

AN EXAMINATION OF PITCH-MATCHING TECHNIQUES UTILIZED BY
MIDDLE SCHOOL CHORAL DIRECTORS TO IMPROVE PITCH
ACCURACY FOR UNCERTAIN SINGERS

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ABSTRACT

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The purpose of this study was to determine if a relationship exists between uncertain singers according to grade level and gender and to identify the most effective techniques for advancing pitch accuracy among uncertain singers in middle school choral programs. Results show that middle school female singers are significantly more accurate in pitch-matching than middle school male singers, and grade level proves to influence pitch accuracy. Additionally, factors such as repetition, listening, pitch perception, vocal modeling, and vocal range tend to influence pitch accuracy; however, directors must first understand emotional, physical, and transitional stages faced by middle school students.

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CHAPTER I

REVIEW OF LITERATURE

Introduction

Music allows individuals to communicate and express themselves when words fail (Smith, 2006). According to Smith (2006), singing provides students with cultural identity, a sense of community, and belonging. Singing is the most basic act of making music and a prerequisite for any choral ensemble (Demorest, 2007; Small, 2008). Improvement of pitch accuracy not only benefits the student, but also the choral program, the school, and the community (Murphy, 2009; Small, 2008; Smith, 2006).

Pitch-matching is a skill that comes naturally to most singers, yet the ability to hear and duplicate a pitch poses a great challenge to some individuals. Whether spectators at a live concert, members of a choral ensemble, or viewers of the latest reality singing television show, most individuals, if not all, have witnessed this phenomenon. Others have labeled themselves as bad singers because they were once told they could not sing or that they were “tone deaf” by their parent, sibling, friend, or even their music teacher (Demorest, 2007; Small, 2008). Apart from the members of our population that are either hearing-impaired or suffer from amusia, everyone is capable of hearing and matching pitches (Bower, 2013; Frederick, 2009; Small, 2008), yet pitch-matching is a commonly underdeveloped skill.

Pitch-Matching vs. Amusia

Tone deafness, or amusia, is commonly used to describe the failure to match pitch; however, it is a rare condition that affects four percent of the human population (Bower, 2013; Casey, 2013). Bower (2013) described amusia as a disorder that hinders differentiation of musical pitches or recognition of musical tunes. Casey (2013) defined amusia as a music-specific disorder of pitch interval analysis and pitch direction change recognition which results in a deficit of musical ability. According to Patel, Wong, Foxton, Aliette, & Peretz (2008), individuals with this disorder struggle to decipher statements from questions because they are unable to hear the inflection, or the rise of pitch in speech. Although amusia is a very rare condition, 10 to 15 percent of individuals struggle to match pitch (Bower, 2013; Pfordresher & Brown, 2007).

Several research studies have been conducted to aid in differentiating between those who struggle to match pitch and those who have amusia. Demorest (2007) developed a hierarchy of singers, classifying subjects as certain, inconsistent, and uncertain singers. Certain singers tend to accurately match pitch while inconsistent singers are only able to match pitch in certain contexts. Uncertain singers struggle to match pitch, only accurately matching by chance, not by skill (Demorest, 2007). Of the three classifications, the uncertain singer is the most fascinating to researchers, yet the greatest puzzle to music educators and choral directors (Small, 2008).

Improving Pitch Accuracy beyond the Elementary Music Classroom

Because it is easily detected, poor pitch-matching can potentially weaken a choral performance, and subsequently, a choral program. The dramatic consequence of poor pitch-matching presents music educators with the daunting task of improving pitch accuracy in uncertain singers. This challenge begins in the elementary music classroom. In fact, singing on pitch is recognized as a national objective in the elementary music classroom (Demorest, 2007; Green, 1990; Rutkowski, 2003; Warzecha, 2013). As a result, most of the studies on pitch-matching have been conducted with elementary students; yet, approximately six percent of elementary students grow into adulthood never developing the skill (Bower, 2013; Demorest, 2007). Based on this information, it is evident that a closer examination of the development of pitch-matching subsequent to elementary music is necessary; thus further consideration should be given to pitch-matching among middle school students.

Factors Influencing Pitch-Matching

Research on pitch-matching among children is multi-faceted. Studies have addressed a number of potential causes of inaccurate pitch matching, as well as suggestions for improving pitch accuracy (Hedden, 2012; Leighton & Lamont, 2006).

Vocal Modeling

Vocal modeling has been cited by a number of studies as being a critical technique advancing pitch-matching among children (Freer, 2009; Green, 1990; Hedden, 2012; Lyons, 1993; Yarbrough, Green, Benson, & Bowers, 1991; Yarbrough, Bowers, & Benson, 1992). According to Yarbrough et al. (1991), children are more likely to

accurately match pitches from a female vocal model, as compared to a male vocal model. Likewise, Green (1990) conducted a study using male, female, and child models to assess pitch accuracy among elementary students. In this study, students were least likely to match the male vocal model and tended to match the child vocal model more frequently than either the female or male models.

Speaking Voice

Trollinger (2003) maintained that vocal models should be used with caution because the vocal apparatus of a child is significantly different than that of an adult, thus inappropriate vocal modeling could potentially cause damage and abuse to the child's voice. Researchers have suggested that rather than using vocal modeling as the foundational beginning of singing, speech should be used to identify vocal limitations and vocal range, and thus prevent possible vocal abuse (Hedden, 2012; Trollinger, 2003). Speech can be used as the starting point in the assessment of monotone singers (Roberts & Davies, 1975). Trollinger (2003) found that speech assisted in determining pitch accuracy among preschool children. Results of her study indicated that the higher a child's speech frequency, the more accurately he/she matched pitch.

Vocal Range

Research suggests the vocal range of a child is related to their pitch accuracy (Hedden, 2012; Joyner, 1969; Lyons, 1993; Small, 2008; Smith, 2006). Joyner (1969) determined that monotone singers could improve their pitch accuracy once their vocal range is extended. Hedden (2012) maintained that tuneful singing is related to the range of pitches children are asked to sing. In other words, pitches outside of a child's vocal

limitation are likely to be inaccurate (Hedden, 2012; Small, 2008; Smith, 2006).

Furthermore, inexperienced music teachers may assign music that is too high or too low for children (Small, 2008; Smith, 2006). Another contributing factor is music literature composed in impractical ranges for children (Beery, 2009; Demorest, 2007; Hedden, 2012; Small, 2008; Smith, 2006). It is critical that music educators select music literature that is within specified ranges of students to ensure pitch-matching success (Hedden, 2012; Small, 2008).

Age

As a child matures, their vocal range is extended, thus pitch accuracy may improve (Hedden, 2012; Joyner, 1969; Rutkowski, 2003). As a result, researchers believe age plays a major role in pitch-matching (Hedden, 2013). In his longitudinal study, Rutkowski (2003) examined 25 students from the beginning of their first grade year to the end of their fifth grade year. The study showed significant gain in students' singing ability past the first grade. Likewise, Joyner (1969) and Roberts and Davies (1975) found that maturation improves pitch accuracy. Moore (1994) found that age was not a significant factor in pitch accuracy; however, in this study, pitch-matching was assessed within the context of two and three chords.

Gender

Gender seems to be one of the most controversial factors of pitch-matching. Studies by Joyner (1969) and Roberts and Davies (1975) indicated that boys were more likely to be monotone singers than girls; however, boys' pitch accuracy improved over time in both studies. Trollinger (2003) also found that boys were more inaccurate

singers. In a longitudinal study of 4- to 6-year-olds, Leighton and Lamont (2006) had participants sing short fragments and a song of their choice in two phases over a two-year period. Their study revealed that gender proved to have little or no significance in the accuracy of pitch-matching. A study conducted by Moore (1994) corroborated Leighton and Lamont's findings regarding the lack of correlation between gender and pitch accuracy.

Student Attitudes

Hedden (2012) attributed gender differences to attitudes toward singing. Small (2008) stated that male students may choose not to match pitch because it may seem "unmanly." Hedden (2012) further stated that although children like to sing, they may be selective in some situations, perhaps based on their feelings towards what they are singing. Males may also be more reluctant to sing for social reasons (Hedden, 2012). Demorest (2007) cautioned music educators to handle the male voice with care so that they will not develop negative attitudes towards singing. Warzecha (2013) provided several reasons males have negative perceptions towards singing, including parental or cultural views, feminine stereotyping, ineffective teaching, embarrassment about the male voice change, or harassment.

Teacher Assessment

Studies have provided evidence that the assessment of pitch-matching is a vital factor in the improvement of pitch accuracy (Hedden, 2012; Joyner, 1969; Leighton & Lamont, 2006; Small, 2008). In his study of uncertain singers, Joyner (1969) assessed

students whom music teachers had labeled as monotone and found that many of the students were able to match pitch in different contexts. Leighton and Lamont (2006) conducted a longitudinal, systematic study, providing music educators with empirical data in an effort to diminish mislabeling of uncertain singers. Unless diagnosed with amusia or a hearing impairment, all students can learn to sing; thus educators must be careful in the assessment of their students (Demorest, 2007; Hedden, 2012; Joyner, 1969; Frederick 2009; Porter, 1977; Rutkowski, 2003; Small, 2006; Smith, 2006).

Although many studies have addressed the challenge of pitch matching, a paucity of research has focused on middle school students (Demorest, 2000). Early adolescents need special attention to their vocal skills while they are in their transitional, physical, and emotional stages, because success or failure can determine the extent of their music involvement for the rest of their lives (Demorest, 2007; Forcucci, 1975; Frederick, 2009). It is still unclear whether techniques identified in studies with children can be applied to middle school students in that no research has been conducted that shows they are successful.

Emotional, Physical, and Transitional Considerations

Middle school students face several challenges in their early adolescent years. Bafumo (2006) stated middle school years are often tumultuous for students, families, and teachers as students are navigating their physical and emotional minefields. According to Barresi (2000), early adolescents go through difficult physical, transitional, and emotional stages. Wormeli (2011) described middle school years as having transformative power in that they directly affect high school years, which directly

correlate with success in adulthood. To be an effective middle school choral director, it is imperative to understand the psychological, physical, and transitional changes students undergo at this age (Barresi, 2000; Hanser, 1982; Robinson, 2004).

Transitions

Kesici (2007) identified variables that contribute to the struggles experienced by middle school students as being sixth grade students passing from elementary level to the middle school and eighth grade students preparing for the transition from middle school to high school. Bafumo (2006) concurred with the notion of transitional challenges of students in sixth and eighth grades, stating that the learning equation changes and students are expected to take on more responsibility in learning. These students experience heightened stress and anxiety about entering an environment in which their peers and teachers are unfamiliar (Kesici, 2007).

Several other factors, such as at-risk students, student perceptions and attitudes towards singing, and home environment can further create barriers to success in the classroom (Murphy, 2009). Consequently, middle school music educators face the unique challenge of developing pitch-matching skills in early adolescent singers, while maintaining an understanding of the fragile physical, emotional, and transitional changes of this age group (Barresi, 2000; Demorest, 2007; Hanser, 1982; Robinson, 2004).

Male Voice Change

The most noteworthy physical transformation among middle school singers is the male voice change (Beery, 2009; Demorest, 2007). According to Demorest (2007), struggles with the male voice change can lead young men to label themselves as

nonmusical individuals. White and White (2001) submitted that the male voice changes in one of four ways. First, the voice can quickly drop down a full register, making it difficult for the male singer to sing in his head voice. Second, the voice can gradually drop one or two pitches, creating a distinct break between the male singer's head and chest voices. Third, the voice maintains the head voice and develops notes in the lower register, but cannot produce notes in the mid-voice range. This type of voice change most frequently leads to the mislabeling of "tone-deafness" among male singers. Fourth, the voice can maintain a strong head voice while developing a full register in the middle and lower ranges with few breaks. This final process of voice change is the rarest among middle school males.

Dilworth (2012) has classified the various stages of male voice change utilizing the following categories: "soprano," "alto," "alto-tenor," "unchanged," "midvoice," "tenor," "new baritone," "settling baritone," "bass-baritone," and "bass." Dilworth (2012) cautions the educator to be mindful of labels because most adolescent males feel uncomfortable being labeled as a soprano or an alto. In his extensive study of the male voice change, Cooksey classifies voice changes into categories that are less gender specific, such as: "unchanged voice," "midvoice I," "midvoice II," "midvoiceIIA," "new voice," and "emerging adult voice" (Thurman, 2012). Freer (2010) criticizes researchers who use vocal classifications to better understand the male voice change. He states, "We do not seek to understand the changing voice through voice classifications. Rather, the classifications result from our understanding of the changing voice," (Freer, 2010, p. 33).

Despite differing perspectives on categorization of voices, it is evident that the male voice change creates a different set of factors when considering pitch-matching.

Researchers have found several techniques to combat the challenges of the male changing voice. Dilworth (2012) and Freer (2010) agree that the educator must first have a thorough understanding of the voice changing process, and should be able to communicate this process to his or her students. Further, the educator must be qualified to implement a variety of vocal exercises, such as descending 5-note patterns, sirens, and sighs, to facilitate pitch matching, regardless of the stage of voice change (Dilworth, 2012; Freer, 2010; White & White, 2001). Dilworth (2012) stated that it is important to listen for any tension or straining during vocalizing to prevent adolescent males from developing poor vocal technique, limiting their vocal ranges, and damaging their voices. He further suggested that singers be encouraged to sing folk songs or popular tunes in a comfortable, accessible range.

Selecting repertoire within a range of pitches that can be sung by male singers during this transition can be a challenge (Demorest, 2007; Dilworth, 2012; Freer, 2010). Dilworth (2012) advised the educator to implement transpositions, octave displacement, doubling parts, or writing new parts to accommodate the changing voice. When considering the male singer's voice change, researchers agree that the main goal is to cultivate a voice that has good use of high, middle, and low ranges with smooth transitions between the ranges, while maintaining emotional and musical confidence (Dilworth, 2012; Freer, 2010; White & White, 2001).

CHAPTER II

METHODS AND PROCEDURES

Purpose of the Study

The purpose of this study was to determine if a relationship exists between uncertain singers according to grade level and gender and to identify the most effective techniques for advancing pitch accuracy among uncertain singers in middle school choral programs. This research provides practitioners with a variety of approaches to utilize when working to improve pitch-matching with their singers.

This study addresses the following research questions:

- 1) What percentage of middle school students struggle with matching pitch according to grade level and gender?
- 2) What techniques have proven to be successful in enhancing pitch accuracy?
- 3) Are the same pitch-matching techniques used for all grade levels?
- 4) Are the same pitch-matching techniques used for both genders?
- 5) What are obstacles uncertain singers face that hinder their success in pitch-matching?

Hypotheses

With the basis of previous research in pitch-matching, the researcher postulated the following hypotheses for this study: pitch-matching can be improved among uncertain middle school singers, given the practitioner implements successful techniques

to improve pitch accuracy, while understanding and weakening negative influences of students' physical, psychological, and transitional barriers.

Method

Participants selected for this study included approximately 100 middle school choral directors from seven regions in North Texas, as defined by the Texas Music Educators Association (TMEA). Directors were randomly selected within the regions. A list of e-mail addresses for the middle school educators was obtained from the directories of the five TMEA Region Music websites. An e-mail was sent to the choral directors, requesting their participation in the study. The e-mail contained a link to the survey, via SurveyMonkey.com. Participants were contacted twice, with a month interval between e-mails. A letter of consent (see Appendix A) was included in the e-mail request. Approval of the survey was given from the Institutional Review Board of Texas Woman's University.

Participants were asked to complete a 15-minute survey, consisting of 10 questions (see Appendix B). The survey included demographic questions about gender, years of teaching experience, and grade levels taught. Participants were also asked to report the percentages of uncertain singers in their programs, according to age and gender. The survey also contained questions in a free-response format about techniques used to improve pitch accuracy, examples of differentiated instruction according to student age and gender, arrangements for one-on-one instruction, and obstacles or barriers that hinder improved pitch-matching among their students. Data were recorded and tabulated according to frequency and percentages of responses.

CHAPTER III

RESULTS

Of 100 e-mails sent to prospective participants in this study, 3 e-mails were undeliverable, and 17 individuals replied, resulting in a response rate of 17%.

Respondents ($N= 17$) included both male (29%) and female (71%) middle school choral directors who were currently teaching in public schools. Years of teaching ranged from 1 to 28 years, averaging approximately 10 years, and totaling 175 years of teaching experience. Ninety-four percent of respondents ($n = 16$) taught 6th, 7th, and 8th grade students, while the remaining 6% ($n = 1$) taught 7th and 8th grade students only.

Respondents were asked to select the percentages of uncertain singers according to their students' grade level and gender. Ranges of percentages were provided, allowing respondents to select the appropriate category that best described the number of uncertain singers in each grade level and gender (see Table 1).

When surveying percentages of uncertain singers according to grade levels, 9% of respondents reported over 20% of their 6th grade students had difficulty matching pitch, 6% of respondents confirmed over 20% of their 7th grade students were uncertain singers, while 3% of the respondents reported over 20% of their 8th grade students struggled with matching pitch (see Table 2). When considering data for respondents with 0-5% of uncertain singers in their choirs, 50% of respondents reported under 5% of their 6th grade

students were uncertain singers, 47% reported under 5% of their 7th grade students had pitch matching challenges, and 53% reported under 5% of their 8th grade students had difficulty matching pitch. The number of respondents gradually decreased as the provided percentages of uncertain singers increased, excluding the number of respondents for 16-20% for 6th grade students (0%).

Table 1

Percentage of Uncertain Singers according to Grade Level and Gender

Grade Level/Gender	Percentage of Uncertain Singers				
	0-5%	6-10%	11-15%	16-20%	over 20%
6 th grade boys	6	4	4	0	2
6 th grade girls	10	3	2	0	1
7 th grade boys	4	5	4	3	1
7 th grade girls	12	4	0	0	1
8 th grade boys	4	5	5	3	0
8 th grade girls	14	2	0	0	1

Note. Of total respondents (N=17), 94% of respondents teach 6th, 7th, and 8th grades; therefore, total number of respondents for 6th grade singers is 16.

Results provide evidence that pitch accuracy is significantly higher with female singers (see Table 3). Although 6% of respondents confirmed over 20% uncertain singers among both male and female students, 72% of the respondents reported 0-5% of their female singers as being uncertain, while only 28% of respondents reported 0-5% of

their male uncertain singers. The number of respondents peaked (28%) at 0-5% and 6-10% of uncertain male singers.

Table 2

Percentage of Uncertain Singers according to Grade Level

Grade Level	Percentage of Uncertain Singers				
	0-5%	6-10%	11-15%	16-20%	over 20%
6 th grade	16	7	6	0	3
7 th grade	16	9	4	3	2
8 th grade	18	7	5	3	1

Table 3

Percentage of Uncertain Singers according to Gender

Gender	Percentage of Uncertain Singers				
	0-5%	6-10%	11-15%	16-20%	over 20%
Females	36	9	2	0	3
Males	14	14	13	6	3

Results for successful techniques used were classified into six different categories for the purpose of reporting (see Table 4). Of the 86 responses, 36 (42%) were placed under the “repetition” category, which included techniques that were a part of the daily routine such as “vocal warm-ups,” “interval exercises,” or “vocalizing up and down the

scale.” The second largest category, containing 15% of responses, was “listening,” followed by “pitch perception” (14%), which included responses such as “audiation,” “error detection exercises,” and “recognizing differences in high and low pitches.” Other categories included “vocal modeling” (13%), “vocal range” (10%), and “varied instruction” (6%).

Table 4

Successful Techniques Used to Improve Pitch Accuracy

Techniques Used	Number of Respondents
Repetition	36 (42%)
Solfège exercises	6
Vocalizing up and down the scale	5
Vocalizing in head voice	5
Interval exercises	4
Daily warm-ups	4
Vocal Sirens	3
Sing 5-note descending scale	2
Scooping/Sliding up or down to pitch	1
Reinforcement of tall vowels	1
Singing easy folk songs	1
Hissing	1

(continued)

Table 4

Successful Techniques Used to Improve Pitch Accuracy (continued)

Techniques Used	Number of Respondents
Little/no piano use	1
Take recording home to practice	1
Daily sight-reading	1
Listening	14 (15%)
Encourage students to listen for others	4
Use of flexible tubes/pipes	3
Blend reinforcement	3
Listen for unisons in songs and exercises	2
Have students cup hands over ears to listen	1
Listening exercises	1
Pitch Perception	12 (14%)
Daily audiation	6
Error detection exercises	3
Make sure students can hear differences in pitches	1
High and low speaking to understand high and low pitches	1
Vocal Modeling	11(13%)
Seating arrangements around certain singers	5
(continued)	

Table 4

Successful Techniques Used to Improve Pitch Accuracy (continued)

Techniques Used	Number of Respondents
Seating arrangements around certain singers	3
Vocal modeling with teacher	2
Vocal modeling with peers	1
Small group tutorials with certain singers	1
Range	9 (10%)
Uncertain singer to initiate pitch and others match	4
Explanation of voice changes	2
Explanation of vocal ranges	2
Find starting pitch with students' speaking voice	1
Varied Instruction	5 (6%)
One-on-one instruction	2
Voice students at the beginning of the year	1
Frequently changing music exercises	1
Small group instruction with the teacher	1

Results show that 64% of the respondents stated that they do not vary their techniques according to student grade level; however, 36% of the respondents modify their approaches to match the grade level. Explanations of differentiated techniques varied, but 33% of the techniques centered on the voice change (see Table 5). An

example of conflicting responses was illustrated when one respondent stated that she allowed her 6th grade students to sing down an octave below the soprano line to ensure student comfort, whereas another respondent stated that she did not allow singing down the octave, but demanded that students sing in their head voices, regardless of how weak they felt. Other responses on differentiated techniques according to grade level included:

“I do not vary my techniques based upon grade level, but I do based upon emotional or maturity level. Some students do not mind being told out loud, ‘You are singing too low,’ while others would be very embarrassed.”

“No, I differentiate for each student. It is truly trial and error.”

“I do some similar activities, but add more advanced warm-ups with 7th/8th grade students. (mee oh, so mi, fa re, mi do, re ti, do) moving up half steps.”

Table 5

Differentiated Pitch-Matching Techniques according to Grade Level

Differentiated Techniques by Grade Level	Number of Responses
Focus more on the male changing voice	2
Use more advanced techniques with 7 th and 8 th graders	1
Allow males to sing down an octave under sopranos	1
Disallow singing down the octave/head voice only	1
Implement sensitivity to embarrassment	1

When asked if they used the same techniques for male and female students, 64% of the respondents ($n = 9$) answered no while 36% of the respondents ($n = 5$) stated that

their techniques were the same. The most frequent responses dealt with the male voice change (27%), while 18% focused on the perceived sensitivity of the middle school female, and 18% on the “carefree” attitudes of the middle school male (see Table 6). Some of the responses included the following:

“I might tell a boy, ‘I want you to sing with these 2 other boys and try to match their pitch,’ but tell a girl, ‘I want you to sing with these two other girls and try to sound like one voice.’”

“It varies depending on the student. I am more sensitive to the girls. With boys, they are more daring and carefree when it comes to it.”

“7th & 8th grade boys need extra help with changing voices.”

Table 6

Differentiated Pitch-Matching Techniques according to Gender

Differentiated Instruction by Gender	Number of Responses
Focus more on the male voice change	3
More sensitive approach with females	2
Direct approach when correcting males	2
Start singing on lower pitches with females	1
Make guys sing in their head voice often	1
Spend more time vocalizing with boys	1
Have girls sing high and low to feel vibrations	1

One-on-one instruction was implemented in 80% ($n = 12$) of the respondents' responses. Most of this instruction time occurs before or after school (45%), while 25% of the respondents stated that they provide instruction during sectionals, or during class (see Table 7). Many respondents were careful to mention that instructional time during class was limited to male singers because female singers are embarrassed. Respondents ($n = 3$) that did not include one-on-one instruction stated that their students could not afford the expense of a private instructor.

Table 7

Methods of Providing One-on-one Instruction for Uncertain Singers

Method of One-on-One Instruction	Number of Responses
Before/after school	9
During class/sectionals	5
Work with private voice instructor	2
Work with assistant choir director	2
Lunch time	1
After school	1

Respondents provided a variety of responses when they were asked about hindrances middle school students face when try trying to match pitch. Two of the most frequent responses included, "laziness...students do not try," and "embarrassment in front of others" (see Table 8). Other responses included the following:

“A lack of music growing up is a hindrance because they often can't hear differences in pitches because they haven't been exposed to it enough.”

“Boys view lower singing as ‘cooler’ and sometimes do not want to sing high, or they spend so much time talking in their low voice and so little time singing in their high voice that they are much weaker high singers.”

“They've been told by others that they're ‘tone deaf’ or that they can't sing.”

Table 8

Obstacles that Hinder Successful Pitch-Matching

Obstacles for Pitch-Matching	Number of Respondents
Laziness/Students do not try	4
Embarrassment in front of others	4
Lack of previous exposure/no prior knowledge	2
No time for one-on-one instruction	2
Middle school voice change	2
Home environment/culture	2
Student is not listening	2
Student was told they are “tone deaf”	2
Lack of confidence	2
Boys are “too cool”	2
Student cannot hear	1

(continued)

Table 8

Obstacles that Hinder Successful Pitch-Matching (continued)

Obstacles for Pitch-Matching	Number of Respondents
Influence of popular music	1
Lack of self-awareness	1
Low reading skills	1
Teacher frustration	1
Student frustration	1

CHAPTER IV

DISCUSSION

The low response rate (17%) could have been caused by the timing of the requests. The first e-mail was sent late during the fall semester. A reminder e-mail was sent approximately one week before the end of the fall semester, when many educators were holding concerts and finalizing semester grades. Despite the limited number of participants, a number of their suggestions could prove to be beneficial to middle school choral directors.

Research Question One

What percentage of middle school students struggle with matching pitch according to grade level and gender?

The majority of respondents reported that the uncertain singers in their choral programs, grades 6 to 8, were limited to the 0-5% range. This confirms previous research (Bower, 2013; Frederick, 2009; Small, 2008) that indicated most students can match pitch naturally. Among respondents who reported over 20% of their students were uncertain singers, sixth graders were most frequently cited, while only one respondent confirmed over 20% of their 8th grade singers were uncertain. This supports previous studies that pitch-matching improves with age (Hedden, 2013; Joyner, 1969; Rutkowski, 2003); however, there is a drop in pitch accuracy between 6th and 7th grade. Respondents reported no uncertain singers within the 16-20% range among 6th graders, yet 3

respondents (9%) reported uncertain singers within that percentage range among their 7th grade singers. Conversely, 50% of respondents reported 0-5% of uncertain singers in 6th grade while 47% reported 0-5% of uncertain singers among 7th grade singers.

Diminishing pitch accuracy could be due to the male changing voice, which affects the students' vocal range and student attitudes (Demorest, 2007; Hedden, 2013; Small, 2008; Warzecha, 2013).

Previous research on pitch-matching and gender is inconsistent in that gender proved to be a factor in some studies (Joyner, 1969; Roberts & Davies, 1975; Trollinger, 2003), but had little or significance in other studies (Leighton & Lamont, 2006; Moore, 1994). Data in this study suggest that middle school females have greater pitch accuracy than males. Six respondents (38%) confirmed 0-5% of their 6th grade boys were uncertain; however, 4 respondents (24%) confirmed 0-5% of their 7th grade boys were uncertain singers. Likewise, 24% of respondents stated 0-5% of their 8th grade boys were uncertain singers. On the other hand, when considering uncertain singers within the range of 0-5%, respondents reported 63% for 6th grade girls, 71% for 7th grade girls, and 82% for 8th grade girls. The percentage of female students who could accurately match pitch steadily increased by grade level, while male singers who were pitch-challenged decreased from 6th to 7th grade, and then the percentage stayed the same from 7th to 8th grade. Several factors, such as vocal modeling, the male changing voice, student

attitudes, and vocal range, may impact these results; however, further research should be conducted to determine definitive causes of poor pitch-matching among male middle school singers in comparison to female middle school singers.

Research Question Two

What techniques have proven to be successful in enhancing pitch accuracy?

Several successfully proven techniques were provided; however, most of the responses fell under the category of “Repetition.” Data suggests that consistent, daily use of basic pedagogical exercises prove to influence pitch accuracy. Other participants suggested that music educators surround their uncertain singers with certain singers and encourage uncertain singers to listen to others around them. Audiation and solfège exercises were the most frequently recommended pitch-matching techniques. This suggests the importance of the uncertain singer to sing the pitch mentally, prior to production of sound. It should be noted that vocal modeling by peers, whether it occurs due to seating arrangements or in one-on-one rehearsal, proves to be more successful than vocal modeling by the teacher. This confirms the findings of Green’s (1990) study that young singers are more likely to match the pitch of their peers than the pitch of an adult vocal model.

Research Question Three

Are the same pitch-matching techniques used for all grade levels?

Most respondents reported that they use the same techniques for all grade levels to improve pitch accuracy. Some directors stated that although they used the same techniques, they used a different approach, or altered the techniques slightly, according to

the needs of their students. One respondent mentioned allowing male singers to sing an octave lower than the soprano line; however, another respondent stated that they do not allow singing down the octave, but instead demand that the students sing in their head voices, regardless of how weak it feels. Both of the respondents claimed their techniques have proven to be successful. This contradiction suggests that no one technique is preferable over another, and teachers should utilize the method that is most effective with their students.

Research Question Four

Are the same pitch-matching techniques used for both genders?

The majority of respondents maintained that techniques for male and female singers were differentiated; however, when explanations of varied techniques were provided, it was evident that the methods were the same, but were slightly adjusted according to gender. For example, male and female students would be required to execute similar vocal exercises, but a director may spend more time with male singers because of their voice change. Or all students would be instructed to listen to those around them, but the director may inform the male singer to match the boy next to him, whereas the female singer would simply be told to blend with her section. In other words, the directors used the same techniques for both genders, but were more direct with males than females. Respondents utilized similar methods for uncertain singers of both genders, yet modified their implementation based on their understanding of the unique emotional and physical needs of middle school students.

Research Question Five

What are obstacles uncertain singers face that hinder their success in pitch-matching?

When considering obstacles of uncertain middle school singers, the most frequent responses from respondents dealt with the emotional and physical aspects of the middle school student, not their musical aptitude; thus, helping students navigate through their emotionally turbulent years may indirectly influence the improvement of pitch accuracy. Responses such as “embarrassment in front of others,” “students do not try,” “lack of confidence,” or “boys are too cool,” stress the importance of understanding the physical, emotional, and transitional changes that middle school students face. Middle school choral directors can positively impact pitch accuracy by creating a classroom environment that cultivates student motivation, student acceptance, and student emotional safety, consequently, providing the optimal environment for success. This validates Barresi’s (2000) list of characteristics of a successful middle school choral teacher . Data further supports Hanser’s study (1982), which noted the correlation between classroom acceptance and pitch-matching success, as well as Robinson’s (2004) contention that a supportive classroom environment positively influences pitch-matching. Hedden (2013) stated: “The ownership of student accuracy belongs to the teacher and he or she must carefully weigh factors that can and do affect singing” (p. 60). According to Hedden’s philosophy, an important component of developing the skill of pitch-matching among middle school choral students is creating an appropriate environment in which singers can gain confidence and feel a sense of belonging and acceptance by their peers.

CHAPTER V

CONCLUSION

This study provides the middle school choral director with insight on enhancing pitch accuracy among middle school students regardless of grade level or gender. Techniques implemented through repetition, listening, pitch perception, vocal modeling, and an understanding of vocal range have proven to be successful among uncertain middle school singers. Conversely, some of the factors that hinder the success of pitch-matching among middle school students are student attitudes, students' emotional sensitivity, middle school voice changes, and students' previous musical experience. Obstacles provided are not insurmountable; in fact, they are manageable. Thus, it is the responsibility of the middle school director to assist in guidance and support through the process of learning to successfully match pitch.

Further longitudinal research could be conducted to determine specific influences on improving pitch-matching according to grade level and which obstacles hinder improved pitch accuracy among middle school students. Extended studies could provide further insight into the relationship of gender and pitch-matching and the influence of society and culture. A larger sample size, encompassing a more extensive Texas or national geographical area, may be helpful in providing more comprehensive data and assist in assessing if there are regional trends in the challenges of pitch-matching among middle school students.

REFERENCES

- Bafumo, M. E. (2006). What matters in the middle. *Teaching Pre-K-8*, 37(3), 10-12.
- Barresi, A. (2000). The successful middle school choral teacher. *Music Educators Journal*, 86(4), 23-28.
- Beery, L. (2009). Music for men in the middle. *Choral Journal*, 50(4), 34-43.
- Bower, B. (2013). The tune wreckers: Lousy singers make a pitch for scientific relevance. *Science News*, 184(6), 26-29.
- Casey, D. A. (2013). Aetiology of auditory dysfunction in amusia: A systematic review. *International Archives of Medicine*, 6(1), 1-5.
- Demorest, S. M. (2000). The challenge of the middle school chorus. *Music Educators Journal*, 86(4), 21-22.
- Demorest, S. M. (2007). Factors influencing the pitch-matching of junior high boys. *Journal of Research in Music Education*, 55(3), 190-203.
- Dilworth, R. A. (2012). Working with male adolescent voices in the choral rehearsal: A survey of research-based strategies. *Choral Journal*, 52(9), 23-33.
- Forcucci, S. L. (1975). Help for inaccurate singers. *Music Educators Journal*, 62(2), 57-61.
- Freer, P. K. (2009). Choral warm-ups for changing adolescent voices. *Music Educators Journal*, 95(3), 57-62.

- Freer, P. K. (2010). Foundation of the boy's expanding voice: A response to Henry Leek. *Choral Journal*, 50(7), 29-35.
- Frederick, T. (2009). Developing good pitch. *Canadian Musician*, 31(2), 32-33.
- Green, G. (1990). The effect of vocal modeling on pitch-matching accuracy of elementary schoolchildren. *Journal of Research in Music Education*, 38(3), 225-231.
- Hanser, S. B. (1982). The effect of peer approval and disapproval on improvement of pitch matching and group behavior. *Journal of Research in Music Education*, 30(4), 221-228.
- Hedden, D. (2012). An overview of existing research about children's singing and the implications for teaching children to sing. *Applications of Research in Music Education*, 30(2), 52-62.
- Joyner, D. R. (1969). The monotone problem. *Journal of Research in Music Education*, 17(1), 115-124.
- Kesici, S. (2007). Middle school students' guidance and counseling needs. *Educational Sciences: Theory and Practice*, 7(3), 1325-1349.
- Leighton, G., & Lamont, A. (2006). Exploring children's singing development: Do experiences in early schooling help or hinder? *Music Education Research*, 8(3), 311-330.
- Lyons, J. T. (1993). Teaching all students to sing on pitch. *Music Educators Journal*, 80(2), 20-22.

- Moore, R. S. (1994). Effects of age, sex, and melodic/harmonic patterns on vocal pitch-matching skills of talented 8-11 year olds. *Journal of Research in Music Education*, 42(1), 6-13.
- Murphy, M. (2009). A case for at-risk students in the middle school/junior high choral ensemble. *Choral Journal*, 50(4), 63-64.
- Patel, A. D., Wong, M., Foxton, J., Aliette, L., & Peretz, I. (2008). Speech intonation perception deficits in musical tone deafness. *Music Perception: An Interdisciplinary Journal*, 25(4), 357-368.
- Pfordresher, P. Q., & Brown, S. (2007). Poor-pitch singing in the absence of tone deafness. *Music Perception: An Interdisciplinary Journal*, 25(2), 95-115.
- Porter, S. Y. (1977). The effect of multiple discrimination training on pitch-matching Behaviors of uncertain singers. *Journal of Research in Music Education*, 25(1), 68-82.
- Roberts, E., & Davies, A. D. (1975). Poor pitch singing: Response of monotone singers to a program of remedial training. *Journal of Research in Music Education*, 23(4), 227-239.
- Robinson, R. L. (2004). How can I teach middle school students to match pitch without a lot of trauma and embarrassment? *Teaching Music*, 12(2), 68-69.
- Rutkowski, J. (2003). A longitudinal study of elementary children's acquisition of their singing voices. *Applications of Research in Music Education*, 22(1), 5-14.
- Small, A. R. (2008). Choral beginnings: Matching pitch. *Choral Journal*, 48(8), 75-77.

- Smith, J. (2006). Every child a singer: Techniques for assisting developing singers. *Music Educators Journal*, 93(2), 28-34.
- Thurman, L. (2012). Boys' changing voices: What do we know now? *Choral Journal*, 52(9), 9-21.
- Trollinger, V. L. (2003). Relationships between pitch-matching accuracy, speech fundamental frequency, speech range, age, and gender in American English-speaking preschool children. *Journal of Research in Music Education*, 51(1), 78-94.
- Warzecha, M. (2013). Boys' perception of singing: A review of the literature. *Applications of Research in Music Education*, 32(1), 43-51.
- White, C. D., & White, D. K. (2001). Commonsense training for changing male voices. *Music Educators Journal*, 87(6), 39-43+53.
- Wormeli, R. (2011). Movin' up to the middle. *Educational Leadership*, 68(7), 48-53.
- Yarbrough, C., Bowers, J., & Benson, W. (1991). Inaccurate singers: An exploratory study of variables affecting pitch-matching. *Bulletin of the Council of Research in Music Education*, 107, 23-34.
- Yarbrough, C., Bowers, J., & Benson, W. (1992). The effect of vibrato on the pitch-matching accuracy of certain and uncertain singers. *Journal of Research in Music Education*, 40(1), 30-38.

Appendix A
Letter of Consent

Letter of Consent

Dear Music Educator:

I am a graduate student at Texas Woman's University and am conducting research under the supervision of Dr. Vicki Baker. The purpose of this study is to identify the most effective techniques for advancing pitch accuracy among uncertain singers in middle school choral programs. This research will provide practitioners with a variety of approaches to utilize when working on pitch-matching with their singers.

If you are a middle school choral director, please complete the on-line survey by clicking the link below: (please see attached .pdf of survey, a link to the survey will be placed here)

You have the option to Agree or Not Agree to participate in this survey. By completing this survey, you are indicating consent to participation in the study. While there is a potential risk of loss of confidentiality in all email, downloading, and internet transactions, the data will remain confidential as far as possible in compliance with state and federal law. There is a potential risk of loss of anonymity should you include identifiable data in your response. To minimize this risk, please avoid the use of names or places of employment in your survey responses. This survey does not collect identifiable data, such as names of participants or places of employment. The survey data is password secure and the exported data cannot be connected to any respondent. Completion of the on-line survey will take approximately 15 minutes.

If you are interested in the results of this survey, you can contact me at jredd@twu.edu.

Thank you for your participation in my research.

Sincerely,

Joy Flores

Research Advisor:

Dr. Vicki D. Baker

Assistant Professor of Music

Texas Woman's University

Denton, Texas 76204-5768

This research study has been reviewed and approved by Texas Woman's University Institutional Review Board for the Protection of Human Subjects.

Appendix B

An Examination of Pitch-Matching Techniques Utilized by Middle School Choral Directors to Improve Pitch Accuracy for Uncertain Singers

Questionnaire

Gender: Male _____ Female _____

No. of Years Teaching Middle School Choir (including current year): _____

Please check all that apply:

I teach:

6th grade boys _____

7th grade boys _____

8th grade boys _____

6th grade girls _____

7th grade girls _____

8th grade girls _____

Select the approximate percentage of students in each grade level that have difficulty matching pitch in the blank provided:

6th grade boys 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

6th grade girls 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

7th grade boys 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

7th grade girls 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

8th grade boys 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

8th grade girls 0 – 5% 6 – 10% 11 – 15% 16 – 20% over 20%

What techniques (if any) do you use to develop skills in pitch-matching among uncertain singers?

What techniques (if any) have you found to be successful in enhancing pitch accuracy among uncertain singers? Please list and describe in detail.

Do you use the same techniques for 6th, 7th, and 8th grade singers? _____ Yes _____ No

If you answered no, explain the different approaches you use with the various grade levels.

Do you use the same techniques for males and females? _____ Yes _____ No

If you answered no, explain the different approaches you use with each gender.

Do your uncertain singers receive one-on-one instruction? _____ Yes _____ No

If you answered yes, explain how you are able to arrange time for individual instruction.

In your opinion, what obstacles (if any) hinder your uncertain singers from successfully learning to match pitch?