

**THE EFFECT OF REPERTOIRE ON THE SINGING ACHIEVEMENT OF
SECOND GRADE STUDENTS**

by

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ABSTRACT

The purpose of this study was to contribute to the body of research on the singing achievement of students. Through a quasi-experimental design using two intact groups, the research question addressed second grade students' ($N=80$) singing achievement when singing a major tonality criterion song or a pentatonic tri-chord criterion song. The researcher collected samples from Group A ($n=40$), which sang the major tonality song and Group B ($n=40$), which sang the pentatonic tri-chord song. On five different occasions, the researcher taught the criterion songs to the two groups with a scripted procedure, using a combination of general music techniques including holistic and phrase-by-phrase singing along with movement activities. During the sixth visit, the researcher reviewed the criterion songs with each group. Students were individually audio-recorded singing the entire criterion song that they learned over the 5-week period. Three independent judges analyzed the song samples using the researcher created and vetted Singing Achievement Measure (SAM) that was comprised of four 4-point descriptive rating scales and one 2-point rating scale. Interjudge reliability ($r=.94$), descriptive statistics, and the intercorrelations of SAM criteria were calculated. Data were analyzed through a two-sample t -Test ($p < .05$). Results indicated that there was no significant difference between the singing achievement of Group A and Group B. Principle Component Analysis was calculated and confirmed that the scores for each of the five criteria were similar between Groups A and B. This study has the potential to inform music educators about the effect of song repertoire choice on students' singing achievement.

Chapter 1

REVIEW OF LITERATURE

Introduction

Singing is a primary characteristic of the elementary general music curriculum. In fact, singing has been an important part of music education since Lowell Mason implemented singing in U. S. schools (Phillips, 1992). Researchers know singing is developmental and affected by instruction (Goetze, Cooper, & Brown, 1990). Yet, many music educators have questions regarding the most effective ways to teach singing. “One of the most persistent problems in music education at the elementary level is the inaccurate singer” (Klemish, 1974, p. 36). Music educators search for ways to help inaccurate singers learn to sing (Rutkowski & Miller, 2003a). Researchers speculate that there are factors associated with singing voice inaccuracies such as a lack of musical exposure at home, low speaking voice, poor singing voice models, few opportunities for individualized singing, singing with and without accompaniment, among a variety of others (Goetze et al., 1990). Some young students enter school unaware of how to use their singing voice and the average kindergarten student has limited use of their singing voice, if any (Rutkowski, 1986). Music teachers must know how to properly guide and instruct young students. It is imperative to investigate singing within the first years of students’ education to determine what changes, if any, should be made to improve singing pedagogy.

There are varieties of pedagogies used for teaching young children to sing in American music education programs. Over time, types of repertoire have been

associated with different methods based on their educational sequence, or lack thereof. For instance, the Kodály Method begins with a focus on the pentatonic scale for the following reasons: (a) the tonal structure of Hungarian folk music, (b) the thought that children are only able to sing a range of five or six tones, and (c) that children cannot sing half-steps in tune (Choksy, 1999). Curwen hand signs present both visualized and kinesthetic means for the specific pitch relationship of what children sing, reinforcing intervallic motion (Choksy, 1999). Repertoire for this method is chosen from children's games, nursery songs, chants, folk music of the country enacting the method, and music written by notable composers. The first intervals introduced to children in the Kodály Method are the minor third (*so-mi*) followed by the major second above (*la*). These intervals are considered the universal musical vocabulary of young children (Choksy, 1974, 1999). After the intervals, *so*, *mi*, and *la*, the *home tone do* is introduced followed by *re* (Choksy, 1999, p. 12). Next, the octaves low *la*, low *so*, and high *do* are taught, followed by the half steps *fa* and *ti*. First grade students will spend two months on the *so-mi* interval before introducing *la* in a curriculum that precisely follows the Kodály Method. In second grade, *do* is introduced in the second month of school (Choksy, 1999). In Hungarian music, the pattern *so, la, mi* is frequently heard, while American songs consistently have the pattern *so, mi, la*. Music educators recognize this difference and teach the sequence accordingly (Choksy, 1974).

The Orff-Schulwerk approach focuses on the child's development of creativity through improvisation (Hall & Walter, 1956). Orff collaborated with Keetman to create texts for the Schulwerk with exercises for music teachers to use with children around the world (Warner, 1991). The approach incorporates poems, rhymes, games,

songs, and dances as basic materials. The starting point of this approach is rhythm, which is not taught mechanically or mathematically, but instead through speech-patterns. With melody, simple intervals are introduced, the simplest being a descending minor third (Hall & Walter, 1956). Gradually more pitches are added leading to a repertoire of pentatonic melodies, which Orff found to be well suited for children. The repertoire may be traditional or original and spoken or sung. Accompaniments of clapping, patsching, and stamping, or rhythms played on drums, sticks, and bells are also common. The well-recognized Orff melody instruments including wooden xylophones and metal glockenspiels are also used to accompany singing, chanting, and movement. Children work in groups and experience the differences between soli and chorus, and melody and accompaniment. Form and improvisation are introduced after basic studies in rhythm and melody. Melodies used in the Orff-Schulwerk approach have a traditional basis, but Orff adapted most because it was difficult to find traditional examples based on two, three, four and five tones (Hall & Walter, 1956).

Music learning theory (MLT) (Gordon, 2012), which describes how students learn when they learn music, has a strong emphasis on audiation, which is “hearing and comprehending in one’s mind the sound of music that is not, or may never have been, physically present” (Gordon, 2012, p. 389). This theory is based on sequential procedures for learning music and incorporates an emphasis on rhythm and tonal content, tonal and metrical context, and individualized instruction within classroom and performance activities. According to methods built upon music learning theory, activities should include songs and chants in a variety of tonalities and meters with clear tonal centers. Teachers are to focus on the musical content of songs or chants

first and then add text, if there is text. The teacher also establishes the context of tonality or meter before singing or rhythmic chanting. Gordon's research has demonstrated that everyone is born musical and has a music aptitude (Gordon, 2012). A person's music aptitude is defined as his potential to learn music. Rich musical experiences are important to experience before age nine when music aptitude stabilizes (Gordon, 2012).

Music educators may base their instruction on one of the above pedagogies or they may use a combination of techniques to create an eclectic curriculum. Similarly, music educators may choose song repertoire based on a specific pedagogy or from the collections of pedagogies. With a variety of options to select from, why do music teachers choose to use certain pedagogies or techniques for teaching songs in their classroom?

Overview of Literature

Researchers have investigated various types song instruction and singing achievement techniques of students through (a) the exploration of various processes to teach melodies (Gault 2002; Gordon, 2012; Hall, 1960; Houlahan & Tacka, 2008; Klinger, Campbell, & Goolsby, 1998; Moore, Brotons, Fyk, & Castillo, 1997; Persellin & Bateman, 2009; Warner, 1991); (b) singing with and without text (Gault, 2002; Goetze, 1985; Jacobi-Karna, 1996; Lange, 1999; Levinowitz, 1989; Rutkowski & Miller, 2003a); (c) singing with solfege syllables and hand signs (Cousins & Persellin, 1999; Martin, 1991; Yarbrough, Green, Benson, & Bowers, 1991; Youngson & Persellin, 2001); (d) singing with gestures (Liao, 2008); (e) optimal group size for singing (Cooper, 1995; Goetze & Horii, 1989; Green, 1994; Rutkowski, 1996; Rutkowski & Miller, 2003a); (f) using the correct vocal model (Green, 1990; Persellin,

2003; Persellin, 2006a; Small & McCachern, 1983; Yarbrough et al., 1991); and (g) the type of appropriate accompaniment to play with melodies (Atterbury & Silcox, 1993; Guilbault, 2004; Hale, 1977; Hedden & Baker, 2010);). Additionally, the relationship between tonal aptitude and singing achievement has been investigated (Aherne, 2011; Gault, 2002; Guerrini, 2002; Hornbach & Taggart, 2005; Jarjisian, 1981; Lange, 1999; Martin, 1991; Rutkowski, 1986; Rutkowski, 1996). However, researchers have completed few investigations on the tonal composition of melodies and the effect of pitch arrangement on singing achievement (Jarjisian, 1981; Guerrini, 2002; Signor, 1984; Persellin, 2006b; Reifinger, 2009). Examining the effect of a melody's composition on singing achievement could affect the choices music educators make when selecting repertoire to teach singing in the elementary general music curriculum.

Statement of the Problem

In some elementary general music classrooms, young students are taught to sing a simple song, and then can continue to practice singing the song many times while playing a game, playing instruments, or taking part in another musical activity (Campbell & Scott-Kasner, 2014; Houlahan & Tacka, 2008; Saliba, 1991). Students seem to have thoroughly learned the song and have had plenty of time to practice it. However, when asked to sing the full song or a portion of the song alone, they sing it with inaccuracies. In music classrooms with music teachers who teach with a focus on singing, do the songs that music educators choose to teach influence the singing achievement of students? Currently, there are varieties of songs used in music education curriculums such as folk songs, songs from various general music curriculum series, as well as songs associated with particular methodologies.

Perhaps the tonal construction of songs used in the general music classroom affects the singing achievement of young students. If so, what types of songs should general music teachers incorporate into their curriculum? Investigating how songs with different tonal construction affects singing achievement of early elementary school students could provide music educators with more information on the songs that they use in their curriculum.

Purpose of Study and Research Question

Music educators generally teach new songs to students as a means to introduce and review concepts and skills or to evaluate students' singing achievement. With the intent of improving students' singing achievement, the purpose of this study was to determine whether the tonal construction of a song affects second grade students' singing achievement. The following research question was investigated:

Do second grade students have higher singing achievement when singing a pentatonic tri-chord criterion song or when singing a major tonality criterion song?

Significance of the Study

Music educators have an obligation to teach elementary school students to sing. The first National Standard as stated by the National Association for Music Education is "Singing, alone and with others, a varied repertoire of music" (Consortium, 1994). The first standard expresses the importance of singing as part of a balanced, comprehensive, and sequential music education. The first standard also entitles students to "...a varied repertoire of music" (Consortium, 1994). Music educators have a significant role of choosing the repertoire used in their classrooms. Knowing whether the tonal construction of a melody affects students' singing

achievement will assist music educators with making proper repertoire choices. There is little research on this topic, therefore results and conclusions from the present study will add to the extant research on singing achievement and choice of repertoire in the elementary general music classroom.

Chapter 2

REVIEW OF RELATED LITERATURE

Researchers have studied various aspects of singing in the general music classroom. This literature review presents an overview of the research that is most closely related to the present study. Various teaching methods of singing, factors that effect singing achievement, as well as singing assessment measures will be discussed in this section. The research reviewed will address the research question that frames this study.

Do second grade students have higher singing achievement when singing a pentatonic tri-chord criterion song or when singing a major tonality criterion song?

Teaching Techniques

Music educators use a variety of techniques to improve singing achievement among their students. Researchers have studied (a) procedures for teaching songs; (b) singing with and without text; (c) the use of solfege syllables and hand signs; (d) individual and group singing; (e) vocal models; (f) accompanied singing; and (g) tonal aptitude to determine if some forms of pedagogy are more effective than others.

Methods-Based Techniques

When music educators teach a new song to their students, they must decide the way in which to teach the song. There are varieties of procedures, and music educators should consider which procedure will work best for their students and their particular

educational context. Most pedagogies outline specific ways to teach songs to children. The procedures that derive from Music Learning Theory (Gordon, 2012), the Kodály Method (Choksy, 1999), and the Orff-Schulwerk approach (Hall & Walter, 1956) are outlined below.

Music Learning Theory

An audiation-based rote song procedure is advocated for in methods based upon Gordon's Music Learning Theory (Gordon, 2012) as a whole-part-whole approach. Here, techniques that draw attention to the tonal and rhythmic aspects of a song are used. Each rote song begins with the teacher singing a *tune-up*, which establishes tonality, meter, keyality, resting tone, starting note, tempo, and style. The rote song sequence allows the students to hear multiple repetitions of the song, each time emphasizing a new musical aspect. Students (a) move to the macrobeat and microbeat, (b) audiate the resting tone, (c) sing the resting tone, and (d) audiate the entire song before singing the song from beginning to end while the teacher listens to evaluate how well they have learned the song.

Kodály Method

When teaching a song by rote in the Kodály Method (Choksy, 1999), the music must be presented in an authentic and stylistically correct manner. The instructor tells students about the phrasing, mood, style, and form of the song. Students move to the beat the second time while the teacher sings the song. There are several techniques for teaching a song by rote with the Kodály Method. Teachers may use (a) questioning techniques to ask questions relating to specific musical elements or to the text of the song after each repetition; (b) a phrase-by-phrase song presentation when presenting

longer and more complex songs by rote; (c) motions or act out a story line to help students memorize songs; (d) call and response songs; (e) pictures associated with the text of a song; (f) manipulatives when teaching a song to help students remember sequence of verses; or (g) use motions that associate the text with the melody (Houlahan & Tacka, 2008).

Orff-Schulwerk Approach

Through the Orff-Schulwerk approach (Hall & Walter, 1956), imitating, exploring, improvising, and then creating in music is emphasized. Songs and instrumental parts, played on instruments designed specifically for this method, are frequently taught through imitation or echo singing. The teacher sings the song in its entirety expressively, followed by repeating the text slowly and clearly while the children imitate each phrase, repeating this step twice. Next, basic movements such as patting and clapping can be added to the text. The children should sing the melody three or four times, then, add in the basic movements with the melody. This procedure is similar to the phrase-by-phrase approach (Hall, 1960; Warner, 1991) as explained below.

Phrase-By-Phrase and Whole-Song Approaches

If music educators do not choose to teach a song with a procedure taken from a particular method, they may instead teach a song through the phrase-by-phrase or whole-song approaches. The following research studies investigated the effect of phrase-by-phrase and whole-song approaches on the singing achievement of students.

Phrase-by-Phrase Approach

The phrase-by-phrase approach involves teaching chunks or phrases of a song with text and having students echo each phrase. Each phrase is learned one by one and then stitched together to complete the song.

Gault (2002) sought to determine the individual and joint effects of pedagogical approach, text condition, and aptitude level on the performance achievement of two songs in major tonality and duple meter, as well as what effect, if any, does grade level have on student performance achievement? The participants ($N=112$) were from four kindergarten and four first-grade intact classes. The students learned the same two traditional folk songs that were used in Klinger et al.'s (1998) study, "Let Us Chase the Squirrel" and "All Around the Buttercup." Both songs were eight-measures long in duple meter. The songs contained simple rhythm patterns and a *do* tetratonic scale (*do, re, mi, sol*), with a strong pull toward the resting tone (*do*) (Gault, 2002). The songs were sung in D, so that all pitches were comfortable within an appropriate singing range for students in this age level. The participants received one 35-minute class session each week, for eight weeks. "Let Us Chase the Squirrel" was taught over the first four weeks and "All Around the Buttercup" was taught in weeks five through eight. Gault divided participants into four treatment groups: (a) holistic with text, (b) holistic without text, (c) echo-phrase with text, and (d) echo-phrase without text. The students' regular music teacher administered the treatment sessions to the groups. When the participants sang without text, the teacher used the neutral syllable *bum*. Gault does not give a reason for choosing this neutral syllable. The songs were taught in the first 5-10 minutes of each class, and each treatment group heard the songs 10 times each week. Performances of each song were recorded during the respective fourth week. Students either sang with or without text, based on

how they learned the song during the treatment period. Before the treatment began, the Primary Measures of Music Audiation (PMMA) (Gordon, 1986a) was administered to all participants. Three independent evaluators measured recordings of the students' vocal performances. The evaluators listened to and rated each song twice, focusing once on tonal elements and once on rhythm elements. Gault developed two 5-point continuous rating scales to evaluate the singing and rhythmic accuracy. The tonal scale focused on accuracy of pitches, maintaining a tonal center, and maintaining the correct melodic contour while singing. The rhythm scale focused on the students' rhythmic accuracy and ability to keep a consistent beat. The reliabilities ranged from $r = .84 - .91$ between pairs of judges for "Let Us Chase the Squirrel," and from $r = .74 - .75$ between pairs of judges for "All Around the Buttercup." The composite performance ratings for both songs were analyzed in a four-way analysis of variance (ANOVA). Then differences between kindergarten and first-grade performance ratings for each song were determined using two *t*-Tests for independent samples. Results revealed students with a high level of music aptitude achieved significantly higher ratings on the songs than did students with low music aptitude. Gault concludes that teaching songs to young school-aged children with or without text or through the use of holistic or echo-phrase teaching procedures depends upon the song to be taught (Gault, 2002).

Moore et al. (1997) involved a larger group of students ($N=600$) of 6- to 9-year-olds from different countries, in their study. They focused on teaching one song comprised of three phrases in a phrase-by-phrase approach to the students in their study. The newly composed song was comprised of 18-tones and was recorded with a 10-year-old child's voice. The participants of the study individually listened to and sang back either each phrase or the entire song on the neutral syllable *la*. Moore et al.

did not explain why the syllable *la* was chosen. The tape recordings of the students' singing were transcribed for analysis. Two musically trained researchers listened to 20% of the recordings and one research transcribed all the responses. Interjudge reliability was $r=.80$ between the two researchers. Comparisons of groups were made for each phrase using ANOVA. The researchers found that the students sang the phrase with diatonic steps more accurately than the one with leaps. Participants' rhythmic accuracy was greater than their pitch and tonal accuracy. The researchers concluded that learning the song in parts seemed to interfere with the students' ability to sing the song in its entirety, suggesting that a holistic approach leads to singing accuracy (Moore et al., 1997).

Whole-Song Approach

In the whole-song approach, teachers use immersion. The teacher repeats the song multiple times leading the students to discover the parts of the song. Some researchers have determined that the whole-song approach leads to more accurate singing than the phrase-by-phrase approach (Klinger et al., 1998; Moore et al., 1997; Persellin & Bateman, 2009).

Klinger et al. (1998) taught the two criterion songs from Gault's (2002) research, "Let Us Chase the Squirrel" and "All Around the Buttercup." Each group of second grade students ($N=39$) learned both songs, one through the whole-song approach and the other through the phrase-by-phrase approach. A week after one 30-minute class of instruction, the students performed each song individually for recording. Each four-measure phrase of each recorded song was scored by a frequency distribution of performance errors in four categories: melodic contour, rhythmic accuracy, text, and pitch by two experienced elementary music teachers. Interjudge

reliability was strong at $r=.89$. Klinger et al. discovered that the whole-song instructional approach led to second grade students' greater singing accuracy when singing a traditional, short, single-verse song.

Persellin and Bateman (2009) taught two songs, "Great Big House" and "L'il Liza Jane," to 32 first grade students. These songs were selected in order to avoid the interval of the descending fifth and to include the scale degree *la*. Bateman taught one song using a whole-song approach and the other song through a phrase-by-phrase approach. The song was taught during three class periods. After one week of teaching, each child was individually recorded performing each song. Tapes were transcribed and analyzed for vocal accuracy by the researchers ($r= .97$). Comparisons were made using ANOVA for differences between classes, songs and types of errors. Children sang the song that was taught using the holistic approach with fewer errors, but no significant difference was found between the teaching presentations of the songs.

Summary

When framing the procedure of the present study, the different teaching approaches discussed above were kept in mind. Based on the research reviewed, a holistic approach would seem to lead to greater singing achievement (Klinger et al., 1998; Moore et al., 1997; Persellin & Bateman, 2009). The research results suggest that a holistic approach requires students to fully absorb a song as a whole whereas Gault (2002) found that the teaching approach should depend on the song or the situation. The results of these studies are mixed; therefore, I will combine the techniques in this study.

Singing With and Without Text

In a study concerning factors that affect young children's singing, Goetze (1985) investigated the use of text versus a neutral syllable. Kindergarten, first, and third grade students ($N=165$) from three schools participated in the research study. The students were taught two pentatonic criterion songs of equal length, intervallic content, and direction. The researcher recorded the students singing both melodies with the text and on the neutral syllable *loo*. This syllable was chosen because "the mouth cavities maintain a fixed position for the vowel and the tongue moves between two positions for the consonant" (Goetze, 1985, p. 32). Immediately after learning the two songs, the students were recorded singing. A device called Visi-Pitch was used to determine the frequency of each tone of the responses. Analysis using the Pitch Measure and the Contour Measure indicated that the students sang more accurately when they sang with the neutral syllable *loo*.

Levinowitz (1989) examined whether singing a rote song with or without text affected children's singing accuracy. Thirty-five children from two classes of 4- and 5-year-old children were the participants in the study. The researcher provided music instruction for the participants for 5 months, one day each week, for 30-minutes. The music instruction included rhythm, movement, and rote-singing activities. During each music class, half of the rote songs taught on that day were sung with text and the other half were sung on a neutral syllable such as *bum* or an onomatopoeic sound. During the last month of instruction, two criterion songs, one with text and one sung on the neutral syllable *bum*, were taught to all of the children. Why the syllable *bum* was chosen is unclear. Each child was tape-recorded singing the song with text and the song without text. Two judges used two researcher created 5-point continuous rating scales to measure the children's tonal and rhythm singing achievement. The tonal

rating scale focused on the intonation of certain patterns found in the criterion songs. The ability to sing the song with a sense of meter was evaluated with the rhythm rating scale. Interjudge reliabilities ranged from $r = .78 - .94$. Levinowitz found that children had greater singing achievement when singing on the neutral syllable *bum*.

Rutkowski's Singing Voice Development Measure (SVDM) (1986) has been used to determine children's use of their singing voices (Guerrini, 2002; Levinowitz, Barnes, Guerrini, Clement, D'April, & Morey, 1998; Rutkowski, 1986; Rutkowski, 1990; Rutkowski, 1996; Rutkowski & Miller, 2003b). This 5-point continuous scale measures how students use their singing voices rather than the students' tonal accuracy. While reliability for the original SVDM (Rutkowski, 1986) was strong ($r = .77-.95$), Rutkowski developed a more detailed 9-point version of the SVDM ($r = .74 - .96$) to allow for fluctuation of singers between stages (Mang, 2011; Rutkowski & Miller, 2003a, 2003b).

Rutkowski and Miller (2003a) discovered that the use of small-group and individual singing strategies had an effect on children's singing voices. Twenty-eight children from one elementary school participated in this longitudinal study during their first, third, and fifth grade years. By fifth grade, three children moved to a different school ($N=25$). All children received music from the same general music teacher once a week for 40-minutes. The children were recorded echoing the patterns of the SVDM (Rutkowski, 1986) both on the neutral syllable *bum* and with text. No reasoning is given for why the neutral syllable *bum* was used. Two raters evaluated the performances using the SVDM. Statistical analyses were performed to determine any significant gains in use of singing voice. Significant differences were found for both text and neutral syllable performances that occurred between the end of first grade and

the beginning of third grade, as well as from the beginning of fifth grade to the end of fifth grade. The composite means for singing with the neutral syllable *bum* were slightly higher than the composite means for singing with text for each performance.

Singing with and without text was also a factor in Gault's research (2002). With kindergarten and first-grade students ($N=112$) learning two criterion songs, Gault discovered that the outcome of teaching songs to young children with or without text depends upon the song to be taught. While students who learned "Let Us Chase the Squirrel" with text had greater singing achievement than students who learned the song on the neutral syllable *bum*, singing with and without text had no effect on students' performance of "All Around the Buttercup." Gault does not explain why the neutral syllable *bum* was chosen.

Yarbrough et al. (1991) investigated the effect of a male and female vocal model on pitch accuracy in singing, while including hand signs, solfege syllables, and the neutral syllable *la*. The participants were 163 students in grades K – 8. At each grade level, one third sang using Curwen hand signs, one third sang with syllables, *sol-mi*, and one third sang on the neutral syllable *la*, while singing a descending minor third. Overall, solfege syllables seemed to help children sing more accurately than hand signals or the single syllable *la*, although there were no statistically significant differences.

Four intact kindergarten classes ($N=58$) were included in Lange's (1999) study, which investigated whether kindergarten students who were taught songs without text would perform with better intonation than students who were taught songs with text. Lange also was interested in determining whether kindergarten students who are taught songs without text can identify the resting tone through

performance of an unfamiliar song better than students who are taught with text. One group received music instruction primarily with text, while the second group received music instruction primarily without text. Instruction occurred over 24-weeks with two 30-minute class periods per week. At the end of the instruction, the students were audio-recorded performing two criterion songs, “Biddy Biddy” and “See How I’m Jumping,” as well as performing the resting tone of two unfamiliar songs, “Ally Bally” and “Round and Round.” Three independent judges who used researcher-created Tonal Accuracy and Resting Tone rating scales rated the performances. The rating scales were pilot-tested before the actual rating and the interjudge reliability was $r=.98$ for the Tonal Accuracy rating scale and $r=.99$ for the Resting Tone rating scale. Lange found no significant difference between the text group and the no text group after the instruction and on the performance of resting tone.

Jacobi-Karna (1996) sought to determine whether children sang more accurately when taught songs on a neutral syllable or when they were taught with the original text. Participants ($N=89$) were 3- to 5-years-old. The children were randomly assigned to the text method or the neutral syllable method. The neutral syllable was varied, but when students were tested the syllable *bum* was used because it was used in previous research and is recommended by Gordon (Jacobi-Karna, 1996). For eight weeks, the children participated in two 30-minute classes per week. During the ninth week, children echoed the test song in phrases and then the song in its entirety. In week 11, the children were presented the song material in the opposite manner and were tested in week 12. Repeated Measures ANOVAs, *t*-Test for independent samples, *t*-Test for correlated samples, and Newman-Keuls post-hoc comparisons were used to measure mean differences and interaction in the data. There were no

significant differences of scores between the treatment groups due to the method of instruction.

Summary

Goetze (1985) and Levinowitz (1989) found that children perform a song better without text. Lange (1999) and Jacobi-Karna (1996) discovered there was no significant difference between singing scores when performing a song with text or without text. Gault (2002) discovered that singing with and without text depends on the song to be taught. Rutkowski and Miller (2003a) determined that children score slightly higher on the SVDM (Rutkowski, 1986) when singing without text. Within all four studies, the neutral syllable was varied between *loo* and *bum*. In Yarbrough et al. (1991), the researchers discovered that using solfege syllables was more effective than the neutral syllable *la*. Few researchers explain why a specific neutral syllable was chosen. Researchers must have rationales and should not just use a syllable because it was used in a previous research study, in which the researcher did not define why the syllable was chosen.

For the purposes of this study, students will be taught the criterion songs with a neutral syllable before adding text. When comparing the various neutral syllables, *loo*, *bum*, and *la*, the *oo* sound seems to be the easiest vowel for singing with minimum jaw movement (Goetze, 1985). A better neutral syllable than *loo* might be *too*, which allows the tongue to help with articulation for a clean and precise sound on each pitch. While the neutral syllable *too* has not been used in any published research studies, in action research, Pinzino noticed children singing more tunefully on *too* than *bum* (Pinzino, 2007). The participants will sing on the neutral syllable *too* during instruction and when they perform for the audio recording, in this study.

Singing With Solfege Syllables and Hand Signs

Researchers continue to search for techniques to use in the classroom to improve children's singing. Some researchers have investigated how techniques, such as singing with solfege syllables and hand signs, could be used to increase pitch accuracy.

The use of hand signs and solfege syllables were included in Yarbrough et al. (1991) when investigating the effect of a male and female vocal model on pitch accuracy in singing. The pitches of the taped responses were analyzed in the computer software program Performer. A two-factor ANOVA comparing models and response modes was calculated, Yarbrough et al. (1991) discovered the following results: (a) kindergarten students responded best with the single syllable *la*; (b) the second, third, seventh, and eight grade students responded best with solfege syllables *sol-mi*; and (c) the first grade students responded best with hand signals. The researchers state "solfege syllables seemed to help children to sing more accurately than hand signals or the single syllable *la*, although there were no statistically significant differences." If there was no statistical difference between singing with hand signals or singing with the syllable *la*, the researchers cannot make the above statement.

Cousins and Persellin (1999) assessed the effect of Curwen hand signs used in conjunction with solfege syllables on young children's vocal accuracy. First grade students ($N=47$) attended music class two or three times each week for 25-minutes. Both classes still received equal amounts of instruction. During the first week of school, the students were assessed with the Children's Vocal Accuracy Scale (Cousins & Persellin, 1999). This scale was created for this study by the authors and was based on Rutkowski's SVDM (1990). The Children's Vocal Accuracy Scale was a 14-point scale. Three music educators used the scale to evaluate individually recorded

children's performances. The interjudge reliability was $r=.90$. Afterward, there was a 10-week treatment period, where both first grade classes received exactly the same music instruction, except one class was taught to sing and read music notation using the Curwen hand signs and solfege syllables. The second class was taught to sing and read music using solfege syllables without Curwen hand signs. At the end of the 10-week instruction period, the children were tested again with the Children's Vocal Accuracy Scale. Pretest and posttest scores were analyzed to determine whether the treatment had a significant effect on vocal accuracy of first-graders. The two posttest scores were compared using ANOVA. Although both groups' vocal accuracy improved, the mean posttest score of the Curwen hand sign group was not significantly higher than the mean posttest score of the solfege only group.

Youngson and Persellin (2001) found that first grade students using Curwen hand signs with solfege syllables sang with greater vocal accuracy. The researchers divided students ($N = 47$) into treatment and control groups and administered pre- and posttests using the Children's Vocal Accuracy Scale (Cousins & Persellin, 1999), later renamed the Vocal Accuracy Assessment Instrument (VAAI) (Youngson & Persellin, 2001). Youngson and Persellin's VAAI (2001) was based on Rutkowski's (1996) 9-point SVDM. The VAAI expanded to a 16-point scale focusing on vocal pitch accuracy and range while including elements of vocal development. The VAAI has demonstrated high reliability in various studies ranging from $r= .89 - .92$. VAAI has been used by its creators in multiple studies due to its detailed nature (Persellin, 2006a; Persellin, 2006b; Youngson & Persellin, 2001). In this study, over 10-weeks, students were either taught to sing and read music notation using solfege syllables and hand signs or just solfege syllables (Youngson & Persellin, 2001). At the end of the

treatment period, the children were again tested using the Children's Vocal Accuracy Scale. The results of the pretest and posttest scores were analyzed and a repeated-measures ANOVA was calculated. While students' vocal accuracy was greater using Curwen hand signs in conjunction with solfege syllables, the mean of the post-test score was not significantly higher than the score of the solfege-only group.

Martin (1991) explored the contribution of tonal syllables, hand signs, and letter representations of tonal syllables on the development of verbal and symbolic tonal syllable skills of first grade students. High and low levels of tonal aptitude and school readiness were also examined to determine their role in children's tonal syllable skill development. Students were divided into three groups with each group assigned to a different strategy. This study was designed in two parts. Within each part, students were exposed to both class sessions and training sessions. The researchers divided 65 first grade students into three classes. During Part 1, all of the groups echoed patterns during the first nine minutes of every class meeting using their assigned strategy of: (a) echoing patterns with tonal syllables; (b) echoing patterns with tonal syllables while using hand signs; or (c) echoing patterns with tonal syllables using hand signs while seeing letter representations of patterns written on unlined cards. Then, students were individually evaluated and recorded singing patterns using their assigned strategy from the treatment. During Part 2 of the study, all groups echoed tonal patterns but also saw them written as note heads on a staff. Every other time group 3 met, they would view letter representations on the staff instead of note heads. The patterns consisted of three and four note tonal patterns using the syllables *do, re, mi, sol, and la*. Again, students were tested and recorded individually singing tonal patterns, but this time they sang after the researcher showed a notecard with the

patterns written in notation. A third test that was identical to the first one was given to the students. Two music specialists and the researcher scored the recordings of the three tests using a researcher-created 6-point rating scale ($r=.99-.98$). ANOVA, a *t*-Test, and an *F*-test, were calculated. Tonal aptitude, rather than any one of the three instructional techniques, influenced the accuracy of pitch and tonal syllables. Martin also concluded that hand signs, letter representations, and use of note heads may not result in increased pitch accuracy for first grade students.

Singing With Gestures

A researcher who discovered positive results of gestures with vocal accuracy was Liao (2008). Eighty Taiwanese children, aged five to six years, sang six tonal patterns while performing gestures that imitated the contour of the patterns. The children sang the patterns with and without gestures while they were audio recorded. Three professional music educators rated the recorded performances of the six tonal patterns with a researcher-created 5-point Likert scale ($r=.83-.91$). Descriptive statistics were calculated and pitch accuracy was analyzed using a general linear model and ANOVA. The effect of using gestures and singing accuracy was greater for girls than for boys. With all six of the tonal patterns, the results demonstrated that the children sang more accurately with gestures than without gestures, regardless of any melodic motion.

Summary

There is not enough conclusive evidence to advocate for the use of any particular teaching technique related to the use of solfege and hand signs. Liao (2008) discovered that the children sang more accurately with gestures imitating the contour

of tonal patterns than without gestures. Yarbrough et al. (1991) speculated that solfege syllables help children sing more accurately than hand signals or the syllables *la*, but this claim cannot be made because there was no statistical difference found. Cousins & Persellin (1999) may have seen gains in vocal accuracy because a pretest-posttest design was used. The 10-week treatment along with other factors could have contributed to the improvement in students' singing. Youngson & Persellin (2001) noticed that students' vocal accuracy was greater using Curwen hand signs in conjunction with solfege syllables, but there was no significant difference. Rather than using solfege syllables in the current study, the students will sing on a neutral syllable. To avoid aligning the procedure that will be used in this study with any particular pedagogy, a variety of teaching techniques will be used.

Individual and Group Singing

In elementary general music classrooms, a teacher may use singing as a form of assessment, and the singing during assessment may take place in either an individual or group setting. The following researchers used individual and group singing to determine if either led to greater pitch accuracy among students' singing.

Rutkowski (1996) and Rutkowski and Miller (2003a) examined whether singing accuracy improved in a small-group and individual setting versus a large classroom setting. In the earlier study, kindergartners ($N=99$) in their intact classes were randomly assigned to either the control or treatment group. All music lessons consisted of large-group singing activities and rhythmic/movement activities. The only difference in the teaching between the control and treatment groups was that the treatment group instruction involved small-group and individual singing. The SVDM (Rutkowski, 1986) was administered prior to treatment and at the end of the treatment

period. Two raters who were familiar with the SVDM rated the children's singing voices. ANOVA was computed to determine the agreement between raters, which was $r=.90$ on the pretest and $r=.99$ on the posttest. ANOVA and Analysis of covariance (ANCOVA) were performed. Rutkowski did not find a significant difference between the development of children's singing voice and the group and individual singing that they experienced.

Rutkowski and Miller (2003a) discovered that the use of small-group and individual singing strategies in the classroom had an effect on children's singing voices. All children received music from the same general music teacher once a week for 40-minutes. Each class consisted of large-group, small group, and individual singing activities, rhythmic/movement activities, and listening activities. The SVDM (Rutkowski, 1986) was administered at the beginning and end of first, third, and fifth grade. Two raters evaluated the performances of children singing with and without text. Statistical analyses were performed to determine any significant gains in use of singing voice. Significant differences existed for both text and neutral syllable performances between the end of first grade and the beginning of third grade, as well as from the beginning of fifth grade to the end of fifth grade. Based on the results of this study, Rutkowski and Miller concluded that by the end of fifth grade all children can be taught to use at least a limited singing range when given instruction in a music setting where small-group and individual strategies are used weekly.

Goetze and Horii (1989) compared the effects of individual and group singing on the pitch accuracy of primary-grade children. With 100 children from kindergarten, first, and third grade, the researchers presented and practiced melodies until the students could sing them with minimal assistance from the researchers. The

researchers used a method for presenting melodies that was modeled after classroom procedures for presenting rote songs. Unfortunately the study is compromised due to the fact that they do not describe this procedure. Students came in small groups to a separate room wearing contact microphones to perform the melodies. With the small groups present, individuals were asked to echo a warm-up phrase. All singing tasks were presented or accompanied by the investigator's treble singing voice. Next, six students sang the song with one of the researchers. The students' performances were individually played back into a Visi-Pitch machine. Goetze and Horii analyzed the data using ANOVA and found that the students sang with more accuracy when singing individually than when singing in groups. Because students' singing in this study was accompanied by the researcher's voice, there is the possibility that the researcher's voice had an effect on the students' singing achievement.

Comparing the differences between unison and individual singing on elementary students' vocal pitch accuracy, Green (1994) found results that differed from previous studies. There were 241 students in first, second, third, and fifth grade in this study. The researcher visited the students' regularly scheduled music classes to acquaint the children with song and the general teaching procedure that would be used. The song "Bow Wow Wow" was taught to each class and later reviewed and practiced during each data-collection session. In groups of eight, students sang through the song, while only four were recorded at a time. Four children were given a microphone to hold while singing. While students were singing in a small group of eight, four of the students' singing was individually recorded. The responses of the four subjects were recorded individually on separate channels of a tape recorder. Then the four students were recorded singing the song one at a time. The researcher

evaluated all of the performances and a trained evaluator independently scored 25% of the total responses ($r=.94$). Data were analyzed using a three-way ANOVA. Green found that the students sang more accurately when singing in a small group with their peers than when singing individually. Green pointed out a major difference in this study compared with other researchers that have investigated this area: “the researcher’s adult voice was not part of the group in the group-singing task” (Green, 1994, p. 111). This is a possible reason for the different results from those obtained by Green and other researchers.

Cooper (1995) investigated the effects of individual and unison singing on students’ pitch-matching accuracy. The 169 first through fifth grade students in this study either echoed a pattern after hearing a recording (individual) or sang with the recording (unison). One child at a time accompanied the investigator to another room where they wore a contact microphone and sang the pattern. Half of the students performed the unison task followed by the individual task; the other half performed the tasks in the opposite order. A Visi-Pitch machine was used to evaluate the performances ($r=.97$ intrajudge; $r=.99$ interjudge). A repeated-measures multiple analysis of variance (MANCOVA) was performed. The mean for unison singing was slightly lower than that of individual singing, but no significant difference was found between individual and unison groups’ vocal pitch accuracy.

Summary

Collectively, the aforementioned studies demonstrate that children having higher singing achievement when singing in small groups or individually. Both of these techniques provide the context for children to make vocal alterations based on what they are hearing. For the purposes of this study, children will be asked to sing

individually when they are audio recorded. The children will not sing with a recording, but instead will sing in solo after hearing a singing cue, “ready sing.” This will allow students’ to hear their singing voices and make adjustments as needed. This process will also allow the three independent judges to evaluate individual students’ singing more accurately.

Vocal Modeling

The vocal model provided by the teacher could affect the singing quality and accuracy of students in the elementary general music classroom. Music educators need to know the best form of vocal modeling to ensure singing accuracy among their students. Researchers investigating what type of vocal model has the best effect on children’s singing accuracy have looked into two different areas. One area focused on whether the teacher should: (a) sing for the class, (b) sing with the class, or (c) sing both for and with the class. The other area compares the female, male, and children’s voices as vocal models for students.

Modeling Singing for Students

In a survey study, Persellin (2003) asked early-childhood music teachers and music supervisors ($N=58$) whether they sing for children, sing with children, or use a combination of the two when teaching a new song. Participants were also asked which method was the most effective. Only 35 participants responded to the survey. Results of the study indicated that teachers felt one teaching model did not fit all contexts, but with a small number of participants, these results cannot be generalized. Persellin suggested that more research on this topic was necessary.

In 2006, Persellin investigated this same topic using a different method. Persellin selected nine classes of kindergarten students ($N=134$) and their three music teachers to participate in the study. Each teacher used the same songs and teaching materials, but a different teaching strategy in each class: (a) sing for the classes, (b) sing with classes, and (c) sing both for and with classes. Persellin recorded each student echoing the voice of an 11 year-old singer as a pre- and post-test. Two evaluators, using the VAAI (Youngson & Persellin, 2001), analyzed the recordings ($r=.92$). Paired comparison tests failed to demonstrate that one treatment was more effective than the other. Vocal accuracy improved in all three groups, but no treatment was significantly different from the other (Persellin, 2006a).

Types of Vocal Model

Comparing female and male vocal models, Small and McCachern (1983) sought to determine whether children match pitch more accurately with one model or the other. First grade students ($N=55$) were given two pretests and a posttest for pitch-matching accuracy. A male and female vocal model recorded song fragments that included different combinations of the pitches *do*, *re*, and *mi*. The researchers used two animal puppets, one with a typically masculine name and one with a typically feminine name. Students interacted with the puppets once they entered the room and then were tested individually. All students with perfect pitch-matching scores on both pretests ($n=8$) were removed from further participation. After initial testing, the remaining students were assigned to one of three groups: (a) practice with female model, (b) practice with male model, or (c) no contact control. Students practiced 30-minutes each day, for five days, with the respective male or female vocal model. The posttest was administered and audio recorded. The researchers listened to and

independently determined pitch-matching accuracy by ear ($r=.93-.95$). Data analyzed with ANOVA indicated that students had somewhat more difficulty matching pitch with the male vocal model than with the female model, but there was no significant difference between the means.

Yarbrough et al. (1991) investigated the effect of a male and female vocal model on pitch accuracy while incorporating the use of hand signs and solfege syllables. After the taped responses were analyzed, Yarbrough et al. discovered a significant difference between responses to the male versus the female model, with more correct responses to the female.

A child vocal model was included when Green (1990) investigated the effect of female, male, and child vocal modeling on the pitch-matching accuracy of children in grades one through six ($N=282$). Each of the children were recorded singing a descending minor third on the neutral syllable *la*. The children were tested individually responding to one of the vocal models on three separate occasions. Three trained evaluators independently analyzed 40% of the total responses with a Korg tuner. The data were analyzed using chi-square and Cochran Q statistics. The results demonstrated that the three vocal models had a significant effect on whether subject's responses were correct. Comparing the three vocal models, the highest number of correct responses was in response to the child model, followed by the female model, and then the male model. The students in this study were most able to match the pitch presented by the child model.

Summary

The vocal model provided for students in an elementary general music classroom is important for the success of their pitch-matching ability. Based on the

research, teachers and researchers should use a child or female vocal model for children when singing. The closer a vocal model is to a child's singing voice, the easier it is for children to imitate that model. Music teachers provide their students with a vocal model each day.

When examining if a teacher should: (a) sing for the class, (b) sing with the class, or (c) sing both for and with the class, researchers have yet to discover any significant results. Gordon suggests that it is important to distinguish the difference between whether students are simply imitating or if they are audiating prior to, or while they are singing (Gordon, 2012). If a student is solely imitating the teacher, she is not fully learning a song. Only through audiation can a student understand the context and content of the song and be able to replicate the song with musical comprehension (Gordon, 2012). In this study, a female vocal model will be used, but the students will sing alone when they are tested.

Singing with Accompaniment

Music teachers frequently use accompaniment when instructing students. Accompaniments are most often played on a piano or guitar, and if they are not used all of the time, they might be used in a concert or performance setting. Could the use and/or type of accompaniment affect the singing accuracy of children in elementary school?

Atterbury & Silcox (1993) investigated the influence of piano harmonic accompaniment on the singing ability of kindergarten students ($N=205$) during a year of music instruction. Classes were randomly assigned to either the experimental (no piano accompaniment) or the control condition (piano accompaniment). There was a pretest and posttest singing of "Pinto Pony." During the first three weeks of school, all

of the students were taught the criterion song, and each child individually sang the song into an audio recorder as a pretest. The same lesson plan for the weekly 30-minute periods was used for all of the classes with the exception of piano accompaniment during all singing. After the year of instruction, the students sang and recorded the criterion song for the posttest. The performances were evaluated using a researcher-created 4-point continuous rating scale developed by the researchers. The scale was adapted from Rutkowski's (1990) SVDM. Atterbury and Silcox's scale focused on measuring whether a child was a presinger, uncertain singer, partial singer, or singer as well as if they could maintain a tonal center and sing melodic phrases accurately. The interjudge reliability was $r=.859$. The posttest means were compared through a two-way ANCOVA. No significant differences existed in the singing ability of the experimental and control groups. The researchers suggested that the narrow range of their scale might have been the reason for a lack of difference observed in the statistical analysis.

In a preliminary investigation of pitch-matching accuracy in a cappella and accompanied singing of a standard song, Hedden and Baker (2010) had two classes of second grade children ($N=26$) learn "America" on a neutral syllable *loo*. The syllable *loo* was chosen so that text would not interfere with pitch matching, but the researchers do not explain why *loo* was the neutral syllable chosen. One class learned the song a cappella and the other with piano accompaniment. The children rehearsed the song during three class sessions and then were recorded singing a cappella and accompanied. Only the first nine pitches of the song were used from the performances for evaluation. Three judges perceptually analyzed the pitches for accuracy and then the pitches were acoustically analyzed using the Multispeech software program. The

reliability was $r=.86-.88$ for the perceptual analysis, but when the analysis of the perceptual data was compared with the acoustical analysis, the reliability was lower, $r=.55-.60$. Chi-square analyses of the perceptual data and the acoustical data both demonstrated no significant differences in accuracy among the nine pitches of the song. Analysis of the data by means of a t -Test did not show differences between the learning conditions.

Hale (1977) sought to determine if students learn to sing songs in major and minor tonality more efficiently when only harmonic accompaniment is used as compared to the use of melodic accompaniment, followed by melodic and harmonic accompaniment together, and finally harmonic accompaniment alone. The students ($N=247$) were randomly assigned as individuals into eight separate groups for music instruction. Each group was randomly designated to receive one of the experimental accompaniment conditions. After one year of general music instruction, the students were rated on the tonal aspects of their performances of two criterion songs. Two independent judges using a researcher-created 5-point rating scale rated each performance. The interjudge reliability in this study was $r=.53-.69$, which could be attributed to the fact that the researcher did not pilot the rating scale. Through ANOVA, the results indicate that the structured combination of melodic and harmonic accompaniment on piano helped kindergarten students to sing accurately, when learning songs in major and minor tonality (Hale, 1977).

Providing a root melody accompaniment while participants were learning and performing songs did not have an effect on singing accuracy (Guilbault, 2004). Kindergarten and first grade students ($N=136$) participated in the study. Kindergarten students received 30-minutes of music instruction twice per 6-day cycle and first grade

students received 40-minutes of music instruction three times per cycle. Instruction lasted for 25 weeks, was based primarily on Music Learning Theory (Gordon, 2012), and incorporated Orff and Kodály techniques. The treatment group was taught rote songs with a root melody accompaniment approximately 80% of each instructional period. The control group did not have root melody accompaniment with the rote songs. Two criterion rote songs without text were taught to all of the children, who individually performed both songs and were audio recorded. One song was in major tonality and the other was in minor tonality. With a tonal achievement scale based on Levinowitz's (1989), Guilbault (2004) examined the effect of harmonic accompaniment on the tonal achievement and tonal improvisations of young children. Guilbault's 5-point continuous rating scale focused on the child's ability to sing while maintaining a tonal center, with strong reliabilities ranging from $r = .85 - .86$. A two-way ANOVA was conducted. Results of this study indicated no significant interactions or differences between the experimental and control groups' tonal achievement.

Summary

Significant results were not seen in the studies of Atterbury and Silcox (1993), Guilbault (2004), or Hedden and Baker (2010) concerning improved singing accuracy with accompaniment. However, Hale (1977) indicated that including a harmonic accompaniment while teaching songs to students helps rather than hinders their singing accuracy. The results were found after working with kindergarten students for an entire year. Perhaps the full benefits of including an accompaniment are not seen right away, but instead will lead to greater singing accuracy after at least a year of instruction. The interjudge reliability of Hale's study ($r = .53-.69$) should be considered

when interpreting the results of this study. Collective results from these studies suggest that singing with an accompaniment in the present study would not improve students' singing achievement; therefore, accompaniment will not be used.

Tonal Aptitude

Rutkowski (1996) looked for significant differences between the control and treatment groups' developmental music (tonal) aptitude scores between four months and nine months of instruction. In addition, the strength of the relationship between tonal aptitude and use of singing voice was examined. Kindergartners ($N = 99$) were given a pretest, midtest, and posttest of the PMMA Tonal subtest (Gordon, 1986a) along with the SVDM (Rutkowski, 1986) as a pretest and posttest. Both the treatment and control groups for this study received music lessons with singing activities and rhythmic/movement activities, taught by the music teacher, for 30-minutes a week over nine months of instruction. Instruction for the treatment group involved small-group and individual participation in the singing activities. ANCOVAs were performed and the results showed no significant tonal aptitude differences between groups, although both groups had gains in their tonal aptitude mean scores during the treatment period. Rutkowski suggested teacher effect and length of instruction could have contributed to the results.

Rutkowski (1986) also examined (a) the effectiveness of two modes of instruction on kindergarten children's singing voice achievement and developmental music aptitude over time; (b) if differences exist between gender for use of singing voice and developmental music aptitude; and (c) the nature of the relationship between kindergarten children's use of singing voice and developmental music aptitude prior to instruction and immediately following the instructional period. Treatments were

randomly assigned to six intact groups ($N=162$). The treatment either utilized song material with a restricted song range or song material with the song ranges found in the commonly used kindergarten level basic series books. The children from the public schools received music instruction from a music specialist for one 30-minute class per week. The children enrolled in the parochial school did not receive music instruction from a specialist and the classroom teacher periodically engaged the children in music activities. The PMMA (Gordon, 1979) and SVDM (Rutkowski, 1986) were administered to all participants. Correlation coefficients between the PMMA and SVDM were small, leading Rutkowski to conclude that a small relationship exists between developmental music aptitude and the use of singing voice.

Jarjisian (1981) studied the effects of pentatonic and diatonic instructional content, socioeconomic status, and music aptitude on the rote singing achievement of young children. The Tonal subtest of PMMA (Gordon, 1979) was administered to the students in six, first grade classes. Students received pattern instruction and were taught four criterion songs, two of which were based upon the pentatonic tonal system and two based upon the diatonic tonal system. Each student was recorded singing the four criterion songs in a random order. Through ANOVA, the results indicated that students with high developmental music aptitudes scored significantly higher for singing achievement than students with low developmental music aptitudes.

Martin (1991) explored high and low levels of tonal aptitude in addition to the contribution of tonal syllables, hand signs, and letter representations of tonal syllables. This study was designed in two parts and within each part, students were exposed to both class sessions and training sessions. The PMMA (Gordon, 1979) Tonal subtest was given to obtain levels of tonal aptitude. Through regression analysis and ANOVA,

Martin concluded that tonal aptitude was the most significant predictor of tonal syllable and pitch performance achievement for both high and low tonal aptitude students. Tonal aptitude, rather than any one of the three instructional techniques, influenced the accuracy of pitch and accuracy of tonal syllables.

The relationship between developmental tonal aptitude and singing achievement was investigated by Hornbach and Taggart (2005). The specific goals of this study were to determine: (a) the relationship between developmental tonal aptitude and singing achievement, (b) whether the relationship between developmental tonal music aptitude and singing achievement changed with age, and (c) whether school setting or age affected singing achievement. The researchers involved 162 participants who were randomly selected students from the kindergarten, first, second, and third grades of two elementary schools. The Tonal subtest of the PMMA (Gordon, 1986a) was administered during regular music instructional time. The music teachers taught the traditional song “Bow Belinda” to each class for four class periods before testing. There is no discussion of how the researchers taught the song to their participants or how much time was spent teaching the song on each of the four visits. Each student sang the song individually after the researchers established tonality. The researchers audiotaped the performances and along with an independent judge evaluated the recordings using the 5-point rating scale for singing achievement that the judges developed. The singing achievement rating scale described the use of singing voice, focusing on melodic contour and key stability. The interjudge reliabilities were strong, ranging from $r = .76 - .97$. Pearson’s product-moment correlation was calculated between composite singing achievement scores and developmental tonal aptitude scores. The results of this study suggested that singing achievement did not

have a meaningful relationship to tonal music aptitude, regardless of age or school setting. The researchers did find that, if singing is taught, student's singing achievement is likely to improve (Hornbach & Taggart, 2005).

Aherne (2011) explored the relationships between home musical environment, developmental tonal aptitude, and vocal performance achievement of kindergarten children. Using the Tonal subtest of Gordon's PMMA (1986a), Youngson and Persellin's VAAI (2001), and Brand's (1985) Home Musical Environmental Scale (HOMES), the researcher collected data from 96 kindergarten students. The students all performed the criterion song "See the Bird," where they echoed the researcher's pre-recorded singing voice one phrase at a time. Two independent judges scored the recordings using the VAAI ($r=.84$). Pearson-product moment correlations were calculated between tPMMA, aHOMES and VAAI scores. The researcher found a low relationship between developmental tonal aptitude and vocal achievement and a moderately low relationship between home musical environment and singing achievement.

Gault (2002) also investigated developmental aptitude on children's performance achievement. Before the treatment of two criterion songs began, PMMA (Gordon, 1986a) was administered to all participants. A four-way ANOVA revealed students with a high level of music aptitude achieved significantly higher ratings on the songs than did students with low music aptitude.

The differences found in children's singing accuracy relative to tonal music aptitude were examined in Guerrini's (2002) study. Fourth and fifth grade students ($N=174$) were tested for vocal accuracy individually and privately singing "See the Bird," "America," and "Path to the Moon." The classes rehearsed each song once a

week for 3-weeks and then performed and audio recorded the songs during the fourth week. Three qualified judges used the SVDM (Rutkowski, 1990) to evaluate the children's singing ($r=.86-.95$). The Intermediate Measures of Music Audiation (IMMA) (Gordon, 1986b) was administered to the students. Through a 2x3 two-factor ANOVA and Scheffe Post-hoc test, the researcher determined the singing of high aptitude children and moderate aptitude children was significantly more accurate than the singing of low aptitude children.

In addition to examining the differences between kindergarten students' ($N=58$) singing with and without text, Lange (1999) determined whether the use of text in song instruction has an effect on developmental tonal aptitude. All of the students were pre- and posttested using the Tonal subtest of PMMA (Gordon, 1986a). In order to determine whether the use of text in song instruction has an effect on developmental tonal aptitude, a two-way ANOVA was conducted. Students who received instruction with no text tended to have greater gains in their tonal aptitude than students who received instruction using only text. Students with low aptitude had significantly greater gains in aptitude after instruction than students with high aptitude.

Summary

While tonal aptitude scores may be used to help teachers identify students with high, average, and low music aptitude, few researchers have found a significant relationship between tonal music aptitude and singing achievement (Gault, 2002; Guerrini, 2002; Jarjisian, 1981; Martin, 1991). The lack of relationship is likely due to the fact that aptitude and achievement are different musical constructs. Researchers did state that singing instruction appears to improve achievement. In studies where tonal aptitude scores were examined in pre- and posttests, the reader should consider

that other factors besides the treatment could have contributed to relationships between tonal aptitude and singing achievement.

Melodic Intervals Affecting Singing Achievement

Persellin (2006b) investigated whether children find half steps within a pattern more difficult to sing in-tune than other intervals. This idea stemmed from Kodály-based pedagogy that states that children have difficulty singing half steps in tune and can instead sing larger intervals in tune. Persellin had 200 kindergarten children from two urban elementary schools sing the criterion song “See the Bird” at the beginning and end of the school year. Each child responded after hearing each phrase played first on the piano and then sung by an 11-year-old child. The VAAI (Youngson & Persellin, 2001) was used to evaluate the singing. The recordings were transcribed and scored by two independent judges. The results indicated that the phrase containing an ascending half step was sung the most accurately. The second most accurately sung phrase contained a descending half step. Both phrases were three note patterns near the tonic of the song. The four phrases that contained a descending minor triad improved from the beginning of the school year to the end, but still were not sung as accurately as the phrases containing half steps. Persellin suggested that the increased vocal accuracy on half steps could have been caused by singing near the tonal center or because the tonal center in this song is in the lower singing range, which is the speaking range for many children (Persellin, 2006b).

Similar results were found in Guerrini’s (2002) study where children also sang “See the Bird.” Guerrini used the SVDM (Rutkowski, 1990) with fourth and fifth grade students ($N=174$). Additionally, the researcher taught the familiar song “America” and the unfamiliar song “Path to the Moon.” Guerrini ranked the patterns

of the SVDM by examining each student's scores individually and discovered the pattern in "See the Bird" with the ascending half step was the easiest pattern to sing. The next easiest pattern was the descending half step, followed by a descending minor third pattern. The researcher concluded that many students sing short patterns more accurately than an entire song.

Signor (1984) examined the difficulty levels of 48 tonal patterns as reflected in the ability of preschool children to echo-sing them, and what factors contributed to this difficulty. Signor chose 48 items as representative of patterns found in children's song materials and were limited in their range and length. Ninety-six children ranging in age from 36 to 71 months were tested in this study. Children's singing responses were taped and evaluated by four judges ($r=.73-.96$). The results indicated that the presence of half steps was not found to be a significant predictor in the singing success of the children in this study. Five of the ten easiest patterns contained half steps. The descending minor third was among the easier patterns for children to sing in this study (Signor, 1984). The descending minor third was contained in six of the ten easiest patterns in this study.

Reifinger (2009) examined beginning pitch-reading achievement with a select group of patterns to identify features that may affect skill acquisition and performance abilities when children first learn to read notation to sing pitches. Second grade students ($N = 193$) from 12 intact classrooms of three schools participated in the study. The students read and sang four-note tonal patterns during the sight-singing portion of the music lesson. The tonal patterns consisted of the pitches representing *do*, *re*, *mi*, *sol*, and *la*. The patterns were practiced during 15 classes, with one new pattern introduced and all previously learned patterns reviewed at each session. On the 16th

session, all of the patterns were reviewed. A pretest was given where the students read and sang 25 unfamiliar patterns. On the posttest, 15 of the patterns were familiar and 10 of the patterns were unfamiliar. After an 8-week period with no pattern instruction following the posttest, a retention test was given. A retired elementary music teacher judged the recordings by writing down the notes heard. Another retired music teacher judged 50% of the tests, establishing a scoring reliability of $r=.89$. The 25 patterns were then ranked from easiest to most difficult. The pattern that was ranked as the easiest was *sol-mi-sol-mi*, which is widely believed to be the most familiar pattern and easiest pattern for young children. The second-easiest pattern for children to read and sing was *do-do-do-mi*. The researcher reported that some music teachers use *do* and *mi* rather than *sol* and *mi* as the pitches to focus on with young children. One of the patterns that stood out as one of the most difficult was *sol-sol-mi-la*. The researcher notes that this is surprising given that patterns like this are widely believed to be familiar to children through their spontaneous singing and as a basis for sequencing tonal material in the Kodály method (Reifinger, 2009).

Examining the effect of pentatonic and diatonic instructional content, Jarjisian (1981) determined the comparative effects of instruction: (a) in pitch patterns which include half steps, (b) in pitch patterns which include no half steps, and (c) in pitch patterns of both types on diatonic and pentatonic rote-singing achievement. The researcher and another music teacher taught first grade students from two separate schools for 16-weeks. The groups were divided into three treatment groups: (a) diatonic patterns, (b) pentatonic patterns, and (c) both diatonic and pentatonic patterns. All of the students additionally learned the same two songs by rote weekly in which one was diatonic and one was pentatonic. Two of the criterion songs were based upon

the pentatonic tonal system, one in *do* pentatonic tonal system, “All Night, All Day” and one in *la* pentatonic tonal system, “John Brown’s Coal Mine.” Two of the criterion songs were based upon the diatonic tonal system, one in major tonality, “So Long, It’s Been Good to Know You” and one in harmonic minor tonality, “The Little Tree.” At the conclusion of the instructional segment, each student was recorded singing the four criterion songs. The researcher and another music educator evaluated the singing samples using a researcher-created 5-point continuous rating scale (Jarjisian, 1981) that focused on maintenance of pitch center, general sense of melodic direction, and accuracy in singing adjacent intervals and leaps. Interjudge reliabilities for each of the criterion songs ranged from $r=.72$ to $.82$. The researcher used ANOVA to analyze the data. Participants who received the treatments that combined diatonic and pentatonic patterns had significantly higher performance ratings on both pentatonic songs and both diatonic songs in comparison with the treatment groups that only focused on either diatonic or pentatonic patterns. The researcher suggests that the diatonic patterns could have aided the development of a sense of tonal center and the pentatonic patterns could have contributed to in-tune singing or sense of melodic contour. This is one reason why the combination treatment may have offered higher results. There was no significant difference between the scores of the diatonic and pentatonic treatment groups. Jarjisian noted that significant differences may have been determined between diatonic pitch pattern instruction and pentatonic pitch pattern instruction if the rating scale could have distinguished between students “who maintained pitch center but not direction and those who maintained direction but not pitch center (Jarjisian, 1981, p. 42).”

Summary

Various patterns and intervals encountered in typical repertoire of young children demonstrate that the descending minor third is one of the easiest patterns for children to sing (Reifinger, 2009; Signor, 1984). Persellin (2006b), saw improvements in children's' singing of the minor third from the beginning to the end of a school year, but the ascending and descending half step were sung more accurately than the minor third. Reifinger's (2009) discovered that the pattern *sol-sol-mi-la* was one of the most difficult patterns to be sung. One thought in music education had for so long been that the descending minor third was easier to sing than half steps. At the same time, many songs used with young children contain the pattern that Reifinger found to be difficult for young children to sing. Jarjisian (1981) suggested that combining pentatonic and diatonic pattern instruction allows students to sing more accurately. The results from these studies do not provide enough evidence as to the appropriate tonal construction of a song for student's singing achievement. More research needs to be conducted on the influence of pentatonic and diatonic songs on singing achievement. In the present study, a major tonality criterion song and pentatonic criterion song will be used.

Discussion

The research studies discussed in this literature review relate to singing achievement, which will be investigated in the present study. While many researchers have determined how teaching techniques can effect singing achievement, few researchers have investigated the effect of repertoire on the singing achievement of children (Jarjisian, 1981). Continued research on effective song repertoire in the music

classroom is imperative. The current study will contribute to the body of literature on song repertoire in the elementary general music classroom.

Chapter 3

METHODOLOGY

Overview of the Study

In this chapter I outline the methodology used for this study, which investigated whether the tonal construction of a song effects second grade students' singing achievement. I will present the design of the study, conceptual framework, role of the researcher, criterion measures, data collection and analysis as well as the results of the study.

Conceptual Framework

Three common teaching methods in American Music Education are the Music Learning Theory (Gordon, 2012) based method, Kodály Method, and the Orff-Schulwerk approach. These three methods are characterized by (a) the construction of song repertoire, and (b) the way that the songs should be taught. Researchers have found that the easiest interval for a child to sing is the descending minor third (Choksy, 1999; Hall & Walter, 1956). The descending minor third interval is the foundation for the song repertoire of the Kodály Method and the Orff-Schulwerk approach. Songs with a strong tonal center, in a variety of tonalities are associated with the Music Learning Theory (Gordon, 2012) based method. Major tonality songs are found in popular culture and music textbook series. While these elementary general music methods suggest various techniques for teaching songs, this research study was not approached from a specific theory, method, or technique of music

teaching. Instead, I desired to investigate if a certain type of song construction is developmentally appropriate for young students by studying the singing achievement of second grade students.

With the intent of improving students' singing achievement, the purpose of this study was to determine whether the tonal construction of a song effects second grade students' singing achievement. The following question was investigated:

Do second grade students have higher singing achievement when singing a pentatonic tri-chord criterion song or when singing a major tonality criterion song?

Design of the Study

Two intact groups of second grade students were participants in this study, rather than randomly assigned groups. The students were already randomly placed into classrooms at the school and the groups could not be reassigned for this study. An alternative treatment post-test-only with nonequivalent groups design was used (Creswell, 2009) (See Figure 1). Each group received a different treatment, but both groups received the same post-test. A post-test only design was advocated by Campbell and Stanley (1963) who stated that post-test only avoids pretest contamination that could occur if a participant learns something from the pretest that would help them perform better on the post test.

Teacher-Researcher

To provide consistent instruction in this study I served as a teacher-researcher and became a visiting music instructor and sole collector of data. On six occasions, I taught all students the criterion songs, reviewed the criterion songs, and recorded the students' singing.

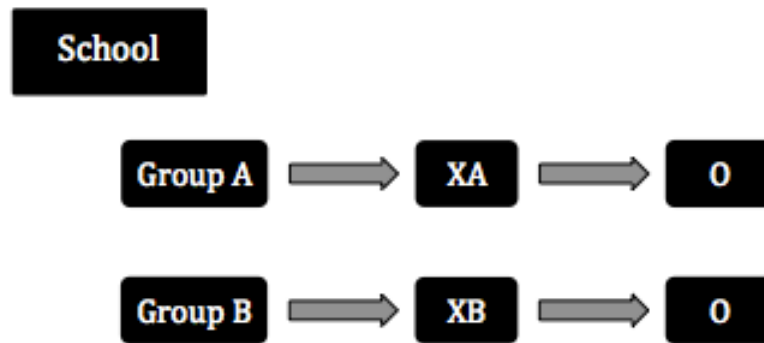


Figure 1 Design of Study.

I was a second year graduate student at the University of Delaware and had experience teaching college methods courses. I also had experience teaching elementary general, instrumental, and early childhood music. During the six years spent in the University of Delaware’s undergraduate and graduate music education programs, I studied Gordon’s Music Learning Theory (Gordon, 2012). I hold Level I Certification in Early Childhood Music through the Gordon Institute for Music Learning (GIML) and taught Early Childhood Music classes through the University’s Community Music School. Therefore, it is possible that I may have been inadvertently biased by this training. Although I did not have extensive Kodály, Orff, or Laban Movement training, I had experience with all three in my undergraduate coursework and student teaching. To control for bias, I took steps to ensure that the procedure used for teaching the criterion songs did not follow a process outlined by any specific teaching method. I also employed three independent judges to rate the students’ singing. To ensure proper treatment of human subjects, I completed the Protection Human Subjects Curriculum through Collaborative Institutional Training Initiative (CITI) (see Appendix F) before beginning this research study.

Delimitations of the Study

The population of this study was limited to four second-grade classes from Oak Hill Elementary School in the mid-Atlantic region of the United States. In the typical music curriculum, each class received music instruction once a week, unless there was a school holiday. For the present study, six instructional visits took place on a weekly basis. There was a two-week period in between weeks three and four for Group A and weeks two and three for Group B because of regularly scheduled school holidays. In addition, a hurricane affected the area and the school was closed for two days during week six. Thus, instead of reviewing and recording the song with the students during music class as planned, two of the groups were taught in their regular classrooms. Students who were absent and missed lessons or the audio recording session, were not included in the study. As the music teacher for the activities of this research, I acted as the teacher-researcher. During week three, I was sick and had a weak singing voice. To ensure that each group heard the same singing model that week, I made a recording of my singing that was used during instruction.

Definition of Terms

For the purpose of this research, the following definitions were used:

- *Keyality* – “Pitch name of the tonic” (Gordon, 2012, p. 399)
- *Method* – “...order in which sequential objectives are introduced in a curriculum to accomplish a comprehensive objective, a goal” (Gordon, 2012, p. 28).
- *Pentatonic Trichords* – “Songs that are composed of three notes within the pentatonic system” (Houlahan & Tacka, 2008, p. 51)
- *Singing achievement* – How well a student sings a song based on singing voice, and the melodic contour, pitches, rhythms, and starting pitch of the song (Gault, 2002; Hornbach & Taggart, 2005;

Jarjisian, 1981; Levinowitz, 1989; Rutkowski, 1996; Rutkowski & Miller, 2003b).

- *Technique* – “a teaching aid employed to achieve one or more sequential objectives” (Gordon, 2012, p.28).
- *Tonic* – “Pitch name of the keyality” (Gordon, 2012, p. 412)

Participants

Students

In 2012, a total of 636 students were enrolled in grades 1-5 of Oak Hill Elementary School. The student body consisted of 17.3% African American, 0.2% American Indian, 14.2% Asian, 3.5% Hispanic/Latino, 61.9% White, and 3.0% Multi-Racial. The population of Oak Hill was 50.6% male and 49.4% female. The percentage of low-income students was 10.3% (State of Delaware, 2013). One music teacher instructed students of Oak Hill for 45 minutes once a week, through an eclectic curriculum of Kodály, Orff, and Music Learning Theory (Gordon, 2012) based teaching methods. Four intact second grade classes from this school participated in this study.

The students ($N= 80$) for this study were in second grade at Oak Hill Elementary School located in the mid-Atlantic region of the United States. Both Group A and B were comprised of the same number of students ($n=40$). Second grade students were chosen as the participants in this study because they were accustomed to the school and the music teacher, and the criterion songs that were taught were developmentally appropriate for the beginning of the year. The major tonality criterion song had a clear emphasis on the tonic with skips, leaps, and diatonic passages that were appropriate for second grade students to sing. The pentatonic trichord criterion

song contained the pitches *so-mi-la*, without a clear sense of tonic. The Kodály curriculum introduces the syllable *la* in March of the first grade year and the next syllable *do* is introduced in October of second grade (Choksy, 1999; Houlahan & Tacka, 2008). This criterion song was also appropriate to teach to second grade students in September. This decision for second grade students to be participants was also made according to the research on singing achievement, in which second grade students have frequently been participants (Green, 1994; Hicks, 1989; Hornbach & Taggart, 2005; Klinger et al., 1998; Reifinger, 2009; Yarbrough et al., 1991).

Criterion Measure

The present study was a quasi-experimental study. Group A ($n=40$) was taught Song A, “Sunshine (see Appendix B),” a major tonality criterion song, and Group B ($n=40$) was taught Song B, “Bell Horses (see Appendix C),” a pentatonic trichord criterion song. “Sunshine” is in major tonality with skips, leaps, and diatonic passages, with a clear emphasis on the tonic (Taggart, Bolton, Reynolds, Valerio, & Gordon, 2000, p. 16). “Bell Horses” contains the pitches of a pentatonic trichord (*so-mi-la*) and does not have a clear sense of tonic. Both songs were eight measures long, in duple meter, and in the keyality of D. The text in each song was appropriate for second grade students. The second grade students had not learned the songs prior to this study.

Rating Scale

To measure the effect of repertoire on singing achievement, I created the Singing Achievement Measure (SAM) (see Appendix A). This measure was created after careful study of the rating scales used by Gault (2002) and Hornbach and Taggart

(2005). While Gault and Hornbach and Taggart's rating scales combined pitch accuracy, melodic contour, singing voice, modulations, and tonal center and keyality maintenance criteria, I developed a measure that clearly separated out each criteria that pertained to singing achievement. The SAM was comprised of four 4-point descriptive rating scales and one 2-point rating scale used to evaluate students' singing samples. The criteria on the measure were melodic contour, pitch accuracy, rhythm, singing voice, and starting pitch. Though debate has ensued as to how many points on a scale yield the most reliable and valid results, I chose a 4-point descriptive rating scale because it removes a mid-point choice option. In addition, researchers have discovered that a 4-point rating scale yields higher reliability and validity in comparison to a scale with a mid-point (Pusecker, Torres, Crawford, Levia, Lehman, & Copic, 2011). When a mid-point is present, participants often choose the mid-point as a more pleasing or socially acceptable answer (Garland, 1991). Constructing the SAM this way allowed judges to accurately assess students' overall singing achievement while focusing on the context of a song as a whole rather than the accuracy of each note. Also, it allowed students to score high in one area even though they might score low on another criteria of the scale. SAM was presented in a rubric format to make it easier and quicker for a judge to use during analysis (See Table 1).

Reliability and Validity

After three independent judges analyzed two random singing samples from this study of Song A and two of Song B, the interjudge reliability for the pilot test of the SAM ranged from $r=.794 - .947$, and therefore, it was shown to be reliable. To ensure construct and content validity, I met with the three judges prior to analyzing the

singing clips to pilot the SAM and ask for their feedback. Judges were music teachers with more than 13 combined years of experience of teaching students in both early

Table 1 Singing Achievement Measure

Criteria	4	3	2	1
Melodic Contour	Child sings with accurate melodic contour	Child sings with mostly accurate melodic contour	Child sings melodic contour with some accuracy	Child sings melodic contour inaccurately
<i>Pitches</i>	<i>Child sings majority of pitches accurately</i>	<i>Child sings most pitches accurately</i>	<i>Child sings some pitches accurately</i>	<i>Child sings majority of pitches inaccurately</i>
Rhythm	Child sings majority of rhythms accurately	Child sings most rhythms accurately	Child sings some rhythms accurately	Child sings majority of rhythms inaccurately
<i>Singing Voice</i>	<i>Child uses singing voice</i>	<i>Child mostly uses singing voice</i>	<i>Child mostly uses speaking voice</i>	<i>Child uses speaking voice</i>
Starting Pitch			Child sings starting pitch accurately	Child sings starting pitch inaccurately

childhood and elementary settings. All three judges frequently assess the musical achievement of the young students they teach. In a conference room one month before data were analyzed for this study, I asked the judges to study the SAM to provide questions or comments they might have had regarding its function. I met with the

judges; we talked through the measure and changed some terminology to ensure consistency between criteria. Then, I played a random sample for judges to rate independently after they listened to it three times. Upon playing the recording three times, we determined that starting pitch should be a separate criteria as students would sing the starting pitch either accurately or inaccurately. Then, I played three more randomly chosen clips, three times each, for the judges to rate independently. At this point, the judges heard two students sing criterion Song A and two students sing criterion Song B. I asked the judges if there were any final questions and if they thought the measure would function as a representation of a child's singing achievement. All three judges agreed that the SAM would accurately measure a child's singing achievement.

Protocol for Teaching

In May 2012, I gained permission from the music teacher and principal of Oak Hill Elementary School, as well as the school district, to complete the research study there. Parents of second grade students from four classes of Oak Hill Elementary School ($N=80$) received a letter and consent form that outlined my proposed study that was to begin in early September (see Appendix D). Parents were to return the form only if they did not wish their student to participate in the project. Those students who did not participate in the study were included in all of the musical activities, but were not audio recorded or included in any other part of the study. The University of Delaware Human Subjects Review Board approved this study (see Appendix K).

Rationale for Teaching Procedure

In mid-September, I visited the second grade classes for the first time to teach the criterion songs. Two second grade classes learned criterion Song A, “Sunshine,” and the other two second grade classes learned criterion Song B, “Bell Horses.” Criterion songs A and B were taught using the same procedures such as: listening, moving, singing phrases, and singing holistically. Some researchers discovered that students sang with fewer errors when taught using a holistic approach (Klinger et al., 1998; Moore et al., 1997; Persellin & Bateman, 2009), while significance in favor of this approach was only found by Klinger et al. (1998). Another researcher stated that teachers should use a combination of holistic and phrase-by-phrase singing approaches when teaching a song (Gault, 2002). Based on these results, I chose to use a combination of holistic and phrase-by-phrase singing when teaching the criterion songs as advocated by Gault (2002). Each week, I used a different technique that focused on giving the students plenty of opportunities to listen to the song and opportunities to sing the song on their own. After hearing the song multiple times, I had the students echo the song in phrases. The movement activities that I used kept the students engaged in the process. I changed the movements each week so that the students would not become bored with the song and the procedure.

I originally planned four visits to teach the songs, but realized after week two that the students would not have enough exposure and practice with the song to learn it. For example, the students were exposed to the song for approximately ten to fifteen minutes once a week and had difficulty remembering the song by the time they returned to music class the following week. I decided to extend the teaching by two weeks, which resulted in six weeks of treatment of the criterion song for both groups before the student’s audio recorded the song. In other studies where a song was

introduced and later tested, students were given 3-4 class periods to learn the criterion song before testing (Gault, 2002; Hornbach & Taggart, 2005; Persellin & Bateman, 2009). Even so, I believed that the results of this study would be affected if the students did not learn the song completely. Additionally, with a two-week break between weeks three and four for Group A and weeks two and three for Group B, it was important to add more opportunities for the students to learn the songs. In a classroom setting, a teacher would ensure that her students were adequately prepared before giving an assessment.

Persellin (2006a) found that there was no statistical difference in vocal accuracy when the teacher: (a) sang for the class, (b) sang with the class, and (c) sang both for and with the class. Therefore, I chose to use a combination of singing for and as a group in this study. Additionally, I had the students learn the song with the text to help them associate the song with a topic. I thought that it would be easier for the students to remember the song from week to week once they learned the text. The students sang both with and without text each week to prepare for their recorded performance at the end of the six visits. The research of Goetze (1985) and Levinowitz's (1989) revealed that children have greater singing achievement when singing without text. This research influenced my decision to have the students sing with a neutral syllable during their audio recording in week six. Singing on a neutral syllable allowed the students to focus on the melody rather than focus on both, the melody and the text. Researchers have explained that when students need to focus on both text and melody, they focus on singing correct text before correct pitches, or use a speaking voice instead of a singing voice (Goetze, 1985; Gordon, 2012).

I chose to use the neutral syllable *too* in this study because it allows the tongue to help with articulation for a clean and precise sound on each pitch. In action research, Pinzino discovered children singing more tunefully on *too* than *bum* (Pinzino, 2007).

Students sang individually when they were audio recorded because researchers have discovered that students sing with more accuracy when singing alone rather than singing with a small group (Goetze & Horii, 1989). Therefore, the students sang the appropriate criterion song alone, allowing the three independent judges to rate each child's singing more accurately.

Outline of Teaching Procedure

At the start of each music class, I taught Group A and Group B their respective criterion songs using a procedure that I changed each week, but was identical for both groups. Before I started, the music teacher took attendance and sang a hello song. Practicum students from a local university visited the school each Tuesday, and on this day would usually lead the opening hello song in place of the music teacher. Due to days off in the school's schedule, there were two weeks between Group A's third and fourth weeks of instruction, and two weeks between Group B's second and third weeks of instruction. During week six, I reviewed the criterion songs with the groups, and then, in another classroom, each student individually audio recorded a performance of the song they had learned. The school was closed for the first two days of week six because of a hurricane that affected the area the weekend before. Two classes did not have music during week six because of the days off. In order to have all students perform the song during week six, I worked with the classroom teachers of

the two classes who did not have music. I was able to take students out of their general classroom to be audio recorded one at a time. (See Figure 2).

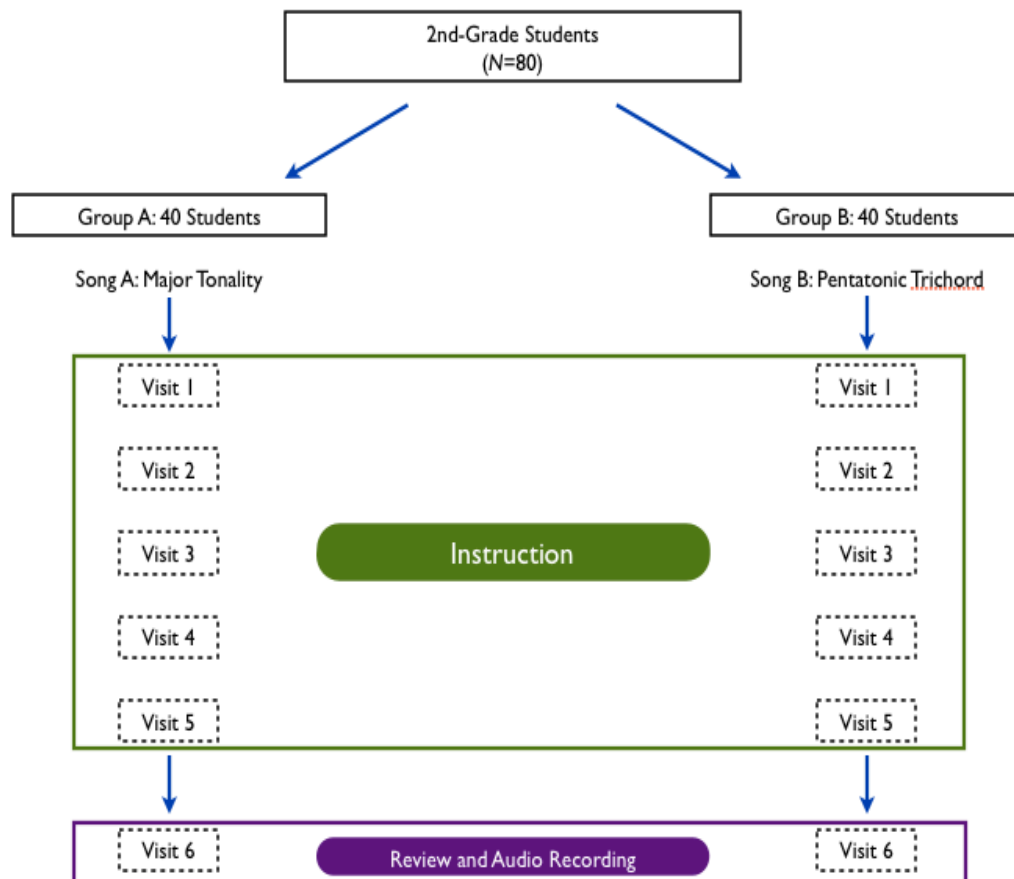


Figure 2 Overview of Teaching Procedure.

Each week I used a scripted procedure to ensure that all second grade classes received the same instruction. I used a bass xylophone to play the starting pitch before beginning instruction. Any time I asked the students to sing, I would provide them

with a starting pitch by singing “ready sing” on the first pitch of the song. Throughout the entire teaching procedure, the songs were taught without accompaniment. The only differences that occurred between groups had to do with classroom management. I tried to sing all instructions and directions, as well as use non-verbal communication for behavior problems. Occasionally, when the students were not following directions, I would verbally give directions. I did not include classroom management in the scripts because it was infrequent and inconsistent between the groups (see Appendix E).

Following is a summary of the procedure that I used each week to teach both groups their criterion songs.

Week 1

Students listened as I sang the song on the neutral syllable *too* six times. Each time, the students followed a different beat keeping movement that I modeled.

Week 2

Students listened as I sang the song on the neutral syllable *too* four times. Each time, the students followed a different beat keeping movement that I modeled. Then, students listened as I sang a phrase of the song on the neutral syllable *too*, and then they echoed the phrase. This was repeated for each of the four phrases. Next, students listened as I sang two phrases of the song on the neutral syllable *too* and then echoed the phrases. This was repeated for the last two phrases of the song.

Week 3

During week three, I was sick and did not have a strong singing voice. I recorded myself singing to use for instruction. This ensured that all of the classes

received the same vocal model. I moved with the students while the music teacher played the appropriate track number through a classroom sound system. Students listened as I sang the song on the neutral syllable *too* while moving to the beat. This step was repeated three additional times. Then, the students alternated singing with the vocal recording and singing without the vocal recording, while moving in a circle and in place to the beat.

Week 4

Students listened and used a coopera-band to move to the beat, while I sang the song on the neutral syllable *too*. I alternated between singing for the students and having the students sing alone. The students listened and moved to the beat as I introduced the text of the song by singing the song twice. Then, I sang the song in four phrases and had the students echo each phrase. Next, I sang the song in two larger phrases and had the students echo. I sang the entire song with text, and then I had the students sing the entire song. I alternated singing the song for the students and having the students sing the song, each time performing a different movement to the beat with the coopera-band.

Week 5

I sang the song for the students on the neutral syllable *too* while moving different body parts in continuous fluid movement. Then, I had the students sing while continuing to move. I sang the song with text while moving, and then I had the students sing with text while moving with a partner. Next, I sang on the neutral syllable *too* while performing an informal circle dance. I sang for the students and had

the students sing alone. Then, I introduced the text into the song again, all while performing the circle dance.

Week 6

During week 6, I reviewed the song with the students and then explained how the audio recording process would work. I sang the song for the students on the neutral syllable *too* while moving different body parts in continuous fluid movement. Then, I had the students sing while continuing to move. I sang the song with text while moving, and then I had the students sing with text while moving. I sang on the neutral syllable *too* while “melting” into the floor and “growing” up from the floor, and had the students perform the same movements while singing, without my help. Two classes learned this lesson in their general classrooms because they did not have a regularly scheduled music class that week.

Data Collection

After reviewing the criterion songs in the sixth week of instruction, I rehearsed the audio recording procedure with the students. To ensure that every student had the same cue before singing for the audio recording, I recorded “ready sing” on the starting pitch of both criterion songs. I played recordings of myself singing for the students so they would know the procedure. The following directions were given to the class of students:

Today you are going to get the chance to sing this song for me! When it is your turn to sing, first I will play a recording of the song for you to just listen to, but not sing along with. Then you will hear my voice on a recording sing “ready sing” and you will sing the entire song on the neutral syllable *too* just like we have been doing in class. Let’s listen to an example. First, you will hear this (I played track 1: “Listen to the Song”). Then you will hear this (I played track 3: “Ready Sing” and

paused the track) and then you will sing the song on the syllable *too* like me (I played the rest of track 3).

Audio recording of the students took place in the foreign language classroom. I took the students from the music room in a previously determined random order. This classroom was full of empty student desks and chairs. I set up a computer along with a Zoom Q3HD audio recorder on top of a desk in the classroom. I walked with one student at a time from either the music room or the regular classroom to the foreign language room. On the way, I tried to set the student at ease by smiling and having a conversation with them. I sat down in a chair and had the students stand close to the recorder. The students faced me while singing rather than the recorder to make the students comfortable by resembling singing evaluations they are accustomed to in their music class. The following directions were given to each student once they were in the room:

(Name of student), remember you will listen first then sing on the syllable *too*.

I played the first track for the student to listen to. I then pressed the record button on the audio recorder. Then, I played the second track “ready sing” and cued the student with a gesture and a breath. When the student finished singing, I said the student’s identification number into the recorder to ensure confidentiality and avoid researcher bias as much as possible. I pressed the record button again to stop the recording, and then thanked the student for singing. The student then chose a “You are a music star!” pencil as a “thank you” for participating. I then walked the student back to the music room or regular classroom and called for the next student.

Because the music teacher frequently had the students sing on their own for assessment and other musical activities, every student willingly sang for me. Those students who were not given consent to be audio recorded, were pulled at the end of a

class to sing together without being audio-recorded. These students then chose a pencil and returned to class.

Data Analysis

A post-test was administered to each group to measure their singing achievement. After I recorded each student singing the criterion song, the song clips were organized to prepare for data analysis. Three independent judges analyzed the students' song samples with the Singing Achievement Measure (SAM) (see Appendix A).

Analysis of Participants' Singing

All three judges gathered with the researcher in a conference room one evening in January to assess all of the students' audio recordings. I gave each judge copies of the SAM, which were color coded and labeled for Song A and Song B. I created a randomly selected list of student's samples to play for analysis. I alternated between samples of criterion songs A and B. I divided the samples into two sections of 27 clips and one section of 26 clips, and provided the judges with two 7-minute breaks between sections. Each student's performance was played three times for the judges with a short pause in between each playing. Most researchers do not report the amount of times judges were allowed to listen to recordings when rating them (Atterbury & Silcox, 1993; Guilbault, 2004; Hornbach & Taggart, 2005; Klinger et al., 1998). However, Gault (2002) had judges listen to the performances twice, focusing once on tonal elements and once on rhythm elements. Judges in this study were encouraged to listen for an overall idea, for judging, and to check their work. I played the samples through a sound system and the volume level was checked before starting to ensure

that all of the judges could hear the samples clearly. I announced the identification number of the student for the judges to write on their SAM, and then I played the recording. The judges independently rated the performance and when all three judges flipped their papers upside down, I moved on to the next performance. At the end of each section of samples, I informed the judges that it was time for a 7-minute break. After the break, I said that it was time to begin again, and read the next identification number. The total judging process took two and one-half hours.

After the judging was complete, I organized the data and input the students' scores into an Excel spreadsheet. I set up the spreadsheet so that the information would easily transfer into the statistical analysis software.

Chapter 4

ANALYSIS AND RESULTS

The purpose of this study was to determine whether the tonal construction of a song affects second grade students' singing achievement. Through a quasi-experimental design, second grade students performed either criterion Song A ($n=40$) or Song B ($n=40$) after 6 weeks of musical instruction. The audio recorded singing clips were labeled and organized to prepare for the rating process. Three independent judges rated the audio recordings of the students' singing using the researcher-created SAM, and the data from the ratings were analyzed to determine whether the tonal construction of a song affects second grade students' singing achievement. After the rating process, I organized the data by judge and criterion song and input all of the information into an Excel spreadsheet. The data were imported into the data analysis program SPSS (Version 21) and interjudge reliability was calculated using Cronbach's Alpha. Interjudge reliability for the SAM was $r = .94$. I calculated descriptive statistics, an intercorrelation of SAM criteria, two-sample t -Test, and principle component analysis using the ratings of each child's performance on the SAM. Results from the statistical analysis answer the following research question:

Do second grade students have higher singing achievement when singing a pentatonic tri-chord criterion song or when singing a major tonality criterion song?

Descriptive Statistics

I calculated descriptive statistics for each criteria within Song A and B using the composite scores of all three judges for each of the students (see Table 2). As can be seen in the table, the mean scores are slightly higher for melodic contour, pitches, singing voice, and the composite for Song B. The rhythm and starting pitch criteria have higher means for Song A. There was greater variability among the scores of pitches, rhythm, singing voice, starting pitch, and the composite for Song B.

Table 2 Descriptive Statistics for Song A and Song B

Criteria	Song A (<i>n</i> =40)				Song B (<i>n</i> =40)			
	<i>M</i>	<i>SD</i>	Min.	Max.	<i>M</i>	<i>SD</i>	Min.	Max.
Melodic Contour	9.42	2.17	5.00	12.00	10.35	2.13	3.00	12.00
Pitches	7.12	3.03	3.00	12.00	7.25	3.54	3.00	12.00
Rhythm	10.85	1.81	5.00	12.00	10.40	2.39	3.00	12.00
Singing Voice	8.75	2.74	4.00	12.00	9.20	2.98	3.00	12.00
Starting Pitch	4.80	1.38	3.00	6.00	4.57	1.48	3.00	6.00
Composite	40.95	9.72	25.00	54.00	41.77	10.04	15.00	54.00

Intercorrelation of Criterion

Intercorrelations among the criteria of SAM were computed (see Table 3). The majority of correlations ranged from moderate to strong ($r = .538 - .866$), which can be expected because the criteria are related with singing achievement. Stronger relationships were found between melodic contour and pitches, singing voice and

pitches, starting pitch and pitches, and starting pitch and singing voice ($r=.714 - .866$). Weaker relationships were found among rhythm and pitches, rhythm and singing voice, and rhythm and starting pitch ($r=.222 - .417$).

Table 3 Intercorrelations of SAM Criterion

	<u>Melodic Contour</u>	<u>Pitches</u>	<u>Rhythm</u>	<u>Singing Voice</u>	<u>Starting Pitch</u>	<u>Composite</u>
<u>Melodic Contour</u>	1.000					
<u>Pitches</u>	0.714**	1.000				
<u>Rhythm</u>	0.538**	0.417**	1.000			
<u>Singing Voice</u>	0.658**	0.776**	0.222*	1.000		
<u>Starting Pitch</u>	0.560**	0.866**	0.315**	0.774**	1.000	
<u>Composite</u>	0.850**	0.934**	0.585**	0.856**	0.852**	1.000

Note. $N = 80$.

* $p < .05$. ** $p < .01$.

***t*-Test**

To examine the means between the two groups, a two-sample *t*-Test was calculated using the composite scores for Song A and Song B (see Table 4). As seen in Table 4, the *t* value is lower than the critical value of 2.02, therefore the difference between the means of the criteria for Songs A and B was not statistically significant.

Table 4 Two-Sample Comparison *t*-Test for Song A and Song B

Criteria	Song A		Song B		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Melodic Contour	9.42	2.17	10.35	2.13	- 1.92	77	0.058
Pitches	7.12	3.03	7.25	3.54	- 0.17	76	0.866
Rhythm	10.85	1.81	10.40	2.39	0.95	72	0.347
Singing Voice	8.75	2.74	9.20	2.98	- 0.70	77	0.484
Starting Pitch	4.80	1.38	4.57	1.48	0.70	77	0.485
Composite	40.95	9.72	41.77	10.04	- 0.37	77	0.710

Note. Song A: *n* = 40. Song B: *n* = 40.

Principle Component Analysis

Principle component analysis (PCA) is based upon an orthogonal transformation to convert a set of possibly correlated variables into a set of values of linearly uncorrelated variables. PCA was calculated because the five criteria were found to be correlated. From the five criteria, two new factors were created and a two-sample *t*-Test was computed on each factor. There were no significant results, therefore the PCA confirmed that the scores were similar for each of the five criteria between the groups.

Results

The results of this study indicated that there is no statistically significant difference between second grade students' singing achievement when singing a major tonality criterion song or when singing a pentatonic tri-chord criterion song. Interjudge reliability was strong between the three independent judges for the SAM, indicating

that the singing achievement scores were reliable for this study and that the SAM was a valid singing achievement measure. Descriptive statistics demonstrated that the means between the groups were similar for each of the criteria as well as the composite scores. Intercorrelations of the SAM criteria demonstrated that all five criteria were correlated to some degree. However, correlations between the criteria are to be expected, as the five criteria, in combination, comprise the specific components of singing achievement. From these results, conclusions, implications for the field of music education, and suggestions for future research can be made, which will be discussed in the following chapter.

Chapter 5

CONCLUSIONS, IMPLICATIONS FOR MUSIC EDUCATION, AND SUGGESTIONS FOR FUTURE RESEARCH

Summary

Purpose and Research Question

To better understand students' singing achievement, the purpose of this study was to determine whether the tonal construction of a song effects second grade students' singing achievement. The following question was investigated:

Do second grade students have higher singing achievement when singing a pentatonic tri-chord criterion song or when singing a major tonality criterion song?

Design

The present study was a quasi-experimental study that involved two intact groups of second grade students from Oak Hill Elementary School. Group A ($n=40$) was taught Song A, "Sunshine (see Appendix B)," a major tonality criterion song, and Group B ($n=40$) was taught Song B, "Bell Horses (see Appendix C)," a pentatonic trichord criterion song. "Sunshine" is in major tonality with skips, leaps, and diatonic patterns. "Bell Horses" contains the pitches of a pentatonic trichord (*so-mi-la*). Both songs were eight measures long, in duple meter, and in the keyality of D. The text in each song was appropriate for second grade students. The students had not learned the songs prior to this study.

In May 2012, I gained permission to complete the research study at Oak Hill Elementary School. Parents of second grade students from four classes of the school ($N=80$) received a letter and consent form, which only had to be returned if they did not wish their student to participate in the project. The students who did not participate in the study were included in all of the musical activities, but were not audio recorded or included in the data of the study.

In mid-September, 2012, I visited the second grade classes for the first time to teach the criterion songs. Criterion Songs A and B were taught using identical procedures that I developed such as: listening, moving, singing phrases, and singing holistically. The students were exposed to the song for 10- to 15-minutes once a week, for six weeks of treatment. During week six, I reviewed the criterion songs with the two groups, and I had each student perform the song individually. To ensure that every student had the same cue before singing for the audio recording, I recorded “ready sing” on the starting pitch of the appropriate criterion song.

Audio recording of the students took place in the foreign language classroom using a Zoom Q3HD audio recorder. Students stood close to the recorder, but did not have to sing directly into the recorder. A script was used during the recording process of each student. The student listened to the recording of the appropriate criterion song and then sang the song after the recorded cue, “ready sing.” After singing, the student chose a, “You are a music star!” pencil as a thank you for participating in the recording process.

Analysis

After I recorded each student singing the criterion song, the clips were organized to prepare for data analysis. Three independent judges analyzed the

students' song samples with the Singing Achievement Measure (SAM), a valid and reliable measure (see Appendix A). The judges were music teachers with more than 13 combined years of experience teaching young students in both early childhood and elementary settings. The SAM was comprised of four 4-point descriptive rating scales and one 2-point rating scale used to evaluate the students' singing samples. The criteria on the measure were melodic contour, pitch accuracy, rhythm, singing voice, and starting pitch. The SAM was set up in a rubric format to make it easier and quicker for judging the singing samples. All three judges gathered with the researcher in a conference room one evening to assess all of the students' audio recordings. Each student's performance was played three times through a sound system for the judges with a short pause in between each repetition. The total judging process took two and one-half hours.

Results

After the samples were rated, the data were organized and imported into the statistical software program SPSS (Version 21). Interjudge reliability was calculated using Cronbach's Alpha. Interjudge reliability for the SAM was $r = .94$. Descriptive statistics were calculated. The mean scores were slightly higher for melodic contour, pitches, singing voice, and the composite of Song B. The means were higher for rhythm and starting pitch of Song A. Intercorrelations among the criteria of SAM ranged from moderate to strong, which can be expected because the criteria are related with singing achievement. The means between the two groups were examined by calculating a two-sample comparison *t*-Test using the composite scores for Song A and Song B. The difference between the means of the criteria for Songs A and B was not statistically significant. Therefore, results of this study indicate that there is no

statistically significant difference between second grade students' singing achievement when singing a major tonality criterion song or when singing a pentatonic tri-chord criterion song. Results of this study yield the following conclusions.

Conclusions

The following conclusions were made in reference to the purpose and research question of the present study. These conclusions are based on the results of this study that demonstrated no significant difference between the singing achievement of second grade students when singing a pentatonic trichord criterion song or a major tonality criterion song.

The combination of pentatonic and diatonic activities in the students' regular music class could have contributed to similar singing achievement scores on both criterion songs. The students of this study were already familiar with pentatonic and major tonality songs, which could explain why there was no difference in their singing achievement. The regular music teacher practices an eclectic curriculum incorporating audiation-based activities and activities from the Kodály Method and Orff-Schulwerk approach. When the students were in first grade, a long-term substitute taught the students for half of the year with a curriculum based on the Kodály Method. The students then had the regular music teacher for instruction during the second half of first grade, as well as second grade. The regular music teacher includes major tonality pattern instruction in her classes and introduces musical notation through pentatonic melodies. Jarjisian (1981) found that participants who received a combination treatment of diatonic and pentatonic pattern instruction performed both diatonic and pentatonic songs significantly better than participants who received either just diatonic pattern or just pentatonic pattern instruction.

The students' regular music teacher's instruction could have effected the results of this study. The instruction for this study only lasted about 15-minutes each week. After the first 15-minutes, the regular music teacher continued with her regularly planned musical activities that included singing, chanting, listening, moving, and playing instruments. Though the music teacher's instruction was not a part of this study, the instruction could have effected students' singing achievement.

The students had strong singing backgrounds, which could have contributed to the similarity in singing achievement scores between the groups. The regular music teacher used a singing-based curriculum and all of the students at Oak Hill Elementary School were accustomed to this practice. It is possible that the two groups of students' singing abilities were very similar based on their previous musical experiences. Each group was focused on learning to sing their specific criterion song. There is also the possibility that any song that was taught to the two groups of students could have led to similar singing achievement results.

The tonal and rhythm constructions of the pentatonic and major tonality songs taught in this study were similar to other songs taught in the music curriculum and may have impacted singing achievement. While the criterion songs used in this study were new to the students, this familiarity could have contributed to the students' singing achievement scores. In addition to duple meter and major tonality songs that are taught consistently in their music classes, this meter and tonality are heard pervasively in other environments. The music teacher frequently teaches pentatonic melodies and some previously taught melodies might have consisted of similar pitch arrangements. According to Guerrini (2002), no significant differences were found between the accuracy of a child singing a familiar song and the same child singing a

newly learned song. Guerrini suggested that once students are able to sing an entire song accurately, they are able to sing other similar songs accurately as well.

While the resting tone was not included in the instruction of this study, it is possible that the students were still audiating a tonal center on their own. The regular music teacher includes singing activities emphasizing the tonic and dominant to tonic relationship in the curriculum. Student teachers and practicum students who work with the regular music teacher also teach activities emphasizing the tonic. Hicks (1989) suggested that there is no way to control for audiation, which takes place in students' minds. Students could have imposed a tonal center in the pentatonic song (Hicks, 1989). Audiating a tonal center could have affected the singing achievement instruction in both groups.

The girls' singing might have offset the composite singing achievement scores on the SAM. Several researchers have found that girls have higher singing achievement than boys (Goetze, 1985; Goetze & Horii, 1989; Green, 1994; Guerrini, 2002; Phillips, 1992). Both groups in this study were almost identical with 21 boys in both groups, Group A had 19 girls, and Group B had 20 girls. No significant difference between the two songs could be attributed to the fact that the genders of each group were so similar. The breakdown of gender is not clear in other studies.

The researcher created SAM was found to have strong reliability and content and construct validity. Three independent judges used the SAM to evaluate students' singing achievement and there was strong consistency among the judges. Therefore, the SAM was an accurate representation of the results of the students' singing achievement.

Several conclusions were made regarding the similarities in singing achievement scores when singing a major tonality and pentatonic tri-chord criterion song: (a) the instruction used by the general music teacher, (b) the construction of the criterion songs, (c) the possibility of students audiating a resting tone, (d) gender, and (e) the SAM as a reliable and valid measure. The conclusions from this study provide music educators with information to consider when teaching students to sing.

Implications for Music Education

Singing is at the heart of most elementary general music programs. Music educators use a variety of techniques to teach songs. However, music educators must know what song repertoire to choose to address students' singing achievement. The following are implications for music educators.

According to the result of this study, music educators could use major tonality and pentatonic tri-chord songs as viable repertoire toward furthering students' singing achievement. Since there was no difference in students' singing achievement scores on the pentatonic and major tonality song, it would seem that music educators could use a combination of the two types of songs in their classrooms.

Music educators could include the SAM in their classrooms to measure singing achievement. The SAM had strong reliability and content and construct validity, and was an accurate way to evaluate students' singing in this study. Additionally, the SAM separates melodic contour, pitches, rhythm, singing voice, and starting pitch as separate criteria and is organized as a rubric so that researchers or teachers may measure the various aspects of singing achievement with ease.

Suggestions for Future Research

The present study determined that there was no significant difference between second grade students' singing achievement when singing a major tonality criterion song or when singing a pentatonic tri-chord criterion song. Replication of this research study is needed to verify the results and conclusions. Furthermore, replication of research on this topic is needed. Few studies exist on the effect of repertoire choice on singing achievement.

This research study could be replicated with disparate criterion songs. Research is needed on criterion songs in different tonalities between groups. Criterion songs in research studies typically are pentatonic or in major or minor tonalities (Atterbury & Silcox, 1993; Gault, 2002; Goetze & Horii, 1989; Guerrini, 2002; Green, 1994; Hale, 1977; Hedden & Baker, 2010; Hornbach & Taggart, 2005; Jacobi-Karna, 1996; Jarjisian, 1981; Klinger et al., 1998; Levinowitz, 1989; Moore et al., 1997; Persellin, 2006a; Persellin, 2006b; Persellin & Bateman, 2009; Rutkowski & Miller, 2003a; Rutkowski & Miller, 2003b). Major and minor songs are familiar to young students because they are exposed to music at home and on the radio and television (Michel, 1973). Using songs in other tonalities within the music education curriculum could lead to novel results on students singing achievement. Both criterion songs, in this study, were in duple meter. The meter of a song may influence students' singing achievement. An experimental design that controls for tonality could include songs in different meters in future research.

Future research should be conducted investigating the effect of song repertoire on the singing achievement with students in other grades. This study determined second grade students singing achievement on two criterion songs, but future research should include students in other grades. Students make significant gains in singing

after first grade and up through fifth grade (Rutkowski & Miller, 2003a). Researchers should take care to use song repertoire appropriate for students' grade level.

In this study, the researcher instructed the students for a portion of the music class each week to teach the criterion songs. This research study could be replicated with the regular music educator teaching the criterion songs instead of the researcher. As noted previously, the regular music teacher's singing activities could have contributed to the results of this study.

In future studies, researchers should determine whether the neutral syllable *too* is most effective for singing achievement. The neutral syllable *too* was used in this study based on the action research of Pinzino (2007). In research studies, few researchers explain why they have chosen to use a specific neutral syllable. If researchers continue to investigate students' singing achievement when singing with and without text, more research is necessary regarding the particular neutral syllable that is used.

In the present study, each group of second grade students learned a particular criterion song. A study should be conducted where two criterion songs are taught to each group of students. Having both groups learn both criterion songs while controlling instruction might better indicate the role of repertoire choice on students' singing achievement.

Future research studies should conduct validation studies of the SAM. While the SAM was found to be reliable and valid in this study, future research could determine whether music educators and researchers could use the SAM in the future. Singing achievement measures that are reliable and valid are needed for use in the elementary general music classroom.

With the intent of improving students' singing achievement, the purpose of this study was to determine whether the tonal construction of a song effects second grade students' singing achievement. While the tonal construction of a song did not affect singing achievement, continued research on this topic is necessary to expand the current literature on singing achievement. Through better understanding of how the choice of song repertoire effects the singing achievement of young students, music educators will have a solid foundation from which to teach songs that lead to higher singing achievement of their students.

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Appendix A

SINGING ACHIEVEMENT MEASURE

J-ID: A - _____

Total _____

Singing Achievement Measure

Criteria	4	3	2	1
Melodic Contour	Child sings with accurate melodic contour	Child sings with mostly accurate melodic contour	Child sings melodic contour with some accuracy	Child sings melodic contour inaccurately
<i>Pitches</i>	<i>Child sings majority of pitches accurately</i>	<i>Child sings most pitches accurately</i>	<i>Child sings some pitches accurately</i>	<i>Child sings majority of pitches inaccurately</i>
Rhythm	Child sings majority of rhythms accurately	Child sings most rhythms accurately	Child sings some rhythms accurately	Child sings majority of rhythms inaccurately
<i>Singing Voice</i>	<i>Child uses singing voice</i>	<i>Child mostly uses singing voice</i>	<i>Child mostly uses speaking voice</i>	<i>Child uses speaking voice</i>
Starting Pitch			Child sings starting pitch accurately	Child sings starting pitch inaccurately

Appendix B
CRITERION SONG A

Sunshine

Edwin E. Gordon



I baked a ray of sun-shine, I fried a sil-ver moon. I
stirred it all to-geth-er With a pea-nut but-ter spoon.

“Sunshine” from *Jump Right In: the Music Curriculum Book 1* by Edwin E. Gordon
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Appendix C
CRITERION SONG B

Bell Horses

Traditional

Bell hor - ses, bell hor - ses, what's the time of day?
One o' - clock, two o' - clock, time to a - way.

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Appendix D

PARENT INFORMATION/CONSENT LETTER

September 6th, 2012



Dear Second Grade Families,

My name is Christine Hadfield and I am a graduate music education student at the University of Delaware working toward a degree concentrating on elementary general music. Because of this interest, I will be conducting research in _____'s music class this fall.

I am interested to see how different types of songs affect second graders' singing achievement. I will teach these songs to your child on four separate occasions during music class. To study the effect of the songs on your child's singing achievement, I will individually audio record your child singing the song I have taught. To ensure that your child's identity is kept confidential, I will use a numerical coding system that will not link the audio recording to your child. Excerpts of recordings may be used in professional settings for presentation purposes.

If you are uninterested in your son or daughter participating in this project, please return the form below to _____ by _____. If the form below is not returned, you understand that your child will participate in the project.

Should you have any questions, please feel free to contact me at chadfiel@udel.edu. If you desire more information regarding you or your child's rights for participation in this study, please contact the University of Delaware Research Office at (302) 831-2137 or udresearch@udel.edu.

Thank you,

Christine Hadfield



I am **not** interested in having _____ participate in
(Child's Name)
the research study described above.

Signed,

(Parent or Guardian)

(Date)

Appendix E
TEACHING PROCEDURE

Week 1

1. Classroom teacher has students sit in a circle.
2. T – Plays starting pitch (A) on barred instrument.
3. “Listen to my song and move like me (sung on the starting pitch A).”
4. T sings song on the neutral syllable *too* while patting the big beat on thighs; S listen and move.
5. T sings song again on the neutral syllable *too* while patting the small beat on thighs; S listen and move.
6. T sings song a third time on the neutral syllable *too* while rocking to the big beat from side to side; S listen and move.
7. T sings song a fourth time on the neutral syllable *too* while rocking to the small beat from side to side; S listen and move.
8. T sings song a fifth time on the neutral syllable *too* while rowing to the big beat; S listen and move.
9. T sings song one more time on the neutral syllable *too* while rowing to the small beat; S listen and move.
10. “Thank you! I will see you next week!”

Week 2

1. Classroom Teacher has students stand in a circle.
2. T – Plays starting pitch (A) on barred instrument.
3. “Listen to my song and move like me (sung on the starting pitch A).”
4. T sings song on the neutral syllable *too* while keeping the big beat in her heels; S listen and move.
5. T sings song again on the neutral syllable *too* while patting the small beat on thighs; S listen and move.
6. T sings song a third time on the neutral syllable *too* while waving arms above the head to the big beat from side to side; S listen and move.
7. T sings song a fourth time on the neutral syllable *too* while waving hands above the head to the small beat from side to side; S listen and move.
8. T sings (on the pitch A), “Listen to my song and echo me.” T sings the first phrase of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.
9. T sings the second phrase of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.
10. T sings the third phrase of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.
11. T sings the fourth phrase of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.

12. T sings the first and second phrases of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.
13. T sings the third and fourth phrases of the song on the neutral syllable *too* then cues S with a breath to echo that phrase.

Week 3

Researcher was without a singing voice so a recording of her singing was used.

1. Classroom Teacher has students stand in a circle.
2. T – Plays starting pitch (A) on barred instrument.
3. “Listen to my song and move in a circle in this direction (points in counter clockwise direction) (sung on the starting pitch A).”
4. T sings song on the neutral syllable *too* while walking to the small beat in a circle to the right; S listen and move (Track 2).
5. T sings (on pitch A), “Turn around,” then sings the song again on the neutral syllable *too* while walking to the small beat in a circle to the left; S listen and move (Track 2).
6. T sings (on pitch A), “March with me,” then sings the song a third time on the neutral syllable *too* while marching to the small beat; S listen and move (Track 2).
7. T sings (on pitch A), “Hop with me,” then sings the song a fourth time on the neutral syllable *too* while hopping to the small beat; S listen and move (Track 2).

8. T sings (on the pitch A), “Sing with me this time; You’ll hear ready sing,” and sings the song a fifth time on the neutral syllable *too* while tip-toeing to the small beat; S sing and move (Track 1).
9. T sings (on the pitch A), “Listen again.” T sings the song a sixth time on the neutral syllable *too* while standing still; S listen (Track 2).
10. T sings (on the pitch A), “Sing for me.” T cues S with, “Ready sing” and a breath; S sing entire song.
11. T sings (on the pitch A), “March with me and listen to my song.” T sings and moves; S listen and move (Track 2).
12. T sings (on the pitch A), “This time sing and march in a circle.” T cues S with “Ready sing,” and a breath and moves with them; S sing song and march in a circle.
13. T sings (on the pitch A), “Sing one more time; this time tip-toe around the circle.” T cues S with, “Ready sing,” and a breath; S sing and tip-toe in the circle.

Week 4

1. Classroom teacher has students get in to a circle and sit criss-cross applesauce.
2. T – Plays starting pitch (A) on barred instrument.
3. T sings (on the pitch A), “Please listen to my song and don’t pick-up the coopera-band until I ask you to.”

4. T lays the therapy band out into a circle in front of the students while singing the song on the neutral syllable *too*.
5. T takes a seat in the circle and sings (on the pitch A), "Please pick-up a color of the coopera-band right in front of you."
6. T sings (on the pitch A), "Listen to my song and move like me."
7. T sings the song on the neutral syllable *too* while bouncing the coopera-band to the small beat on her lap; S listen and move to the small beat.
8. T sings (on the pitch A), "Sing for me, ready sing," and cues with a breath while continuing the previous movement; S sing and move to the small beat.
9. T sings (on the pitch A), "Move like this," changing her bounce to the big beat; S join in the movement.
10. T sings (on the pitch A), "Ready sing," and cues with a breath while continuing to move to the big beat; S sing and move.
11. T sings (on the pitch A), "Move like this," bouncing from the left side of her lap to the right side of her lap to the small beat; S join in the movement.
12. T sings (on the pitch A), "Listen this time." T sings the entire song with text; S listen and move to the small beat.
13. T sings (on the pitch A), "Listen again," and repeats the entire song again with text; S listen and move to the small beat.
14. T sings (on the pitch A), "Move like this," and rows with the coopera-band to the small beat; S join in the movement.

15. T sings (on the pitch A), “Echo me, I’ll sing first.” T sings the first phrase of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
16. T sings the second phrase of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
17. T sings the third phrase of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
18. T sings the fourth phrase of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
19. T sings the first and second phrases of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
20. T sings the third and fourth phrases of the song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
21. T sings the entire song with text while rowing to the small beat and cues the S with a breath; S listen then echo while moving.
22. T sings (on the pitch A), “Sing for me and move like this; Ready sing,” and rows to the big beat; S sing and move to big beat.
23. T sings (on the pitch A), “Listen and move like me.” T taps the cooperaband on her lap and then the floor to the small beat; S listen and move.

24. T sings (on the pitch A), “Ready sing,” and cues the students with a breath while continuing the movement; S sing and move.
25. T sings (on the pitch A), “Move like me and sing again; ready sing.” T cues the students with a breath while tapping the coopera-band band on the floor and then picking it up in the air to the small beat; S sing and move.
26. T sings (on the pitch A), “Please stand up.”
27. T sings (on the pitch A), “Move like me,” while bending knees and standing up with the coopera-band to the small beat; S join in with movement.
28. T sings (on the pitch A), “Ready sing,” while continuing the movement; S sing and move.
29. T sings (on the pitch A), “Move like me and sing again. Ready sing,” while moving the coopera-band in toward the body and out toward the center of the circle to the small beat; S sing and move.
30. T sings (on the pitch A), “Please move into the center of the circle.” Once the students are close together, the T will sing, “Please touch the coopera-band to the floor. On the count of three everyone must let go. 1, 2, 3.”

Week 5

1. Classroom teacher has students stand in their assigned places on the carpet.
2. T – Plays starting pitch (A) on barred instrument.
3. T sings (on the pitch A), “Please listen to my song and follow my moves.”

4. T sings the song on the neutral syllable *too* while moving arms in Continuous Fluid Movement (CFM); S listen and mirror T.
5. T sings the song on the neutral syllable *too* while moving elbows in CFM; S listen and mirror T.
6. T sings the song on the neutral syllable *too* while moving legs in CFM; S listen and mirror T.
7. T sings (on the pitch A), “Sing and move with me; Ready Sing,” and cues with a breath while moving arms in CFM; S sing and mirror T.
8. T sings (on the pitch A), “Listen this time,” and sings the song with text while moving head in CFM; S listen and mirror T.
9. T sings (on the pitch A), “Ready sing,” and cues with a breath while moving elbows in CFM; S sing and mirror T.
10. T sings (on the pitch A), “Turn to an elbow partner silently and move with your partner just like this.” T models with a student rocking from left to right.
11. T sings (on the pitch A), “Listen and rock.” T sings the song on the neutral syllable *too*; S listen and rock.
12. T sings (on the pitch A), “Ready sing,” and cues with a breath; S sing and rock.
13. T sings (on the pitch A), “Sing for me and get into a circle; Ready sing,” and cues with a breath. S sing on the neutral syllable *too* and get into a circle.

14. T sings (on the pitch A), “Listen and watch how I move.”
15. T sings the song on the neutral syllable *too* while performing the following movements. S listen and watch.
 - a. T takes 4 steps into the center of the circle.
 - b. T takes 4 steps out of the circle.
 - c. T taps heel out in front then together (alternating feet) for 8 counts.
16. T sings (on the pitch A), “Move with me and sing along; Ready sing” and cues with a breath; S sing and move
17. T sings (on the pitch A) “Sing with the text this time; Ready sing,” and cues with a breath; S sing and move.
18. T sings (on the pitch A), “Watch this time, but sing along on *too*; Ready sing,” and cues with a breath; S sing while T performs the following movements:
 - d. T walks 4 steps to the right.
 - e. T walks 4 steps to the left.
 - f. T taps heel out in front then together (alternating feet) for 8 counts.
19. T sings (on the pitch A), “Move and sing; Ready sing,” and cues with a breath; S sing and move with T.
20. T sings (on the pitch A), “Sing with the text this time; Ready sing,” and cues with a breath; S sing and move.

21. T sings (on the pitch A), “Watch this time, but sing along on *too*; Ready sing,” and cues with a breath; S sing while T performs the following movements:
 - g. T takes 4 steps into the center of the circle.
 - h. T takes 4 steps out of the circle.
 - i. T taps heel out in front then together (alternating feet) for 8 counts.
 - j. T walks 4 steps to the right.
 - k. T walks 4 steps to the left.
 - l. T taps heel out in front then together (alternating feet) for 8 counts.
22. T sings (on the pitch A), “Move and sing; Ready sing,” and cues with a breath; S sing and move with T.
23. T sings (on the pitch A), “Sing with the text this time; Ready sing,” and cues with a breath; S sing and move.

Week 6

1. Classroom teacher has students stand up in their spots.
2. T – Plays starting pitch (A) on barred instrument.
3. T sings (on the pitch A), “Please listen to my song and follow my moves.”
4. T sings the song on the neutral syllable *too* while moving arms in CFM; S listen and mirror T.
5. T sings the song on the neutral syllable *too* while moving hips in CFM; S listen and mirror T.

6. T sings (on the pitch A), “Sing and move with me; Ready sing,” and cues with a breath while moving shoulders in CFM; S sing and mirror T.
7. T sings (on the pitch A), “Listen this time,” and sings the song with text while moving elbows in CFM; S listen and mirror T.
8. T sings (on the pitch A), “Ready sing,” and cues with a breath while moving knees in CFM; S sing and mirror T.
9. T sings (on the pitch A), “Listen this time and move like me,” and sings the song on the neutral syllable *too* while slowly “melting” into the floor; S listen and move.
10. T sings (on the pitch A), “Ready sing,” and cues with a breath while slowly “melting” into the floor; S sing and move.
11. T sings (on the pitch A), “Listen this time and move like me,” and sings the song on the neutral syllable *too* while slowly “growing” up from the floor; S listen and move.
12. T sings (on the pitch A), “Ready sing,” and cues with a breath while slowly “growing” up from the floor; S sing and move.
13. T sings (on the pitch A), “Please sit down criss-cross applesauce right where your feet are.” T sings the song on the neutral syllable *too* while the S sit down.
14. T says “Today you are going to get the chance to sing this song for me! When it is your turn to sing, first I will play a recording of the song for you to just listen to, but not sing along with. Then you will hear my voice on a

recording sing “ready sing” and you will sing the entire song on the neutral syllable *too* just like we have been doing in class. Let’s listen to an example. First, you will hear this (T plays track 1: “Listen to the Song”). Then you will hear this (T plays track 3: “Ready Sing” and pauses track) and then you will sing the song on the syllable *too* like me (T plays the rest of track 3).

15. T then calls the first student to walk with her to the Foreign Language classroom where the recording will take place. The other students will continue with their regular music class activities.
16. “(Name) remember you will listen first then sing on the syllable *too*. Listen to the song (T plays track 1). T presses the record button on the sound recorder and plays track 2 and cues student with a breath. When student finishes singing, the T says “student # _____” and presses the record button to stop the recording. T says “Thank you (Name). You can pick a pencil from the bag.”
17. T will then walk the student back to class, and will ask for the next student. The same procedure will be followed for each student.
18. There are a handful of students who will not be singing for the recording because their parents have asked that they not participate. These students will be brought in together and the same procedure will be followed, except the T will not use the sound recorder and will not say their student number.

The students will just hear “ready sing” and will be cued with a breath to sing. These students will still receive a pencil.

Appendix F

HUMAN SUBJECTS TRAINING

Completion Report

4/23/12 9:50 PM

CITI Collaborative Institutional Training Initiative

Course In The Protection Human Subjects Curriculum Completion Report Printed on 4/23/2012

Learner: Christine Hadfield (username: chadfield)
Institution: University of Delaware
Contact Information 510 Madison Ave.
Prospect Park, PA 19076 United States
Department: Music Education
Phone: 6102092026
Email: chadfiel@udel.edu

Graduate Students:

Stage 1. Basic Course Passed on 04/23/12 (Ref # 7815164)

Required Modules	Date Completed	Score
Belmont Report and CITI Course Introduction	04/19/12	3/3 (100%)
Students in Research	04/19/12	10/10 (100%)
History and Ethical Principles - SBR	04/19/12	4/4 (100%)
Defining Research with Human Subjects - SBR	04/19/12	5/5 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	04/19/12	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	04/19/12	5/5 (100%)
Informed Consent - SBR	04/23/12	5/5 (100%)
Privacy and Confidentiality - SBR	04/23/12	5/5 (100%)
Internet Research - SBR	04/23/12	4/4 (100%)
University of Delaware	04/23/12	6/6 (100%)
Elective Modules	Date Completed	Score
Research in Public Elementary and Secondary Schools - SBR	04/23/12	3/4 (75%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

Appendix G
IRB APPROVAL LETTER



RESEARCH OFFICE

210 Hullen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: August 14, 2012

TO: Christine Hadfield, BM
FROM: University of Delaware IRB

STUDY TITLE: [365332-1] The Effect of Repertoire on the Singing Achievement of Second Graders

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: August 14, 2012

REVIEW CATEGORY: Exemption category # 1

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.

