants responded to the request; however, three of the nine who responded did not complete the entire questionnaire and therefore their responses were eliminated from analysis. The data collection instrument was tested for reliability using the Cronbach’s Alpha coefficient for the 31 items on the tool. The reliability coefficient was very satisfactory at r=.73. After an item-by-item analysis, adjustments were made to the tool to provide clarity in the main study (Appendix D).

Procedure. Data collection for the main study was collected electronically using a website service called SurveyMonkey. Potential participants (n=336) were sent an invitation to participate via U.S. Postal service. The invitation contained a URL that participants could insert into their browser to take them directly to the questionnaire. An introductory page was included on the questionnaire that contained a thank-you. Two first-class mailings were sent to the participants. Two weeks after the first mailing, a second mailing was sent reminding participants of the invitation and encouraging them to participate. At the end of the second week, the website was closed to participation.

Data analysis. Participants were given four weeks in which to respond to the questionnaire, after which responses were compiled for data analysis. Descriptive data were then analyzed using SPSS to determine group percentages and means for questions 1, 2, and 3. Chi Square was used to analyze responses to question 4 to determine probability levels.

Results
Seventy (21%) of the 336 choral directors participated. Of these, seven did not fully complete the questionnaire and therefore were eliminated from the study. The final sample used for data analysis was n=63, for a response rate of 18.75%.

Demographic results indicated that: 11% of respondents had a degree in Choral Conducting, 40% a degree in Music Education (either a vocal concentrate or another concentrate), 27% had degrees in both Choral Conducting and Music Education, 19% had a degree in Voice Performance, and two respondents no degree in any of these training areas. The levels of choirs conducted by participants were pretty evenly split with 54% in collegiate settings and 46% in high school. The years of experience as a Choral Conductor spanned the spectrum of response options offered on the questionnaire. Thirty-seven percent or 26 choral directors had more than 30 years of experience. At the other end of the spectrum, nine percent or six had 5 or fewer years of experience. After a comparison of questionnaire responses from early and late respondents, no significant difference in responses was found indicating no bias in the sample.

Research Question 1: What are choral directors’ perceptions regarding techniques of voice and choral production that are supported by vocal and choral pedagogues?

A majority of choral conductors responded with “Agree” on fourteen of the nineteen statements. The statement regarding the negative effects on vocal health from the usage of straight tone, was the only question to receive less than 50% of agreement (47%): therefore, a majority of choral conductors were in agreement with all questions regarding voice pedagogy except for the usage of straight tone.

Research Question 2: To what degree do most choral directors use solo vocal training techniques in choral rehearsals?

Results indicate that a majority of conductors used Breathing (97%), Tone Color (96%),
Phonation (84%), Body Alignment (87%), Resonance (84%), and Vocal Health (78%), Coordination (68%), Balanced Onset (50%), and Vibrato (50%) in the choral rehearsal. Formant (36%) and Straight Tone (32%) are used infrequently; therefore, the majority of choral directors used solo vocal training techniques most of the time in their rehearsals while only one in three used Formant and Straight Tone in their rehearsals.

Research Question 3: To what degree do choral directors perceive that choral singing alters the solo singer’s vocal technique and/or affects the singer’s vocal health?

Choral conductors (83% of respondents) feel that choral singing alters the solo singer’s vocal technique with a majority feeling that it has a positive impact. Fifty-five percent felt that choral singing alters the solo singer’s vocal health in a negative way with a majority feeling that it has a positive impact.

Research Question 4: Do perceptions among choral directors differ by educational preparation of the choral conductor?

Based on the data, respondents were classified into four groups based on their major degree in college. After conducting Chi Square Analyses on the 19 areas that measured the Perceptions of Choral Conductors Regarding Solo Vocal Pedagogy and Choral Pedagogy, no statistically significant differences were found among these four groups on any of the 19 statements. Chi Square Analyses were then conducted on the 11 areas that measure the usage of solo voice techniques in the choral rehearsal. No statistically significant differences were found among the four groups on any of the 11 techniques used. Therefore, educational preparation of the choral conductor does not affect their perceptions of Solo Vocal Pedagogy and Choral Pedagogy.

Limitations
Participants in this study were limited to active high school and collegiate conductors in the United States who were members of ACDA. The results of the study, therefore, should not be generalized to conductors outside of the membership of this organization.

In addition, the questionnaire was mailed to participants at their school addresses in the summer. It is possible that some in the sample did not receive the mailing. Therefore, the possibility exists, depending on the summer commitments of participants, that participation in the study for some was not possible because some may not have received the mailing. It is reasonable to assume that if the questionnaire had been mailed during the spring semester, more participants may have been able to participate thus creating a larger sample that might better represent the population. The timing of the distribution of a questionnaire should be considered more carefully for future research.

Discussion

Results from this study indicated that the majority of choral conductors share the same perspectives as vocal pedagogues about most aspects of voice and choral pedagogy techniques. Literature in this study including the Proclamations of 1964 (American Academy of Teachers of Singers) and 2005 (National Association of Teachers of Singing) suggested that voice teachers also align in their perspectives about vocal and choral pedagogy with vocal pedagogues; therefore, the observation was made that voice teachers, choral conductors, and vocal pedagogues all seem to share many of the same perspectives regarding vocal and choral pedagogy.

Smith & Sataloff (2006) stated a scarcity of scientific research exists to date regarding the effects of choral singing on the techniques and health of the voice (Smith & Sataloff, 2006). This suggests that earlier claims made by some voice teachers (Wrolstad, 1979; Von Ellefson.
1996) and by some voice teacher organizations (AATS and NATS) that choral singing was harmful to vocal health and technique were premature; therefore, it is reasonable to assume, based on choral directors’ perspective revealed by this study, that conflict between choral directors and voice teachers in high schools and in collegiate settings need not exist regarding the teaching of the basic principles of singing.

Secondly, choral directors’ responses regarding how they attend to these techniques in the choral rehearsals are aligned with their perspectives of vocal and choral pedagogy. A majority of choral directors report they address breathing, tone color, phonation, body alignment, resonance, vocal health and coordination 68-98 percent of the time in rehearsals. This means that 7 of 11 vocal techniques likely taught by voice teachers in studio lessons are also considered by choral directors in this study to be appropriate for the choral rehearsal. Vennard (1964) and Olsen (2010) suggested that choral directors might approach the tenets of vocal instruction differently in the choral rehearsal, but it would seem that if choral directors and voice teachers have shared perspectives on these seven individual voice techniques, then solo vocal techniques are reinforced when taught in choral rehearsals.

Major choral pedagogues (McKinney, 1994; Miller, 1996; Vennard, 1964) all strongly support the idea that the coordination aspect of singing, which leads to healthy phonation, involves breath, onset, and eventually release of tone and needs to be addressed in all singing. Results from this study indicated that 68% of choral directors teach Coordination most of the time and 50% indicated teaching Balanced Onset most of the time. Since onset is a significant part of the coordination process in singing, it would be reasonable to assume that Onset would be taught at least as much as Coordination. Also, when asked to respond as to level of agreement for item number 6 on the questionnaire to the statement, “The choral conductor synchronizes the
collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble”, 79% of choral conductors indicated that they agreed but on the statement, “The most accurate type of onset is balanced onset,” only 56% of conductors were in agreement. Vocal pedagogues such as McKinney (1994) and Miller (1996) stressed the importance of the use balanced onset for all phonation and defined it exactly as it was stated in the questionnaire. It is curious that 79% agree with the statement for balanced onset but only 56% feel that it is the most accurate type of onset.

In similar fashion, only 36% of choral conductors indicated teaching Formant most of the time in rehearsals, yet when responding to the statement in number 6, “Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique”, 92% agreed with the statement. In addition, 64% agreed when responding to “Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity”. All vocal pedagogues listed in Appendix A are in support of teaching students to sing with formant. Once again, it is curious that only 36% of choral conductors teach formant, yet 92% feel that it is necessary to sing with formant.

A conclusive answer for these inconsistencies is not apparent. One possibility is that not all choral conductors have a thorough understanding of the meanings of onset and formant. If this is the case, choral conductor’s perspectives on questions involving onset and formant may not be accurate. Another possible answer is that since some statements use both of these words in combination with other techniques, it is reasonable to assume that some choral conductors may have decided on their answer without full consideration for all of the terms in the statement.
If that were the case, once again some choral conductors’ perspectives on questions using these terms may have been different.

In a third observation, data reveal some choral conductors are less in agreement with consensus of major pedagogues regarding vibrato, straight tone, and vocal fatigue. This finding is supported in the literature through numerous studies (Bretos & Sundberg, 2003; Daugherty, 2001; Doscher, 1989; Dromey, Carter & Hopkins, 2003; Nair, 1999; Nix, 2013; Prame, 1997; Shipp, Doherty & Haglund, 1990). Results from this study are somewhat convoluted regarding these three interconnected techniques because the percentages in the response do not align. For instance, in responding to statements of consensus in question 6 of the questionnaire, 83% of conductors agreed that vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction but only 50% of conductors addressed vocal health in *most* rehearsals; 90% agreed that singers have a limited number of hours in the day in which they can sing before compromising vocal health but results also indicated that only 78% of choral conductors addressed vocal health in *most* rehearsals; and 46% agreed that usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health but only 32% addressed straight tone in *most* rehearsals. Doscher (1989), Titze (1999), and Olson (2010) among other vocal pedagogues strongly warn against the used of straight tone due to the potential vocal harm to the voice.

Although the majority of choral conductors believed that vocal health is important and indicated that they address it frequently in choral rehearsal, the two vocal techniques (vibrato and straight tone) that have a great deal of impact on vocal health are the two least addressed techniques in the choral rehearsal. This suggests that possibly many choral conductors are not
aware of the vocal health risks associated with the use of straight tone or with minimal use of vibrato.

The fourth item for discussion considers the perceptions of choral directors regarding the impact of the usage of vocal techniques in the choral rehearsal. Whereas the Proclamation of 1964 as well as the restatement of that Proclamation in 2005 by professional voice teacher associations made strong claims that choral singing had negative effects on solo vocal technique and health, results in this study indicated overwhelmingly that the majority of conductors feel choral singing has no negative impact on voice technique. Most felt that choral singing actually had a positive impact on voice technique. This does not align with voice teacher concerns stated in the Proclamations, and to the best knowledge of this researcher, no other research results suggest that choral singing improves solo singing technique. A large majority also indicated that they felt that singers incurred no damage to vocal health through choral singing and almost half felt that choral singing had a positive impact on vocal health. These results suggested that the majority of choral conductors felt that pedagogies used in their rehearsals were good for vocal technique and vocal health. They also implied that a majority of choral conductors do not share the claims made by the American Academy of Teachers of Singing or the National Association of Teachers of Singing that choral singing can be damaging to vocal technique and/or vocal health.

Finally, results from this study yielded no significant differences based on participants’ educational background on any of the 19 statements that measured perceptions of choral conductors regarding solo voice pedagogy and choral pedagogy. This implied that the perceptions among choral conductors regarding vocal techniques are more alike than different; choral conductors with degrees in Conducting, Conducting and Music Education, Music
Education, and Voice Performance had similar perspectives on vocal techniques. One should not assume, however, that conductors with these perceptions shared the same qualifications or have the ability to teach vocal techniques effectively in the choral rehearsals.

Recommendations for Future Research

Further research is recommended to further clarify perceptions that still exist between some techniques of vocal and choral pedagogies. The first recommendation is to replicate this study by revising the section of the questionnaire concerning the educational background of the choral conductor. In the current study, the option to “select all that apply” convoluted the attempt to create clearly defined groups for statistical analysis. For instance, after establishing groups based on all the combinations of participant degrees from the data, some groups emerged that were too few in number to be usable in an effective way in some statistical measures (in this case, Chi Square). Rather than allowing participants to check all that apply, it would be recommended that a set group of generalized degree combinations be offered from which a participant would make one choice. This would help compensate for group sizes when smaller numbers of participants in the sample occur.

Secondly, although the population for this study encompassed all states in the United States, ACDA represents only a portion of high school and collegiate conductors in this country (N=2610). It would be recommended to replicate the study using a larger population. For instance, with a membership of over 130,000 members, the National Association for Music Education (NAfME) would yield a larger population of high school and collegiate choral conductors than the ACDA membership, and therefore larger sample size. For the sake of comparison, in comparing the Pennsylvania membership of NAfME and ACDA state members, the researcher found that the number high school and collegiate choral directors that are
members of NA/ME alone is larger than the national membership of ACDA. Another replication
might include membership of Chorus America, an organization comprised of members
representing mostly community and church choirs. Since this organization would include an
older membership, possible differences in perspectives of the problem might surface. And
finally, this study only included directors in the United States. In order to form a more
comprehensive understanding of all active choral directors’ perspectives, replication in foreign
countries might produce differences in perspectives based on cultural differences.

In this study, the focus of query was on the choral conductor’s perspective. Voice
teachers formally stated their concerns about choral singing in 1964 and reaffirmed their
concerns in modified form in 1995 and 2005. It would seem helpful to know if voice teachers
feel the same about the effects of choral singing on solo singing at this point in time. Comparing
perspectives of voice teachers and choral conductors regarding choral and solo singing at this
point in time would provide information pertinent to what path both groups need to follow in
order to better unify their approaches to singing in the future.

Results from data collection indicate that vibrato, straight tone, and vocal fatigue are
three techniques about which some vocal teachers and some choral conductors disagree. Since
this conflict still exists between some voice teachers and some choral conductors, a third
recommendation is that further research be conducted utilizing recently developed instruments in
voice science to further clarify the parameters of vibrato control. This clarification will help
determine the degree to which singers can safely replace the usage of straight tone in
compositions in which choral conductors strive for historical authenticity in choral style, tone,
and intonation. The question needs to be answered as to whether vocal health or choral style and
techniques are most important.
It would be valuable to know whether years of experience influence the choral conductor’s perspective of vocal and choral pedagogy, especially on vibrato, straight tone, and vocal fatigue. To create a sample of choral conductors in layers of experience, for instance - first, fifteen, and thirtieth years of conducting - to reveal if and how choral conductor attitudes might be different regarding vibrato, straight tone, and vocal fatigue. The results from such a study might have implications for program preparation for pre-service teachers at colleges and universities.

Since professional music organizations such as ACDA and NAfME have policy against allowing the use of email addresses for outside contact, researchers wishing to contact professional membership for purposes of research have to resort to using US Postal ground mailing addresses to contact potential participants. Due to the multiple instances of human handling involved in this process, the possibility of some mail not researching participants exists. Twenty-four letters mailed to participants by this researcher were returned “not deliverable”. Email addresses however, generally follow the holder of the address whether the person has moved or simply is away from their place of residence and would be a more reliable means for contacting participants. This researcher has voiced concern to ACDA and PMEA as to why an exception to this rule cannot be granted for research since research is generally beneficial to the membership.

Also, it is important to consider the time that data collection occurs in a study that involves faculty in an academic setting. There are times of the year when it is more likely that choral conductors, for example, are not available due to professional commitments such as conferences, festivals, or summer programs, and therefore as less likely to participate. For choral conductors, perhaps initiating data collection in the fall or winter academic semesters would
yield a higher number of participants because faculty is in-session fulfilling their professional teaching duties at their place of employment

*Implications for Practice*

The main aim of this study was to learn choral directors’ perspectives about voice pedagogy and choral pedagogy. Voice teachers view voice pedagogy through the eyes of vocal pedagogues who have abundantly published their perspectives. Because voice teachers have been critical of the choral conductor’s knowledge about vocal pedagogy, it is necessary for all those involved in the teaching of singing to know what choral conductors believe and practice so that a common set of singing techniques can be recognized and taught to singers in a consistent and vocally safe manner. If this type of rationale is adopted, solo singers and choral singers should receive basic vocal instruction that is mutually reinforced by both the voice teacher and the choral conductor.

The results of this study confirm that 53 years after concerns over this issue was first stated in 1964, voice teachers and choral conductors still remain opposed in their beliefs regarding vibrato, straight tone, and vocal fatigue. Since 1964, verification of vocal health damage associated with the use vibrato, straight tone and vocal fatigue has been supported through studies in voice science (Nix, 2013). Yet, some choral conductors continue to use it.

Perhaps voice science will be an aid in working towards this goal. More resent research in voice science has unveiled new information regarding straight tone, vibrato, and excessive singing. Both choral conductors and voice teachers would benefit from learning about some of the results of these studies. Prame (1997), Nair (1999), and Bretos & Sundbert (2003) have all conducted studies on vibrato exploring vibrato rates, vibrato extent, and control. Prame’s (1997) discovery that vibrato rate and extent can be controlled might enable the choral director not to
call for straight tone on compositions where historical style period calls for pure sounds. If wide
vibratos and fast vibratos can be controlled, it is reasonable to assume that the resultant unified
tone and improved intonation might make straight tone a nonentity in choral singing. The use of
controlled vibrato in these instances would contribute to healthier singing and would alleviate the
concerns of Corbin (1982), Doscher (1989), Titze (2000), and many others regarding the abusive
nature of straight tone to the vocal folds.

Choral directors need to recognize the potential physical harm to the voice as a result of
using extreme tessitura and dynamics as well as long rehearsals. Evidence has been presented
through voice science that abusive levels and duration of phonation is harmful to the voice.
Choral conductors need to consider appropriate difficulty levels in repertoire with respect to
tessitura and dynamics that appropriately accommodate every singer at their stage of
development at a given point in time, i.e. elimination of the “one size fits all” attitude or maybe a
required standard repertoire list does not work for everyone from a vocal health standpoint. All
teachers of singing need to consider new ideas for time lines regarding the preparation of music
for performance in order to avoid vocal fatigue and the resultant vocal damage caused by
traditional rehearsal marathons before concerts and recitals.

Finally, choral directors and voice teachers should be made aware of the use of other
scientific instruments now available to study vocal fatigue. For instance, the Ambulatory
Phonation Monitor (APM), used in a study in 2011 by Daugherty, Manternach, & Price, is
capable of monitoring the number of phonation cycles that occur during rehearsals and out of
rehearsals. It is reasonable to assume that devises such as this could provide parameters that
might help control fatigue in choral performance in the future.

Conclusion
This research study explored choral directors’ perceptions of vocal pedagogy and choral pedagogy, examined three areas of vocal pedagogy that could be harmful to the voice, and investigated what effect the education backgrounds of conductors might have on their perspectives of vocal and choral pedagogies. Data collected from the questionnaire indicated that perceptions of choral directors regarding vocal and choral pedagogy are very similarly aligned to the consensus of major vocal pedagogues. Data also indicated the choral conductors do not agree with voice teachers regarding the effect of choral singing on vocal technique and vocal health. Based on the responses, choral directors feel that not only does choral singing not have a negative effect on vocal technique and vocal health, but the majority feel that choral singing improves vocal technique and vocal health. Responses from the questionnaire also indicated choral conductors’ perspectives on vocal and choral pedagogy did not differ based on the educational background of the choral conductor.

Although choral conductors shared views similar to the majority of vocal and choral pedagogies, I remain very concerned about the three aspects of choral pedagogy that emerged in which some choral conductors and voice teachers disagree, i.e. vibrato, straight tone, and vocal fatigue. Voice science reveals that misuse of any of these three can lead to vocal damage, yet some choral directors use straight tone in their ensembles and rehearse extended periods of time leading to vocal fatigue. It is of the essence that further research be undertaken to determine the appropriateness of using these techniques in the choral rehearsal and the degree to which the voice can be harmed through their use.
References


Appendix A

VOCAL OR CHORAL PEDAGOGY TEXTBOOKS

Joan Boytim (2003), *The Private Voice Student Handbook*

Alan Gumm (2009), *Making More Sense of How to Sing*

Barbara Conable/James Jordon (2000), *Structures and Movement of Breathing*

Scott McCoy (2012). *Your Voice: An Inside View*

James McKinney (1994), *The Diagnosis and Correction of Vocal Faults*

Richard Miller (2002), *National Schools of Singing*

Richard Miller (1996), *On the Art of Singing*

Richard Miller (2004), *Solutions for Singers*

Richard Miller (1996), *The Structure of Singing*

Robert Sataloff (2005), *Voice Science*

Johan Sundberg (1987), *The Science of the Singing Voice*

Leo Thurman & Graham Welch (2000), *Bodymind & Voice - Foundations of Voice Education*

Ingo Titze (1994), *Principles of Voice Production*

William Vennard (1967), *SINGING: The Mechanism and the Technic*
Appendix B

VOCAL TECHNIQUES AND CHORAL TECHNIQUES

1. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.

2. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.

3. The most accurate type of onset is balanced onset.

4. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.

5. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.

6. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.

7. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.

8. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.

9. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.

10. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.
11. Singers have a limited number of hours in the day in which they can sing before compromising vocal health.

12. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.

13. Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.

14. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.

15. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.

16. Choral conductors should be well-versed in voice pedagogy.

17. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.

18. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.

19. The conductor, through instruction and conducing gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.
Appendix C

CHORAL DIRECTOR QUESTIONNAIRE
First Version

Section One: General Information

1. Questionnaire Completion Date MM/DD/YYYY

2. State - Drop Down Menu for State Selection

Section Two: Background of the Choral Director

3. Indicate which of the following option(s) describe your training. Please check all that apply:
   __ I have a degree(s) in choral conducting.
   __ I have a degree(s) in voice (either performance, music education, or vocal pedagogy).
   __ My degree(s) are not in choral conducting, voice, or vocal pedagogy.

4. Choose the answer that best indicates your years of experience as a choral conductor.
   __ 1-10 years
   __ 11-20 years
   __ 21-30 years
   __ more than 30 years

5. Which of the following best indicates your area of activity as a choral teacher/conductor?
   __ High School
   __ College/University

Section Three: Voice and Choral Techniques

6. Please indicate whether each of the following statements about voice or choral pedagogy is representative of your perspective for that statement. Answer either “Agree” or “Disagree, Don’t Know”.

   1. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.
   2. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.
   3. The most preferred type of onset is balanced onset.
4. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.
5. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.
6. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.
7. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.
8. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.
9. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.
10. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.
11. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.
12. Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.
13. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.
14. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.
15. Choral conductors should be well-versed in voice pedagogy.
16. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.
17. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.
18. The conductor, through instruction and conducting gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.

Section Four: Voice Techniques in the Choral Rehearsal

7. Please indicate whether you address the following items in the choral rehearsal using solo vocal training. Answer either “Yes” or “No”.

12. Body Alignment
13. Breathing
14. Phonation
15. Balanced onset
16. Resonance
17. Tone Color
18. Formant
19. Coordination
20. Vibrato
21. Straight Tone
22. Vocal Health

Section Five: Concluding Postures

8. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous question will alter solo singing technique? Answer “Yes” or “No”.

9. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous questions will be damaging to vocal health? Answer “Yes” or “No”.

Appendix D

CHORAL DIRECTOR QUESTIONNAIRE
Second Version

Section One: Welcome to My Survey

Thank you for participating in my study by completing this questionnaire!

Your feedback is important; therefore, please be sure to answer all questions. Incomplete questionnaires cannot be used in the study. The average time to complete the questionnaire is 5 minutes. There are six pages in the questionnaire. You will need to click "NEXT" to advance to each page. The following represents the format of the questionnaire:

P. 1 Introduction

P. 2 General Information- 2 questions

P. 3 Background of the Choral Conductor- 3 questions

P. 4 Vocal and Choral Techniques- 1 question with multiple responses

P. 5 Vocal Techniques in the Choral Rehearsal- 1 question with multiple responses

P. 6 Concluding Postures- 2 questions

Section Two: General Information

10. Questionnaire Completion Date- MM/DD/YYYY

11. State- Drop Down Menu for State Selection

Section Three: Background of the Choral Director

12. Indicate which of the following option(s) describe your training. Please check all that apply:
   ___ I have a degree(s) in choral conducting.
   ___ I have a degree(s) in music education- vocal concentration
   ___ I have a degree(s) in music education- non-vocal concentration
   ___ I have a degree(s) in voice performance
   ___ I have a degree(s) in vocal pedagogy
My degree(s) are not in choral conducting, music education, voice, or vocal pedagogy.

13. Choose the answer that best indicates your years of experience as a choral conductor:
   ___ 1-5 years
   ___ 6-10 years
   ___ 11-15 years
   ___ 16-20 years
   ___ 21-25 years
   ___ 26-30 years
   ___ more than 30 years

14. Which of the following best indicates the level of choirs you have conducted as a choral teacher/conductor?
   ___ High School
   ___ College/University

Section Four: Voice and Choral Techniques

15. Please indicate whether each of the following statements about voice or choral pedagogy is representative of your perspective for that statement. Answer either “Agree” or “Disagree, Don’t Know”/  

20. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.
21. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.
22. The most accurate type of onset is balanced onset.
23. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.
24. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.
25. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.
26. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.
27. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.
28. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.
29. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.
30. Singers have a limited number of hours in the day in which they can sing before compromising vocal health.
31. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.

32. Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.

33. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.

34. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.

35. Choral conductors should be well-versed in voice pedagogy.

36. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.

37. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.

38. The conductor, through instruction and conducing gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.

Section Five: Voice Techniques in the Choral Rehearsal

39. Please indicate whether you address the following items in the choral rehearsal using solo vocal training techniques. Answer using the provided Likert scale for each item:

   ___Every Rehearsal, ___Most Rehearsals, ___Few Rehearsal, ___Never

23. Body Alignment
24. Breathing
25. Phonation
26. Balanced onset
27. Resonance
28. Tone Color
29. Formant
30. Coordination
31. Vibrato
32. Straight Tone
33. Vocal Health

Section Six: Concluding Postures

8. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous question will alter solo singing technique? Answer using the following Likert scale:

   ___much positive impact
   ___some positive impact
   ___no impact
   ___some negative impact
9. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous questions will be damaging to vocal health? Answer using the following Likert scale:

___ much positive impact
___ some positive impact
___ no impact
___ some negative impact
___ much negative impact

Please use the optional response box provided if you wish to provide comments or clarifications on this question.
Appendix E

CHORAL DIRECTOR QUESTIONNAIRE
Third Version

Section One: Welcome to My Survey

Thank you for participating in my study by completing this questionnaire!

Your feedback is important; therefore, please be sure to answer all questions. Incomplete questionnaires cannot be used in the study. The average time to complete the questionnaire is 5 minutes. There are six pages in the questionnaire. You will need to click "NEXT" to advance to each page. The following represents the format of the questionnaire:

P. 1 Introduction

P. 2 General Information- 2 questions

P. 3 Background of the Choral Conductor- 3 questions

P. 4 Vocal and Choral Techniques- 1 question with multiple responses

P. 5 Vocal Techniques in the Choral Rehearsal- 1 question with multiple responses

P. 6 Concluding Postures- 2 questions

Section Two: General Information

16. Questionnaire Completion Date- MM/DD/YYYY

17. State- Drop Down Menu for State Selection

Section Three: Background of the Choral Director

18. Indicate which of the following option(s) describe your training. Please check all that apply:
   ___ I have a degree(s) in choral conducting.
   ___ I have a degree(s) in music education- vocal concentration
   ___ I have a degree(s) in music education- non-vocal concentration
   ___ I have a degree(s) in voice performance
   ___ I have a degree(s) in vocal pedagogy
   ___ My degree(s) are not in choral conducting, music education, voice, or vocal pedagogy.
19. Choose the answer that best indicates your years of experience as a choral conductor:
   ___ 1-5 years
   ___ 6-10 years
   ___ 11-15 years
   ___ 16-20 years
   ___ 21-25 years
   ___ 26-30 years
   ___ more than 30 years

20. Which of the following best indicates the level of choirs you have conducted as a choral teacher/conductor?
   ___ High School
   ___ College/University

Section Four: Voice and Choral Techniques

21. Please indicate whether each of the following statements about voice or choral pedagogy is representative of your perspective for that statement. Answer either “Agree” or “Disagree, Don’t Know”:

40. Good body alignment for singing can be achieved by maintaining an imaginary straight line from the top center of the head extending through the center high point of the hip bone and ending at the bottom center part of the foot.

41. During inhalation, a downward movement of the diaphragm fills the lungs with air that results in an expansion of the front, sides, and back of the midsection.

42. The most accurate type of onset is balanced onset.

43. Resonance is the quality and intensity of the sound that is produced by the resonating cavities as a result of phonation.

44. Formants are acoustic peaks of resonating frequencies that occur on certain pitches as a result of the shape of the resonating cavity.

45. Phonation occurs through a combination of actions of the vibrator (or vocal folds) and the resonating system.

46. Good classical vocal technique is a result of optimal coordination of breath, tone, and articulation.

47. Vibrato is a natural occurrence that emerges as a singer matures physically and evolves with proper vocal instruction.

48. Usage of straight tone, i.e. singing with minimal vibrato by singers in the choral ensemble can have negative effects on vocal health.

49. Singers have a limited number of hours in the day in which they can sing before compromising healthy technique.

50. Singers have a limited number of hours in the day in which they can sing before compromising vocal health.

51. Singing in a choral ensemble using an extreme tessitura, dynamic range, or limiting vocal color can be excessively taxing on the voice, especially for the inexperienced singer.
52. Singing choral repertoire that technically or musically is too difficult for a developing singer can be harmful to the voice.
53. Choral conductors are teachers of vocal technique in the choral setting and therefore should be well-trained vocalists.
54. Vocal exercises that emphasize breathing, onset and release, resonance, vowel color, diction, and singers’ formant are all necessary so that the singing apparatus as a whole can reach the epitome of classical technique.
55. Choral conductors should be well-versed in voice pedagogy.
56. The choral conductor synchronizes the collective coordination of respiration, onset, articulation, and vibrato for all of the singers in the choral ensemble.
57. Suspension is that brief moment between inhalation and onset where the singer is preparing the breath for phonation.
58. The conductor, through instruction and conducting gestures, attempts to control resonance, formant, and timbre in order to create a ‘blended’ choral sound.

Section Five: Voice Techniques in the Choral Rehearsal

59. Please indicate whether you address the following items in the choral rehearsal using solo vocal training techniques. Answer using the provided Likert scale for each item:

___Every Rehearsal, ___Most Rehearsals, ___Few Rehearsal, ___Never

34. Body Alignment
35. Breathing
36. Phonation
37. Balanced onset
38. Resonance
39. Tone Color
40. Formant
41. Coordination
42. Vibrato
43. Straight Tone
44. Vocal Health

Section Six: Concluding Postures

10. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous question will alter solo singing technique? Answer using the following Likert scale:

___much positive impact
___some positive impact
___no impact
___some negative impact
___much negative impact
11. In the choral rehearsal, do you feel that the usage of the techniques referenced in the previous questions will be damaging to vocal health? Answer using the following Likert scale:

___ much positive impact
___ some positive impact
___ no impact
___ some negative impact
___ much negative impact

Please use the optional response box provided if you wish to provide comments or clarifications on this question.
Appendix F

COMMENTS ABOUT ALTERING SOLO SINGING

Vocal pedagogy is an important aspect of my teaching and I feel qualified to address it regularly in rehearsal.

Using solo vocal technique for rehearsals allow that technique to be reinforced. In regards to blending and balance, it allows the student to become aware of what needs to be altered/changed between solo and choral singing and learn how to do that in a healthy way that does not produce tension or bad habits.

The solo singer has a much different "sense of voice" than the same person as a choral singer.

The degree of impact is quite often based on singer maturity and vocal development.

Singers need to know that sometimes they have to sing with different tone in choir than they do as soloists, and they need to know what that difference is and how to do it healthily.

No choir can sing all styles of choral music equally well. Different styles require different tonal characteristics. Each individual singer's vocal health is paramount.

My philosophy is that good singing is good singing. Training occurs so that a person's natural abilities can be shaped to fit many different styles of singing, including choral and solo work.

Much of the impact of using those techniques depends on the maturity and memory of the singers themselves.

It depends on how much training one has as a soloist.

In small rural schools, with administrative pressure on music classes and declining student participation, choices have to be made concerning how much/little time is spent on techniques. Knowing those are important is one thing; emphasizing them every day may be "overkill". Sometimes students just want to sing!

Good technique is good technique! I don't believe in choral versus solo technique!

For my students, it can be hard for them to strive for a brighter sound in solo singing, since we use a much darker sound in the choral rehearsal.

Consistency and repetition of good singing habits can only help solidify good vocal technique.
Asking students to sing with a completely straight tone or to hold back very high notes for the sake of blend and balance I believe can have a negative impact on full vocal technique development.

Activities are related, obviously. Activities for one and for many require different pedagogy, obviously.

Proper classical training will allow a singer to easily produce an operatic vibrato or a straight choral tone with no harm to his vocal health.

**COMMENTS ABOUT DAMAGING VOCAL HEALTH**

In terms of damaging vocal health, the choral directors wrote the following comments on their questionnaires.

Basic good singing technique is needed regardless of the style, genre, etc. you are performing.

Excessive straight tone, or a heavy and pushed vibrant tone can bring strain on the voice. I believe that different styles of music might require a slightly different tone or vowel shape, but a healthy vocal technique can still be maintained. Teaching students how to vary the wrapping paper while keeping the contents the same is challenging, especially for novice singers.

I do not think pedagogical techniques in the choral rehearsal will have a negative impact on vocal health if they are taught and practiced correctly.

I do not understand how to answer this question. All techniques listed would build vocal health, except for the term straight-tone. Insisting on no vibration at all can cause laryngeal tension. It is a matter of adjusting the quality of the vibrato, not eliminating it entirely.

I rarely think that there is time to teach this much technique in a choral rehearsal. One needs to be careful about using terms that may not be totally understood at the risk of singers trying things without specific reinforcement.

I think it would depend of how the techniques are taught and developed.

Some singers with vocal training tend to overusing in a choral setting.

Straight tone I would think would be the most damaging or strenuous.

Teaching and using healthy vocal techniques in the choral rehearsal should not be damaging to singers' vocal health. The challenge for the choir director is to devise/utilize
warm-up exercises that will teach healthy vocal technique to as many choir members as possible. This is difficult because of the varying individual needs of the choir members--choir members that include male and female, high and low, heavy and light.

The techniques referenced will not be damaging to vocal health but are necessary to maintain vocal health.

There are many ways to sing healthily. The idea that only soloistic, bel canto, operatic singing is the only way to sing healthily is nonsense. The world is full of people who sing many different ways and are able to maintain vocal health.

These techniques do not damage the voice. Use of "straight tone" could imply use of pushing with a chest voice to some adolescents, but that is just the students imitating what they hear on the radio. I feel that if pushing is addressed, it helps students to relax their vocal technique.

Vocal control is an important aspect of vocal technique. Healthy production with "middle of the road" volume, color and vibrato produces healthy singing. Choral singers can sing in this manner without damaging their solo technique.
VITA
Don B. Schade

Academic Preparation

2017  Doctor of Philosophy Music Education
      The Pennsylvania State University, University Park, PA
1978  Master of Music in Conducting
      The Pennsylvania State University, University Park, PA
1976  Double Major: Bachelor of Music Education and Music Performance
      Susquehanna University, Selinsgrove, PA

Professional Experience

2017  Assistant Professor of Music, Director of Choral Activities
      Westminster College, New Wilmington, PA
2015  Instructor in Music Education
      Bloomsburg State University, Bloomsburg, PA
2013-14 Director of Choral Studies
       Kutztown University, Kutztown, PA
1981-2011 Instructor and Conductor of Choirs and Bands/Department Chairman
       Annville-Cleona School District, Annville, PA
1981-1985 Director of Concert and Chamber Choirs/Adjunct
       Franklin and Marshall College, Lancaster, PA
1977-1981 Instructor of Chapel Choirs/Percussion Instructor
       Susquehanna University, Selinsgrove, PA

Scholarly Presentations and In-Service Presentations

April, 2013  PMEA In-Service Conference/Research Poster Session, Eric, PA
April, 2013  NA/ME All-Eastern Conference/Research Poster Session, Hartford, CT
April, 2013  Thompson Symposium/Research Poster Session, Penn State University,
            University Park, PA
            April Presentations: A Comparison of Program Content in High
            School Choral Programs between 2001 and 2011
January, 2012 PMEA District 7 Chorus/Scoring Rubrics for Performance, Dillsburg, PA
April, 2012  PMEA In-Service Conference/Research Poster Session, Hershey, PA
October, 2011 Committee on Intellectual Cooperation/Research Poster Session
            Michigan State University, East Lansing, MI
            October/April Presentations: No Child Left Behind: Its Impact on Music
            Education Programs in Pennsylvania Public Schools
November, 2009 PMEA Fall In-Service Conference/Choral Reading Session, Annville, PA

Awards and Honors

2011-2013  Teaching Assistantship, The Pennsylvania State University
2001      Excellence in Education Award- Lebanon Chamber of Commerce
1992      Pennsylvania Music Educators Association- Leadership Award