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CHORAL SIGHT-SINGING INSTRUCTION: AN AURAL-BASED ENSEMBLE METHOD FOR DEVELOPING INDIVIDUAL SIGHT-READING SKILLS COMPARED TO A NON-AURAL-BASED SIGHT-SINGING METHOD

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CHORAL SIGHT-SINGING INSTRUCTION: AN AURAL-BASED ENSEMBLE METHOD FOR DEVELOPING INDIVIDUAL SIGHT-READING SKILLS COMPARED TO A NON-AURAL-BASED SIGHT-SINGING METHOD

A DISSERTATION APPROVED FOR THE
SCHOOL OF MUSIC

BY

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POTTS, SHERMIE DIANA, PhD. Choral Sight-Singing Instruction: An Aural-Based Ensemble Method for Developing Individual Sight-Reading Skills Compared to a Non-Aural-Based Sight-Singing Method. (2009)
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The purpose of this study was to determine if there was a significant difference in students' individual sight-singing performance as a result of instruction using a non-aural-based method when compared with instruction employing the researcher-constructed aural-based *Music Literacy for Secondary Choir* method. Secondary research objectives addressed gains from pre- to posttest between the methods and whether individual sight-singing skills could be improved in an ensemble setting. Background variables, such as prior band or orchestra participation, piano lessons, instrument lessons, voice lessons, and church choir participation were compared with pretest and posttest scores, and percentage gains.

Students from five Oklahoma high school beginning choirs that fulfilled specific selection criteria served as subjects in the study (N = 116). Two teachers were assigned a non-aural-based sight-singing method (Control group) and three teachers were assigned *Music Literacy for Secondary Choir* (Experimental group).Teachers taught their respective methods as assigned at the beginning of each class period for a duration of 30 lessons, one lesson per day. The researcher provided pre-instructional

training for each teacher to ensure compliance with the methodology of the two methods.

Before the instructional period, the students were tested individually to establish a sight-singing skills base assessment standard and ensure performance equality among all students before instruction. The student questionnaire assessing background music experience also was administered at that time. After 30 sight-singing lessons, the students were again administered the sight-singing assessment. No significant difference was found between the posttest sight-singing score means of students in the Control group compared to students in the Experimental group ($p > .05$). However, the Experimental group produced larger percentage pre- to posttest gains. All classes significantly improved their individual sight-singing scores ($p < .05$), indicating individual sight-singing skills can be improved in an ensemble setting. Students with prior instrument lessons other than piano had the lowest pretest mean. Students that participated in church choir had the highest posttest mean, and students with prior piano lessons showed the largest pre- to posttest gain.

CHAPTER I

INTRODUCTION

Overview

In 1994, The National Committee for Standards in the Arts approved arts standards, providing a basis for developing curricula (The National Standards for Arts Education: A Brief History. n.d., Retrieved October 6, 2009, from http://www.menc.org/resources/view/the-national-standards-for-arts-education-a-brief-history). These National Standards for Arts Education included nine standards crafted for music education; however, two of these are applicable to the current research: 1. Singing, alone and with others, a varied repertoire of music and 5. Reading and notating music.

Since 1990, the arts have been a part of the core curriculum in Oklahoma. The Oklahoma State Department of Education developed the Priority Academic Student Skills as benchmarks in the understanding for all students. High School Music Standard Number 1 is stated: “The student will read, notate and interpret music” and indicates that a “proficient” choral ensemble member should be able to read a vocal score of up to four staves.

According to research conducted by Henry and Demorest (1994) and Daniels (1986), students enrolled in a choral program that has received high ratings in sight-reading for many years are no more likely to be independent

music readers than choral students from a choir that does not perform well in sight-reading. The only factor that asserts itself when attempting to ascertain the characteristics of a strong music reader is whether the student has had private piano lessons (Henry & Demorest, 1994; Demorest & May, 1995; Daniels, 1986).

Purpose of Study

The purpose of the current study was to test the efficacy of a researcher-constructed aural-based sight-singing method for secondary school choral students entitled *Music Literacy for Secondary Choir*. The method, with an accompanying *Director's Guide*, was uniquely designed to be used for instruction in choral ensemble environments, but with the specific objective of improving students' individual sight-singing skills.

Foundational Research

Research has revealed that most humans can only process about seven pieces of information when presented with aural or visual stimuli (Colwell & Richardson, ed., 2002). "One difference between students with high and low verbal abilities might be the speed with which sequential and other information is processed in short term memory" (Tobias, 1982, p. 7). To successfully read music, responses to almost every interval and rhythm must be automatic, or a subconscious skill, like reading the written word (Sloboda, 2005). Children are taught to read printed words using "sound before sight,"

the sounds of their language are well known before the symbol is introduced. With practice, the skill of reading new text is developed into an automatic response. Therefore, humans must depend on experiential and relational mental foundations for processing visual stimuli in the form of printed music in order to process new information quickly (Sloboda, 2005).

According to Seashore (1938), the music learning process consists of two components: the acquisition of musical information and the development of music skills. He maintained that these two components should be cultivated separately but integrated into a complete musicianship skill set. Intensity, time, and timbre should be taught separately when training the ear. A “working brain” may have both conscious and subconscious memory, or autonomic skills, functioning simultaneously. Students cannot process two new functions at once. Seashore suggests when clapping one rhythm and singing another, either the song or the clapped rhythm must be automatic to be able to process the new function. Sight-reading training, according to Seashore, is a combination of notation, ear training, and tone production, and he believed that only one component can be improved at a time. When adding new intervals to ear training, only mastered rhythms should be used and should be placed in a comfortable range so difficulties in tone production do not overtake the intended learning concept (Seashore, 1938).

The concept of perceiving sounds internally when no external sound is present is identified as *audiation* (Gordon, 1988). According to Gordon, an

example of audiation is expressed in terms of a person being able to hear and comprehend music for which the sound is no longer or may never have been present. Gordon states that students cannot produce vocally what they cannot audiate. Audiation is assisted by an aural cache of rhythmic and melodic patterns that Gordon outlines for teaching students. Gordon endorses presenting rhythmic patterns devoid of melody and melodic patterns without varying rhythm.

Related Methodologies

Music educators and researchers have formed a variety of beliefs and theories about the most effective methods for teaching sight-singing. When choral directors in the north central region of the American Choral Directors Association were asked to rank reading systems in order of frequency of use, they responded with a narrow but definite ordered ranking, placing fixed-*do* first, followed closely by moveable-*do,* and numbers (Johnson, 1987). In contrast, May (1993) found moveable-*do* more popular among Texas high school choral directors. Eighty-two percent used moveable-*do*, with 68% of these directors also using *la*-based minor (May, 1993). In a survey of Florida middle schools, a significant number of choral programs in schools with enrollments from 500 to 1500 used solfege during instruction, relied less on the piano, and used published materials for sight-singing (Kuehne & Taylor, 2003). Research on the efficacy of moveable-*do* versus fixed-*do* reveals

inconsistent findings and conflicting views. Henry and Demorest (1994) found no significant difference between the individual sight-singing skills of students using either of these systems. However, Demorest and May (1995) found that subjects using moveable-*do* scored significantly higher on individual sight-singing assessments than those using fixed-*do*.

The Kodály method has been widely used by elementary music teachers in the United States. Kodály's philosophy contains two basic tenets: sound before sight using quality vocal music and specific sequencing of music objectives. The Kodály philosophy encourages aural preparation before reading notation. Kodály sequencing defines specific music reading skills and presents, or "makes conscious," one educational element at a time while aurally preparing future objectives.

Music Literacy for Secondary Choir: The Focus of the Current Study

A sight-singing method that emphasizes music literacy and can be integrated into choral rehearsals theoretically has the potential of providing effective instructional materials for secondary school choral teachers and developing independent musicianship. *Music Literacy for Secondary Choir* was created on foundations of sequencing theory, aural perception principles, and research pertaining to how humans learn.

Music Literacy for Secondary Choir provides singular daily objectives, aural training, and sight-singing exercises designed for objective mastery.

Short lessons and a fast pace allows for the rapid rate of learning necessary for appropriate skill acquisition desired at the high school level, while not infringing on rehearsal time needed for ensemble performance preparation. *Music Literacy for Secondary Choir* is further designed to augment other choral education objectives, such as improving vocal technique, balance, and blend. Other program elements such as aural training using moveable-*do* and Curwen hand signs blend naturally into the aural nature of choral tone, tuning, balance, and vocal technique instruction.

Research Questions and Null Hypothesis

The items listed below served as the principal and secondary research questions that fueled the statistical tests used to comparatively determine the effectiveness of *Music Literacy for Secondary Choir*. The results from multiple analyses supported empirical-based conclusions regarding the viability of successful applications toward individual sight-singing skill improvement for students in high school choral programs.

Principal Research Question

Will there be any significant differences in sight-singing skills of beginning high school choral students following instruction using the *Music Literacy for Secondary Choir* method as compared with a non-aural-based sight-singing method?

Secondary Research Questions

1. To what extent will gain scores change from pre- to posttest within groups using *Music Literacy for Secondary Choir* as compared with a non-aural-based sight-reading method?

2. Can individual (singing alone) sight-singing skills of beginning high school choral students be improved when instructed in an ensemble environment?

3. Will students that participated in middle school band or orchestra increase sight-singing scores to a greater extent than students without instrumental ensemble experience?

4. Will students with prior piano lessons increase sight-singing scores to a greater extent than students without prior piano lessons?

5. Will students with prior instrument lessons other than piano increase sight-singing scores to a greater extent than students without prior instrument lessons?

6. Will students with prior voice lessons increase sight-singing scores to a greater extent than students without prior voice lessons?

7. Will students that participated in church choir increase sight-singing scores to a greater extent than students without church choir experience?

Null Hypothesis

The principal objective of the current research was to determine if a significant difference existed between the effectiveness of a non-aural-based

method for teaching sight-singing and the *Music Literacy for Secondary Choir* method. Therefore, the null hypothesis was stated:

> There will be no significant differences between solo sight singing skills of beginning high school choral students following 30 lessons of instruction using either the *Music Literacy for Secondary Choir* method or a non-aural-based sight-singing method. Alpha was set at $p \leq .05$.

Definitions

The following words and terminology used in the study and are defined below.

Audiation	A term defined by Edwin Gordon meaning the ability to internally perceive and comprehend music when no music is audible.
Aural dictation	The choral educator chants a rhythm or sings a melodic pattern on a neutral syllable and students respond in pitch or rhythm, naming the pattern.
Beginning choir	A choir with many students that have not mastered basic music reading skills, such as quarter notes, eighth notes, intervals in the pentatone, plus *fa* and *ti*.
Curwen hand signs	The hand motions attributed to John Curwen designed to give spatial substance to pitch.
La-based minor	Musical exercises in a minor key are sung with *la* as the tonic, decreasing the need for altered tones.
Moveable-do	The tonic is always *do*.

Music literacy	The ability to accurately and independently read and sing unfamiliar tonal music composed of common tonal chordal structures and simple rhythms without the presence of external tonal and rhythmic stimuli that provide perceptual assistance and the ability to accurately aurally recognize common melodic, rhythmic, and chordal patterns.
Non-aural-based sight-reading method	Teaching music reading skills through the use of published method books and materials and conventionally accepted educational practices. Students practice intervals using solfege and Curwen hand signs. A published sight-reading exercise or song is performed as a group.
Pentatone	The notes of a major scale excluding f*a* and *ti.*
Retrograde	Performing a musical exercise in reverse.
Sight-reading	Performing an unfamiliar musical passage without prior rehearsal on an instrument without the aid of another instrument. The instrument of choral students is the voice, thus “sight-reading” and “sight-singing” may be used interchangeably when referring to performing music at sight for the purposes of the current choral sight-singing research.
Sight-singing	Singing an unfamiliar musical passage without prior rehearsal without the aid of any external instrument. For the purposes of the current choral sight-singing research,

	this term may be used inter-changeably with “sight-reading.”
Solfege for altered tones	Complete chromatic scale solfege in ascension is as follows: *do, di, re, ri, mi, fa, fi, sol, si, la, li, ti, do*. Descending scale: *do*, *ti, te, la, le, sol, se, fa, mi, me, re, ra, do*.

Organization of the Dissertation

This dissertation contains five chapters. Following introductory Chapter I, Chapter II provides a review of the related literature. Sources related to psychology of music, relevant brain research, learning theories, the acquisition of aural skills in school age children, success factors in secondary choral students’ sight-singing, and current practices in choral music upon which the research is founded. An outline for the study method, *Music Literacy for Secondary Choir,* is also included. Chapter III provides a description of the methods and procedures that were employed in the research, including the school selection procedure, specific testing procedures involved in the comparison between the non-aural-based, or control, sight-singing method and the *Music Literacy for Secondary Choir* method, and the statistics used for data analysis in the study. Chapter IV includes a report of the data treatment, analyses, and results, thus employing descriptive statistics, pre- and posttest score comparisons, and statistical treatment of the null hypothesis. Chapter V includes a discussion of the results, interpretations of

the results, comparisons to related literature, conclusions, implications from the research, and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Developing literate musicians is a principal goal of music educators, requiring both the teaching of basic music reading skills and the development of aural skills. Music education researchers have studied music reading skills, methodology, and processes needed and used for teaching music literacy in choral classrooms. They have noted the attributes that strong sight-singers possess and question if these attributes can be taught to and developed in students that do not readily exhibit these competencies. Questions surrounding the teaching of sight-singing in high school choral classrooms have been approached from several perspectives: psychology and brain function, aural training methods, and choral methods. Research literature directed toward issues involving teaching and learning as related to sight-singing instruction is addressed in this chapter.

Psychology of Music

Music psychologists have studied how the brain processes visual stimuli as music. In *The Musical Mind* (2005), Sloboda compares music reading to language reading and claims that reading language is always sight reading. The sounds of language were learned before the symbol and

every time one reads language these sound symbols are employed. The brain must have sufficient knowledge and practice to process new information quickly. To this point, Sloboda states, “One of the key features of any cognitive skill is speed” (p. 6).

Research has shown that experienced typists typically scan eight characters ahead when typing (Sloboda, 2005). The eyes are deciphering new symbols while the fingers are performing tasks of the past symbols. The brain is capable of dual tasking as long as the skill, whether typing or reading music, is well learned. Experienced musicians will even unknowingly fix errors when reading music, just as the human brain can process misspelled words or words with missing letters, because the accepted patterns are so clearly ingrained in the brain (Sloboda, 2005).

Processing individual notes when sight reading is laborious and retards the process. Notes should be grouped into patterns for music reading, like individual letters make words. Edwin Gordon (1988) used this concept to develop rhythmic and tonal patterns to teach students through ear training. Gordon proposed that students should be given an arsenal of patterns with which to approach new music. These patterns are presented sequentially and separated into rhythmic and melodic patterns. Rhythmic patterns are verbally presented by the teacher, and echoed by the students on a single pitch. Melodic patterns are sung by the teacher, and echoed by students in constant quarter notes.

An important component of music learning, according to Gordon, is audiation. Audiation occurs when we hear and comprehend music for which the sound is no longer or may never have been present. Gordon contends that this cognitive process must be developed before verbal descriptions and symbols are taught. Gordon's Music Learning Theory is focused on learning, not teaching. His work is in designing an ideal presentation sequence and defining the prerequisite knowledge required at each stage of learning. Gordon states that student aptitude must be taken into account when selecting patterns for teaching. All students have low and high points among the various aptitudes. These include two tonal (melodic and harmonic), two rhythmic (tempo and meter), and three preference (phrasing, balance, and style).

Seashore's (1938) music learning theory is similar to Gordon's, in that objectives are separated for mastery, then reassembled for music making. Seashore defines two process components: the acquisition of musical information and the development of music skills. These two components should be cultivated separately, then integrated into a complete musicianship skill set. When training the ear, according to Seashore, intensity, time, and timbre should all be taught separately. A working brain may have both conscious memory and subconscious, or automatic skills, functioning simultaneously. Students cannot process two new functions simultaneously. Sight-reading training, according to Seashore, is a

combination of reading notation, ear training, and tone production, and only one component can be improved at a time. Therefore, when adding a new interval to ear training and sight-singing, only mastered rhythms should be used. This new interval should be placed in a comfortable vocal range so difficulties in tone production do not overtake the intended learning concept, which is successfully singing the new interval (Seashore, 1938).

Current research supports Gordon's and Seashore's theories. Gromko (2004) sought predictors or traits of good music readers. Using high school wind players as subjects, the four factors that affected the students' sight-reading ability were: reading comprehension, rhythmic audiation, visual field articulation, and spatial orientation. Results of this study support Gordon's theory concerning rhythmic audiation, but more importantly it appears that cognitive ability more accurately determined music reading success of the wind players in the study (Gromko, 2004).

The two components of Seashore's music learning process, musical knowledge and music skills, find support in McPherson's research (1994). In a study of 101 high school trumpet and clarinet students who were completing the Australian Music Examinations Board (AMEB, 1990) performance examinations, McPherson tested two groups of students: students completing Grade III and Grade IV (average age 13 years, four months), and students completing Grade V and Grade VI (average age 16 years, 1 month) in the AMEB examination. The sight-reading skills of the

students were measured by the *Watkins-Farnum Performance Scale* (1954).The sight-reading skills of the students testing at the lower level of music competency were not significantly correlated with the ability to play rehearsed music, but did correlate significantly ($p < .01$) with the ability to play by ear and improvise. Students in the higher level of the performance examination exhibited a stronger relationship between the aspects of performance and sight-reading ($p < .01$), suggesting performance and sight-reading are not initially related and should be taught separately (McPherson, 1994).

Theory and Aural Skills Research

Collegiate Level

College music majors are expected to achieve institutionally-specified requirements upon completion of theory and aural skills courses. Theory and aural skills obviously are definable and supported by assessable objectives that can be accurately measured. Published research on testing methods and outcomes at the college level is prevalent in the literature, yet music educators have not globally embraced common methods for this kind of learning. This inconsistency may be attributed to a difference in the abilities of the students arriving in university classrooms.

Researchers have investigated the combination of certain preexisting conditions as predictors for selecting successful theory students. Harrison,

Asmus, and Serpe (1994) found that a latent–trait model consisting of musical aptitude, academic ability, music experience, and motivation for music accounted for 73% of the total aural skills variance among freshmen theory students. Music aptitude had the largest effect on performance ($p < .001$), while motivation for music did not affect aural skills performance or correlate significantly ($p > .01$) with the other latent variables. This model accounted for 79% of the variance in aural skills, but only 44% in sight-singing scores.

The above findings are similar to those of Harrison (1991), showing the variables that predicted a student's first semester ear-training course to be Scholastic Aptitude Test (SAT) math scores, experimental college version of the Musical Aptitude Profile (CMAP) Tonal Imagery test scores, years of music experience, and CMAP Rhythm Imagery test scores. Only three variables statistically affected ($p < .001$) sight-reading scores: years of music experience, CMAP Rhythm Imagery test scores, and SAT math scores.

Among instrumental majors, Brand and Burnsed (1981) found no statistically significant relationships ($p > .01$) between previous musical experiences and error detection ability among undergraduate instrumental education majors. The researchers suggest that the skill of error detection may exist independently from other musical skills. Error detection may not correlate with learning obtained through participation in ensembles or theory

and aural skills training. Conversely, in another study the error detection abilities of instrumental music education majors did show improvement with contextual sight-singing and aural skills training in comparison to a control group (Sheldon, 1998). This training emphasized pitch and encouraged audiation yet rhythm errors were more readily detected by both the treatment and the control groups.

Geringer (1980) investigated a specific kind of error detection: intonation in one's own performance. Ninety-six undergraduate and graduate students playing a variety of instruments indicated a tendency toward sharp intonation when asked to correct their performance. Perception of intonation of unaccompanied scales was less accurate than both accompanied scale perception and performance of unaccompanied and accompanied scales.

Richard Larson (1976) searched for relationships between melodic error detection, melodic dictation, and melodic sight singing among undergraduate music majors. Significant relationships ($p < .05$) were found to exist regardless of melodic style. Relationships were generally stronger between error detection and dictation than between error detection and sight singing.

Many factors create a diversity and pace among students' mastery of aural skills. The recognition of individual differences in aural skill development, however, does not assist the effective teaching of those with

less musical aptitude or previous musical training and experiences. How can intervals, rhythms, and harmonies be presented with the most efficacies for success? Marquis (1963), in a study of freshmen music majors, focused on how interval problems in sight singing vary according to the context in which the interval is presented. Errors were greatest when chromatic scale movements, a lack of harmonic clarity, and the absence of a strong note as a tonic existed. Conventional scale movements, harmonic clarity, and a strong tonic yielded the least interval errors. A contextual condition that further reduced errors was observed when the second note of the interval had been previously and frequently repeated. Little evidence was found to support the notion that intervals missed in isolation would be sung erroneously in context.

In the area of melodic dictation, Pembrook (1986) studied one hundred and thirty-six freshmen and sophomore music theory students and six dictation strategies. No significant differences ($p > .05$) were revealed among the strategies when analyzed simultaneously, but within the group, two strategies were found to produce superior results, melodic presentation twice with simultaneous notation, and notation after hearing the melody twice. According to Pembrook, repetition was shown to be a factor in achieving correct responses. The length of the exercises also affected the success of student accuracy. Pembrook suggests emphasizing careful listening or coding instead of drilling isolated intervals in order to increase a

student's retention of dictation; therefore, allowing longer passages to be successfully notated.

Pembrook's conclusions are supported by Long's research (1975). Long investigated relationships between memory for pitch in short melodies and melody length, tonal structure, melodic contour, and music perception ability. Findings showed graduate and undergraduate music majors more accurately remembered pitch than non-music majors ($p < .01$); supporting the premise that pitch memory is dependent on learned systems. Pitches imbedded in tonality, a learned system, were also recalled more readily. Length of the melody did not result in statistically different results ($p > .01$), although differences did exist between 7-pitch melodies and 15-pitch melodies.

School Age

Musical aptitude appears to be a substantial factor in determining the future musical success of young musicians. Those with high musical aptitudes typically gain aural skills easily, while those with low musical aptitudes struggle to master simple musical tasks. How can music educators tap into both high and low aptitudes and increase achievement in music students?

Ramsey (1983) investigated the effects of age, singing ability, and instrumental experiences on preschool children's melodic perception.

Rasmey found significant differences ($p < .04$) associated with age in perception of melodic rhythm, melodic contour, and melodic interval, but not in absolute pitch abilities or skills in identifying a tonal center. High ability singers scored better than low ability singers on perception of melodic rhythm, melodic contour, tonal center, and melodic intervals. Instruction on pitched instruments did not improve the scores on any of the music perception skills.

Geringer (1983) found that acuity in pitch discrimination improved with age. Fourth graders scored significantly higher than preschoolers in pitch discrimination tasks ($p < .01$), but were similar in pitch matching scores. As with melodic contour, melodic rhythm, and melodic interval in Ramsey's study, Geringer concluded that pitch matching may improve with instruction if not innate to the individual.

An investigation of music students from 5th grade through high school was conducted by Colwell (1963) to determine what kind of musical experiences best develops auditory discrimination. Students with vocal and instrumental music experiences scored highest in academic grade, intelligence quotient, musical aptitude, and musical achievement. The next highest scores belonged to instrumentalists with piano training, followed by vocal students with piano training, instrumentalists with no piano training, and students with only choral training.

Fourth-graders' melodic discrimination improved when visual-spatial cues were added. Forsythe and Kelly (1989) presented melodies while the teacher used horizontal and vertical hand motions across a chalkboard to show the contour of the melody. These melodies were presented to a separate group of students without these visual cues. The students receiving the visual-spatial cues performed significantly better ($p < .001$) than the students without these cues.

Music Reading Skills Research: School Age

Music training may begin aurally, but students must eventually learn to read printed music. Klemish (1972) compared two methods of teaching music reading to first-graders. Method 1 used hand and body movements to demonstrate melodic direction, whereas Method 2 used staves and conventional note heads. No significant difference ($p > .05$) was shown between methods, but certain skills were better developed depending on the method used. Method 1 (hand and body movements) students showed stronger skills in identification of melodic direction, aural matching, aural and visual matching, and singing patterns. Method 2 (staves and note heads) students excelled in recognition of patterns, writing tones dictated from the piano and dictated by numbers, and visual matching.

Cutietta's research (1979) suggests that improvements in sight-singing skills can occur with as little as two minutes of drill per day. The

middle school students in his study using this two minute drill displayed significant improvements ($p < .05$) in melodic sight-singing (regardless of rhythm), rhythmic sight-singing (regardless of pitch) ($p < .01$), composite sight-singing ($p < .02$), melodic recognition ($p < .01$), and singing confidence ($p < .01$). Students in the control group received identical choral instruction, but no sight-singing drill. The control group showed significant improvement ($p < .05$) in rhythmic sight-singing only.

Killian (1991) found little relationship between junior high students' sight-singing accuracy and error detection skills. The relationship between sight-singing and error detection was different for high and medium scoring sight-singers. No significant difference was shown between error detection and sight-singing skills among these students, while low-scoring sight-singers were significantly more accurate ($p < .01$) on error detection tasks. Descending patterns were more accurately performed than ascending patterns.

McPherson (1996) tested a group of junior high instrumentalists and a group of high school instrumentalists for five elements of musical performance: perform rehearsed music, sight read, perform from memory, play by ear, and improvise. While moderate correlations were found between these five areas for the junior high students, the high school group showed significant correlations ($p < .01$) between all five aspects. The ability to sight read produced a stronger correlation in both the junior high and high

schools groups with the ability to play from memory, to play by ear, and to improvise than with the ability to perform rehearsed music.

Sight-Singing Research: High School

Many states have added a sight-reading component to choir contests with an objective of encouraging choral directors to add music literacy to their rehearsals. The results of these new requirements are difficult to ascertain. According to a survey by Norris (2004) fewer than half the states in the nation have added the sight-reading requirement to large group choral festivals, and many do not delineate levels of difficulty, define objectives to be assessed, or use the sight-singing score in final ratings.

How much time is currently being devoted to music reading skills in secondary school choral programs? A quantitative investigation of high school rehearsal time in 33 Florida schools (Brendell, 1996) showed conductors using 22.23% of rehearsal time on sight-reading. Students were off-task 9.22% of the time during the sight-reading segment, which was the lowest off-task percentage throughout rehearsals. Off-task percentages increased as required participation in rehearsal activities decreased (preparation, physical warm-up, verbal literature instruction). Sight-reading instruction used the largest proportion of rehearsal time, yet yielded the least off-task behaviors. During the study, the choirs were preparing for the spring

choral festival that included a sight-reading component with a specific outlined procedure.

Daniels' (1988) results from a survey of choral directors in the southeastern region of the United States show only a moderate commitment to teaching sight-singing. Half of the teachers reported spending between 15% and 30% of rehearsal time on sight-singing, while the other half reported spending 10% or less. These same teachers also reported drilling individual parts using piano with greater frequency than approaching a new song with a music reading system, such as solfege syllables.

Johnson's 1987 survey of choral directors in the North Central region of the American Choral Director's Association received 157 responses. The average time spent on music reading instruction in beginning choirs was 16%, decreasing to 13% for advanced choirs. However, only 56% of the directors responded to Johnson's survey which limits valid generalizations.

Szabo (1992) studied 10 high school choral programs selected randomly from the membership of MENC: The National Association for Music Education. The researcher spent one week with each choral program for purposes of observing and recording their methods and practices in detail, for subsequent descriptive analysis. Although Szabo sampled the entire nation, only Midwestern and Eastern schools were selected for the study. None of the choral directors Szabo visited taught music reading as part of rehearsal.

Choirs that consistently perform well in sight-reading when in competition were studied by Henry and Demorest (1994). Students were tested individually on sight-singing ability and the researchers determined that the only significant background variable related to individual performance was private piano study. Another study (Demorest & May, 1995) examined individual sight-singing skills of high school choir members in relation to their private musical training, their choral experience, the difficulty of the melodic material, and the system used for group sight-singing instruction. The researchers concluded that school choral experience was the best predictor ($p < .05$) of individual sight-singing performance, followed by years of piano lessons, years of instrument lessons, and years of voice lessons. These findings, however, conflict with other research. Daniels' (1986) research showed school choral experience to be not significant ($p > .05$) in individual sight-singing success, and Nolker (2003) found a significant negative relationship ($p < .05$) between years of choral experience and sight-singing scores. The Demorest and May (1995) study also determined that scores for Melody A, which was diatonic, were significantly higher ($p < .05$) than Melody B, which contained an altered fourth scale degree, both ascending and descending. Moveable-*do* students scored significantly higher ($p < .05$) than those using fixed-*do.*

Daniels, in the 1986 study cited above, included 20 high school select choirs in South Carolina, North Carolina, Georgia, and Tennessee. Eight

factors were found to be significant predictors ($p < .05$) of group sight-singing success, and only when they occurred in combination: ethnic make-up of the school, a large percentage of choir students who have a piano in the home, school in a rural setting, occasional use of rote procedures to teach music, a large percentage of choir students who participated in all-state chorus, a large proportion of choir students with experience playing a musical instrument, a large high school, and a choir teacher who expressed the belief that the development of sight-reading ability is an important objective for the high school choir. Daniels hypothesized that successful choirs have students who develop strong sight-reading skills outside of class.

A factor shown to improve individual sight-singing achievement is individual testing. Demorest's (1998) findings show students who were tested individually showed significant improvement ($p < .05$) over students who were tested only as a group. Nolker found a comparable relationship between individual testing and sight-singing skills (2003) during his investigation of Florida high school students' individual and ensemble sight-singing ability. He found significantly higher ($p < .05$) mean scores among subjects while sight-singing as an ensemble, as opposed to sight-singing in isolation. Previous festival sight-singing experience and school size did not impact the scores significantly. Musical background variables principally emerging as factors positively affecting the students' individual sight-singing

success were: (a) playing an instrument other than the piano, (b) years of choir experience, (c) years of band and orchestra experience, and (d) playing the piano.

Killian (2005) discovered that successful sight singers benefited from a 30-second study period, wherein they used the time to establish the key, use hand signs, sing through an exercise, and physically keep the beat. Less accurate singers did not benefit from this practice period. The strong readers tonicized the key before performance, and utilized the behaviors described above to assist them during performance. Characteristics appearing among high scorers included participation in regional and state choirs, private voice or piano lessons, playing an instrument, membership in an instrumental ensemble, sight-singing individually outside of class, and sight-singing tests administered by the teacher.

Henry (2004) investigated the effectiveness of sight-singing instruction using specific pitch skills emphasizing scale degree (targeting specific intervals) and harmonic function. One group received instruction using new melodies constructed for the targeted skills and another group received instruction using familiar melodies that contained the same skills. Each group scored significantly higher gains from the pre- to posttest ($p < .0005$), but no significant difference was found between groups, indicating that the use of constructed exercises for specific objectives toward the

building of sight-singing skills among choral students is as effective as using accepted choral literature and folk songs.

Junior high band students benefited from prescribed physical movements while learning rhythmic concepts (Boyle, 1970). The experimental group was instructed to use the following activities when reading music: (a) mark time, (b) clap rhythms while tapping the beat, and (c) play rhythms on a single note while tapping the beat with a foot. The control group did not engage in these activities. The experimental group scored significantly higher ($p < .01$) on rhythm sight-reading than the control group.

Summary of High School Aural Skills and Sight Reading Research

Sight-reading in conjunction with performance as dual educational objectives generally has not flourished throughout the nation (Johnson, 1987; Norris, 2004; Szabo, 1992). Areas of the country where music reading is emphasized, such as Florida, employ choral educators who spend the highest percentage of rehearsal time on sight-reading (Brendell, 1996). Choirs in states that do not require sight-reading spent little to no time in rehearsals on teaching music literacy (Szabo, 1992).

The principal factors that predict group sight-singing success in combination include: a large number of students with a piano in the home, a large percentage of all-state choir members, a teacher who believes in the

importance of music literacy, and a choral program in a rural setting (Daniels, 1986). The factors that predict individual sight-reading success preclude elements such as being a member of a successful sight-singing choir (Nolker, 2003) or years of choir experience (Daniels, 1986). The only consistent background variable found in the literature that predicts individual sight-singing success is private piano lessons (Henry & Demorest, 1994; Daniels, 1986; Nolker, 2003).

Types of instruction found to increase music literacy include: individual testing (Demorest, 1998), melodies constructed for targeted skills (Henry, 2004), and physical movements while reading music (Boyle, 1970). Teaching effective use of a practice period has led to increased sight-reading scores. Behaviors such as establishing the key, physically keeping the beat, and using hand signs are exhibited by strong sight-singers (Killian, 2005).

Survey of Choral Music Literacy Methods

The search for the most efficient music literacy method for choirs has led to much consternation among choral directors. Certain directors prefer specific methods, while others' approach and methodology continually evolve. Some choral directors ignore the problem while waiting for the definitive cure. The topic is much debated and discussed among choral

educators, however, the search continues for the most effective strategy for teaching music literacy to secondary choral students.

Directors were asked to rank reading systems in order of frequency of use (Johnson, 1987). Fixed-*do*, moveable-*do*, and numbers were ranked in the aforementioned order, but with little difference in ranking. Intervals were used much less frequently than the other systems. May (1993) found moveable-*do* much more popular among respondents. Eighty-two percent used moveable-*do*, with 68% of these directors also using the relative minor approach (*la* as tonic).

Uses of Moveable-do and Curwen Hand Signs

Elementary education majors were given sight-singing instruction using one of the following: solfege syllables and Curwen hand signs, solfege syllables alone, note names, or singing “la” (Cassidy, 1993). All experimental groups improved their sight-singing skills, while subjects using solfege coupled with Curwen hand signs and those using solfege alone scored significantly better ($p < .05$) than subjects using staff letter names, or singing “la” as a neutral syllable.

Winnick (1987) states that the most efficient music reading tool to be moveable-*do*, with the use of *la*-based minor. Winnick notes *la*-based minor has been used historically since Guido d’Arezzo and requires less alteration of the solfege syllables. *Do*-minor requires many alterations for altered

tones. Names are provided for altered tones in the moveable-*do*, with *la*-based minor system (*do, di, re, ri, mi, fa,fi, sol, si, la, li, ti, do, ti, te, la, le, sol, se, fa, mi, me, ra, do).*

The Kodály philosophy utilizes moveable-*do* and *la*-based minor, Curwen hand signs and a specific sequence for the presentation of concepts (Chosky, 1999). On its most basic level, melodically the interval of *sol-mi* is first presented, using quarter notes for the first rhythm. Concepts are specifically defined and sequenced. An example of how this could be utilized in a choral setting is Barbra Sletto's "Developing Musical Literacy Through Choral Repertoire: A Kodály-Based Model" (1994). This literacy program was designed for the Anderson Area Children's Choir, an auditioned group in Indiana. The sequence includes the elements of Rhythm, Melody and Aural Training, Harmony, Form, Vocal Technique, and Movement. Between September of 1993 and January of 1994, all intervals, excluding chromatic, were introduced to the children in the choir. Basic rhythms, part-singing, simple form, and basic vocal technique were also presented. By April of 1994, the students could accurately sing triads and inversions in familiar keys.

Martha Mead Giles' "Choral Reading Built on Basics" (1991) suggests using Kodály methods in middle school, junior high, and high school choirs. If the students come from a Kodály elementary school, continuing the philosophy of their music education to expand their abilities only makes

sense (Giles, 1991). The educational procedures can remain as the difficulty increases. As an example, Giles suggests using a difficult passage from a repertoire piece as the daily music literacy lesson.

Aural Training

Curwen hand signs can provide an easy vehicle for melodic dictation, according to Giles (1991). The teacher can sign intervals and melodies that the students sing and sign back. For two part-singing, the teacher can sign two notes simultaneously to create harmony, both consonance and dissonance. The choir could be divided even further and each part given an ostinato that creates regular harmonic progressions.

McCoy (1989) states that choral students need experience with a variety of modes and sounds to build their aural knowledge. Pieces that can serve as a vehicle for vocal technique while providing such musical experiences include unaccompanied chants, chorale melodies, and art songs. For aural training, McCoy suggests using the major scale and all the intervals therein. Canons are a good start for confident part-singing, and block harmonies (harmonies created by singing the scale, each part stopping at a predetermined note to create chords) build a rudimentary understanding of harmony.

Participatory activities for aural training described by Henke (1984) include standing when a specific mode is played on the piano, silent singing,

melodic canon**,** and inventive ideas for sight-reading. Silent singing involves continuing an exercise silently when signaled and singing aloud when again signaled, requiring maintenance of the tempo and tonality for accurate re-entry. The melodic canon is started by the piano (by playing four E pitches), and continued by the piano (by playing four G pitches) as the singers sing the first four notes (EEEE). A minimum of sight-reading material can be augmented by singing the example in retrograde, singing one measure aloud and one silently, singing every other measure, each part beginning in a different measure, singing in canon, or changing the key signature. Jordan (1987) approaches aural training through Gordon's concept of audiation and contends that singers cannot tune if they are unable to audiate the resting tone of the passage. He provides, as an example, the tuning of Vaughn Williams' *Mass in g minor*. This piece drifts through Dorian, Mixolydian, Lydian, and Phrygian modes. Jordan states that most singers can audiate major and minor, but inexperienced singers can only audiate major. All pitches are produced by tuning to the resting tone (tonic, *do*, or home key tone). If the singers' resting tone is wrong, the tuning will be wrong. Therefore, students must be taught to hear the resting tones in all tonalities.

Contemporary Choral Sight-Singing Methods

Vivian Munn created “A Sequence of Materials for Developing Sight-Singing Skills in High School Choir” (1990) for the purpose of preparing Texas choirs for the required concepts in the sight-singing portion of the Texas state choir contest. The content of the method included: (a) musical exercises, (b) instructor’s guide, and (c) recommended pieces that correlate with exercise units. The objectives of the method adhered to the highest level of sight-reading competition in the state of Texas, including minor mode, modulation, chromatic tones, changing meter, and compound time.

Patti DeWitt Folkerts (1998) analyzed the adopted sight-reading texts for Texas middle schools. These textbooks, *Something New to Sing About for Young Voices* (G. Schirmer, 1987), *Sing!* (Hinshaw, 1988), and *World of Choral Music* (Silver, Burdett & Ginn, 1988), were found by the researcher to be inadequate for preparation in fulfilling the requirements of middle school sight-reading contests in Texas. Folkerts (1998) designed a method for the purpose of preparing Texas middle school students for sight-reading contests. The method begins with *do, re, mi* and progresses sequentially through each of the intervals in the I, V, and IV chords. Original literature and harmonic exercises are offered in the following voicings: SA, SSA, TB, TTB, SB, SAB, and SATB.

Summary of High School Methods

According to the research results, the most commonly used music reading system in school choirs is moveable-*do* with *la*-based minor (May, 1993), and non-musicians were most easily taught basic music reading through the use of solfege and Curwen hand signs (Cassidy, 1993). A music literacy method for high school choral students learning to read music could employ these elements to reduce transition time from another method.

Aural training is an important component of music reading (Chosky, 1999) and choral training (McCoy, 1989). Using canons, chants, folk songs, and art songs for aural training utilizes the constant singing in choral classrooms to teach major scale intervals, part singing, and a rudimentary understanding of harmony (McCoy, 1989). Melodic dictation can be given using Curwen hand signs (Giles, 1991). Hearing pitches at the onset of a hand sign encourages audiation, an important skill for tuning (Jordan, 1987).

The participatory nature of choir allows for participatory activities in aural training (Henke, 1984). Singing or moving in response to an aural stimulus strongly reinforces aural training objectives (Chosky, 1999). Sight-reading can be more than an exercise through the use of singing in retrograde, singing in canon, singing specific notes, or instructing sections beginning the exercise in different measures to create part-singing (Henke, 1984).

While the cited research is useful in gathering information for teaching sight-singing skills in choral rehearsal, the literature falls short of suggesting an effective method for teaching comprehensive music literacy to high school choral students. Information concerning music learning theories and suggestions for improving the aural skills of high school singers may interest a choir teacher, but without guidance as to the actual application of said knowledge, this information is soon forgotten and unused.

Choral music educators would benefit from a music literacy method that utilizes moveable *do* in a sequential manner to teach intervals and patterns and encourage audiation. This method could provide exercises for aural training and allow for a rudimentary understanding of harmony and function in the context of a choir classroom. A music literacy method for secondary choral classrooms is needed that provides music reading and aural training in a participatory, sequenced, efficient, and an effective manner.

The Current Study: *Music Literacy for Secondary Choir*

The researcher-composed sight-singing method was developed on the foundations established by a study of the results of related research, cited above, and current music learning theories. Principally, this foundational material can be summarized as follows. (a) The human brain can only process one new skill at a time (Colwell & Richardson, ed., 2002;

Tobias, 1982). (b) Sound before sight. Much like children are taught to read language using known sounds and matching these sounds to symbols; music must be mastered aurally before it can be produced from symbols (Sloboda, 2005). (c) Audiation, the term created by Edwin Gordon to describe the ability to hear music internally when no audible tonal stimuli are present. Students must be able to audiate intervals and rhythms before they can be read (Gordon, 1988).

Within the proposed method, musical skills and concepts are presented individually and only in conjunction with other mastered musical concepts. All skills are presented and mastered without the assistance of external instruments, such as a piano. Rhythmic and melodic concepts are presented in a manner parallel to the Kodály sequence but, because of the emphasis on secondary school applications, at a much faster pace than recommended for elementary students. Aural training precedes singing from music notation.

Other practical considerations forming the foundations for the development of the *Music Literacy for Secondary Choir* were incorporated from the nature and accepted general practices of choral education in the United States. This music literacy method was established on the premise that it would support the logical and realistic functions of high school choral rehearsals. The teaching of vocal technique, part-singing, aesthetic beauty**,** and ensemble skills were the fundamental objectives intended to accomplish

superior achievement in the development of music literacy for secondary choirs.

Developing the Method

Music Literacy for Secondary Choir (see Appendix A), was specifically designed to promote music literacy in secondary choral music classrooms. The method includes daily sight-reading exercises and suggested activities associated with the exercises. The concepts presented in the daily sight-singing exercises are prepared using aural activities, including learning selected songs by rote, part singing, and aural dictation. Instructions provided in the *Director's Guide* apply directly to the exercises, thus providing detailed instructions and explanations of the basic procedure to be used for the aural activities and suggestions for the preparation and mastery as each new concept is presented.

Daily sight-reading exercises were composed using the Kodály sequence of concept presentation expressed in Lois Chosky's text, *The Kodály Method I: Comprehensive Music Education* (1999). Initial exercises were composed using only *sol* and *mi* for pitches and quarter notes for values (see Figure 2.1).

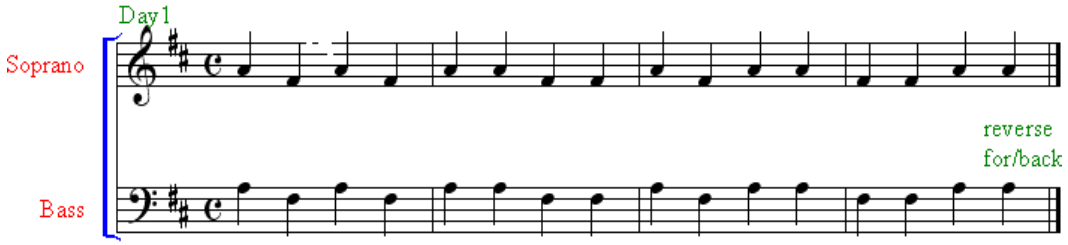

Figure 2.1. First reading exercise from Music Literacy for Secondary Choir.

These three concepts (*sol*, *mi*, and quarter notes) are presented in the key of D and the key of C to establish the relationship between the two pitches (space to space or line to line on the staff). Each subsequent objective (solfege syllable, interval, or rhythm) appears in the sight-singing exercises as a singular and sequentially new concept. For example, after the initial exercise using *sol, mi*, and quarter notes is sung successfully, the Day 2 exercise adds the quarter rest. Day 4 adds *la,* and Day 5 adds eighth notes. In 5 days, participants can learn to read *sol, mi,* and *la* using quarter notes, eighth notes and quarter rests. The exercises are short and simple, allowing successful use of the objective for mastery in sight-singing..

A short, consistent sight-reading period can significantly improve sight-reading skills, as shown in Cutietta's (1979) study, and exercises designed to target pitch skills have been shown to be just as effective as melodies chosen for the same purpose (Henry, 2004). These two points lend justification to the creation of short, content-based constructed

exercises for the purpose of teaching music reading skills. The objectives for mastery included in the first six weeks of *Music Literacy for Secondary Choir* are the presentation of all solfege syllables, all intervals in the pentatone (*do, re, mi, sol, la*), plus *fa* and *ti,* quarter notes, quarter rests, eighth notes, half notes, dotted half notes, whole notes, 3/4, 4/4, and 2/4 time signatures.

Part-singing is included starting with the first exercise. After singing the exercise shown in Figure 1 from the beginning to the end, the students immediately sing the exercise in retrograde, doubling the length of the exercise and adding new interval approaches and rhythms. Half of the choir then sings the exercise forward while the other half sings the exercise in retrograde. Other exercises suggest singing in canon, adding an ostinato, singing one note per section, or beginning sections in different measures to create opportunities to practice tuning and ensemble skills. These techniques also allow more reading to occur with a short exercise, eliminating the need for unnecessary paper and copying expenses.

Rote Songs

Songs were selected for use in the aural preparation of certain concepts. Songs were chosen on the basis of quality (folk songs, arts songs, masterworks) and whether they can be used in a choral setting to promote quality vocal technique and part singing. These songs are predominantly folk songs that help aurally prepare students for musical concepts. The

teacher teaches a song by rote during the vocal warm-up. The rote song can be used by the teacher for vowel unification one day and dynamic contrast the next day, as an example. After the song is well known by the students, music objectives can be found in the song and named aurally. For example, if the educational objective for the day is eighth notes, a rote song is sung that contains eighth notes. After singing the song, students are asked where eighth notes are sung in the song.

Not all concepts appear in a specific aural preparatory song. Part-singing and vocal technique practice were the over-riding factors when choosing appropriate rote songs for the method. Specific instructions concerning the use of the songs are expressed in the *Director's Guide*.

The Director's Guide

The *Director's Guide* contains the chosen rote songs, a basic aural training procedure, exercises for reading, and instructions for using the exercises and rote literature. The *Director's Guide* is divided into daily lessons. Each set of five lessons has a list of objectives for mastery and a list of preparatory objectives for the following five lessons, a list of the rote songs to be taught, and five reading exercises. A basic procedure for preparation and mastery of the objectives is outlined for the teacher. This procedure utilizes solfege syllables and Curwen hand signs. Aural activities include echo singing using solfege, dictation using hand signs, and aural

dictation of both melodic and rhythmic elements. Written sight-singing exercises include suggestions for preparation and mastery of new concepts, as well as ways to lengthen exercises, add part-singing, and other enrichment activities.

The *Director's Guide* includes the rationale supporting the suggested activities and the composition of specific exercises. For example, research results have indicated that a singer will have more success with a new or difficult interval if the second note of the interval has been sung repeatedly previously (Marquis, 1963). The day 18 sight-singing exercise (see Figure 2.2) from *Music Literacy for Secondary Choir* is designed to create successful practice with the intervals *sol* to *re* and *re* to *sol.* Before *re* to *sol* appears, *sol* has been sung in a known pattern, *do, mi, sol*, and in stepwise format. *Re* has been sung two times before the interval *sol* to *re* is sung.

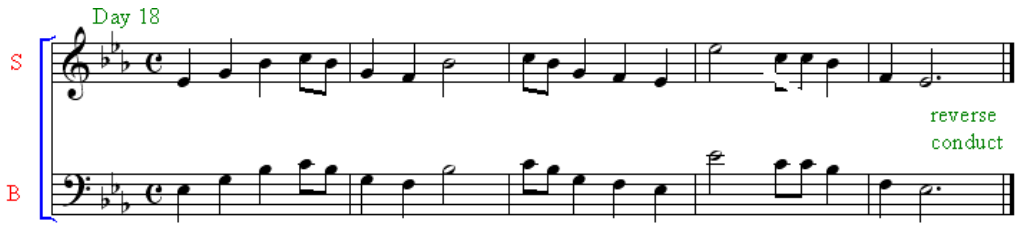

Figure 2.2. Reading exercise for Lesson 18 from Music Literacy for Secondary Choir.

Conclusion

Music Literacy for Secondary Choir was created to be integrated into choral rehearsals using foundations of sequencing theory, aural perception

principles, and music learning research. Choral teaching experience and an investigation of current and related methodologies helped inform the designated practices and procedures of the method with the intent for use in choral ensemble environments but with the specific objective of improving students' individual sight-singing skills.

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CHAPTER III

METHODS AND PROCEDURES

Introduction

The purpose of this study was to test the efficacy of a researcher-constructed aural-based sight-singing method for secondary school choral students entitled *Music Literacy for Secondary Choir*. The method, with an accompanying *Director's Guide,* was uniquely designed to be used for instruction as applied in choral ensemble environments, but with the specific objective of improving students' individual sight-singing skills. Therefore, the global benefits were intended to conserve instructional time by effectively and expeditiously improving the individual and independent sight-singing skills of choral students.

According to research conducted by Henry and Demorest (1994), and Daniels (1986), students in a choral program that has received high ratings in ensemble sight-reading for many years are no more likely to be independent (solo) music sight-readers than choral students from a choir that does not perform well in sight-reading. The only factor that asserts itself when attempting to ascertain the characteristics of a strong music reader is whether the student has had private piano lessons (Henry &

Demorest, 1994; Demorest & May, 1995; Daniels, 1986). *Music Literacy for Secondary Choir* was designed for the specific purposes of improving individual sight-singing skills as a result of music literacy instruction in an ensemble setting.

Selection Process

School Identification and Selection

For purposes of testing the effectiveness of the *Music Literacy for Secondary Choir* method, a pre- posttest control group design was established. Within the state of Oklahoma, schools were surveyed as an initial step for identifying schools by name that were potential candidates for participation in the study according to criteria stated below. Schools meeting these criteria were selected and assigned to either a non-aural-based sight-singing method, identified as the control group, or the aural-based *Music Literacy for Secondary Choir*, identified as the Experimental group. Random assignment was not attempted, and schools were assigned to treatment groups using a purposive procedure that enabled equal matching of groups on the basis of class type, student gender, and grade level.

Selection criteria. Secondary school state choir choral contests in Oklahoma require an ensemble sight-reading component as a part of the high school choral composite performance rating. Therefore, the initial

selection criterion for this study was participation in the Oklahoma Secondary School Activities Association state choir contests. From a list of these choral programs, specific schools were selected that fulfilled the following criteria: location in a non-urban setting, the presence of a beginning or entry-level choir meeting daily, and feeder schools with traditional middle school vocal music programs.

Selection of teachers. Choir teachers employed at these select schools (*N* = 16) were contacted via email with follow-up by telephone concerning the possibility of, and willingness to participate in the study. Teachers who responded affirmatively (*N* = 6) regarding participation in the study were matched, according to their responses, to the researcher's inquiries about their school, their feeder schools, their teaching experience, general rehearsal procedures, quality of music taught, and current methods and philosophies for teaching sight-singing. From the pool of teachers responding affirmatively, five teachers (and choral programs) who fulfilled all of the selection criteria, as specified for teachers and students, were selected for participation in the study. Two schools; one mixed choir and one freshmen women's choir, were assigned to the Control group, and three schools; one mixed choir, one freshmen women's choir, and one non-select women's choir, were assigned to the

Experimental group, thus the latter three schools received instruction using *Music Literacy for Secondary Choir.*

Description of Subjects

Subjects were students enrolled in their respective high school choral programs in Oklahoma schools at locations determined by willing teachers with similarities regarding instructional philosophy and methodology. These students lived in areas with comparable non-urban settings. The students had received traditional middle school choral education and were enrolled in the entry level choir class taught by one of the five teachers participating in the study.

Teacher Training and Instructional Preparation

The two teachers assigned to the Control group attended teacher instructional sessions independent of the teachers assigned *Music Literacy for Secondary Choir*. These sessions, conducted by the researcher, focused on specific procedures outlined for the Control method for the purposes of this study. At the conclusion of these sessions, the teachers demonstrated their understanding of the prescribed procedure and agreed to adhere to the order of presentation of concepts defined in this study.

The three teachers assigned to the *Music Literacy for Secondary Choir* method attended instructional sessions where they received the *Director's Guide* with explanation and demonstration by the researcher of

the method‘s procedures. The *Director’s Guide* (see Appendix A) includes a list of objectives serving as criteria for mastery, aural activities, sight-singing exercises, and rote songs to be used in aural training. The order and rate of the presentation of educational objectives were explained, as well as the rationale underlying the method’s development. The teachers agreed to adhere to the method’s procedures and apply their understanding and competence when teaching the method.

Testing

Background Student Questionnaire and Test Development [1]

A Student Background Questionnaire was designed by the researcher to collect information regarding students’ previous musical experiences, musical training outside of the traditional middle school choral classroom prior to high school enrollment, and demographic factors that might affect internal validity. The Student Background Questionnaire (see Appendix B) was reviewed by university faculty members and choral education colleagues prior to final acceptance for administration.

The sight-singing test melody was adapted from melodies used in high school choral sight-singing research conducted by Steven Demorest

[1] “Test” refers to the materials, equipment, testing setup, and procedures. In subsequent chapters, “test” is generally referenced as “assessment.” The latter includes the test and procedures as described herein as well as the global process of quantifying students’ sight-singing skills.

(1998).[2] Demorest's melodies were chosen for the current study because they were appropriate for the age group being studied. The music skills contained in the melodies are attainable by high school choral students, and the pitch content is in a comfortable range for high school singers. The two melodies used by Demorest were combined with the addition of a repeated *do*, or tonic pitch, to lengthen the test melody to eight measures. This combined single melody was used for pre- and posttest purposes (see Appendix D). Although test reliability before administration was of concern, consultation with professors and pilot trials administered to students not associated with the study provided confidence in the test equipment setup and testing procedures.

Test Administration

Two weeks prior to testing, a parent permission form and student informed consent form were distributed to the students in accordance with The University of Oklahoma Institutional Review Board requirements (see Appendix C). After these permission and consent forms were returned, the researcher scheduled a testing day with each school. The researcher traveled to each of the five schools on the designated testing day for purposes of setting up the testing room, calibrating the equipment, and administering the questionnaire and the test. This testing session served

[2] Permission for use and adaptation granted by Dr. Steven Demorest, July 1, 2008.

as the pretest, and results were treated statistically to determine pre-instruction equality in sight-singing skills among all groups.

For purposes of procedural standardization, the researcher composed a script containing instructions and directions for the test administration procedures. Immediately before the pretest was administered, the researcher read the script to all students in the respective choirs to ensure uniform information, directions, and understandings regarding step-by-step procedures all students followed during the testing procedure. The script included a segment wherein the researcher demonstrated the testing procedure. After the presentation of the script and the demonstration of the test procedure, students were encouraged to ask questions about any part of the procedure.

Students were tested individually during choral rehearsals in an adjacent acoustically-treated practice room at each of the schools. Students entered in random order, as determined by numbers drawn from a box immediately prior to testing. In the practice room, students positioned themselves at a location marked on the floor by masking tape. The testing stations were pre-arranged so that students had easy and comfortable access to all equipment and materials used during the test. Two tape recorders (Radio Shack, Model 14-1128) with internal microphones were strategically placed on a table that was modified to accommodate a vertical height, thus allowing students to complete the

necessary operations without stooping or changing body position. Tape recorder 1 was loaded with a tape containing instructions, a chord progression, and starting pitch, and Tape recorder 2 was used to record each student's performance. A music stand was placed equidistant from both tape recorders and the position of the student. The only physical variation in the position of students or equipment permitted before or during the test was a pre-determined allowance of the repositioning of the music stand to accommodate operation of the tape recorders for the convenience of left- and right-handed students. This thorough standardization of all elements of the physical testing environment ensured full control of any irregularities that might affect the sight-singing performance.

A manila folder containing the sight-singing exercise was placed on the music stand prior to the testing session. Written instructions inside the folder were a printed duplication of the previously-administered verbal instructions and reminded students to release the previously set pause button on Tape Recorder 2 and speak their previously assigned identification number. Students then pressed the pause button on Tape Recorder 2. Following the next written instruction, students turned on Tape Recorder 1 to hear recorded spoken instructions, a chord progression, and starting pitch in the key of F. They were allowed 30 seconds to study the exercise and practice in any manner they had been taught and they found

useful, which included tapping the beat or rhythms, speaking solfege or note names, and singing. At the end of 30 seconds, the recorded spoken instructions from Tape 1 resumed with instructions to release the pause button on Tape Recorder 2 and sing the exercise. Written signs, strategically placed, reminded students to press pause on Tape Recorder 2 and rewind on Tape Recorder 1. Students were instructed not to rewind Tape Recorder 2, and the rewind button was covered so as to prohibit its use. The students were instructed to place the sight-singing exercise in the manila folder and close the folder before leaving the room. If the testing required more than one class period, a high school music student aide coached by the researcher served as a test monitor and sat quietly in a corner to ensure procedures were followed correctly and the tapes were not damaged. When the last student completed the testing procedure, the researcher collected the tapes and transported Tape 2 to a safe location for backup and storage.

Test Scoring Procedures

The scoring procedures also were modeled from the Demorest (1998) study. All scoring was completed by the researcher using a playback tape recorder, Radio Shack, Model 14-1128, and Koss QZPRO headsets. A scoring sheet, developed by the researcher (see Appendix E)

was used to score the performances of each student according to the specified criteria described below.

Scoring from the tape-recorded sight-singing tests was structured according to the following system. The test melody contained 31 notated pitches and 31 rhythms (see Appendix D). A perfect score was 62. Errors resulted in the following deductions from the maximum score. One point was subtracted for each rhythm error and one point for each pitch error. One point was subtracted for a tempo change or repeated note not indicated in the notation. Two points were subtracted for starting the melody over. Two points were subtracted for changing the key or tonic pitch. The researcher assigned a score to the recorded tests after two hearings using the procedure described above. Following the pretest and the scoring of all students in the five classes, the same tapes were “blind scored,” using the same procedures, by an experienced high school choral teacher who had no association with or knowledge of the study. Scores from each of these evaluators were statistically compared to confirm confidence in scoring accuracy and, subsequently, establish interscorer reliability. When confidence in scoring accuracy was established, the scores were subjected to statistical analysis for purposes of determining variance in sight-reading skills across the five classes.

Teaching: The Instructional Period

The purpose of the current study was to compare the effectiveness of *Music Literacy for Secondary Choir* with a non-aural-based sight-singing method, the former constructed from objectives structured specifically to develop independent music sight-readers by means of ensemble instruction, and the latter serving the same intent while using specific traditional methodological definitions. Therefore, the non-aural-based instructional procedures will hereafter be referenced as a "method." This nomenclature is justified by employing standardized specifications and instructions that are generally considered customary practices among choral teachers and were written for purposes of serving as a uniform and controlled choral procedure that matched the time and attention to warm-up and sight-reading activity presented in *Music Literacy for Secondary Choir*. The schools using the *Music Literacy for Secondary Choir* method will hereafter be referenced as the Experimental group, and schools using the non-aural-based method will be identified as the Control group. Standardized researcher-specified instructions and procedures were established that were followed by teachers in the Control group and the Experimental group. The two instructional methods are described below. The objectives for the two methods are identical. Both groups sight-sang daily as a group using solfege and Curwen hand signs. The only difference between the two methods, and thus the variable under scrutiny, is the

aural preparation of the objectives prior to sight-singing using the objectives. These instructional methods began immediately following completion of the sight-singing pretest.

Instructional Procedures

Control Group

The Control method included the use of published sight-reading manuals and textbooks, including past Oklahoma Secondary Schools Activities Association sight-reading contest pieces, and method books. Solfege syllables and Curwen hand signs were utilized. Published music available in the classrooms was used for sight-reading purposes. Control group teachers received pre-instructional training, conducted by the researcher, focused on standardizing teaching content and procedures. While limited flexibility was permitted in areas of materials and methodology, teachers were required to teach in compliance with the educational objectives listed below. The instruction time allotted in class for the Control group matched parameters specified for the respective areas for the Experimental group. In this context, the instructional period was administered for 30 consecutive lessons.

<u>Lessons 1-5</u>
New concepts: *do, re, mi, fa, sol, la, ti*, quarter note, quarter rest, eighth notes, common time

Lessons 6-10
New Concepts: half note, whole note, *do/mi/sol, sol/mi/do, do/sol↓, do/sol*

Lessons 11-15
New Concepts: *re/fa/la, la/fa/re*

Lessons 16-20
New Concepts: 3/4time, *re/sol, do/do', sol/re,* dotted half note, pick-up measure, *do/la, la/re*

Lessons 21-25
New Concepts: singing with words, syncopa (eighth, quarter, eighth), *la/re, do/fa, do/la*

Lessons 26-30
New Concepts: sight-singing in 3 parts, *re/ti, re/do', t/re/sol*

The teachers using the Control method began each rehearsal with a vocal warm-up. The vocal warm-up utilized three, five, and eight note diatonic patterns, both step-wise and triadic. The vocalizes included vowels and solfege. The warm-up lasted five minutes.

After vocal warm-ups, teachers led students in interval practice using solfege, hand signs, and a solfege ladder (solfege syllables written in ascending order on the board). Students then sight-sang using published exercises approved by the researcher. The music reading objectives for each day were determined by the method book or sight-reading music selected. These objectives were in accordance with the weekly concept list. The interval practice and sight-singing lasted seven minutes.

Experimental Group

Students in the Experimental group were taught aural skills and sight-singing skills using *Music Literacy for Secondary Choir.* Teachers for the Experimental group classes followed the instructional methods and procedures covered in the researcher's instructive session and as specified in the *Director's Guide*. Experimental group teachers agreed to adhere to the method's pace, objective presentation order, and the procedures specified in the *Director's Guide* for preparation and presentation of the educational objectives. The *Director's Guide* is divided into 30 lessons. Each set of five lessons is prefaced by a list of objectives serving as criteria for mastery and a list of preparatory objectives is provided for the following five lessons. A list of the rote songs to be taught and five reading exercises are also included.

New and mastery concepts are shown below for each five lessons. The full method, teacher instructions, and specifics of the lessons are presented in Appendix A.

<u>Lessons 1-5</u>
New concepts: *sol/mi*, *la*, quarter note, quarter rest, paired eighth notes, part-singing, common time

Concepts for Mastery: *sol/mi*, quarter note, quarter rest, common time
Preparation for Next Week: *mi/la, sol/la, mi/la, do/la,* half note

Lessons 6-10
New Concepts: 3/4 time, conducting, reading two measures at a time, half note, *do, do/la↓*

Concepts for Mastery: *sol/la, mi/la, la/mi,* paired eighth notes, half note
Preparation for Next Week: *re, do/re/mi*, *do/sol↓, do/mi/sol, do/sol,* whole note

Lessons 11-15
New Concepts: *re, do/re/mi*, *do/sol↓, do/mi/sol, do/sol,* whole note

Concepts for Mastery: *do/la↓, sol/mi/do, do/mi/sol, do/re/mi, do/sol↓ do/sol,* whole note
Preparation for Next Week: *re/sol, do/do', sol/re,* dotted half note, *do/la, la/re*

Lessons 16-20
New Concepts: ostinato, *re/sol, do/do', sol/re,* dotted half note, pick-up measure, conducting in 4/4, *do/la, la/re*

Concepts for Mastery: dotted half note, pick-up measure, *re/sol, sol/re, do/do', do/la*, clap in canon
Preparation for Next Week: syncopa (eighth, quarter, eighth), *fa*

Lessons 21-25
New Concepts: Dictation, singing with words, syncopa (eighth, quarter, eighth), *fa*

Concepts for mastery: *la/re,* syncopa, *sol/fa/mi*
Preparation for Next Week: *fa/la, do/fa, fa/re, ti, re/do'*

Lessons 26-30
New Concepts: *fa/la, do/fa, fa/re,* sight-singing in singing in 3 parts, *ti, re/do'*
Concepts for mastery: *fa/re, la/ti/do',* singing in 3 parts

The teachers for the Experimental classes using *Music Literacy for Secondary Choir* taught the rote songs for aural preparation immediately

following vocal warm-up and performed the aural training procedure as directed. This procedure utilizes solfege syllables and Curwen hand signs. Aural activities include echo singing using solfege, dictation using hand signs, and aural dictation of both melodic and rhythmic elements. Instructions for use of the sight-singing exercises as outlined in the *Director's Guide* and practiced in the teacher pre-instructional sessions were followed implicitly. These instructions include, in part, singing the exercise in retrograde to lengthen the task and allow for different approaches of intervals and rhythm combinations, and instructing half the choir to read the exercise forward while the other half of the choir reads the exercise in reverse, as well as starting different sections of the choir in different measures, to create opportunities for sight-singing in parts. Other activities include clapping an ostinato while singing the exercise, clapping the measure just sung while continuing to sing the exercise (clapping in canon), and conducting.

The Experimental group teachers using *Music Literacy for Secondary Choir* began each rehearsal with a vocal warm-up. The vocal warm-up utilized three, five, and eight note diatonic patterns, both step-wise and triadic. The vocalizes included the use of vowels and solfege. Rhythms were chosen from either the objectives to be mastered or objectives for preparation listed in the *Director's Guide*. The warm-up lasted five minutes.

As a part of the vocal warm-up, teachers transitioned into an aural exercise. These aural exercises were designed to prepare for each day's objective for mastery. The teachers then facilitated and observed students in reading the sight-singing exercise, following the instructions in the *Director's Guide* for *Music Literacy for Secondary Choir*. The aural exercise and the sight-singing exercise covered a period of seven minutes. The instructional period was administered for 30 consecutive lessons. Attention to and time allotted for standardization of warm-up and sight-reading activity was held constant, for a total of 12 minutes, across the five classes for purposes of procedural control within the study.

Measures to Ensure Consistency and Standardization

All teachers participating in the study videotaped the vocal warm-up, aural training, and sight-singing lesson portion of their rehearsal every fifth lesson. The purpose of the taping was to ensure a record of consistency among teachers that was evaluated according to the respective instructional objectives and pre-study orientation. By following this designated routine each teacher taught their respective methods four times before an assessment was administered. While taping was not intended to measure student achievement or responses to methodology, the four previous lessons' activities and objectives potentially could have altered teacher strategy and behavior. Therefore, in order to obtain the

maximum and most accurate determinant of teacher consistency, the fifth lesson assessment procedure was determined to be consistent with other carefully crafted controls. If school activities altered the fifth lesson taping schedule, an adjacent day closest to the aforementioned schedule was selected for this weekly assessment.

Videotape Evaluation and Adjudication

The videotapes of the sight-singing instruction were copied using high quality duplicating equipment. These tapes were distributed to a panel of two qualified adjudicators. These judges evaluated the videotapes for purposes of determining consistency in instruction among the five teachers according to the objectives and procedures specified for the respective methods. Two rating forms (see Appendix F) were developed by the researcher based on the criteria and objectives specified for instruction as applied to each method. The adjudicators marked these forms while viewing each of the six teaching sessions for each of the five teachers. A 5-point Likert-type scale was used with bipolar adjectives of “strongly agree” and “strongly disagree” serving as guides for the adjudicators’ ratings. Scores were statistically treated to determine conformity to the pre-determined criteria and inter-judge reliability.

Statistical Analysis

At the end of the 30 lesson research period, each student was again administered the sight-singing test as a posttest following the same procedures as described for the pretest. The data collected from the posttest were subjected to descriptive statistics. Posttest scores for the Control and Experimental groups were treated statistically within each group for homogeneity between schools. ANOVA and post hoc analysis were applied to the posttest scores of the five schools as preliminary procedures for identifying comparable classes to be used in the final analysis. The results from these analyses revealed needed adjustments because of an extreme posttest mean produced by one school. Therefore, the final analysis was performed using an independent-samples *t* test with one school eliminated. This analysis served as the principal determinate for the treatment of the null hypothesis.

Descriptive statistics were compiled from information supplied by the subjects. Differences in pre- and posttest scores were compared to subject characteristics such as: previous musical experiences including prior piano lessons or other instrumental lessons, prior voice lessons, participation in band or orchestra in middle school, and participation in church choir. For purposes of treating secondary research questions, the descriptive data were primarily grouped by categories stated above and compared with test scores. Analytical focus was directed toward pre- to posttest differences in

the respective scores. These differences, referenced as gain scores, provided information about trends that occurred during the treatment period as reflected by pre- and posttest percentage gains.

CHAPTER IV

RESULTS

Introduction and Overview

Introduction and Selection of Subjects

The purpose of this study was to test the efficacy of a researcher-constructed aural-based sight-singing method for secondary school choral students entitled *Music Literacy for Secondary Choir*. The method, with an accompanying *Director's Guide*, was uniquely designed to be used for instruction as applied in choral ensemble environments, but with the specific objective of improving students' individual sight-singing skills. Therefore, the global benefits were intended to conserve instructional time by effectively and expeditiously improving the individual and independent sight-singing skills of choral students.

Five high schools were selected based on the non-urban location of the community, participation in the Oklahoma Secondary Schools Association, and the presence of an entry level choir that meets daily. The high school choral students must have experienced only traditional middle school vocal music with no specialized sight-reading instruction before entering high school. These stringent selection criteria were

established for the purpose of exercising controls that would maximize sight-singing skill homogeneity at the beginning of the study.

Students from each of the five beginning choirs[3] were individually administered a tape recorded sight-singing assessment pretest and a student questionnaire regarding previous music experience (see Appendixes B and D). Two schools, one mixed choir and one freshmen women's choir, were assigned to a non-aural-based sight-singing instruction method (control group) and three schools, one mixed choir, one freshmen women's choir, and a non-select women's choir, were assigned the *Music Literacy for Secondary Choir* method, (experimental group). After 30 consecutive sight-singing lessons taught in class, the students were administered the pretest sight-singing assessment as a posttest.

Analyses to Ensure Procedural Confidence

Student data, as referenced hereafter, consists primarily of the student background questionnaire and the pre- and posttest scores. Data analysis was directed toward ensuring reliability of the sight-singing performance test and the scorer reliability of the student sight-reading assessments in addition to employing analytical procedures to establish confidence that a multiple teacher factor did not bias the results. The potential confounding effects of multiple teacher factors jeopardizing the

[3] A choir with many students that have not mastered basic music reading skills, such as quarter notes, eighth notes, intervals in the pentatone, plus fa and ti.

integrity of instructional consistency, as often revealed in the literature, was thoroughly investigated with special assessment techniques and statistical analyses applied to determine that all five teachers were consistent with the standardized and specified procedures of instruction for the Control and Experimental methods (Hill, Rowan, & Ball, 2005; Nye, Konstantopoulos, & Hedges, 2004; Rivkin, Hanushek, & Kain, 2005). The effects of teaching styles, personality, environment, and other factors are often associated with inconsistencies in learning and assessment of student behaviors, and are well documented in the literature (Duke, 2000; Grant & Drafall, 1991; Teachout, 1997; Yarbrough, 1975; Yarbrough & Madsen, 1998). Therefore, the data were subjected to a battery of analyses, not only to treat the null hypothesis and research questions, but also to test for strong interscorer reliability and assure the presence of acceptable internal validity as could be influenced by the multiple teacher effect. Videotapes of teaching were not only evaluated by experienced adjudicators employing objective scoring sheets (see Appendix F), the data obtained from these assessments of teaching authenticity were subjected to statistical analysis, reported below.

Main Analyses

The statistical treatment for the main analyses primarily consisted of descriptive statistics, one-way ANOVA, and *t* tests. Since the design of the study included five schools, different teachers, and individually-administered

student sight-singing tests, statistical treatments applied were thorough and included, for example, individual comparative analyses to determine homogeneity within the Control and Experimental groupings for purposes of combining the respective schools to test the null hypothesis. Further, the consistency and fidelity of teaching the respective methods were analyzed for the six week treatment period, as well as the reliability of the original scoring of both pre- and posttests, and the reliability of the sight-singing performance test. All results were tested using an alpha level of $p \leq .05$ that was established for the study. Since none of the supplementary analyses disproved or changed the results of any analyses, these sub-verification procedures and analyses are not given further attention and the results are not reported herein. Therefore, individual analyses that focused on descriptive information about each of the five schools, individual *t* tests, and ANOVAs computed independently and inclusively for the Control and Experimental groups, gain score analyses for each individual school, and teaching consistency observed for each week produced a microscopic view of progressive changes throughout the study and established confidence in the presence of strong internal validity. All statistical analysis was accomplished by means of the SPSS statistical package, version 15.0.0, for Windows®.

Demographic Profiles from the Background Student Questionnaire

In compliance with the selection criteria stated above, only five beginning choir classes from Oklahoma non-urban communities were identified who fulfilled the specified standards while also located in reasonable proximity to the researcher, allowing the researcher to conduct and fulfill the research design requirements. Specifically, the researcher traveled to the five schools for purposes of administering teacher methodology instruction, testing the students for individual sight-singing skills, and maintaining appropriate contact and communication at each testing site that ensured controlled administration of the study.

Each class met daily and was assigned as described above either the Control method, or the researcher-constructed sight-singing method, *Music Literacy for Secondary Choir.* Both methods were taught by the respective teachers to their designated classes for 30 daily lessons according to standard procedures and instructions written by the researcher (see Appendix A). The Control classes were comprised of School 1, a girls' chorus with 16 members and School 2, a mixed chorus with 24 members. The Experimental classes included three schools**:** School 3 was a girls' chorus with 22 members, School 4 was a girls' chorus with 30

members, and School 5 was a mixed chorus with 24 participants[4] (see Table 1). Because of the stringent criteria established for admission to the study, difficulties with identifying experienced teachers willing to participate, and schools fulfilling the selection criteria while geographically located in accessible proximity to accommodate testing by the researcher, the inclusion of a sixth school, to balance Control and Experimental classes, was not possible.

Table 1
Composition of Choir Populations by Gender

Method	Total	Female		Male	
Class Number	*N*	*N*	(Percent)	*N*	(Percent)
Control 1	16	16	(100%)	0	(0%)
Control 2	24	21	(88%)	3	(12%)
Experimental 3	22	22	(100%)	0	(0%)
Experimental 4	30	30	(100%)	0	(0%)
Experimental 5	24	18	(75%)	6	(25%)
Totals	116	107		9	

Designed to ascertain the students' music experience and home music environment, the researcher-constructed Background Student

[4] For the purposes of identification, schools were numbered 1 through 5. Schools 1 and 2 were instructed using the Control method, and Schools 3, 4, 5 were taught using the Experimental method. Hereafter, for purposes of brevity, the schools will be referenced by number unless specific clarification is needed to avoid ambiguity.

Questionnaire was administered to all students prior to treatment (see Appendix B). Questions pertaining to parents' level of education and current musical involvement were included, as well as information regarding the students' music instrument study and performance experience, prior singing experience, special music study or private lessons, selection for an honor choir, talent show participation, and musical production participation.

Student Background

The responses to the Background Student Questionnaire administered at the beginning of the study were tabulated and entered into a spreadsheet. The gender distribution between the two groups was similar. School 1, from the Control Group, was 100% female (*N* = 16). School 2, also in the Control Group, was 88% (*N* = 24) female. Schools 3 (*N* = 22) and 4 (*N* = 30), from the Experimental Group, were both 100% female. School 5, also in the Experimental Group, was 75% female.

Freshmen constituted the largest percentage of three of the five choirs: School 1 with 92% (*N* = 16), School 4 with 100% (*N* = 30), and School 5 with 67% (*N* = 24). Sophomores were the largest percentage of the School 3 choir with 43% (N=22), and seniors were the largest percentage with 63% (N=24) of School 2 (see Table 2).

Table 2
Composition of Choir Populations by Grade Level

Method Class	Total *N*	Grade Level: Freshman *N* (Percent)	Sophomore *N* (Percent)	Junior *N* (Percent)	Senior *N* (Percent)
Control 1	16	15 (92%)	1 (8%)	0 (0%)	0 (0%)
Control 2	24	0 (0%)	0 (0%)	9 (37%)	15 (63%)
Experimental 3	22	1 (4%)	9 (43%)	5 (21%)	7 (32%)
Experimental 4	30	30 (100%)	0 (0%)	0 (0%)	0 (0%)
Experimental 5	24	16 (67%)	7 (29%)	1 (4%)	0 (0%)
Total	116	62	17	15	22

Parent and Home Music Environment

Students reported their parents' highest educational level. Students from all of the schools except School 2 reported the largest percentage of their father's highest level of education to be a high school diploma, 58% to 67%. School 1 students reported 21% of their fathers had a 2-year college degree, 4% had a 4-year college degree, and 8% had a master's degree, combining for a total of 33% of School 1 fathers with college credentials. School 2 students reported 17% of their fathers had a 2-year college degree, 25% had a 4-year college degree, and 4% had a doctorate, combining for a total of 46% of School 2 fathers with college credentials. School 3 students reported 13% of their fathers had a 2-year college degree, 20% had a 4-year college degree, and 4% had a doctorate,

combining for a total of 36% of School 3 fathers with college credentials. School 4 students reported 5% of their fathers had a 2-year college degree, 26% had a 4-year college degree, and 11% had a master's degree, combining for a total of 42% of School 4 fathers with college credentials. School 5 students reported 17% of their fathers had a 2-year college degree, 9% had a 4-year college degree, 4% had a master's degree, and 4% had a doctorate, combining for a total of 34% of School 5 fathers with college credentials (see Table 3).

An examination of the distribution of the fathers' education shows the presence of a graduate degree for all classes, although the percentage is small and, with the exception of Schools 1 and 5, roughly one-quarter of the fathers finished college. These percentages lend credence to a subjective observation that students across all classes show a relatively balanced education among their fathers.

Table 3
Father Highest Degree Attained

Method	High School	Trade	2 year	4 year	Master's	Doctorate
Control 1	67%	0%	21%	4%	8%	0%
Control 2	42%	8%	17%	25%	0%	4%
Experimental 3	65%	0%	13%	20%	3%	0%
Experimental 4	58%	0%	5%	26%	11%	0%
Experimental 5	65%	0%	17%	9%	4%	4%

Students from all five schools reported the largest percentage of their mother's highest level of education to be a high school diploma, 58% to 74%. School 1 students reported 21% of their mothers had a 2-year college degree and 8% had a 4-year college degree, combining for a total of 29% of School 1 mothers with college credentials. School 2 students reported 17% of their mothers had a 2-year college degree, 21% had a 4-year college degree, and 8% had a master's degree, combining for a total of 46% of School 2 mothers with college credentials. School 3 students reported 18% of their mothers had a 2-year college degree, 5% had a 4-year college degree, and 10% had a master's degree, combining for a total of 33% of School 3 mothers with college credentials. School 4 students reported 5% of their mothers had a 2-year college degree, 16% had a 4-year college degree, and 5% had a master's degree, combining for a total of 26% of School 4 mothers with college credentials. School 5 students reported 17% of their mothers had a 2-year degree, 8% had a 4-year college degree, 8% had a master's degree, and 4% had a doctorate, combining for a total of 37% of School 5 mothers with college credentials (see Table 4).

An examination of the distribution of the mothers' education shows the presence of a graduate degree for all classes except School 1. The percentage of college degrees among mothers is slightly less than fathers, but with the addition of more trade school graduates, fewer mothers than

fathers in three of the five schools (1, 3, and 5) ended their formal education with a high school diploma.

Table 4
Mother Highest Degree Attained

Method	High School	Trade	2 year	4 year	Master's	Doctorate
Control 1	61%	4%	21%	8%	0%	0%
Control 2	54%	0%	17%	21%	8%	0%
Experimental 3	60%	8%	18%	5%	10%	0%
Experimental 4	74%	0%	5%	16%	5%	0%
Experimental 5	58%	4%	17%	8%	8%	4%

Students responded to questions about their parents' current involvement in music activities (church, recreational, vocational). According to the students' responses, the number of fathers currently involved in music recreationally or vocationally was largest at School 5 (29%), with 2 of these fathers reported as professional musicians, 2 participating in church choir, and the remainder playing instruments recreationally. The largest percentage of mothers involved in music was at School 3 (41%). These School 3 mothers were predominately involved with church choir, and 2 mothers participated in a community orchestra. School 4 mothers' current participation in music was less than half of the fathers' current participation in music. Students reported mothers participating in music less than fathers in three of the five schools (See Tables 5 and 6).

Table 5
Fathers' Current Involvement in Music

School	Church *N*	Band or Orchestra *N*	Professional *N*	Other *N*
1	3	0	0	0
2	2	0	1	0
3	3	0	0	1
4	0	2	3	2
5	2	3	2	0

Table 6
Mothers' Current Involvement in Music

School	Church *N*	Band or Orchestra *N*	Professional *N*	Other *N*
1	0	0	0	1
2	5	0	0	1
3	6	1	0	2
4	3	0	0	0
5	1	0	0	0

When asked if there was a piano in the home, the school with the largest percentage of students in this category also had the largest percentage of students reporting prior piano lessons. Forty percent of the students in School 4 had a piano in the home, with 37% of these students reporting prior piano lessons. However, the next highest percentage of

students with a piano in the home, School 2, with 30%, only had 8% of the students reporting previous piano lessons. The school with the lowest percentage of a piano in the home had a higher percentage of students reporting prior piano lessons. School 5 students reported 17% had a piano in the home, but 21% had taken piano lessons previously (see Table 7).

Table 7
Choir Populations' Piano Experience

		Piano in the Home		Piano Lessons	
Method	*N*	*N* (Percent)		*N* (Percent)	
Control 1	16	4	(25%)	2	(13%)
Control 2	24	7	(30%)	2	(8%)
Experimental 3	22	4	(18%)	4	(18%)
Experimental 4	30	12	(40%)	11	(37%)
Experimental 5	24	4	(17%)	5	(21%)
Total	116	31		24	

Fifty percent of the students in School 5 received previous lessons on instruments other than piano. Ten percent of the students in School 4 and 23% of the students in School 3 received previous lessons on instruments other than piano. Thirty-three percent of School 2 and 13% of School 1 students had received lessons on an instrument other than piano.

Band or orchestra participation was indicated by 25% of the students in School 5, 10% of School 4 students, and 23% of School 3 students. Eight percent of School 2 students indicated band or orchestra participation, and

School 1 students indicated a band or orchestra participation of 13% (see Table 8).

Table 8
Choir Populations' Instrument Experience

Method	*N*	Instrument Lessons *N* (Percent)		Band or Orchestra *N* (Percent)	
Control 1	16	3	(19%)	2	(13%)
Control 2	24	8	(33%)	2	(8%)
Experimental 3	22	8	(36%)	5	(23%)
Experimental 4	30	4	(13%)	3	(10%)
Experimental 5	24	12	(50%)	6	(25%)
Total	116	35		18	

Students reported their prior voice lessons, honor choir selection, involvement in musical productions, and participation in church choir. Over 20% of the students in three schools (Schools 2, 3, and 4) had taken private voice lessons, but the schools with the largest percentage of students with private voice lessons were not the same three schools with the largest honor choir selection percentage. School 4 was in both groups with 33% of the students selected for honor choir, and 23% with previous voice lessons. School 5 had 46% of students previously selected for an honor choir, whereas only 13% of these students reported previous voice lessons. School 1 students reported 25% selected for honor choir and 13% with previous voice lessons (see Table 9).

Student participation in musical productions was 70% or above for Schools 3, 4, and 5. School 2 was close with 63%, and School 1 students reported the smallest musical production participation of 25%. School 2 students reported the smallest church choir participation at 13%. The largest church choir participation was at School 3, with 59%, followed by School 5, where 38% participated in church choir. School 1 students reported a church choir participation rate of 31%, and School 4 had a participation rate of 20%, all shown in Table 9.

Table 9
Choir Populations' Singing Experience

Method	*N*	Voice Lessons *N* (Percent)	Honor Choir *N* (Percent)	Production Participation *N* (Percent)	Church Choir *N* (Percent)
Control 1	16	2 (13%)	4 (25%)	4 (25%)	5 (31%)
Control 2	24	5 (21%)	4 (17%)	15 (63%)	3 (13%)
Experimental 3	22	6 (27%)	3 (14%)	17 (77%)	13 (59%)
Experimental 4	30	8 (27%)	10 (33%)	23 (77%)	6 (20%)
Experimental 5	24	3 (13%)	11 (46%)	17 (71%)	9 (38%)
Total	116	24	32	76	36

Interscorer Reliability and Teaching Consistency

Interscorer Reliability

All students from the five schools were administered an individual sight-singing assessment by the researcher (pretest) before sight-singing instruction commenced. Two teachers were assigned a non-aural-based sight-singing method which served as a control or comparison group and three teachers were assigned *Music Literacy for Secondary Choir* (Experimental group). Prior to implementation of the study, all teachers were given standardized written guides specifying the exact instructional procedures to be followed when teaching their assigned sight-singing method. Each guide contained identical weekly objectives and specific procedures for teaching the daily lessons in accordance with the weekly objectives (see Appendix A). The researcher met with each teacher to review the objectives, explain the specified procedures to ensure that the respective teachers understood the instructional part of the study, and resolve any apprehensions the researcher or teachers had about fulfilling the specified teaching expectations. The teachers taught 30 sight-singing lessons using either the Control or Experimental method, videotaping every fifth lesson for purposes of documenting their adherence to the instructions, objectives, procedures, and method instructional fidelity as specified.

The researcher scored all audio taped pretest assessments using a standardized scoring guide and procedure modeled after Demorest (1998)

(see Appendix E). Following the pretest assessments scoring, randomly selected tests representing 20% of the assessments were “blind scored” by an experienced high school choral teacher not associated with the study using the identical procedures as those used by the researcher. These sets of scores were grouped by classes and entered into a spreadsheet then statistically compared to establish interscorer reliability. The pretest interscorer reliability was $r = .995$. The same scoring procedures and choral teacher were used for the posttest. Interscorer reliability for the posttest was $r = .966$.

Teaching Consistency

Because the research design required five teachers in different schools and locations who may, for various reasons, have created extraneous and uncontrolled variability in teaching the methods as intended, all teachers participating in the study videotaped the vocal warm-up, aural training, and sight-singing lesson portion of their rehearsal every fifth lesson. At the conclusion of the study, these tapes were assembled and distributed to a panel of two experienced choral teachers who evaluated the videotapes using scoring guides designed by the researcher, based on a 5-point Likert-type scale (see Appendix F). These scoring guides served to assess consistency in instruction among the teachers according to the specific weekly educational objectives stated in Chapter III and sight-singing

instruction procedures stipulated in each method (see Appendix A). The assessment of each teacher's fidelity to teaching the respective methods was a formalized evaluative compilation of the information and procedures presented at each teacher's individual training session conducted by the researcher to inform and practice the specified procedures for the respective methods. The judges independently viewed the tapes and scored the teachers for each of the 6 lessons, approximately one hour of tape per teacher, to determine consistency, and standardization of procedures. The scores from each judge were entered into a spreadsheet for each of the six weeks. The means of scores from each judge and the interjudge reliability were calculated for each week, thus producing 12 means and six reliability coefficients. This dual comparative procedure provided (a) a measure of teacher fidelity to the respective methods and specified standards as indicated by the judges' mean scores from their evaluation of each teacher across a period of six weeks, and (b) a weekly monitoring of the judges' agreement when assessing the teachers' compliance to the respective methods. These comparative results produced not only measures of teacher performance but also an interjudge reliability check.

While interpretations or generalizations are not intended to be predicated from these results, the comparative means and reliability coefficients provide substantial, objective, and statistical confirmation that the teachers were presenting and teaching the respective methods as

specified and instructed. The videotape assessment scores (5-point scale) were independently averaged for each judge, thus producing 12 mean comparisons (six per judge) across the instructional period. The means when combined across the six-week period for Judge 1 was a composite of 4.30 (M = 4.30) and the composite mean for Judge 2 was 4.42 (M = 4.42). The interjudge reliability for the six week instructional period was r = .78. Therefore considering the composite mean scores to be only slightly below a perfect score of 5.00 and the relatively strong interjudge reliability coefficient, all teachers in the study were considered to be in compliance with the procedures of their assigned methods.

Sight-Singing Assessment Results

Pretest Results

To ensure the equality of the sight-singing ability of the students across five schools before treatment, a series of statistical analyses were conducted on the sight-singing assessment pretest scores. Following the sight-singing assessment administered to students individually in each school, each student's score was entered into a spreadsheet for their respective class. Therefore, five columns consisting of the two Control schools 1 and 2 and the three Experimental schools 3, 4, and 5 formed a matrix of scores for each student as categorized by method. This and

additional spreadsheets served as the foundational reference for subsequent SPSS analysis.

The pretest means and standard deviations are shown in Table 10 and observationally indicate similarity in assessment results among all schools. However, to ensure equality of sight-singing skills of the subjects within and across schools, a one-way ANOVA was computed, with school serving as the independent variable and assessment scores as the dependent variable. The results of this analysis revealed no significant differences in sight-singing skills as assessed for the pretest $F(4, 111) = 0.68$, $p = .68$. These results indicate that sight-singing skills among the

Table 10
Pretest Descriptive Statistics for All Groups

Method	*N*	*R*	Mean*	Standard Deviation
Control 1	16	40	13.00	12.60
Control 2	24	35	10.88	9.75
Experimental 3	22	33	11.18	10.88
Experimental 4	30	44	8.17	9.93
Experimental 5	24	49	12.08	13.68
Total	116			

*Maximum possible points in the test was 62

five schools was statistically homogeneous so that instruction could begin under the assumption that there were no outstanding differences in sight-singing skills that would create inequities at the beginning of instruction nor bias the effects of the independent variable. As a result of thorough scrutiny

of the pre-instruction descriptive statistics as well as the consideration that ANOVA (See Table 11) treats the student scores from the five schools in a single analysis, a decision was made to conduct additional data analysis.

Table 11
Pretest ANOVA Groups Combined

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	315.86	4	78.97	.58	.68
Within Groups	15137.69	111	136.38		
Total	15453.55	115			

Reasons for this decision primarily were motivated by several concerns that emerged after scoring the pretest: (a) the standard deviations for all schools were considerably larger than expected; (b) Experimental School 4 produced a mean of only 8.13 while Control School 1 achieved the largest mean of 12.94—a difference of 4.81 points, but large enough to derive attention; (c) observing an unexpectedly large number of single digit student scores on the pretest when considering that the maximum test score was 62 points; (d) a probability of the presence of test anxiety among beginning choir students that could influence their test performance scores in non-quantifiable and unexplainable ways, especially when testing students with different teachers and in 5 different environmental and geographic locations; (e) the students were asked individually to sight-read in the presence of an unfamiliar test administrator. Therefore, since the

schools were already assigned to Control and Experimental classifications, an individual test of homogeneity within these two groupings was warranted.

In order to control for potentially biased results from the ANOVA applied to the pretest scores from the five schools, statistical analyses were run to determine if differences emerged when analyses were confined independently to each of the groups. Therefore, the two Control schools' sight-singing scores were subjected to an independent-samples *t* test and the scores from the Experimental schools were treated with a one-way ANOVA. These additional analyses confirmed that the students' sight-singing skills were not significantly different within the groupings and eliminated any false effects that may have resulted from the ANOVA. The results from the Control group analysis did not produce significant differences, showing $t(38) = 0.59$, $p > .05$. In like manner, the ANOVA results from the Experimental group also was not significant $F(2, 73) = 0.76$, $p > .05$. Therefore, as a result of the individual statistical treatment of the pretest assessment scores, substantial confidence in the homogeneity of sight-singing skills among the five schools before instruction was achieved.

Posttest Results

Following 30 lessons of ensemble sight-singing instruction, students were again tested individually by the researcher on sight-singing skills using the same test and procedure as the pretest. Posttest descriptive statistics are shown in Table 12.

Table 12
Posttest Descriptive Statistics for All Groups

Method	*N*	*R*	Mean*	Standard Deviation
Control 1	16	48	25.56	15.81
Control 2	24	50	24.71	14.84
Experimental 3	22	43	30.00	13.84
Experimental 4	30	49	31.17	14.78
Experimental 5	24	49	18.79	14.50
Total	116			

*Maximum possible points in the test was 62

A one-way ANOVA was computed on the posttest scores from all five schools, the two Control schools and the three Experimental schools. This procedure follows the preliminary ANOVA analysis applied to the pretest scores and, when presented with the descriptive statistics, provides a standardization of analytical procedures showing a cursory profile of the posttest results. A significant difference between the five schools was obtained from the posttest ANOVA, $F(4, 115) = 2.81$, $p = .029$ (see Table 13), and the descriptive statistics revealed a substantial mean test score inconsistency within the Experimental group.

Table 13
Posttest ANOVA Groups Combined

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	2434.15	4	608.54	2.81	.029
Within Groups	24113.02	111	216.33		
Total	26447.17	115			

Due to the significant *F* ratio, the likelihood of testing the Control schools as a combined group against the Experimental schools, combined, was diminished. These observations clearly created the need for extended statistical treatment and additional analyses. Both Tukey and Scheffe post hoc analyses were then conducted to identify which classes contributed to the significant *F* ratio. The Tukey Post hoc analysis produced a significant difference between Experimental schools 4 and 5 of $p = .022$ and Scheffe analysis showed a $p = .058$. The ambiguity obtained thus far from the posttest analyses including the five schools and the presence of significant difference from this analysis, mandated further study.

Independent analysis of Control and Experimental groups. The scores from the two method groups were separated by sight-singing method and subjected to analyses by grouping in order to determine homogeneity, or lack of, within the Control and Experimental groups without one influencing the other. An independent-samples *t* test was computed between the two Control schools and a one-way ANOVA was computed for the three

Experimental schools. This separation of groups on the basis of method, provided an individual test for homogeneity within each instructional method.

The posttest scores from the Control schools 1 and 2, when subjected to an independent-samples *t* test, resulted in a nonsignificant difference ($p > .05$) within the Control grouping $t(38) = .174$, $p = .863$. However, the one-way ANOVA grouping of Experimental schools 3, 4, and 5 produced a highly significant difference ($p < .05$) between group means $F(2, 75) = 5.308$, $p = .005$. Post hoc Tukey and Scheffe tests were run to identify the location and extent of significant differences between the three Experimental schools and identified significant differences in school combinations except between School 3 and School 4 (see Table 14).

Table 14
Post Hoc Analysis for the Experimental Groups

Tukey	School 3	School 4	.955
		School 5	.028*
	School 4	School 5	.007*
Sheffe	School 3	School 4	.959
		School 5	.037*
	School 4	School 5	.010*

*Significant beyond the .05 level.

The results from the posttest analyses described above created a substantial need to reassess the planned statistical treatment and design because: (a) The scores from the two Control schools were not significantly

different, thus allowing these schools to be merged into a single Control group for the final analysis, (b) Scores from the three Experimental schools were significantly different which, when considering the three-class ANOVA results, precluded combining these schools and treating them as statistically homogeneous, (c) Time, location of schools, and unavailability of students and choral classes complying with selection criteria eliminated any possibility of additional treatment and testing, and (d) Research design constraints, maintaining the integrity of disciplined inquiry, and upholding ethical practices prevented the elimination of Experimental School 5 in order to achieve equal and comparable groupings.

A determination that Control school 1 and 2 could be combined to form a single Control group for purposes of analysis, attention was then directed toward fairly and impartially resolving difficulties caused by the significant differences between the Experimental schools and how they could be transformed or treated for hypothesis testing in a manner that allowed straightforward comparison with the Control group.

Test for homogeneity when Experimental School 5 is eliminated. As shown in Table 14, post hoc analysis following the ANOVA conducted on the three Experimental schools revealed no significant difference between schools 3 and 4. Therefore, in order to ensure this finding, Experimental School 5 scores were removed from this matrix and an independent-

samples *t* test was run between the scores from schools 3 and 4 to gain accuracy in determining differences between these means without the influence of School 5. The results from this analysis produced a *t* value that was not significant, $t(50) = .289$, $p = .774$. Therefore, the final analysis to test the null hypothesis using Control schools 1 and 2 versus Experimental schools 3 and 4 could authentically be conducted.

Comparisons within the Experimental group. School 5 included 24 students, 21% of the entire population and 32% of the students in the Experimental schools. In addition, the raw score mean of the posttest scores for School 5 was 18.79 ($M = 18.79$) with the mean of the highest scoring school (Experimental School 4) being 66% larger, and the mean of the class scoring next above School 5 (Control School 2) being 32% larger. Further, the pretest raw score mean of Experimental School 5 was 12.08 ($M = 12.08$) indicating a percentage raw score pre- to posttest mean gain of only 56%, while School 3 and School 4 achieved raw pre- to posttest raw score gains of 168% (raw pretest mean = 11.18) and 282% (raw pretest mean = 8.17) respectively. While the objectives of the current research were not intended to investigate these kinds of inconsistencies, the results revealed information that could fuel further study on methodology and the teaching of sight-singing. The facts stated above that generated interest and apprehension about several aspects of the study are summarized as

follows: (a) Experimental School 5 obviously was unique as indicated by test scores, (b) The pretest mean for School 5 was in the middle of the pretest distribution of means (two classes with means above and two schools below), among the five schools; however, the posttest mean for School 5 was substantially below the other four schools, (c) Experimental School 5, with a posttest mean of 18.79 was the principal contributor and outlying mean among all schools, and (d) Based on the information that is extensively presented and described above, analyses employing the five schools, were not possible to administer as originally intended. Therefore, consultation centered on the retention or elimination of School 5 in the final analysis.

Retention or expulsion of Experimental School 5 in the analysis. Returning to descriptive statistics presented above, it is noted that Experimental School 5 comprises 21% of the entire population and 32% of the students in the Experimental schools. Therefore, deletion of this sizable amount of data (students) from a study with an *N* of 116 was difficult to justify. Therefore, one additional analytical procedure was implemented in an attempt to add a dimension that had not yet been investigated.

Control schools 1 and 2 were combined and identified as a single group, a product of non-aural sight-singing instruction ($N = 40$, $M = 25.05$). In the same manner, Experimental schools 3 and 4 were combined and

identified as a single representation of the Experimental sight-singing method (*N* = 52, *M* = 30.71). This data matrix produced an *N* of 92 (*N* = 92). Experimental School 5 was omitted from this analysis. An independent-samples *t* test was then run between these Control and Experimental groups to determine if there was a significant difference between the means of the two combined groups. The results of this analysis produced a *t* value that was not significant, $t(90) = 1.831$, $p = .070$, ($p > .05$), indicating that these schools could be combined, as described, to test and accurately treat the null hypothesis.

Using an argument that Experimental School 5 was a contaminating influence in the study and should not be included, the principal objective as stated: “There will be no significant differences between solo sight singing skills of beginning high school choral students following six weeks of instruction using either the *Music Literacy for Secondary Choir* method or a non-aural sight-singing method” would be retained ($p > .05$). This analysis justifies deleting Experimental School 5 from the study and ending the main analysis with the hypothesis treatment as stated above. However, in view of the deviant results obtained from School 5 and the number of students within this class that would be eliminated from the study, the decision was made not to omit School 5 from the study completely.

Considerations leading to the final treatment of the null hypothesis. Relating to the presentation above that sustain the advantages of retaining Experimental School 5 in the current study, and considering potential contributions and informational support the school might render to the enhancement of specific secondary research questions, the school was retained and included in the final considerations regarding the treatment of the null hypothesis.

Reference to Table 13 shows significant differences (p = .029) in posttest score means when the Control and Experimental methods scores from the five schools are included in a 1-way ANOVA. Further, the significant differences exhibited by the Experimental group means imply that the sight-singing skills within the Experimental group vary to an extent that these three schools cannot authentically be combined to form a single Experimental group to be tested against the combined Control group.

Although violating basic practices of statistical applications, the posttest scores from three Experimental classes were combined, thus forming a single Experimental group (N = 76). An independent-samples t test was then conducted to determine significance and how the results of this analysis might affect the treatment of the null hypothesis. Results from this independent-samples t test produced no significant difference between the Control and Experimental groups, $t(114) = .630$, $p = .530$, ($p > .05$). Therefore had this procedure been used as a final test, the null hypothesis

would have been retained under the assumption that neither the Control or Experimental method was more effective in improving individual student sight-singing skills.

An alternate analysis that assumed School 5 could be eliminated from the study without jeopardizing the global value of the research compared the combined Control schools 1 and 2 with the Experimental schools 3 and 4 to treat the null hypothesis without violating the principles of grouping the significantly different Experimental schools. The results from this independent-samples *t* test analysis, the same as with the inclusive analysis above, produced a *t* value that also was not significant, $t(90) = 1.831$, $p = .070$, ($p > .05$).

Rationale for Statistical Treatment of the Null Hypothesis

The null hypothesis was stated: “There will be no significant differences between solo sight singing skills of beginning high school choral students following six weeks of instruction using either the *Music Literacy for Secondary Choir* method or a non-aural sight-singing method.” For purposes of testing the null hypothesis a lengthy series of statistical procedures was used to ensure an appropriate and dependable result. Because the three Experimental schools’ means were significantly different, a simple, valid, and conclusive statistical comparison of the methods could not be accomplished without compromises in the number of students participating

in the study or violating established principles associated with statistical comparisons and research design. Therefore, two statistical applications were administered to determine if conflicting or antithetical results affected the treatment of the null hypothesis.

The alpha level established for the study was $p \leq 05$. The one-way ANOVA analysis, including the five schools, produced an F ratio that was well beyond the alpha set to achieve significance, $F(4, 115) = 2.81$, $p = .029$, ($p < .05$), (See Table 13). The Scheffe post hoc comparison test, applied to the ANOVA results, identified significant differences between Experimental group means, except for School 3 versus School 4 (there were no significant differences within the Control groups). These differences between means of the Experimental schools confounded the ability to combine these schools as well as include the Control and Experimental schools in one ANOVA.

As described previously in this chapter, the second possibility for a valid treatment of the null hypothesis was to eliminate Experimental School 5 from the study because of its extremely low posttest mean that caused the post hoc analysis to show significant differences within the Experimental group. When Experimental schools 3 and 4 were tested independently without School 5, the results produced a t value that was not significant, $t(50) = .289$, $p = .774$, ($p > .05$), thus showing homogeneity and allowing these schools to be combined and compared with the Control group to test the null hypothesis. When comparing the Control method (combined schools

1 and 2) with the Experimental method (combined schools 3 and 4) the *t* value was not significant, $t(90) = 1.831$, $p = .070$, ($p > .05$).

The diversity and multiformity of the raw posttest sight-singing scores reflected by means that were significantly different, required extensive scrutiny of the data under many analytical approaches and statistical applications to ensure viable and accurate results. The final decision regarding the most productive and fair manner of treating the null hypothesis, while gaining the ultimate educational and musical value from the research, was determined on the basis of research and analytical integrity and a pragmatic stance. Therefore, the combined Control schools 1 and 2 were compared with the combined Experimental schools 3 and 4. This analysis, using statistically homogeneous classes to treat the null hypothesis, was determined to be ethical and professional while the ANOVA procedure, although generating valid questions, left numerous elements of the study that could not be answered. Thus, the elimination of Experimental School 5 from the main analysis that determined treatment of the null hypothesis, upheld the validity and integrity of the research. However, beyond the main research objective, Experimental School 5 was retained in the study and used in specific secondary research questions because of its unique and interesting characteristics. In addition, School 5 offers opportunities for future research that go beyond sight-singing instruction.

Main Analysis and Null Hypothesis Treatment

The main and final statistical procedure employed for purposes of treating the null hypothesis was an independent-samples *t* test. The combined Control schools 1 and 2 were compared with the combined Experimental schools 3 and 4, the "Experimental Method." The null hypothesis is stated: "There will be no significant differences between solo sight singing skills of beginning high school choral students following six weeks of instruction using either the *Music Literacy for Secondary Choir* method or a non-aural sight-singing method." Based on the results of the four-class *t* test analysis, the null hypothesis was retained, ($p > .05$).

Secondary Research Questions

The items listed below served as secondary research questions formulated for purposes of evaluating the global effectiveness of *Music Literacy for Secondary Choir* and the non-aural sight-singing method used in the study. For purposes of comparison, the five choir classes were combined into two groups; as described above in one of the main analyses.[5]

1. To what extent will gain scores change from pre- to posttest within groups using *Music Literacy for Secondary Choir* as compared with a non-aural-based sight-reading method?

[5] Experimental School 5, although eliminated from the principal research question, is retained in the treatment, analyses, and responses as related to Secondary Research Questions.

Both the Control and Experimental groups increased their mean sight-singing assessment scores across the instructional period. The percentage gain scores between the Non-aural (control) group and the *Music Literacy for Secondary Choir* (experimental) group were, however, substantially larger for the Experimental group.

The Control group. The scores from the Control group (N = 40) for the pretest were paired with the respective scores from the posttest. The combined pretest Control group raw scores produced a mean of 11.73 and a standard deviation of 11.03 and the corresponding posttest scores produced a mean of 25.05 and a standard deviation of 14.85. The total possible score for the sight-singing assessment was 62 points. A paired-samples t test was computed to determine if the pre- to posttest means were significantly different. This comparison produced a significant difference in gains for the Control group over the six-week instructional period $t(39) = 12.444$, $p < .01$.

In order to achieve a more revealing and descriptive perspective of the differences between pre- to posttest scores, a percentage of gains was also calculated This procedure required entering the raw scores for each student in a spreadsheet which produced a matrix serving as the basis for calculating the percent correct for each student in both groups then computing an average of the respective groups' individual percent gain from

pre- to posttest (Calculating Gain Scores. (n.d.), Retrieved September 17, 2009, from http://www.emporia.edu/teach/tws/documents/TWSGainScore Calculation R.xls).

This analysis for the Control group revealed an improvement in test scores from pre- to posttest of 190.58 percent. While this percentage gain is exorbitant and must be treated with extreme caution, some observations can be drawn from these results that better explain the gains in sight-singing scores during instruction that might differentiate effectiveness between the two methods.

An examination of the raw scores revealed an interesting phenomenon that obviously had a profound and somewhat confusing effect on the percentage gain from pre- to posttest. The large standard deviations indicated that there was a substantial spread of scores among students within the Control schools on both tests. For example, the posttest mean of the Control group was 25.05 and, with a standard deviation of 14.85, about 68% of the class scores fell between scores of 10.20 and 39.90, with the maximum possible test score being 62 points. Further, an examination and comparison of students' individual raw scores revealed differences, for example, scores such as 1 correct out of a total possible score of 62 (1.61% correct) on the pretest and a paired score of 2 (3.23% correct) on the posttest which produced a gain of 100% as figured using raw scores. In contrast, a student receiving a score of 36 (58.06% correct) on the pretest

and 52 (83.87% correct) on the posttest resulted in a raw score gain of 44.44%.

The Experimental group. Scores from the Experimental group (N = 76) for the pretest were paired with the respective scores for the posttest. The pretest scores produced a mean of 10.28 and a standard deviation of 11.63. The posttest scores for the Experimental schools produced a mean of 26.95 and a standard deviation of 15.15. The total possible score for the sight-singing assessment was 62 points. As performed on the Control group, a paired-samples t test was computed to determine if the pre- to posttest means were significantly different. This comparison produced a significant difference in gains for the Experimental group across the six-week instructional period $t(75) = 13.103$, $p < .01$.

In order to achieve a more revealing and descriptive perspective of the differences between pre- to posttest scores for the Experimental group, a percentage of gains was also calculated. This procedure required entering the raw scores for each student in a spreadsheet, thus creating a matrix serving as the basis for calculating the percent correct for both tests, then computing the percentage gain which produced seventy-six (N = 76) individual gain scores for each student in the Experimental group. This analysis revealed an improvement in test scores from pre- to posttest for the Experimental group of 331.72 percent.

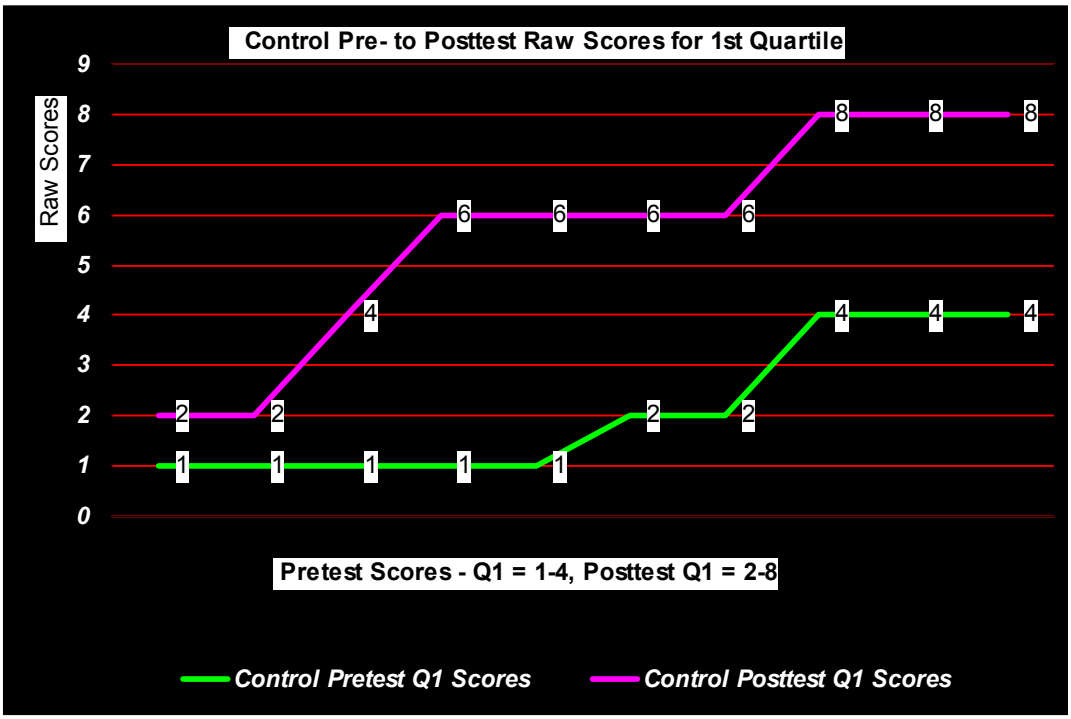
Summary of percentage gains. Because of the difficulties inherently produced by employing percentages when using a range of raw scores transformed to percentages, as stated above, caution again must be suggested when making comparisons in gains between pre- and posttest scores. However, when used intelligently, percentages can reveal some informative, interesting and revealing views regarding differences between the two methods and their respective differences in gains beyond the abrupt result and probability produced by a *t*-test procedure. From the analyses herein, it appears that the Experimental method produced substantially greater pre- to posttest percentage gains than the Control method. Although both methods influenced significant sight-singing score changes following instruction, a profound improvement in percentage gains by the Experimental group as compared with the Control group is of consequence when examined in context of raw scores converted to percentages.

Analysis of gain scores by quartiles. Because of the inconsistent and somewhat misleading results when comparing raw score and group percentage gains from pre- to posttest, this phenomenon warranted additional study and analysis as motivated by the inherent possibilities of future research on why students in the Experimental group appeared to accelerate their sight-singing skills to a greater extent than the students receiving non-aural sight-reading instruction.

Control group pre- and posttest comparisons, Quartile 1 (Q1), (*N* = 10), included the lowest scores in the Control group, with the largest score in the Q1 area (pretest) being a raw score of 4 (maximum test score = 62). When comparing this pretest score in Q1 with the respective largest posttest scores in Q1, of 8, the net gain was 100%, an obvious disadvantage to converting extreme raw scores to percentages in this manner.

In order to achieve an observational and subjective assessment of the influences that the extremely low scores in both groups may have contributed to the large cumulative percentage gains, the scores from each group were subjected to a frequency distribution that indicated cumulative percentiles. This ranking of raw scores provided yet another opportunity to view the results of the tests and gains by means of a quartile distribution matrix. The following results were obtained from this extended analysis. Both Control and Experimental groups produced frequency distributions that provided a graphic representation showing cumulative percentages which were transformed into quartile distributions (see Figure 4.1) for the Control pre- to posttest raw scores within Q1, the lowest quarter of the test score distribution.

Figure 4.1
Control Group Pre- to Posttest Raw Scores for the First Quartile[6]

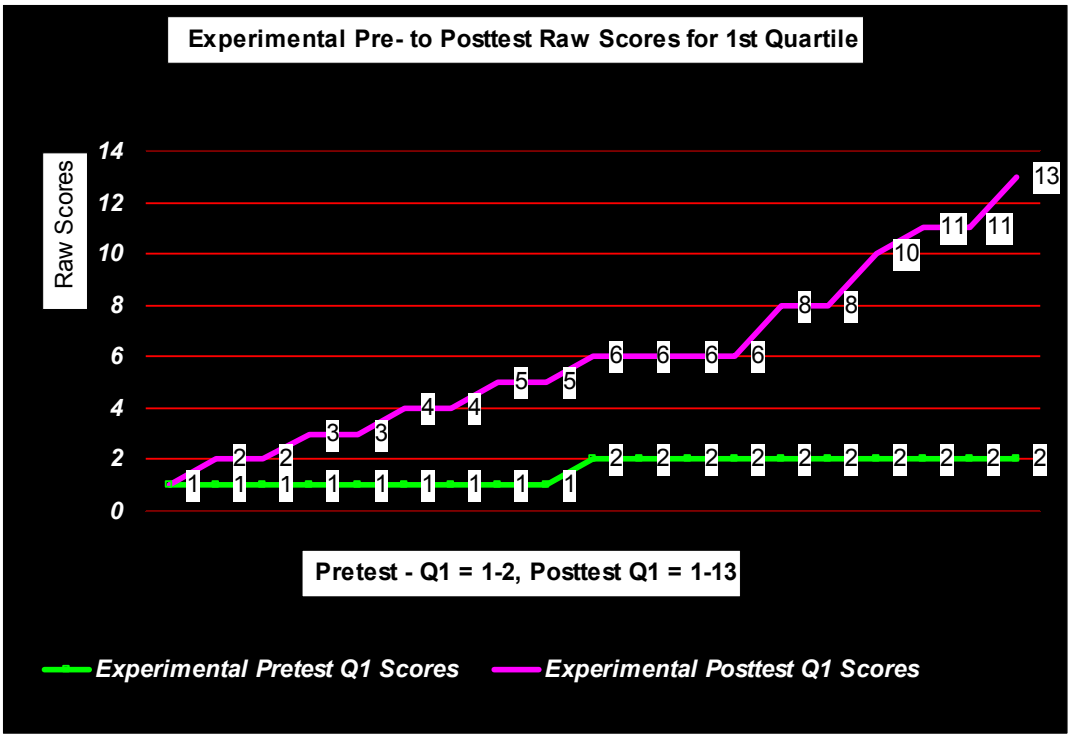


Influence of Quartile 1 on overall percentage gains. Experimental group pre- and posttest comparisons, when calculating the Quartiles in the same manner as with the Control scores (Q1), (*N* = 19), included 12% of the lowest scores in the Experimental group score distribution, with the largest score in Q1 (pretest) being a raw score of 2. When comparing this pretest score in Q1 with the respective largest posttest scores in Q1, of 13, the net gain was 550%, a revealing comparison, but an obvious misleading comparison between the groups' raw scores to percentages in this manner. However, comparisons of the Q1 Control group Figure 4.1 with the Experimental group

[6] See Appendix H for further graphic representations of Quartile data.

Figure 4.2, questions about the effectiveness and efficiency between the two methods emerge.

Figure 4.2
Experimental Group Pre- to Posttest Raw Scores for the First Quartile



For purposes of investigating any influences the scores in Q1 had on the respective Control and Experimental gain percentages, all scores in the bottom quartile, as shown above, were removed from the original matrix and average percentage gains were calculated for only the upper 75% of the distributions for each method. The elimination of the bottom quartile reduced the overall gains for both groups from pre- to posttest, thus producing the

changes in gains as shown in Table 15. In order to investigate any effects the top scoring students had on the gain percentages, the top quartiles in both groups were then subjected to an average of their gain scores for comparisons with the overall percentage gains.

Table 15
Comparison of Quartile Pre- to Posttest Gains

	N	Traditional Group	*N*	Experimental Group
Pre- to Posttest Percentage Gains (all students)	40	190.58%	76	331.72%
Pre- to Posttest Percentage Gains (eliminate bottom quartile)	30	179.86%	57	301.56%
Pre- to Posttest Percentage Gains (top quartile only)	10	62.75%	19	74.82%

Several observations can be made from the multiple manipulations of the results obtained from the sight-singing scores as considered under Secondary Research Question Number 1. First, the pre- to posttest gains when comparing all scores between the Control and Experimental groups were exorbitant, although providing an indicator that the students receiving the Experimental treatment accelerated their sight-reading skills well beyond those students in the Control group. Second, when eliminating students'

extremely low scores in the first quartile from the percent gained, the percentage differences between the two groups showed some reduction. Third, when considering the top scoring sight-singing students, the highest quartile, the percentage difference reduced even further. No conclusions will be drawn in the current chapter; however, possible explanations will be discussed in Chapter V, primarily because of the extreme differences within the two groups regarding assessment raw scores and the percentage gains between the two groups receiving instruction under different sight-reading methods.

2. Can individual (singing alone) sight-singing skills of beginning high school choral students be improved when instructed in an ensemble environment?

All of the students were tested individually on sight-singing skills before and after ensemble sight-singing instruction. Even in the short duration of the study, 30 lessons, all of the classes significantly (p <.01) improved their individual sight-singing scores. Individual sight-singing scores of beginning high school students can be improved with ensemble instruction.

3. Will students that participated in middle school band or orchestra increase sight-singing scores to a greater extent than students without instrumental ensemble experience?

All students in the study that participated in school instrumental ensembles prior to the study were clustered and their scores analyzed to determine if these students' individual sight-singing assessment scores

exhibited larger gains than the students in the study without prior instrumental ensemble experience. These students had an overall smaller pretest mean (*M* = 8.73) than the mean of either the Control group (*M* = 11.73) or the Experimental group (*M* = 10.28). The students with instrumental ensemble participation also had a smaller posttest mean (*M* = 23.27) than the Control (*M* = 25.05) and Experimental (*M* = 26.95) groups. These students improved their sight-singing assessment mean score by 166 percent.

4. Will students with prior piano lessons increase sight-singing scores to a greater extent than students without prior piano lessons?

All students in the study that had taken prior piano lessons were clustered and their scores analyzed to determine if these students' sight-singing assessment scores exhibited larger gains than the other students in the study. The pretest mean for these students was 8.06, smaller than the pretest mean for the Control group (*M* = 11.73) and the Experimental group (*M* = 10.28). The piano students' posttest mean was 31.94, larger than both the Control group posttest mean (*M* = 25.05) and the Experimental group mean (*M* = 26.95). This is a 296% increase in the mean scores of students with prior piano lessons.

5. Will students with prior instrument lessons other than piano increase sight-singing scores to a greater extent than students without prior instrument lessons?

All students in the study with prior instrument lessons other than piano were clustered and their scores analyzed to determine if these students' sight-singing assessment scores exhibited larger gains than the other students in the study. The pretest mean for these students was 6.57, smaller than the Control group (*M* = 11.73) and the Experimental group (*M* = 10.28) means. The posttest mean for the students with prior instrument lessons was 23.48, slightly smaller than the Control group posttest mean (*M* = 25.05) and the Experimental group posttest mean (*M* = 26.95). Students with prior instrument lessons had a 257% mean percentage gain increase.

Table 16
Mean Scores and Percentage Increase of Students with Prior Instrument Experience

Instrument Experience	*N*	Pretest Mean	Posttest Mean	Percentage Increase
Band or Orchestra	18	8.73	23.27	166%
Piano Lessons	24	8.06	31.94	296%
Instrument Lessons	35	6.57	23.48	257%

6. Will students with prior voice lessons increase sight-singing scores to a greater extent than students without prior voice lessons?

All students in the study that had previously taken voice lessons were clustered and their scores analyzed to determine if these students' sight-singing assessment scores exhibited larger gains than the other students in the study. The pretest mean for these students was 11.67 and the posttest mean was 32.39. This pretest mean is comparable to both the Control and Experimental groups, but the posttest mean for students with prior voice lessons was

considerably higher than either the Control group posttest mean (*M* = 25.05), or the Experimental group posttest mean (*M* = 26.95), resulting in a 178% mean percentage gain. However, this percentage gain is not as large as the piano students in the study (296%) or students in the study with prior instrument lessons other than piano (257%).

7. Will students that participated in church choir increase sight-singing scores to a greater extent than students without church choir experience?

All students in the study that had previously participated in church choir were clustered and their scores analyzed to determine if these students' sight-singing assessment scores exhibited larger gains than the other students in the study. Church choir participants began the study with a 16.82 pretest mean, which is higher than either the Control group (*M* = 11.73) and the Experimental group (*M* = 10.28) means. Students that participated in church choir had a 34.18 posttest mean score, once again higher than either the Control group posttest mean (*M* = 25.05), or the Experimental group posttest mean (*M* = 26.95), resulting in a mean percentage gain of 103%.

Table 17
Mean Scores and Percentage Increase of Students with Prior Singing Experience

Singing Experience	*N*	Pretest Mean	Posttest Mean	Percentage Increase
Voice Lessons	24	11.67	32.39	178%
Church Choir	36	16.82	34.18	103%

Summary

Five beginning high school choirs were administered individual sight-singing assessments. Statistical analysis showed no significant difference in mean scores between the five schools prior to treatment. Two schools were assigned a non-aural sight-singing method (control group) and three schools were assigned the researcher-developed sight-singing method (experimental group). A total of 40 students were in the Control group and 76 students in the Experimental group. After receiving 30 lessons within their respective method groupings, all students were again administered the sight-singing assessment. Because of an extreme posttest mean from School 5, it was eliminated for the final analysis. Thus, no significant difference was found in sight-singing skills between groups from the analysis of the posttest assessment scores. The null hypothesis is therefore retained ($p > .05$).

Pre- and posttest assessment scores were subjected to an independent-samples *t* test for each class. All five classes significantly improved ($p < .01$) their individual sight-singing mean scores, supporting the premise that individual sight-singing skills can be improved through ensemble instruction. Although no statistical significance was revealed through any analyses between the two methods groups, the Experimental group produced a larger percentage gain as determined by sight-singing scores from pre- to posttest.

The students who produced the largest percentage gain in sight-singing scores were in the prior piano lessons classification. School 4 had the largest percentage of students with prior piano lessons and also the largest gain. School 5 was problematic to the validity of the study for several reasons, primarily because the posttest scores for this class were substantially lower than any of the other four groups. Paradoxically, Class 5 had the largest percentage of instrument lesson experience, other than piano, and the smallest gain scores. Students with church choir experience had the highest pretest mean. Students with prior voice lessons had the highest posttest mean.

A summary, conclusions, discussion, associations with the related literature, and recommendations for future research are presented in Chapter V. Comparisons from related literature will provide interpretations from the results and bridge applications from the results of the study to choral music education, particularly how the research findings may provide benefits for individual sight-singing improvement when taught in ensemble settings.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

According to research conducted by Henry and Demorest (1994) and Daniels (1986), students enrolled in a choral program that has received high ratings in sight-reading for many years are no more likely to be independent music readers than choral students from a choir that does not perform well in sight-reading. The only factor that asserts itself when attempting to ascertain the characteristics of a strong music reader is whether the student has had private piano lessons (Henry & Demorest, 1994; Demorest & May, 1995; Daniels, 1986). As choral directors have little control over the piano study of their students, secondary school choral directors and their students may profit from a sight-singing method that can be integrated into choral rehearsals.

Research results indicate that a sight-singing method for secondary school choirs would be more likely to succeed if the method utilizes solfege, aural training, and individual assessment (Giles, 1991; May, 1993; Keuhne & Taylor, 2003; Brown, 2003; Demorest, 1998). To successfully read music, responses to intervals and rhythms should be automatic, or a subconscious skill, like reading the written word (Sloboda, 2005). Reading is customarily taught by employing a “sound before sight” philosophy, wherein children learn

the sounds of their language before symbols are introduced. Gordon (1988) states that students cannot produce vocally what they cannot audiate (hear music internally when no external sound is present).To encourage audiation, Gordon specifies common rhythmic and melodic patterns and emphasizes the importance of teaching these patterns to students, not simply presenting isolated note values or intervals. Much like Sloboda's comparisons to reading skills and Gordon's advocacy of audiation, the Kodály philosophy encourages aural preparation before reading notation. Kodály sequencing defines specific music reading skills and presents one element at a time while preparing future objectives. A researcher-constructed sight-singing method, entitled *Music Literacy for Secondary Choir,* was created on foundations of sequencing theory, aural perception principles, and research pertaining to how humans learn.

Purpose and Principal Research Question

The purpose of the current study was to test the efficacy of an aural-based researcher-constructed sight-singing method for secondary choral students entitled *Music Literacy for Secondary Choir*. The method, with an accompanying *Director's Guide,* was uniquely designed to be used for instruction as applied in choral ensemble environments, but with the specific objective of improving students' individual sight-singing skills.

The principal objective of the current research was to determine if there was a significant difference in students' individual sight-singing performance as a result of instruction using a non-aural-based method when compared with instruction employing the aural-based *Music Literacy for Secondary Choir* method. Therefore, the null hypothesis was stated: There will be no significant differences between solo sight singing skills of beginning high school choral students following 30 lessons of instruction using either a non-aural-based sight-singing method or the *Music Literacy for Secondary Choir* method. Alpha was set at $p \leq .05$.

Secondary Research Questions

1. To what extent will gain scores change from pre- to posttest within groups using *Music Literacy for Secondary Choir* as compared with a non-aural-based sight-reading method?

2. Can individual (singing alone) sight-singing skills of beginning high school choral students be improved when instructed in an ensemble environment?

3. Will students that participated in middle school band or orchestra increase sight-singing scores to a greater extent than students without instrumental ensemble experience?

4. Will students with prior piano lessons increase sight-singing scores to a greater extent than students without prior piano lessons?

5. Will students with prior instrument lessons other than piano increase sight-singing scores to a greater extent than students without prior instrument lessons?

6. Will students with prior voice lessons increase sight-singing scores to a greater extent than students without prior voice lessons?

7. Will students that participated in church choir increase sight-singing scores to a greater extent than students without church choir experience?

Summary of the Study

Five high schools were selected using criteria based on the non-urban location of the community, participation in the Oklahoma Secondary Schools Association choir contests, and the presence of an entry level choir that meets daily. Two teachers (School 1 and School 2) were assigned a non-aural-based sight-singing method which served as a control or comparison group and three teachers (School 3, School 4, and School 5) were assigned *Music Literacy for Secondary Choir* (experimental group). Students from each of the five beginning choirs were administered an individual sight-singing assessment and a student questionnaire regarding background music experience. The pretest scores were analyzed and no significant differences were found between schools in students' sight-singing skills. After 30 sight-singing lessons, the students were again administered the sight-singing assessment as a posttest.

The design of the study included five schools that met the selection criteria. Statistical treatments included tests of reliability for the sight-singing performance assessment procedures, scorer accuracy of the assessment, and teacher fidelity within the context and content of the respective methods. Comparative analyses were conducted to determine homogeneity within and across the Control and Experimental groupings for purposes of

combining the respective schools to test the null hypothesis. These statistical tests of the pretest scores confirmed the assumption that students from all schools were statistically similar in their sight-singing skills before instruction. However, posttest analyses produced a significant difference in sight-singing performance skills between the schools that was suspect of a false interpretation. Further analysis revealed that School 5 was an outlier within the Experimental group's distribution of means, thus creating a lack of homogeneity that precluded combining these schools in a single grouping for the final analysis. With Experimental Schools 3 and 4 showing statistical similarity, allowing them to be combined for the final analysis, School 5 was excluded from the statistical test of the null hypothesis. However, School 5 was retained in the remainder of the analyses for the following reasons: (a) The subsequent treatment of the Secondary Questions was not affected by the outlier characteristics, (b) Permanent deletion of School 5 would have reduced the *N* of the original population by 21%, and (c) The demographic contributions of School 5 to the study were of parallel importance and value when considered with the other four schools for analysis beyond testing the null hypothesis.

The statistical treatment for the main analyses to test the null hypothesis and secondary research questions consisted of descriptive statistics and a *t* test. All results were tested using an alpha level of $p \leq .05$ that was established for the study.

Demographics

Designed to ascertain the students' music experience and home music environment, the researcher-constructed Background Student Questionnaire (see Appendix B) was administered to all students prior to treatment. The classes respectively assigned to the Control and Experimental groups each were comprised of a mixed choir and a freshmen women's choir, creating similar gender make-up and grade classification dispersed across both groups. Students from four of the five schools reported the largest percentage of their fathers' highest level of education to be a high school diploma, and students from all five schools reported the largest percentage of their mothers' highest level of education to be a high school diploma.

The minimal number of students with a piano in the home for all schools was slightly below 20%, with the highest being 40%. The number of students reporting piano lessons was much smaller, but Experimental School 4 had the largest percentage in both categories. Experimental School 5 had the largest percentage of students with previous lessons on instruments other than piano (50%) and the largest band or orchestra participation (25%). Over 20% of the students in three schools (Control School 2, and Experimental Schools 3 and 4) had taken private voice lessons. Experimental School 5 had the largest percentage of students

previously selected for an honor choir, and School 3 had the largest church choir participation. Music production involvement was 70% or above for Schools 3, 4, and 5.

Interscorer Reliability and Teaching Consistency

All students from the five schools were administered an individual sight-singing pretest and posttest assessment. The researcher scored all audio-taped pretest assessments using a standardized scoring guide and procedure modeled after Demorest (1998) (see Appendix E). Randomly selected tests representing 20% of the assessments were subsequently "blind scored" by an experienced high school choral teacher not associated with the study using the identical procedures as those used by the researcher. The pretest interscorer reliability was $r = .995$. The same scoring procedures and choral teacher were used for the posttest. Interscorer reliability for the posttest was $r = .966$.

For purposes of evaluating teaching consistency, all teachers in the study videotaped every fifth lesson to document their adherence to the instructions, objectives, and methods as specified by the researcher. At the conclusion of the study, these tapes were assembled and distributed to a panel of two experienced choral teachers who evaluated the videotapes for teaching consistency, as specified, and fidelity to the respective methods. These evaluators used scoring guides designed by the researcher, based

on a 5-point Likert-type scale (see Appendix F). The results of this test revealed no significant difference between means of the evaluators' scores *(p* > .05). The interjudge reliability was *r* = .78.

Treatment of the Null Hypothesis

Posttest scores were analyzed to determine if there was a significant difference between the two methods. An independent-samples *t*-test analysis was run between combined Control schools 1 and 2 (*M* = 25.05) and combined Experimental schools 3 and 4 (*M* = 30.71) for the main analysis.

The null hypothesis was stated: There will be no significant differences between solo sight singing skills of beginning high school choral students following 30 lessons of instruction using either a non-aural-based sight-singing method or the *Music Literacy for Secondary Choir* method. Alpha was set at $p \leq .05$. The results produced a *t* value that was not significant ($p > .05$). Therefore, the null hypothesis was retained.

Discussion and Conclusions

Principal Research Question

The main post-treatment analysis comparing the two Control method schools with two Experimental method schools revealed no significant difference ($p > .05$) in the effectiveness of either method for purposes of

improving individual sight-singing skills within this population of students from the four schools. Therefore, the null hypothesis was retained.

As a result of the failure to reject the null hypothesis, the practical conclusion is projected that students within this population will not improve their sight-singing skills to a different level of achievement, whether instruction is given under the Control or the Experimental method. However, differences are revealed between the methods in percentage gains within and between all five schools. Here, while both Control and Experimental schools made significant pre- to posttest gains (improvement) in their assessment scores, the Experimental schools made a substantially larger percentage improvement in their sight-singing scores than the percentage improvement shown by the Control schools, as discussed below.

When considering the lack of significance between methods, several factors must be scrutinized. These factors are revealed in the methodological similarities within the respective methods while considering an identification and isolation of strategies and techniques that differ. Research has shown that moveable-*do* and hand signs are beneficial to beginning sight-singers (Klemish 1972; Cassidy, 1993). Both methods used these components; therefore, the assumption can be made that this factor contributed to a lack of difference in sight-singing performance scores between the two methods. The vocal warm-up procedure and general choral technique, as well as the order of presentation of the objectives used in both

methods, also were similar. Both methods utilized a short, daily drill, prescribed objectives, daily sight-singing, and a standardized procedure. All of these elements have been shown to benefit beginning sight-singers (Cutietta, 1979; Demorest & May, 1995; Forsythe & Kelly, 1989).

Therefore, the variables that differed within the methods must be examined. Specifically, those variables that were purposely composed in the Experimental method when it was under study and development are of prime importance when drawing conclusions from the results. A comparison of the technical and methodological elements reveals the principal dissimilar contextual element between the two methods was the focus on aural skills and preparation through aural activities. This isolation of an aural strategy in teaching students in a choral environment to improve sight-singing skills when performing individually emerges as the main experimental variable that was tested. The results of the statistical comparisons between the two methods fuels the conclusion that an aural approach to teaching sight-singing under the conditions of the current study has no greater influence in sight-singing achievement of beginning sight-singers in 30 lessons than a non-aural-based method.

While the conclusions stated above are statistically solid, the realization of possible contamination within the current research design must be recognized. The principal consideration regarding the emergence of results that may have caused undependable variance within the teaching,

testing, and monitoring during the administration of the study is a concern regarding school selection. One of the criteria for selection was specified as schools within a non-urban locale. This criterion, while obviously not insurmountable, mandated a search for qualifying schools across a broad geographic area of Oklahoma. Schools qualifying for participation in the study were located in a geographical range of 26 miles to 169 miles. While the same controls for teacher preparation, testing, and monitoring were enforced, the profound separation of the testing sites likely influenced the results in unidentifiable ways. Therefore, considering only this one potential factor of influence on the assessments and subsequent results of the analyses, the possibility of jeopardizing internal validity, especially in areas of testing, selection, and interaction of selection and maturation (Campbell & Stanley, 1963) cannot be ignored.

A finding of considerable interest and an invitation for the possibility of additional study were the results of the analysis of gain scores, pre- to posttest, as reported in percentages. These percentage gains were surprisingly exorbitant. When scrutinizing the raw score matrix of the five schools, however, these gains become transparent to the point of realizing effects of extreme scores and the potential of the misleading descriptive nature of percentages. The Experimental group posted larger percentage gains than the Control group by a substantial margin. For example, the Experimental group of three schools combined, produced a pre- to posttest

percentage gain of 331.72% and the Control group of two schools gained 190.58%, pre- to posttest. Although these percentages are an accurate internal indicator of sight-singing achievement within both Control and Experimental groups, the presence of extreme scores, as mentioned above, can create false interpretations and conclusions. For example, when partitioning the score distributions into quartiles, the realization of the impact of excessively low scores, especially on the pretest, is astonishing when considering these in a practical and realistic context. For example, the Control group's highest pretest score in the first quartile was a raw score of 4 (maximum test score of 62 points) and the highest posttest score was an 8. Within the same observational context, the Experimental group's highest pretest score was 2 and the highest posttest score was 13. While the first quartile scores reveal that the respective students associated with these scores gained 5 points more than their Control counterparts in sight-singing skills during instruction, these numbers are mundane.

When the score distributions in the upper quartiles, as shown in Chapter IV, are factored into the composite percentage gains, some meaning and trends become apparent. Clearly, some factor, presumably within the methods, contributed to a substantially greater percentage pre- to posttest gain for the Experimental group as compared with the Control group. This factor may have improved the Experimental group's individual sight-singing scores more than, or at a faster rate than, the Control group.

The only dissimilar element that can be objectively identified between the two methods is the aural element existing in the Experimental method. While cause cannot be attributed to any tangible factor within the methods or teaching environments, these differences are worthy of further investigation.

Although comprehensive and exhaustive objective techniques were used to match and obtain comparable schools, students, and teachers, and the study included controls to ensure teaching consistency and alleviate any adverse effects of different teachers in different communities, an unidentifiable factor of teacher personality and approach to methodology may have influenced the results. Teacher effectiveness is a subjective area which many researchers have attempted to objectify in the literature. Teacher knowledge of content has been shown to be important in student achievement (Hill, Rowen, & Ball, 2005), but less important as quality teaching (Riykin, Hanushek, & Kain, 2005, Teachout, 1997). Unfortunately, a universally-accepted definition of “quality teaching” has yet to be secured, and cannot be explained by observable characteristics, such as education or experience (Riykin, Hanushek, & Kain, 2005).

Music education researchers have attempted to identify factors or traits of quality music teaching. Teacher enthusiasm and proper pacing are identified in the literature as strong contributors to student attentiveness and a perception by students and observers that “quality teaching” is occurring (Yarbrough, 1975; Yarbrough & Madsen, 1998). These behaviors and traits

were assessed by the videotape evaluators in the current study, and all of the teachers received high scores on these instructional characteristics. However, it is not clear how teacher personality and traits may have affected the two methods' influence, efficiency, and success.

The results of the current research verify sight-singing achievement under instruction from both methods. All five classes significantly improved their sight-singing scores. While both methods produced significant sight-singing achievement among the students during the 30 lesson instruction period, there were no significant differences between the effects of the two methods as revealed by posttest sight-singing assessment scores. However, students instructed under the aural-based Experimental method, *Music Literacy for Secondary Choir* showed accelerated achievement (M = 30.71) beyond that of the Control group (M = 25.05). Similarly experienced teachers who placed high importance on sight-singing skills were selected for the study. Both methods utilized a daily, standardized procedure, and a specific order of objective presentation. The presence of these factors in combination contributed to the sight-singing achievement of the students as objectively shown in the statistics.

Secondary Research Questions

1. To what extent will gain scores change from pre- to posttest within groups using *Music Literacy for Secondary Choir* as compared with a non-aural-based sight-reading method?

Both the Control and Experimental groups increased their sight-singing assessment scores from pretest to posttest. The percentage gain scores between the non-aural (control) group and the *Music Literacy for Secondary Choir* (experimental) group were, however, substantially larger for the Experimental group.

The Control group. A paired samples *t* test was computed to determine if the pre- to posttest means were statistically different. This comparison produced a significant difference in gains for the Control group over the six-week instructional period ($p < .05$). A percentage difference between pre- and posttest scores also was determined for the Control group and revealed an improvement in mean test scores from pre- to posttest of 190.58 percent. This large percentage gain primarily is attributed to extremely low pretest scores. These percentages must be treated with caution, but provide a comparison of the differences in gains in sight-singing scores during instruction that indicate a possible difference in effectiveness between the two methods.

Experimental group. A paired samples *t* test was computed to determine if the pre- to posttest means were significantly different. This comparison produced a significant difference in gains for the Experimental group over the six-week instructional period ($p < .05$).The percentage difference between pre- and posttest scores for the Experimental group revealed an improvement in mean test scores of 331.72 percent. Again,

when comparing these percentage gains and formulating conclusions, caution with assumptions about the differences in effectiveness between the two methods must be respected, however, a revealing observation is formulated from the fact that the Experimental group's percentage gain was substantially larger.

The research literature has shown concentration on aural skills improves skills in aural and visual matching and singing patterns (Banton, 1995; Gordon, 1988; Grutzmacher, 1987; Henry, 2004; Kelmish, 1972; Sletto, 1994). Aural matching and singing patterns are principal components of the Experimental method, *Music Literacy for Secondary Choir*. Therefore, the larger gains achieved by the Experimental group could be associated with the method's emphasis on the aural aspect.

2. Can individual (singing alone) sight-singing skills of beginning high school choral students be improved when instructed in an ensemble environment?

All of the students were tested individually on sight-singing skills before and after ensemble sight-singing instruction. Even in the short duration of the study, 30 lessons, all of the classes significantly improved ($p < .01$) their individual sight-singing scores. While it obviously is encouraging to choral educators that individual sight-singing skills can be improved during choral rehearsals, it is possible that the students in the current study were motivated to increase their individual sight-singing skills as a result of knowing that they would be tested individually at the end of the study.

Demorest's (1998) findings reveal that students who were tested individually showed significant improvement over students who were tested only as a group. However, regardless of the contributing factors, this study shows that individual sight-singing skills can be improved in an ensemble setting.

3. Will students that participated in middle school band or orchestra increase sight-singing scores to a greater extent than students without instrumental ensemble experience?

The students in the study who participated in school instrumental ensembles prior to the study had a smaller pretest mean and posttest mean than either the Control or Experimental group, and consequently, these students did not experience the gain of either the Control or Experimental group. It is unclear why these students did not improve as much as their peers, and this difference conflicts with the prevailing belief that band and orchestra students are desirable choir members because of their music reading ability, which is substantiated in the literature (Demorest & May, 1995; Grutzmacher, 1987; Killian & Henry, 2005; Nolker, 2001). However, the results of the current study are consistent with other related literature revealing no significant difference in sight-singing ability or improvement associated with instrumental ensemble experience (Stegall, 1992; Ramsey, 1983).

4. Will students with prior piano lessons increase sight-singing scores to a greater extent than student without prior piano lessons?

The students in the study that had taken prior piano lessons had a smaller pretest mean than the Control or Experimental group, but their posttest mean was larger than both the Control and Experimental group posttest means. Piano students have been shown to be successful sight-singers in the literature (Henry & Demorest, 1994; Demorest & May, 1995; Daniels, 1986), and the piano students in the current study confirmed this finding. However, the piano students' low pretest mean and large gain indicates that private piano study may prime students for individual sight-singing success, but instruction is required before they can achieve this success.

5. Will students with prior instrument lessons other than piano increase sight-singing scores to a greater extent than students without prior instrument lessons?

Previous studies have shown instrumental lessons to be a predictor for sight-singing success (Demorest & May, 1995; Grutzmacher, 1987; Killian & Henry, 2005; Nolker, 2001). The students in the current study with prior instrument lessons other than piano had a pretest mean that was much smaller than the Control or Experimental group pretest means, and the posttest mean was slightly smaller than the Control and Experimental group posttest mean. Therefore, the results for the students with prior instrumental lessons, while showing substantial gains within this classification, improved to an extent greater than students experiencing the Control instruction, but to a

lesser extent than the students receiving instruction using the Experimental method.

6. Will students with prior voice lessons increase sight-singing scores to a greater extent than students without prior voice lessons?

The pretest mean for students in the study that had previously taken voice was comparable to both the Control and Experimental groups, but the posttest mean was considerably larger than either the Control or Experimental group posttest mean. The voice students in this study improved more than either the Control or Experimental group. This could be attributed to more practice and experience with pitch production, thus creating an increased ability to produce proper pitch. High ability singers have been shown to perform better on sight-singing skills (Ramsey, 1983). The voice students in this study might also have considerably more singing experience that contributed to comfort when singing alone, as required by the testing procedure.

7. Will students that participated in church choir increase sight-singing scores to a greater extent than students without church choir experience?

Church choir participants had the highest pretest mean and the highest posttest mean. These students either had more sight-singing experience than the other students in the study, or felt more comfortable singing alone due to their increased singing experience. Research on choral experience and sight-singing skills is mixed, as some studies show school choral experience to be a strong predictor for sight-singing success, and others find school choral experience to be irrelevant (Demorest & May,

1995; Daniels, 1986), but these studies did not address church choir experience. Further, not all choral experiences are equal, especially in the area of sight-singing. Many choral directors do not address sight-singing at all in their choral rehearsals (Brendell, 1996; Nolker, 2004; Szabo, 1992).

Summary of Conclusions

No significant differences were found between methods in this particular comparison of sight-singing methods. Statistically, both the aural-based and non-aural-based methods produced similar student achievement. These results may have been different under different conditions. Any variance in schools, teachers, locations, students, or the definition of the control method could produce different results. Refinement of the selection procedures is warranted.

Individual sight-singing can be improved in an ensemble setting. It is likely that the focused attention on sight-singing required by this study produced this finding, but it is of paramount importance to choral educators. A small amount of time spent on sight-singing instruction in choral rehearsal can produce independent choral musicians.

While both methods produced significant gains in sight-singing achievement, scores from the Experimental method indicated these students gained skills faster. The experimental variable was a focus on aural skills and aural preparation of the musical objectives. An aural-based sight-

singing method may be a more efficient vehicle to teach choral students to sight-sing individually.

The low scores from the study reveal students are lacking in basic sight-reading skills, even though state and National Standards clearly state "reading and notating" music as a primary objective of music education. Choral students deserve to meet these objectives and develop the lifelong skills to make, create, and evaluate music. We must continue research for future guidance in teaching our students adequately and ensure that these standards are met.

Recommendations for Further Research

Further research is recommended to test the efficacy of an aural-based sight-singing method when teaching secondary choral students to sight sing. The foremost recommendation for replication of the current study and future research on sight-singing instructional methodology is to create a research design in which subjects are selected from one community or region that can produce homogeneity among students in areas such as kinds and composition of choirs, grade levels, and musical experiences. A second recommendation concerns teacher effect. The teaching of sight-singing to test differences in methodology should be controlled by using a single teacher or teachers that are tested, matched, and frequently observed on all identifiable variables that may generate variance in the conveyance of

instructional content. A third recommendation is to increase the duration of the treatment. Assuming that instructional delivery is standardized and controlled, the study of sight-singing methodology should extend beyond 30 lessons. Lastly, in order to reduce the presence of extremely low scores, item analysis and discrimination, if appropriate, of the assessment instrument should be conducted, as well as the establishment of reliability and validity. Of paramount importance is the fitting of the sight-singing assessment to the skills, experiences, and musical levels of the students who are to serve as subjects.

The areas recommended above for future research are specifically directed toward replication or expansion of the current research. Many variations in design are possible in methodologies, student backgrounds, and assessment procedures. The need for choral sight-singing research is of continuing importance in secondary choral music education in order to ensure viable and effective teaching strategies that extend beyond vocal technique and ensemble performance.

BIBLIOGRAPHY

Anderson, J. N. (1981). Effects of tape-recorded aural models on sight-reading performance skills. *Journal of Research in Music Education*, 29, 23-30.

Apfelstadt, H. (1984). Effects of melodic perception instruction on pitch discrimination and vocal accuracy in kindergarten children. *Journal of Research in Music Education*, 32, 15-24.

Australian Music Examinations Board (1990). *Handbook for examiners.* Sydney, Australia.

Banton, L. J. (1995). The role of visual and auditory feedback during the sight-reading of music. *Society for Research in Psychology of Music and Music Education*, 23, 3-16.

Bennett, P. D. (1984). Tricks, masks and camouflage: Is imitation passing for music reading? *Music Educators Journal*, *71*(3), 62-69.

Boisen, R. (1981). The effect of melodic context on students' aural perception of rhythm. *Journal of Research in Music Education*, 29, 165-172.

Boyle, J. D. (1970). The effect of prescribed rhythmical movements on the ability to read music at sight. *Journal of Research in Music Education*, 18, 307-318.

Boyle, J. D. & Lucas, K. V. (1990). The effect of context on sightsinging *Bulletin of the Council for Research in Music Education*, 106, 1-9.

Brand, M. & Burnsed, V. (1981). Music abilities and experiences as predictors of error-detection skill. *Journal of Research in Music Education*, 29, 91-96.

Brendell, J. K. (1996). Time use, rehearsal activity, and student off-task behavior during the initial minutes of high school choral rehearsals. *Journal of Research in Music Education*, 44, 6-14.

Brown, K. D. (2003). An alternative approach to developing music literacy in transient society. *Music Educators Journal*, *90*(2), 46-54.

Butler, D. (1997). Why the gulf between music perception and aural training? *Bulletin of the Council of Research in Music Education*, 132, 38-48.

Brittain, L. M. (1998). Sight-singing pedagogy: Research applied to classroom methods. *Choral Journal, 38*(1), 9-17.

Brunner, D. L. (1992). Choral repertoire: A director's checklist. *Music Educators Journal*, *79*(1), 29-32.

Calculating Gain Scores. (n.d.), Retrieved September 17, 2009, from http://www.emporia.edu/teach/tws/documents/TWSGainScore Calculation R.xls.

Campbell, D. T. & Stanley, J. C. (1963), *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally & Company.

Casey, J. W. (1991). An analysis of band conductor sight-reading behavior and ensemble preparation for sight-reading. *Journal of Band Research*, *27*(1), 66-74.

Cassidy, J. W. (1993). Effects of various sightsinging strategies on nonmusic majors' pitch accuracy. *Journal of Research in Music Education*, 41, 293-302.

Chosky, L. (1999). *The Kodaly Method I: Comprehensive Music Education*. Englewood Cliffs: Prentice Hall.

Colwell, R. (1963). An investigation of musical achievement among vocal students, vocal-instrumental students, and instrumental students. *Journal of Research in Music Education*, 11, 123-130.

Colwell, R. & Richardson, C (2002). *The New Handbook of Research on Music Teaching and Learning*. Oxford Oxfordshire: Oxford University Press

Cutietta, R. (1979). The effects of including systemized sight-singing drill in the middle school rehearsal. *Contributions to Music Education*, 7, 12-20.

Daniels, R. D. (1986). Relationships among selected factors and the sight-reading ability of high school mixed choirs. *Journal of Research in Music Education*, 34, 279-289.

Daniels, R. D. (1988). Sight-reading instruction in the choral rehearsal. *Update: Applications of Research in Music Education. 6*(2), 22-24.

Deal, J. J. (1985). Computer-assisted instruction in pitch and rhythm error detection. *Journal of Research in Music Education*, 33,159-166.

Demorest, S. M. (2001). *Building choral excellence.* Oxford University Press: New York.

Demorest, S. M. (1998). Improving sight-singing performance in the choral ensemble: The effect of individual testing. *Journal of Research in Music Education*, 46,182-92.

Demorest, S. M. (1998). Ensemble: A review of the research. *Bulletin of the Council for the Research in Music Education*, 137, 1-15.

Demorest, S. M.& May, W. V. (1995). Sight-singing instruction in the choral ensemble: Factors related to performance. *Journal of Research in Music Education*, 43, 156-167.

Dettwiler, P. (1989). Developing aural skills through vocal warm-ups: Historical overview of pedagogical approaches and applications for choral directors. *The Choral Journal*, *30*(3), 13-20.

Duke, R. A. (2000). Measures of instructional effectiveness in music research. *Bulletin of the Council for Research in Music Education*, 143, 1-48.

Dwiggins, R. (1984). Teaching sight-reading in the high school chorus. *Update: Applications of Research in Music Education. 2*(2), 8-11.

Folkerts, P. D. (1998). A systematic analysis of choral sightreading materials adopted for use in Texas middle schools from 1988-1999 and a suggested original program of study. (Doctoral dissertation, University of Houston 1999). *Dissertation Abstracts International, 60*(3), 585A.(UMI No. 9922265)

Forsythe, J. L. & Kelly, M. M. (1989). Effects of visual-spatial added cues on fourth-graders melodic discrimination. *Journal of Research in Music Education*, 37, 272-277.

Garder, B. W. (1969) *A comparison of the teaching of music fundamentals by the traditional method with the omnibus approach*. Unpublished doctoral dissertation, University of Oklahoma.

Geringer, J. M. (1978). Intonational performance and perception of ascending scales. *Journal of Research in Music Education*, 26, 32-40.

Geringer, J. M. (1983). The relationship of pitch-matching and pitch-discrimination abilities of preschool and fourth grade students. *Journal of Research in Music Education*, 31, 93-99.

Giles, M. M. (1991). Choral reading built on the basics. *Music Educators Journal*, *77*(6), 26-29.

Gonzo, C. (1973). Research in choral music: A perspective. *Bulletin for the Council of Research in Music Education*, 33, 21-33.

Gordon, E. E. (1988). *Learning sequences in music: Skill, content and patterns*. Chicago: G.I.A Publications.

Grant, J. W., & Drafall, L. E. (1991). Teacher effectiveness research: A review and comparison. *Bulletin of the Council for Research in Music Education*, 108, 31-48.

Grashel, J. W. (1979). Strategies for using popular music to teach form to intermediate instrumentalists. *Journal of Research in Music Education*, 27, 185-191.

Gromko, J. E. (2004). Predictors of music sight-reading ability in high school wind players. *Journal of Research in Music Education*, 52, 6-15.

Grutzmacher, P. A. (1987). The effect of tonal pattern training on the aural perception, reading recognition, and melodic sight-reading achievement of first-year instrumental music students. *Journal of Research in Music Education,* 35, 171-181.

Harrrison, C. S. (1991). Analyses of relationships between aural skills and background variables: LISREL versus Multiple Regression. *The Quarterly Journal of Music Teaching and Learning*, *II*(4), 10-20.

Harrison, C. S., Asmus, E.P. & Serpe, R.T. (1994). Effects of musical aptitude, academic ability, music experience, and motivation on aural skills. *Journal of Research in Music Education*, 42, 131-144.

Helbling, D. W. (1965). *An experimental study of the relative effectiveness of 'whole' and 'part' methods of teaching sight singing*. Unpublished doctoral dissertation, Indiana University.

Henke, H. H. (1984). The application of Emile Jaques-Dalcroze's solfege-rhythmique to the choral rehearsal. *The Choral Journal*, *25*(4),11-14.

Henry, M. L. (2001). The development of a vocal sight-reading inventory. *Bulletin of the Council for Research in Music Education*, 150, 21-35.

Henry, M. L. (2004). The use of targeted pitch skills for sight-singing instruction in the choral rehearsal. *Journal of Research in Music Education*, 52, 206-217.

Henry M. & Demorest S.M. (1994). Individual sight-singing in choral ensembles: A preliminary study. *Update: Applications of Research in Music Education. 13*(1),4-8.

Hill, H. C., Rowan, B., & Ball, D. L. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. *American Educational Research Journal*, *42*(2), 371-406.

Hutton, D. (1953). A comparative study of two methods of teaching sight-singing in fourth grade. *Journal of Research in Music Education*, 1,119-126.

Kanable, B. K. (1969). An experimental study comparing programmed instruction with classroom teaching of sightsinging. *Journal of Research in Music Education*, 17, 217-226.

Knox, M. (2003). Reading music and written text: The process of sight-singing. *Dissertation Abstracts International*, *64*(09), 3225A (UMI No. 3107009)

Kuehne, J. M. (2003). A survey of sight-singing instructional practices in Florida middle school choral programs. *Dissertation Abstracts International*, 64(10), 3624A. (UMI No. 3109293)

Killian, J. N. (1991). The relationship between sightsinging accuracy and error detection in junior high singers. *Journal of Research in Music Education*, 39, 216-224.

Killian, J. N. & Henry, M. L. (2005). A comparison of successful and unsuccessful strategies in individual sight-singing performance. *Journal of Research in Music Education*, 53, 51-60.

Kelmish, J. J. (1970). A comparative study of two methods of teaching music reading to first grade children. *Journal of Research in Music Education*, 18, 355-364.

Kopiez, R. (2006). Towards a dynamic model of skills in sight reading music. *Music Education Research*, *8*(1), 97-120.

Landis, B. & Carder, P. (1972) *The eclectic curriculum in American music education: Contributions of Dalcroze, Kodaly and Orff.* Music Educators National Conference: Washington D.C.

Larson, R. C. (1978). Relationships between melodic error detection, melodic dictation and melodic sightsinging. *Journal of Research in Music Education*, 25, 264-271.

Lawrence, J. E. (1989). The right stuff: Success begins with the director. *Music Educators Journal*, *75*(6), 36-39.

Long, P. A. (1977). Relationships between pitch memory in short melodies and selected factors. *Journal of Research in Music Education*, 25, 272-282.

Lucas, K.V. (1994). Contextual condition and sight-singing achievement of middle school choral students. *Journal of Research in Music Education*, 42, 203-216.

Luce, J. R.(1965). Sight-reading and ear-playing abilities as related to instrumental students. *Journal of Research in Music Education*, 13, 101-109.

MacKnight, C. B. (1975). Music reading ability of beginning wind instrumentalists after melodic instruction. *Journal of Research in Music Education*, 2, 23-34.

May, J. A. (1993). A description of current practices in the teaching of choral melody reading in the high schools of Texas. *Dissertation Abstracts* International, *54*(03), 856A. (UMI No. 9320311)

Marquis, J. H. (1963). *A study of the interval problems in sightsinging performance with consideration of the effect of context*. Unpublished doctoral dissertation, University of Iowa.

McCoy, C. W. (1989). Basic training: Working with inexperienced choirs. *Music Educators Journal*, *75*(4), 42-45.

McPherson, G. E. (1994). Factors and abilities influencing sightreading skill in music. *Journal of Research in Music Education*, 42, 217-231.

McPherson, G. E. (Winter 1995-1996). Five aspects of musical performance and their correlates. *Bulletin of the Council for Research in Music Education*, 127, 115-121.

Middleton, J. A. (1984). Develop Choral Reading Skills. *Music Educators Journal*, *70*(7), 29-32.

Munn, V. C. (1991). A sequence of materials for developing sight-singing skills in high school choirs. *Dissertation Abstracts International*, *51*(11), 3662A. (UMI No. 9110044)

Neuen, D. L. (1988) The sound of a great chorus. *Music Educators Journal*, *75*(4), 42-45.

Nolker, D. B. (2001). Individual sight-singing success: Effects of testing condition, large ensemble sight-singing rating, school size, and selected background factors*. Dissertation Abstracts International*, *64*(12), 3990A. (UMI No. 3036849)

Norris, C. E. (2000). Factors related to the validity of reproduction tonal memory tests. *Journal of Research in Music Education*, 48, 52-64.

Norris, C. E. (2004). A nationwide overview of sight-singing requirements of large-group choral festivals. *Journal of Research in Music Education*, 52,16-28.

Nye, B., Konstantopoulos, S., & Hedges, L. V. (2004). How large are teacher effects? *Educational Evaluation and Policy Analysis*. *26*(3), 237-257.

Pembrook, R. G. (1986). Inference of the transcription process ands other selected variables on perception and memory during melodic dictation. *Journal of Research in Music Education*, 34, 238-261.

Pembrook, R. G. & Riggins, H. L. (1990). Send Help!: Aural skills instruction in U.S. colleges and universities. *Journal of Music Theory Pedagogy*, 4, 231-242.

Peretz, M. H. (1988). Three time-saving tactics for rehearsals. *Music Educators Journal*, *75*(1), 29-31.

Phillips, K. H. (1996). Teaching singers to sight-read. *Teaching Music*, *3*(6), 32-33.

Porter, S. Y. (1977). The effect of multiple discrimination training on pitch-matching behaviors of uncertain singers. *Journal of Research in Music Education*, 25, 68-82.

Powell, S. (1991). Choral intonation: More than meets the ear. *Music Educators Journal*, *77*(9), 40-43.

Ramsey, J. R. (1983). The effects of age, singing ability and instrumental experiences on preschool children's melodic perception. *Journal of Research in Music Education*, 31, 133-145.

Revesz, Geza. (2001). *Introduction to the psychology of music.* Mineola, NY: Dover Publications.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*. *73*(2), 417-458.

Seashore, E., Carl. *Psychology of music.* New York: Dover, 1938.

Sheldon, D. A. (1998). Effects of contextual sight-singing and aural skills training on error-detection abilities. *Journal of Research in Music Education*, 46, 384-95.

Sletto, B. A. (1994*). Developing musical literacy through choral repertoire; a Kodaly based model*. Unpublished Masters Thesis, University of St. Thomas.

Sloboda, J. A. (1985). *The musical mind: The cognitive psychology of music*. Oxford: Clarendon Press.

Sloboda, J. A. (2005). *Exploring the musical mind: Cognition, emotion, ability, function*. New York: Oxford University Press, Inc.

Smith, T. A. (1987). Solmization: A tonic for healthy musicianship. *The Choral Journal*, *28*(1), 16-23.

Spohn, C. L. (1965). *A comparison between different stimuli combined with two methods for providing knowledge of results in music instruction*. Title VII Project Number 1088, U.S. Department of Health, Education, and Welfare. Ohio State University.

Swisher, W.S. (1926). *Psychology for the music teacher*. Boston: Oliver Ditson Co.

Taylor, J. A. (1976). Perception of tonality in short melodies. *Journal of Research in Music Education*, 24, 197-208.

Teachout, D. J. (1997). Preservice and experienced teachers' opinions of skills and behaviors important to successful music teaching. *Journal of Research in Music Education*, 45, 41-50.

Tobias, S. (1982). When do instructional methods make a difference? *Educational Researcher. 11*(4), 4-9.

Thompson, W. B. (1987). Music sight-reading skill in flute players. *Journal of General Psychology, 114*(4), 345.

Turpin, D. (1986). Kodaly, Dalcroze, Orff and Suzuki: Application in the secondary schools. *Music Educators Journal*, *72*(5), 56-60.

Watkins, J. G. & Farnum, S.E. (1954) *The Watkins-Farnum Performance Scale: A standardized achievement test for all band instruments.* Winona, MN: Hal Leonard.

Wilson, G. B. (1991). Three Rs for vocal skill development in the choral rehearsal. *Music Educators Journal*, *77*(7), 42-46.

Winnick, W. (1987). Hybrid methods in sight-singing. *The Choral Journal, 28*(1), 24-30.

Yarbrough, C. (1975). The effect of magnitude of conductor behavior on performance, attentiveness, and attitude of students in selected mixed choruses. *Journal of Research in Music Education*, 23, 134-146.

Yarbrough, C., & Madsen, K. (1998). The evaluation of teaching in choral rehearsals. *Journal of Research in Music Education*, 46, 469-481.

APPENDIX A

MUSIC LITERACY FOR SECONDARY CHOIR

DIRECTOR'S GUIDE

Music Literacy for Secondary Choir
Director's Guide

Beginning Choirs

Beginning choirs may include any 7th, 8th and/or 9th grade choir; any choir with a predominance of new music students or any choir with students that have not mastered basic music reading.

Lessons 1-5

New Concepts: *sol/mi*, *la*, quarter note, quarter rest, eighth notes, part-singing, common time
Concepts for Mastery: *sol/mi*, quarter note, quarter rest, common time
***Preparation for Next Week: *mi/la, sol/la, mi/la, do/la,* half note**

The first week you will establish your procedures and begin teaching the melodic and rhythmic sequence. You will also teach, by rote, songs to help develop aurally concepts to be presented later. Warm-up the voice and body. Teach, by rote one of the aural preparation songs, or practice one of these songs during your warm-up. Use it for vowel formation practice, tuning, balance, or another area of vocal technique, and then proceed with the music literacy lesson.

Below is a detailed description of the first music literacy lesson. Follow the script to establish the basic procedure for the students. Later, use your knowledge and creativity to vary the lessons. However, only one concept can be practiced at a time.

Procedure:

- Sing and sign *sol/mi*. Instruct the students to echo your voice and your movements. If the students are not familiar with hand signs, say "For *sol* you look at the palm of your hand and for *mi* you close the box." Sing and sign as many variations of *sol/mi* as possible. Use different rhythms.
- Take away your voice and only sign variations on *sol/mi*. Have the students sing and sign what you have signed to them.
- Take away the signs and the names. Sing variations of *sol/mi* on "loo." Have the students sing the solfege and sign what you sang.

Note: The students have sung *sol/mi*, used physical representations for *sol/mi*, audiated* *sol/mi* (when you sign only) and completed an aural dictation assignment (singing back correct notes when you "loo"). They are now ready to read *sol/mi*.

- Read the 1st exercise with hand signs. You may copy the page, or write the exercise on the board. Inexperienced music students shy away from the task of reading a whole page of music, so you may elect to show them only what they are reading that day.
- Beginning exercises are only four measures long. Immediately sing the exercise in retrograde. This doubles the length without overwhelming the students' perception of the task and adds new interval approaches. This will be especially helpful later when more notes are added.
- After singing the exercise backwards, split the group in half and have one half sing forwards while the other half sings backwards. Switch parts and repeat. Now the students have not only read new music, but read in parts.
- Make sure the students continue to use hand signs whenever singing solfege. The brain can only master one concept at a time. Learning seven hand signs at a later date will prove frustrating.
- You may change the key of any exercise, if needed, to accommodate your choir's comfortable range. If you sing it in a different key than is written, be sure to tell the students. It will matter to some.

**Audiation-a term coined by Edwin Gordon to describe the ability to hear music internally when no music is currently audible.*

The above is the basic daily procedure. It can and should be varied for future preparation/presentation of concepts.

Notice the exercise for Lesson 3 says "in canon, sol/mi sect." After singing and signing the exercise, split the group and have one group start one measure after the other. Then have one group sing all the *mi's* and the other group sing all the *sol's.* This tactic forces students to internally maintain the beat and tune to the other group. Feel free to play with fun ways to practice the concepts.

Lesson 4 introduces *la*. Be sure to prepare using something like the above procedure.

Lesson 5 introduces eighth notes. To prepare this concept, use the suggestion below with "Clap Your Hands." Have the students echo rhythm patterns, particularly those with eighth notes, with clapping, patting, stomping, snapping (any rhythmic sound). Then do a rhythm canon. (You clap one measure. As you clap, snap, pat, stomp the next measure, the students echo the first measure). Continue for about 16 measures.

By the end of the first week, the beginning choir student can audiate and read *sol/mi*, *la* quarter notes, quarter rests and eighth notes. Be sure to point out these concepts in their literature and read passages on solfege as concept mastery allows.

Songs for Aural Preparation:
By the end of the first week, students should also know rather well "Clap Your Hands," "Hey, Ho Nobody Home," and "Ah Poor Bird". Here are some ideas on how to use them:

"Clap Your Hands" – This is the first song I teach, because I use it for eighth notes, form and "te." Eighth notes are presented the first week, and before they can read them, they must hear and feel them. Have the students pat, clap in quarter notes on the A section (Clap Your Hands) and slap thighs in eighth notes on the B section (La, las). Just show them. Do not say quarter or eighth notes yet. Let them determine which is which. Then, randomly call out "quarter notes" or "eighth notes," at which time the students change to the appropriate clapping pattern.

- This song can be used as a partner song with one group starting at the beginning and the other starting on the B section. Any song can be sung as a round. Challenge the students to see how many groups they can successfully manage.

"La, ti, do re" –Fabulous tuning exercise. Prepares a dotted quarter/eighth note in 3/4. Change the key to match a minor piece in repertoire and it will help with tuning (it helps students audiate tonic in minor.)

*****Preparation for Next Week: The easiest way to prepare a concept is during vocal warm up or aural training. For example, you can echo and hand sign intervals for preparation. You can echo clap or use upcoming rhythms in rhythm canon. Vocalizes can contain particular intervals or rhythms. Use "songs for aural preparation" that contain concepts for preparation. The students must experience each concept aurally and perform it before they can read it or name it.

Assessment:

Group assessments occur daily as the students sing in groups and hand sign the exercises. However, more assessment may be needed if your choir is larger than 20 people. To maintain the positive atmosphere, this should be handled as a game. You may take volunteers to perform the exercise, alone or with several people. You may pit sections against each other, "Who can perform the exercise perfectly?" Candy can be involved. Or have small groups (no more than 4) sing one measure each.

At the end of each grading period, have the students sight-read alone with you as the only one present. This is the only way to really know if the concepts have been mastered individually. Of course, performance anxiety is an unpredictable factor, so this should be prepared for as well. After the students have had some success reading, let them know about the individual test. The more small-group singing, the better prepared they will be for individual singing. This test should not exemplify the most difficult level of reading as a group, but rather the level you feel almost all of the students have mastered.

Lessons 6-10
New Concepts: ¾ time, conducting, reading two measures at a time, half note, *do, do/la*↓
Concepts for Mastery: *sol/la, mi/la, la/mi,* eighth notes, half note
***Preparation for Next Week: *re, do/re/mi*, *do/sol*↓, *do/mi/sol, do/sol,* whole note**

The Lesson 6 exercise uses ¾ time. Be sure to prepare this adequately. Remember preparation helps ensure their success. Success leads to personal motivation to learn more. Use warm-ups in ¾. Echo rhythm patterns in ¾. Sing a song in ¾. Use the rhythm canon in ¾.

The Lesson 6 exercise instructs "pat, clap, snap," "conduct" at the end of the exercise. After singing as written, sing again and add a pat, clap snap to indicate ¾ time physically. Next, teach the ¾ conducting pattern and have the students conduct each other (Half and half works).

Lesson 8 says "clap in canon." This is an advanced skill that should be taught at a low level. Notice the rhythms are all quarter notes and half notes. After singing as written by all, Have half the group sing again while the other half claps the rhythms one measure after group 1 began, then switch parts and repeat. Finally, have everyone sing and everyone clap one measure behind their singing. If using a board, you may write the rhythms to be clapped above the notes to be sung, and then erase. This forces the singers to read two measures at once, a skill many singers lack.

Lesson 9 adds *do*. This should come naturally. They have been audiating *do* for quite some time, but do not neglect preparation. Long before this day the students should have been echoing patterns with *do* and *do/la* during the aural training procedure. Also, use warm-ups that utilize solfege. Further, the exercise "Do, do re do" helps prepare the solfege to come, particularly *do*.

> **Songs for Aural Preparation**:
> By the end of the second week students should know "Jubilate Deo," and "Do, do, re, do."

"Jubilate Deo" – Can be sung in 6 parts allowing for independent singing. Its wide range and Latin vowels are appropriate for practicing proper vocal technique. Prepares *do/re/me, ti, fa/re, do/sol* and dotted quarter/eighth notes.
"Do, do, re, do" –Drills order of solfege syllables. Sing as a round or have half start at high *do* and half start at low *do*. This exercise creates opportunities for tuning and vowel unification.

Lessons 11-15
New Concepts: *re, do/re/mi*, *do/sol*↓, *do/mi/sol, do/sol,* whole note
Concepts for Mastery: *do/la*↓, *sol/mi/do, do/mi/sol, do/re/mi, do/sol*↓ *do/sol,* whole note
Preparation for Next Week: *re/sol, do/do', sol/re,* dotted half note, *do/la, la/re

Lesson 12 presents *do/sol*↓. Make sure you have practiced this interval aurally previously. You can name it in "Clap Your Hands." For example, have the students sing the words for the first two measures and sing the solfege on measures 3-4. Find a *do/sol*↓ in the repertoire music.

Lesson 13 presents *re*. Make sure you have prepared *do/re/mi*. The students should be able to audiate and sing back dictation using *do/re/mi*.

Songs for Aural Preparation:
Keep utilizing the taught songs to practice tone, blend and balance. This week's aural preparation may take all week to learn.
"Intervals" – These are the intervals in the pentatone (*do, re, mi, sol, la*) only. After Lesson 13, the pentatone will have been presented and you may begin teaching this exercise. Write a solfege ladder on the board beginning with low *sol.* Leave empty spaces for *fa* and *ti*. Point to the solfege on the board as you proceed through the exercise. Try 2nds, 3rds and 4ths on the first day (up in 2nds, down in 3rds, up in 4ths).

After the solfege tree has been presented, you may use it for aural training. Instead of using hand signs, point to the solfege letter. You can use known melodies and have them name the tune, or make up melodies.

Lessons 16-20
New Concepts: ostinato, *re/sol, do/do', sol/re,* dotted half note, pick-up measure, conducting in 4/4, *do/la, la/re*
Concepts for Mastery: dotted half note, pick-up measure, *re/sol, sol/re, do/do', do/la*, clap in canon
Preparation for Next Week: syncopa (eighth, quarter, eighth), *fa

Aural training should take place every day. Have the students echo and hand sign melodies including fa and ti. How many notes can they remember? See if they recognize a familiar tune after echoing. Let a student lead the audiation by giving hand signs and allowing the choir to sing his/her tune.

Make sure to look ahead to see what concepts are coming and prepare your students' ears, tongues (with new solfege syllables) and hands (new signs). The students should already know what it is and how it relates to what they already know before they read it.

Lesson 16 adds an ostinato of half note, quarter note in ¾ time. You can prepare this by using the pat, clap, snap from Lesson 6. Slide the pat into the clap without making any noise to simulate the half note. The snap is then the quarter note. Make both notes claps. Be sure to explain what an ostinato is. Feel free to add ostinatos of mastered rhythms to any exercise.

Lesson 18 begins 4/4 conducting. This body movement helps some and frustrates others. It is a tool, not a mastery concept. Allow those who desire to conduct the choir. Those who have trouble with conducting need not be singled out.

Lesson 19 utilizes a pick-up measure. Be sure to explain this concept. This exercise includes *do/la.* Be sure you have prepared this interval. Also, teach the students to be aware of the preceding notes to see if they have already sung a seemingly difficult note. For instance, measure 1 contains a *la* that will be easy for the students to sing. They should retain this pitch for measure 3.

Songs for Aural Preparation:

Keep using the other songs as vocal technique and choir building exercises.

"Viva la musica" –This an excellent exercise for spinning tone, vowel production, phrasing and tuning. It is helpful in aural training because it does not end on *do* and helps prepare dotted rhythms. Sing on solfege and words.

"Music Shall Live" – This piece also uses the dotted rhythm, but in ¾, which has a different feel. Sing it on solfege after it is known. It contains *fa/sol↓, la/fa* and sequence. Recognizing patterns, particularly sequences, will make sight-singing much easier on the singer.

<u>Lessons 21-25</u>

New Concepts: Dictation, singing with words, syncopa (eighth, quarter, eighth), *fa*

Concepts for mastery: *la/re,* syncopa, *sol/fa/mi*

Preparation for Next Week: : *fa/la, do/fa, fa/re, ti, re/do'

Lesson 20-After successfully singing the exercise, practice clapping the ostinato. Sing again while clapping the ostinato. Make sure to set a reasonable tempo.

Lesson 22-Group Dictation: Sing the entire song for the students while the students pat the beat. Determine the rhythm of the first four measures by singing slowly and patting the beat. How many notes are there per beat? Write the rhythm on the board as it is discovered. Continue for the remainder of the song. To determine the melody, first let them establish *do*. Proceed through the song. Write the notes on the board as the students determine them, right or wrong. Sing through on solfege to check their work. Add the words while performing the correct handsigns. If this is too much for one day, do the rhythm one day and add the melody the next day, or do the A section one day and the B section the next day.

Lesson 23 uses words that are familiar from the previous day. Sing through on solfege first, then sing with words and handsigns. Syncopa (eighth, quarter, eighth) is also presented in this exercise. The addition of words aids in the syncopa, but make sure this concept has been prepared.

Lesson 24 adds *fa* in step –wise motion. Make sure the students are familiar with the handsign.

Songs for Aural Preparation:

"One Bottle of Pop" – You may think this one is too juvenile, but everyone loves singing it. It prepares triplets, chord progressions, *fa/re*, and dotted quarter notes. Have fun!

<u>Lessons 21-30</u>

New Concepts: *fa/la, do/fa, fa/re,* sight-singing in singing in 3 parts, *ti, re/do'*
Concepts for mastery: *fa/re, la/ti/do',* singing in 3 parts

Lesson 26 introduces *fa/la, fa/do, do/fa*, *fa/re*.

Lesson 28 uses *ti.* After singing the exercise as a group, have one group start in the first measure, another group start in the second measure and a third group start in the fifth measure. All groups sing the entire exercise simultaneously starting from different locations, but singing all measures.

Lesson 30 indicates 3-part singing again with different starting points for the groups.

Rationale

Current research has identified three human information processing principles: the limits of our working memory, the importance of practice and the importance of continuing practice until fluent (Colwell, Richardson, ed., 2002). Most individuals can only process about seven pieces of information. Too much content will overload the system and the information will be lost in confusion. Yet, we give students a piece of music and say, "read it." It may have new rhythms, intervals yet to be mastered, unfamiliar words and may be arranged on the page in a confusing way. We should use our knowledge about how the brain processes information to help our students become literate musicians.

In *The Musical Mind* (2005), Sloboda compares music reading to language reading. Reading language is always sight reading. We learned the sounds of language before the symbol and every time we read we put these sound symbols into use. "One of the key features of any cognitive skill is speed" (p. 6). The brain must have sufficient knowledge and practice to process new information quickly.

According to Seashore (1967), the music learning process is made up of two components: the acquisition of musical information and the development of music skills. These two components should be cultivated separately but integrated into a complete musicianship skill set. When training the ear, intensity, time and timbre should all be taught separately. A working brain may have both conscious memory and subconscious or automatic skills functioning simultaneously. Students cannot process two new functions at once. For example, when clapping one rhythm and singing another, either the song or the clapped rhythm must be automatic to be able to process the new function. Sight-reading training, according to Seashore, is a combination of notation, ear training, and tone production, so only one component can be improved at a time. When adding new intervals to ear training, only mastered rhythms should be used and should be placed in a comfortable range so difficulties in tone production do not overtake the intended learning concept.

Reading and processing each note is laborious. Notes should be grouped into patterns for music reading, just like individual letters make words. Edwin Gordon used this concept to develop rhythmic and tonal patterns to teach students through ear training.

An important component of music learning, according to Gordon, is audiation, the ability to hear and comprehend music silently. Directors audiate constantly. Audiation allows us to hear mistakes for correction and prepare a piece for performance. Through the rehearsal process, we hone the students' output to match the music in our head, our audiated version of the piece: the version that played when we first read the piece and selected it for the repertoire list.

By the time a student reaches middle school, Western harmony and rhythm should be firmly engrained. Students can often detect errors much more readily than perform a new passage correctly. In Boisen's research (1981) aural rhythmic perception was affected by the melodic context. Over two thousand public school students were tested. Accuracy of single-pitch melodies and matching melodic/rhythmic melodies yielded no differences. Less accuracy existed in non-matching melodies. The students agreed on the melodies that matched the rhythm because it sounded correct according to previous musical experiences.

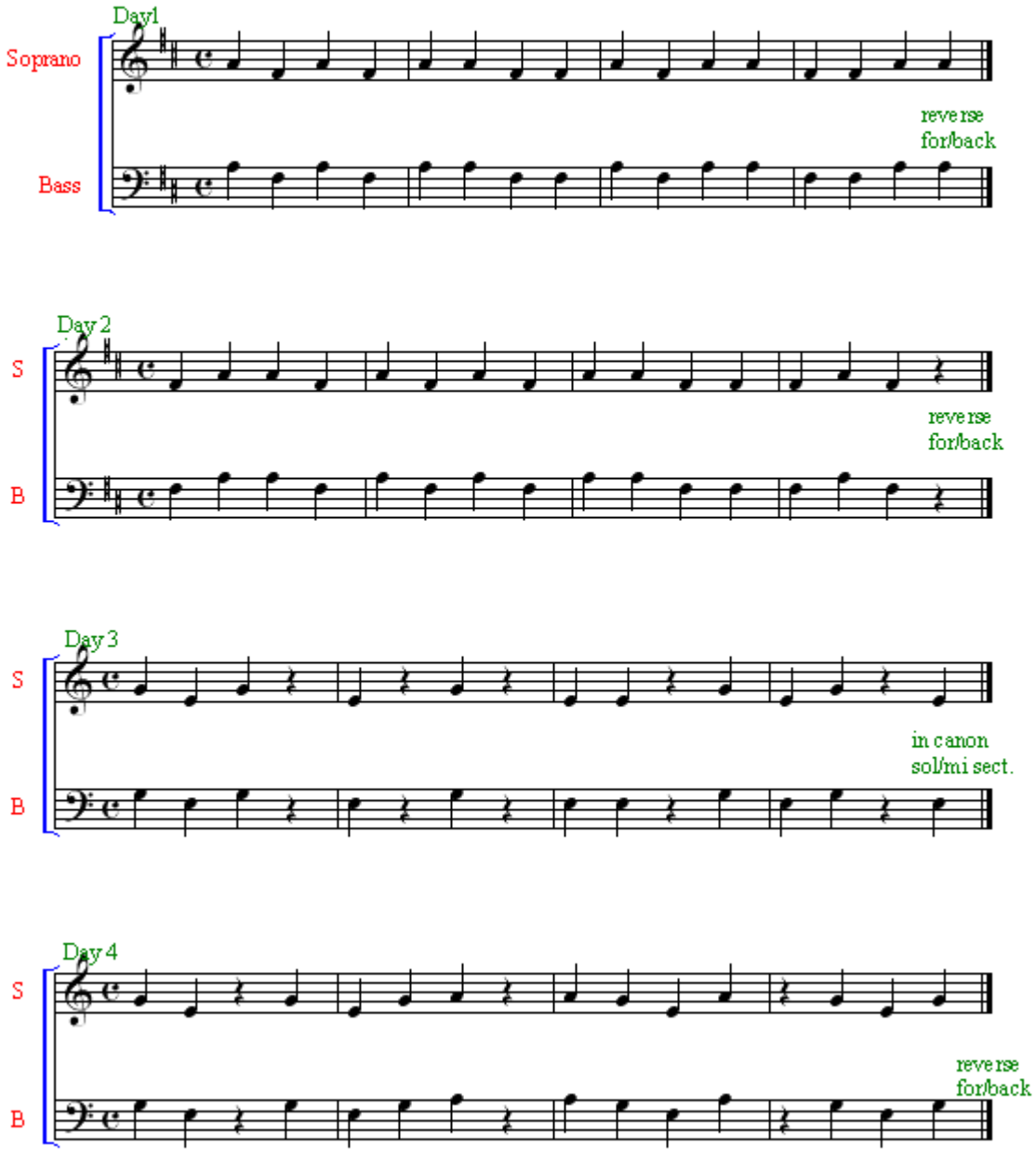
Other research (Cutietta, 1979) suggests that gains in sight singing skills can occur with as little as two minutes of drill per day. The middle schools students in his study with this two minute drill displayed significant improvements in melodic sight-singing (regardless of rhythm), rhythmic sight-singing (regardless of pitch), composite sight-singing (pitch and rhythm), melodic recognition and singing confidence. Students in the control group significantly improved in rhythmic sight-singing only.

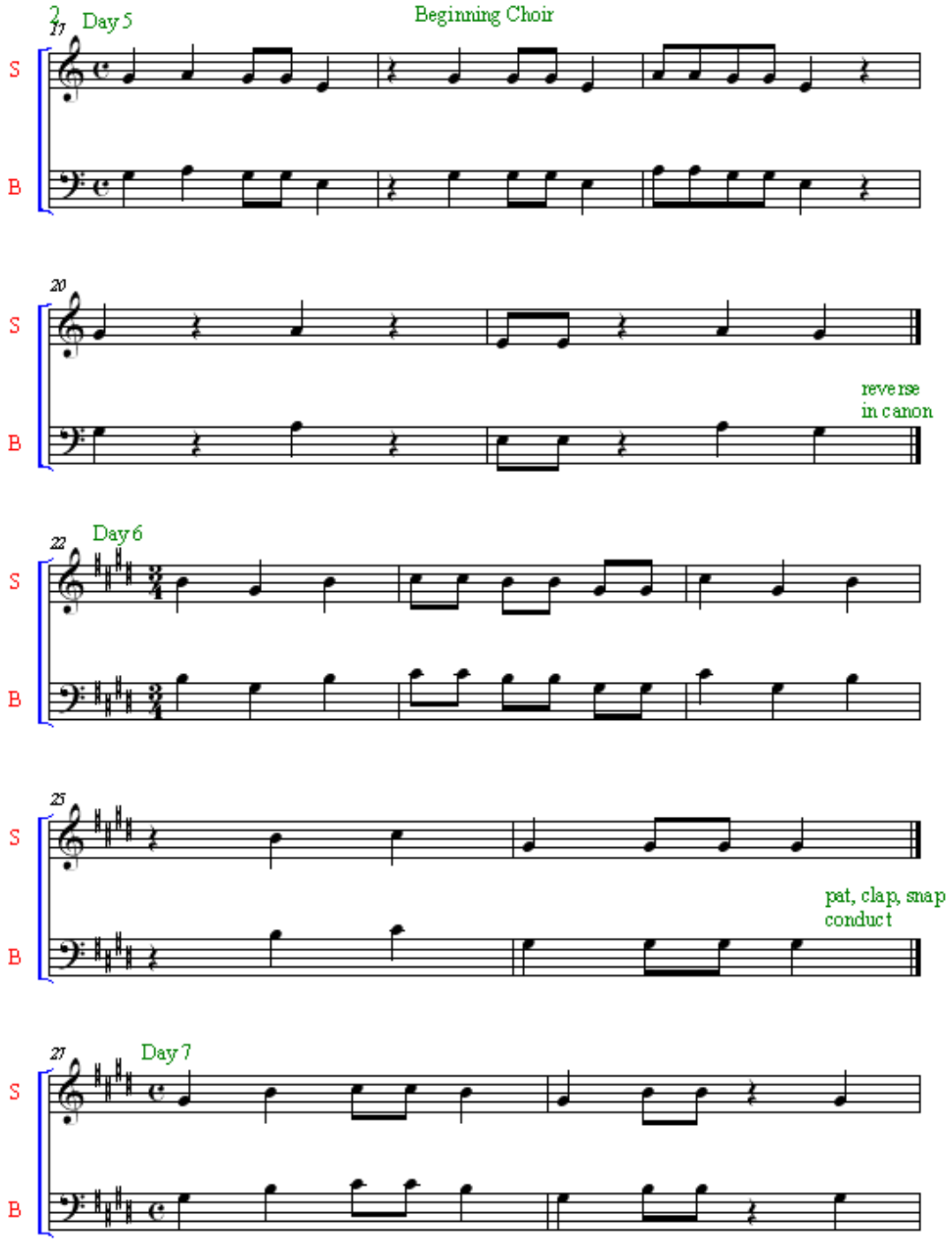
How do choral directors improve individual student's sight-reading ability? Killian (2005) discovered that successful sight singers benefited from a 30 second study period. They used the time to establish the key, use hand signs, sing through the exercise and physically keep the beat. Less accurate singers did not benefit from the practice period. The strong readers tonicized the key before performance and utilized the above behaviors to assist them during performance. Low-scoring performers can be taught these behaviors as part of the sight-singing process.

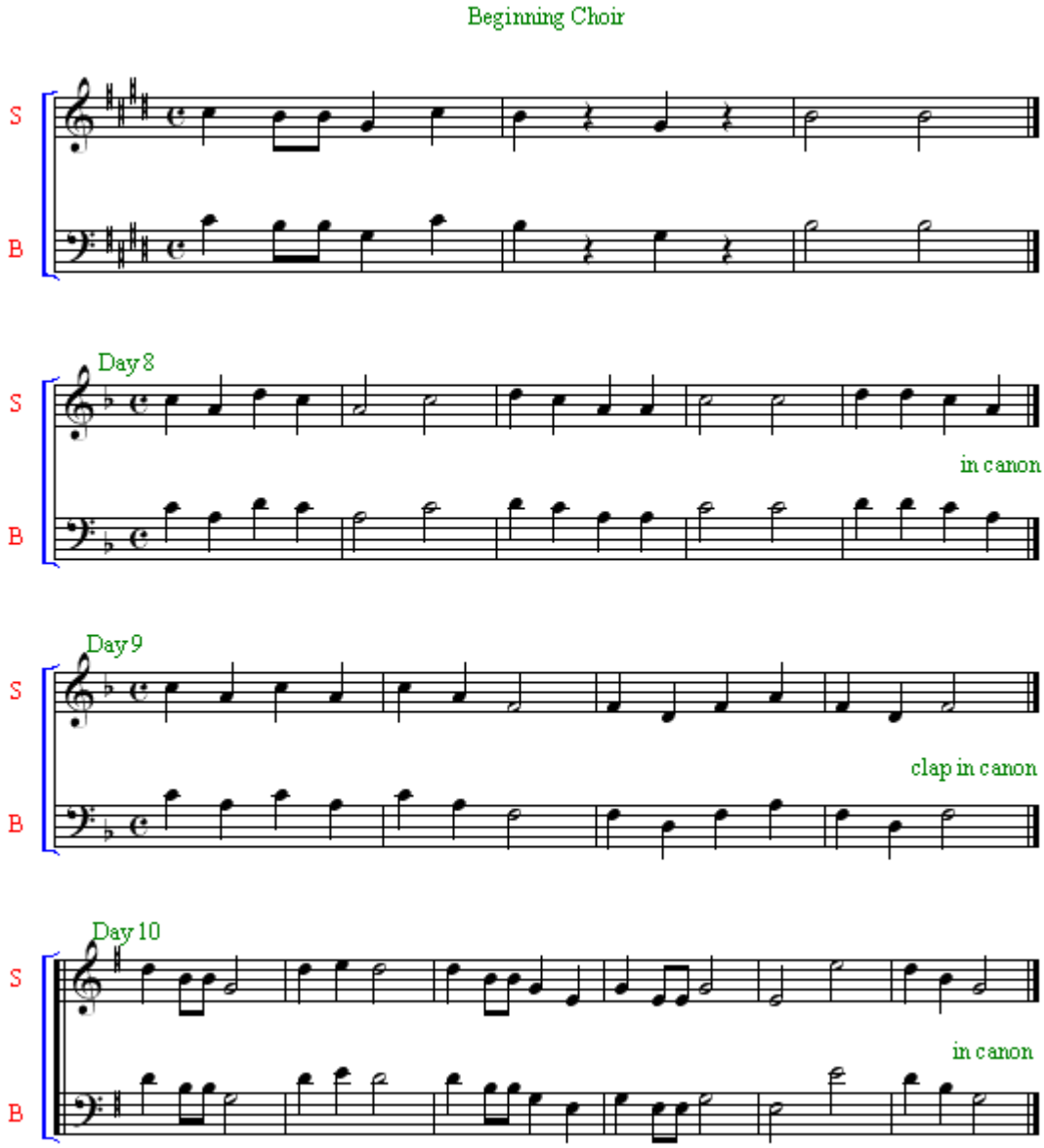
Accurate sight-singers are confident. They have a process, a plan. Less accurate sight-singers desperately need a plan and long for the confidence that others possess. This program is based on brain research, but also motivation concepts. Success breeds confidence. Confidence leads to motivation to learn more. This music literacy method is both simple and challenging. The sequence is provided by the Kodály concept, a proven method. The aural training is designed to promote audiation, and the rate of learning is designed to create motivation.

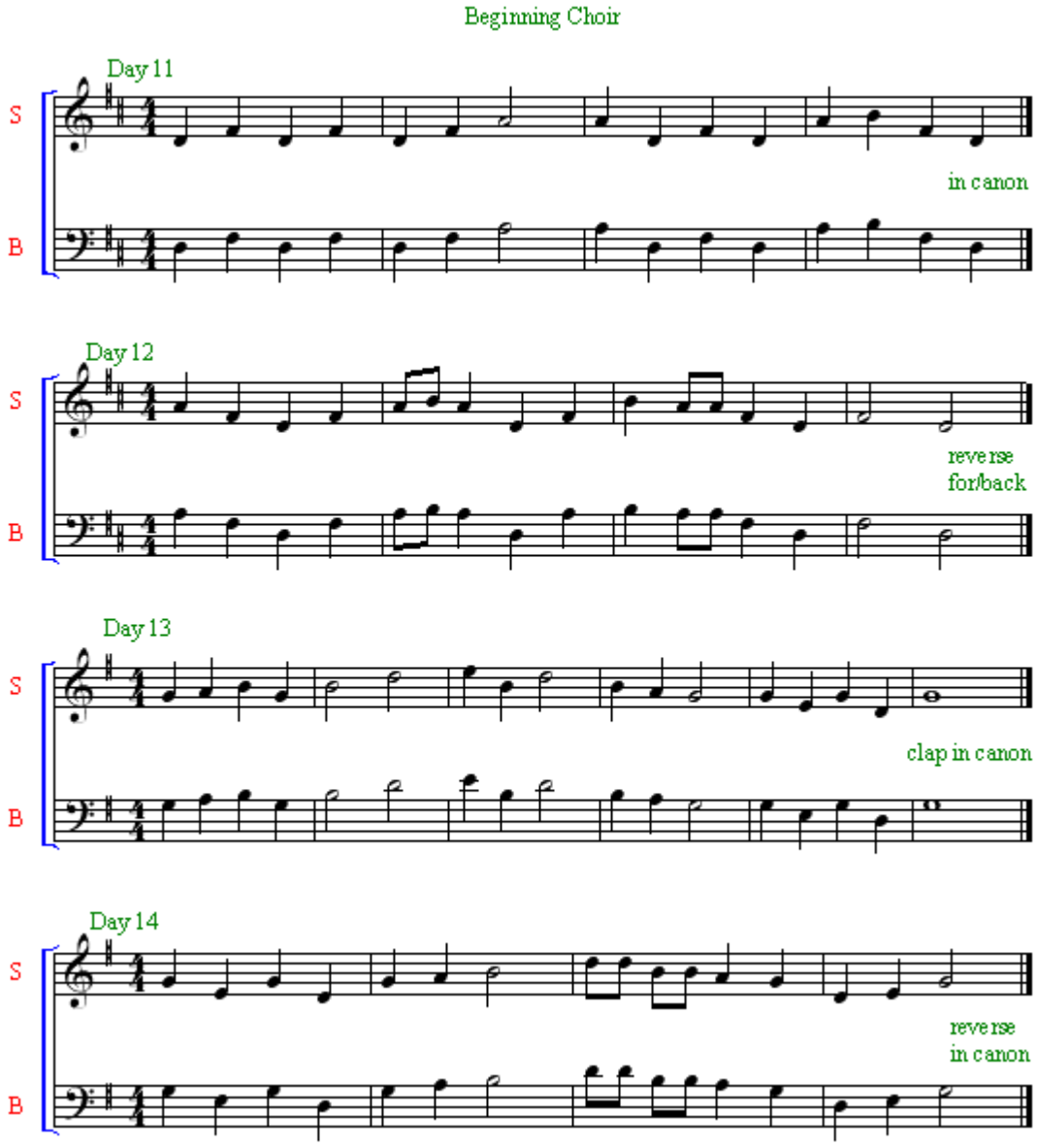
Beginning Choir

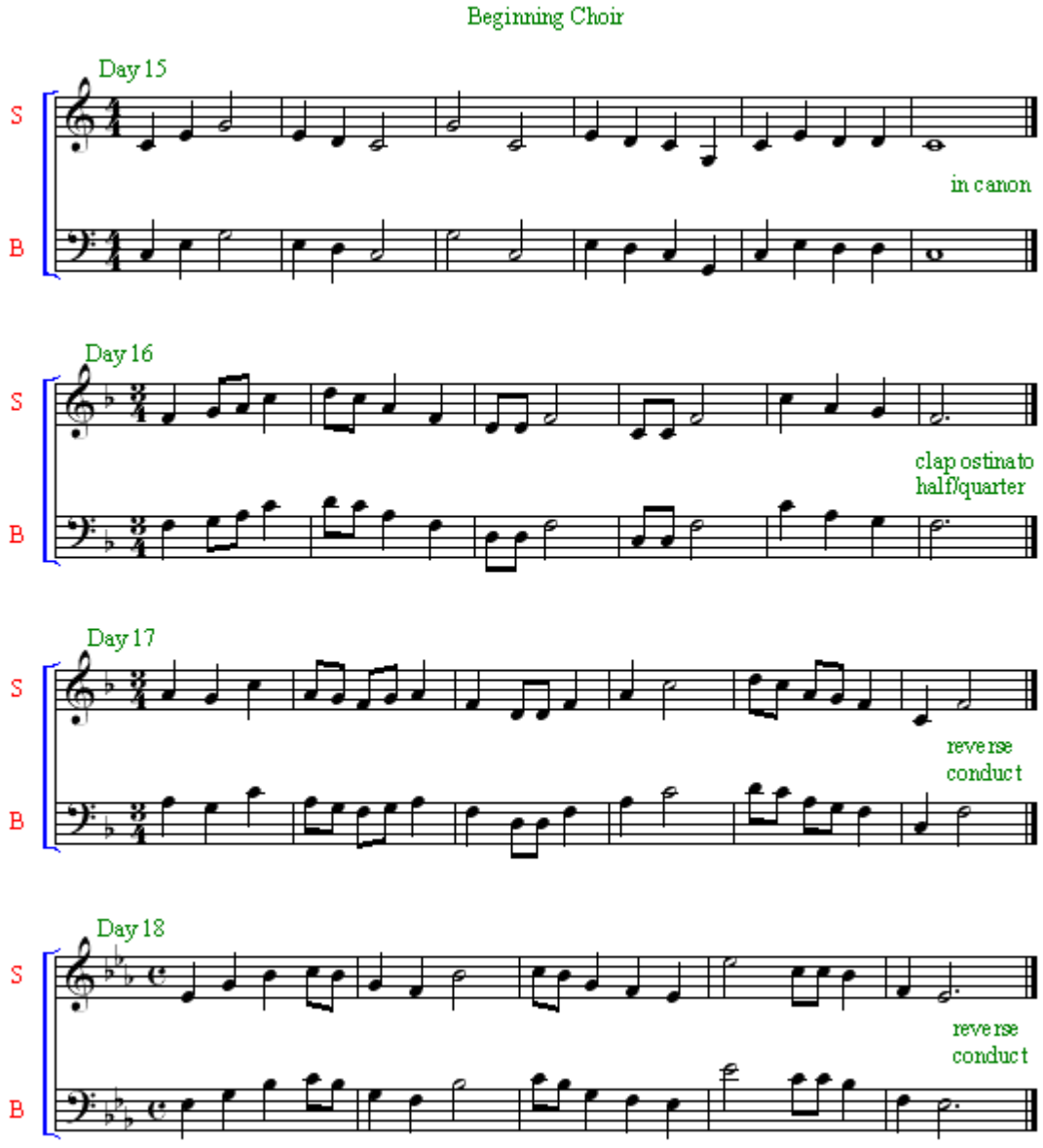
Potts

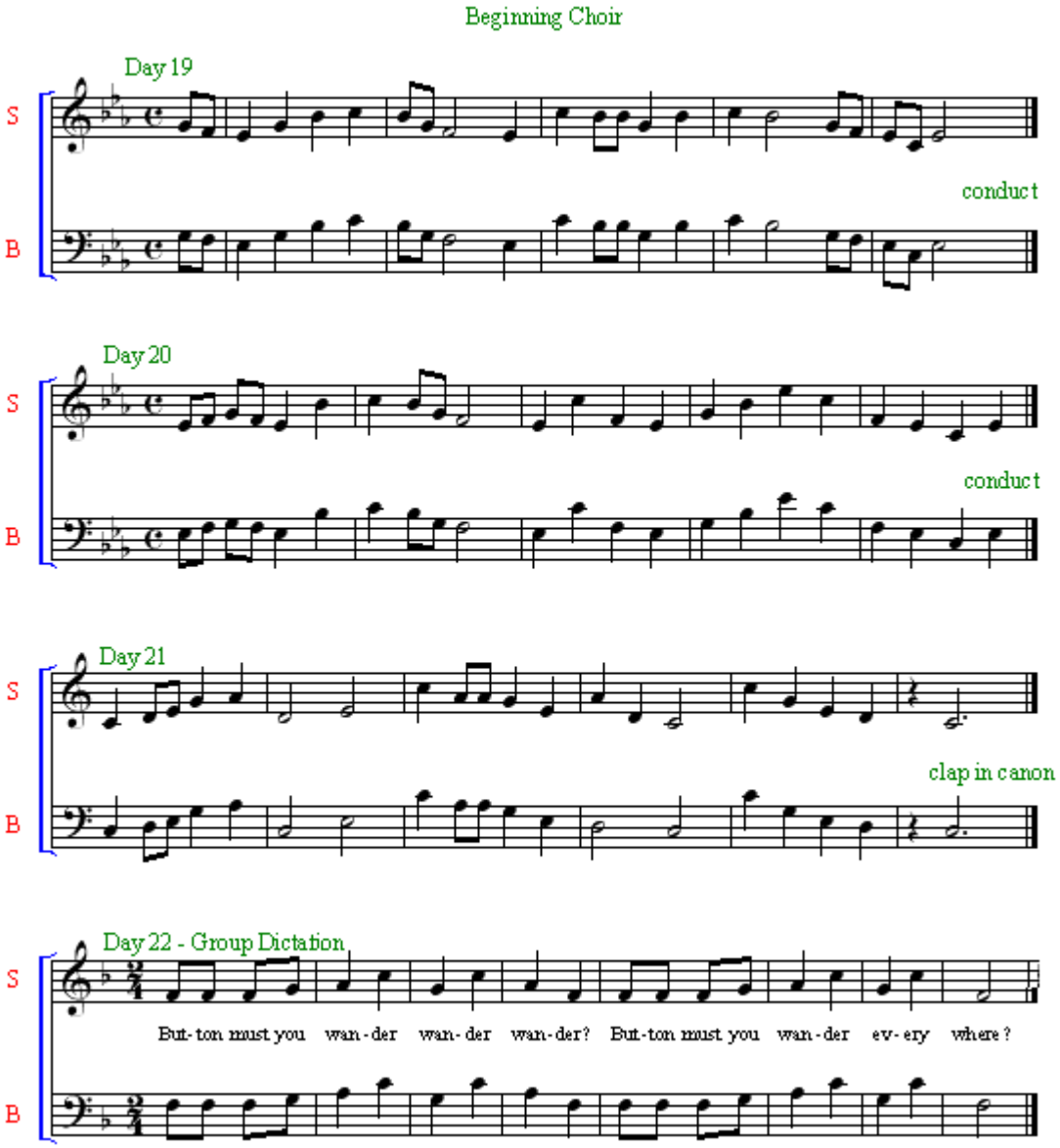


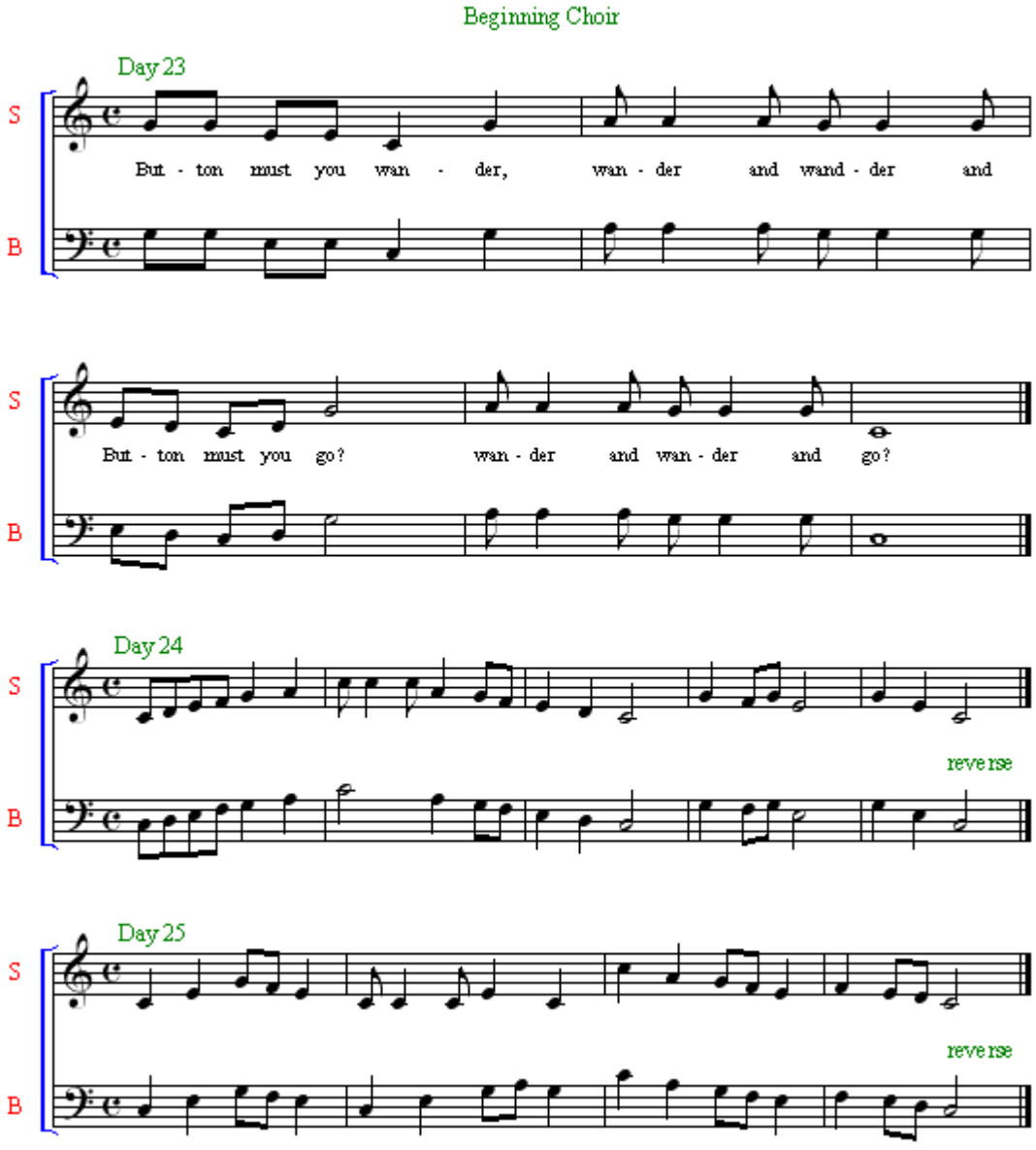

2
17
Day 5
Beginning Choir
S
B
20
reverse
in canon
22
Day 6
25
pat, clap, snap
conduct
27
Day 7

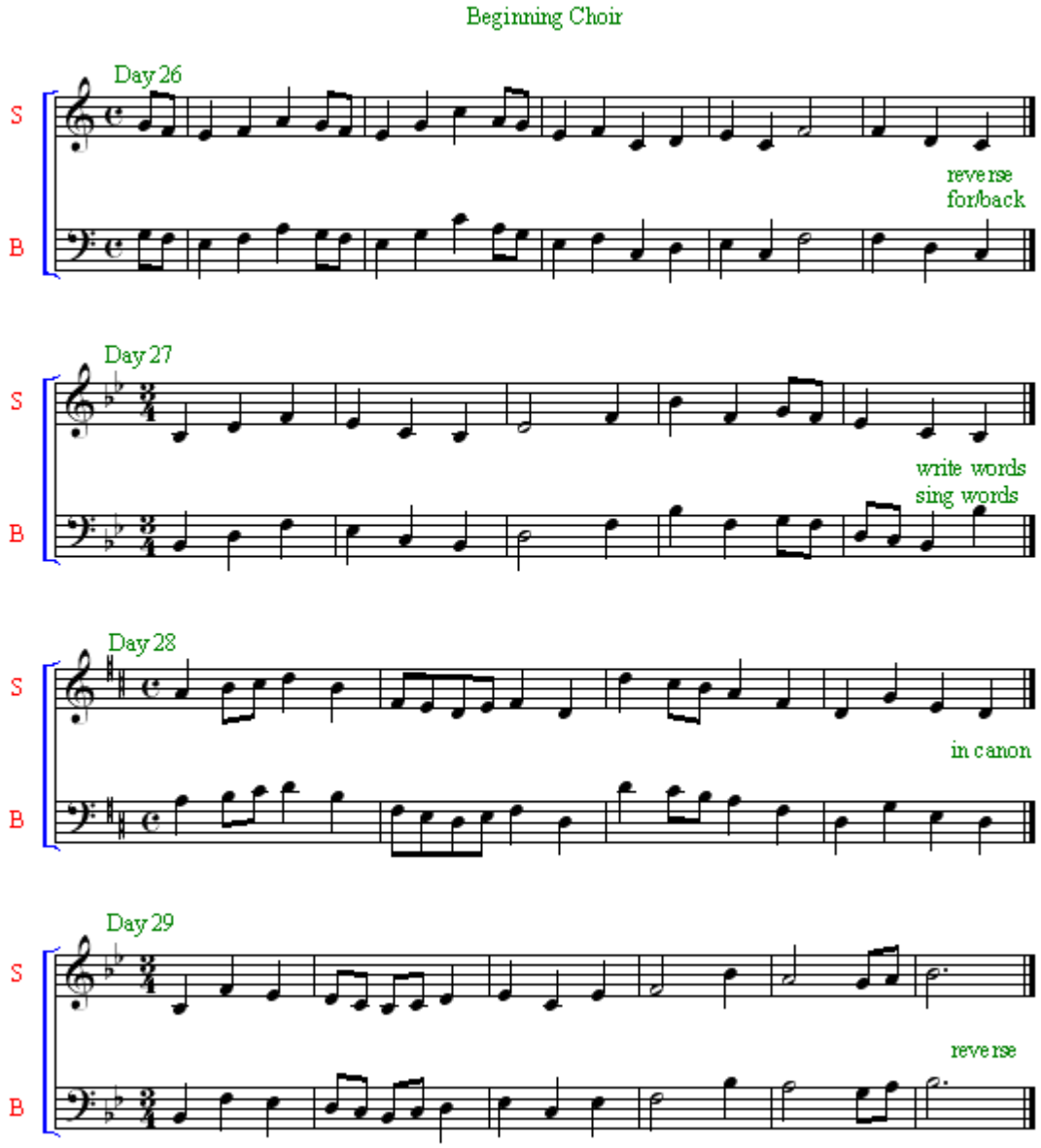

Beginning Choir
S
B
Day 8
in canon
Day 9
clap in canon
Day 10
in canon

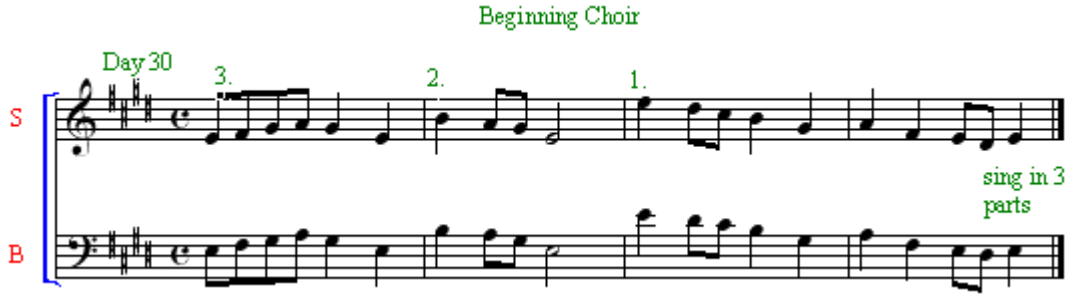

Beginning Choir
Day 11
S
B
in canon
Day 12
S
B
reverse
for/back
Day 13
S
B
clap in canon
Day 14
S
B
reverse
in canon


Beginning Choir
Day 15
S
B
in canon
Day 16
S
B
clap ostinato
half/quarter
Day 17
S
B
reverse
conduct
Day 18
S
B
reverse
conduct


Beginning Choir
Day 19
S
B
conduct
Day 20
S
B
conduct
Day 21
S
B
clap in canon
Day 22 - Group Dictation
S
But-ton must you wan-der wan-der wan-der? But-ton must you wan-der ev-ery where?
B

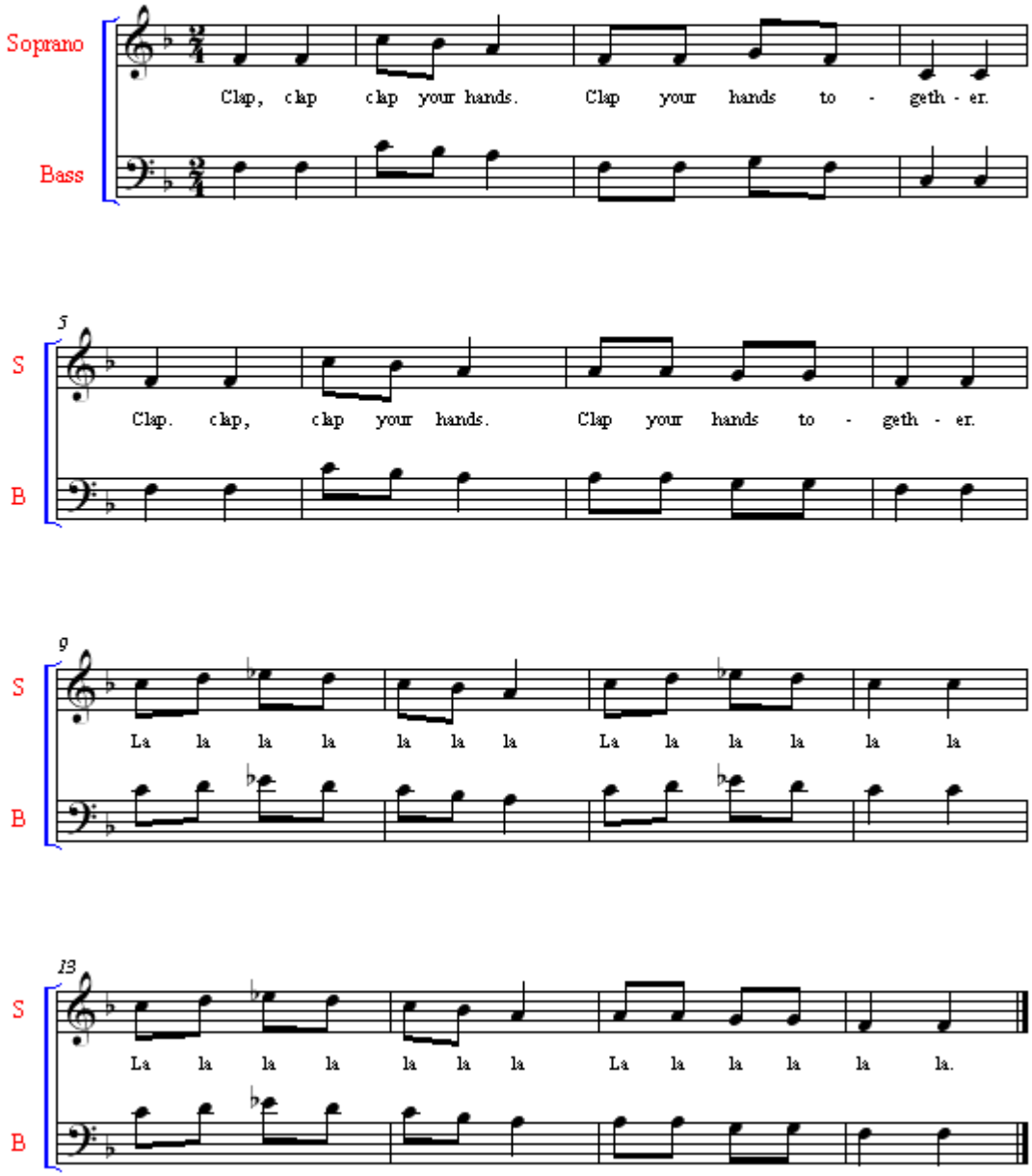

Beginning Choir
Day 23
S
B
But - ton must you wan - der, wan - der and wand - der and
But - ton must you go? wan - der and wan - der and go?
Day 24
reverse
Day 25
reverse


Beginning Choir
Day 26
S
B
reverse
for/back
Day 27
S
B
write words
sing words
Day 28
S
B
in canon
Day 29
S
B
reverse


Beginning Choir
Day 30
3.
2.
1.
S
B
sing in 3
parts

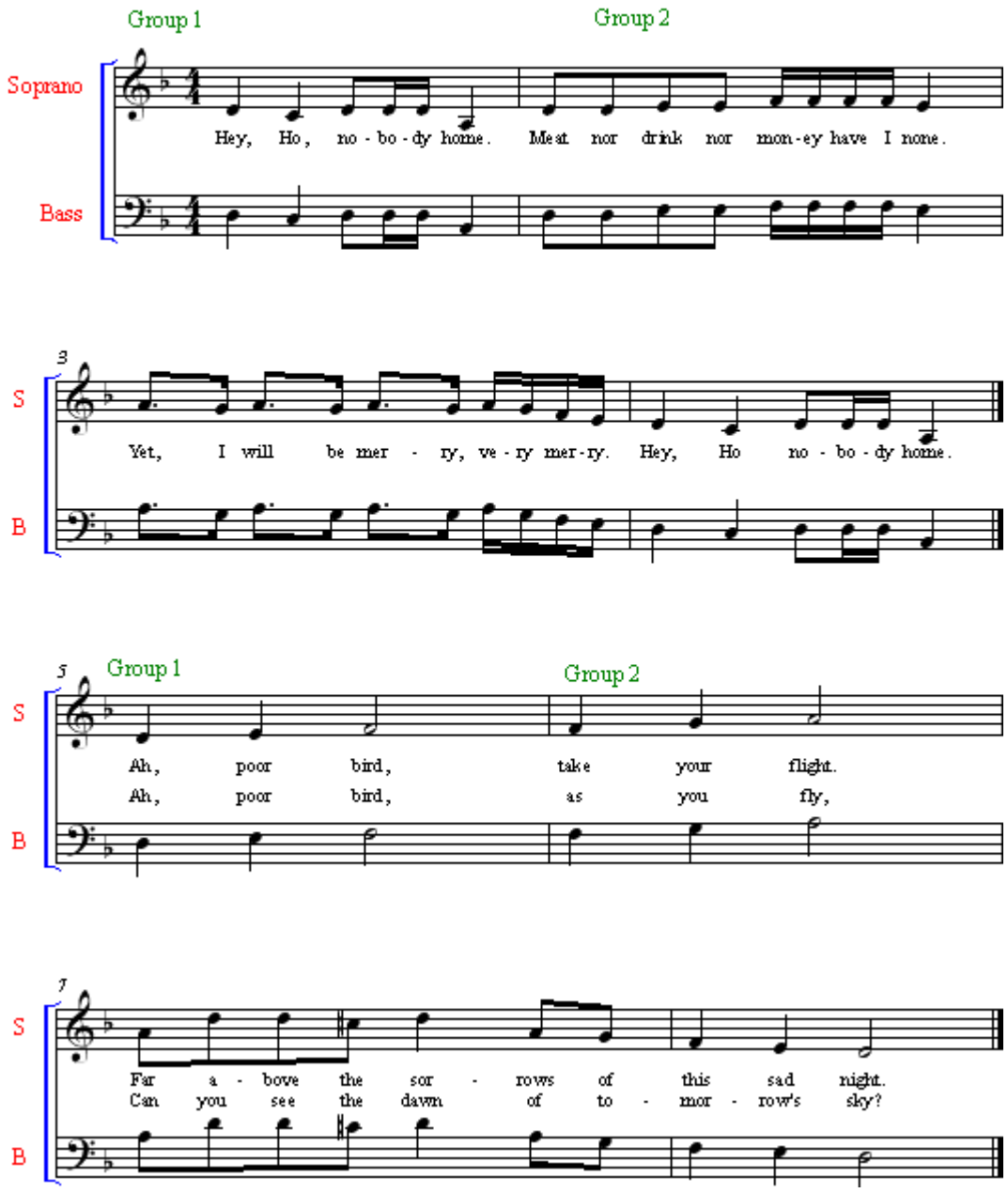
Clap Your Hands

Unknown



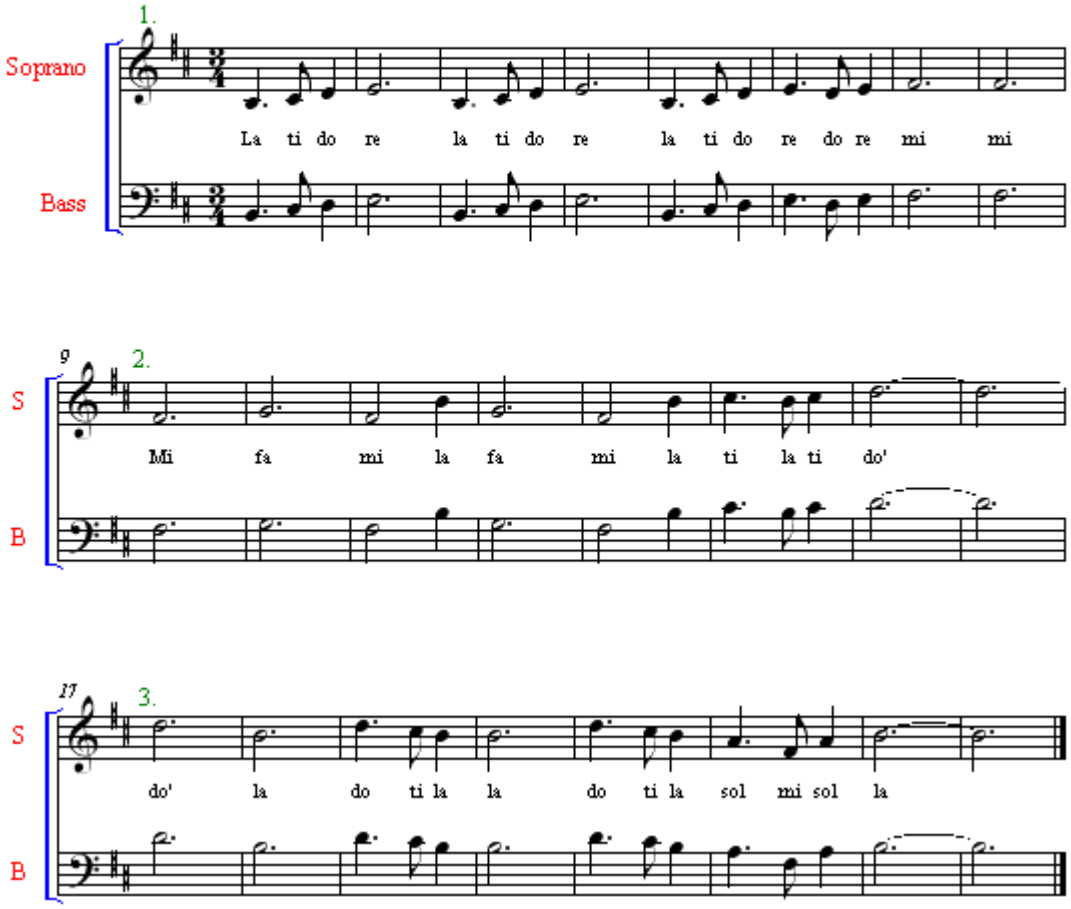
Hey, Ho Nobody Home/Ah Poor Bird

Unknown



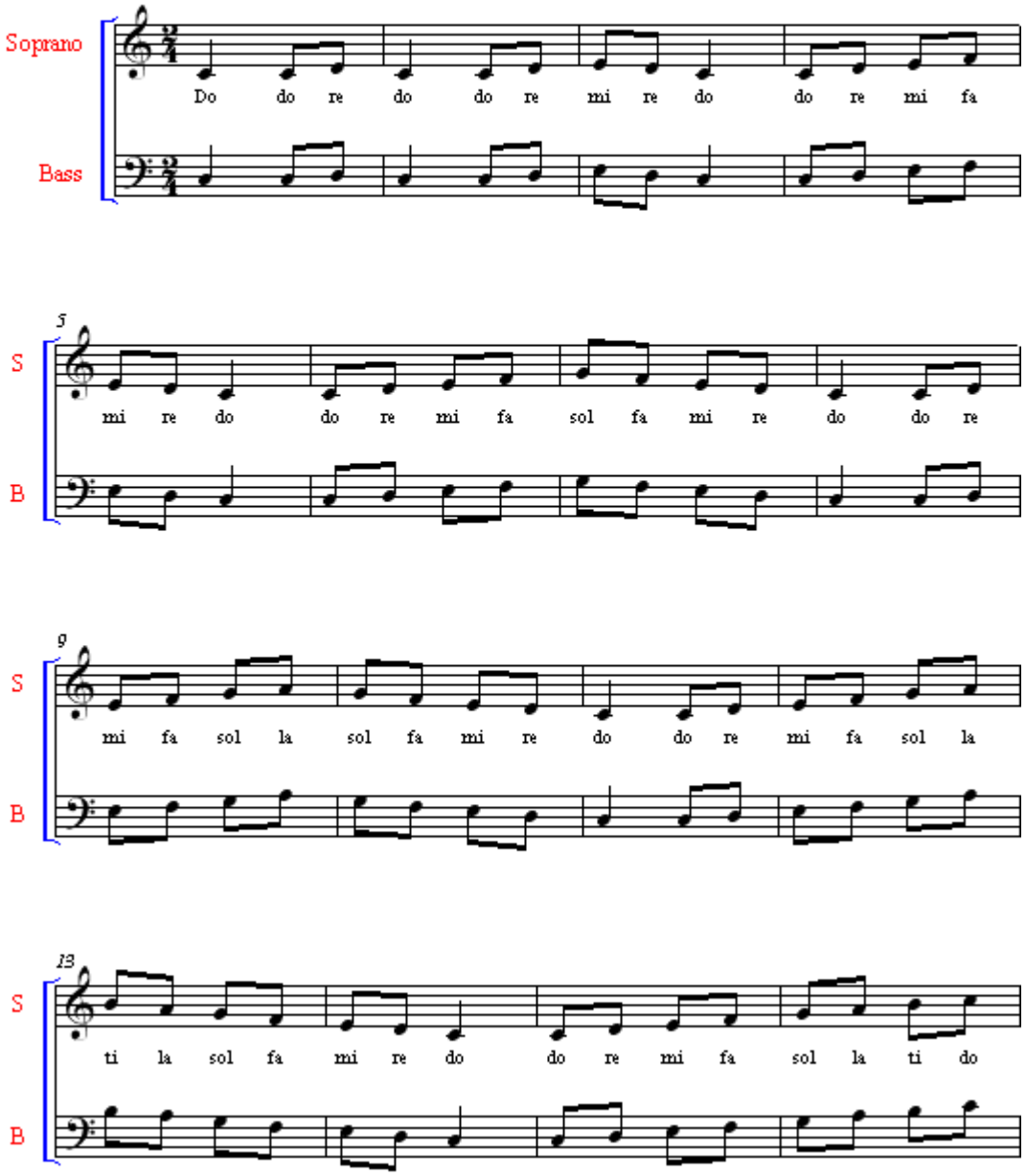
La, Ti, Do, Re

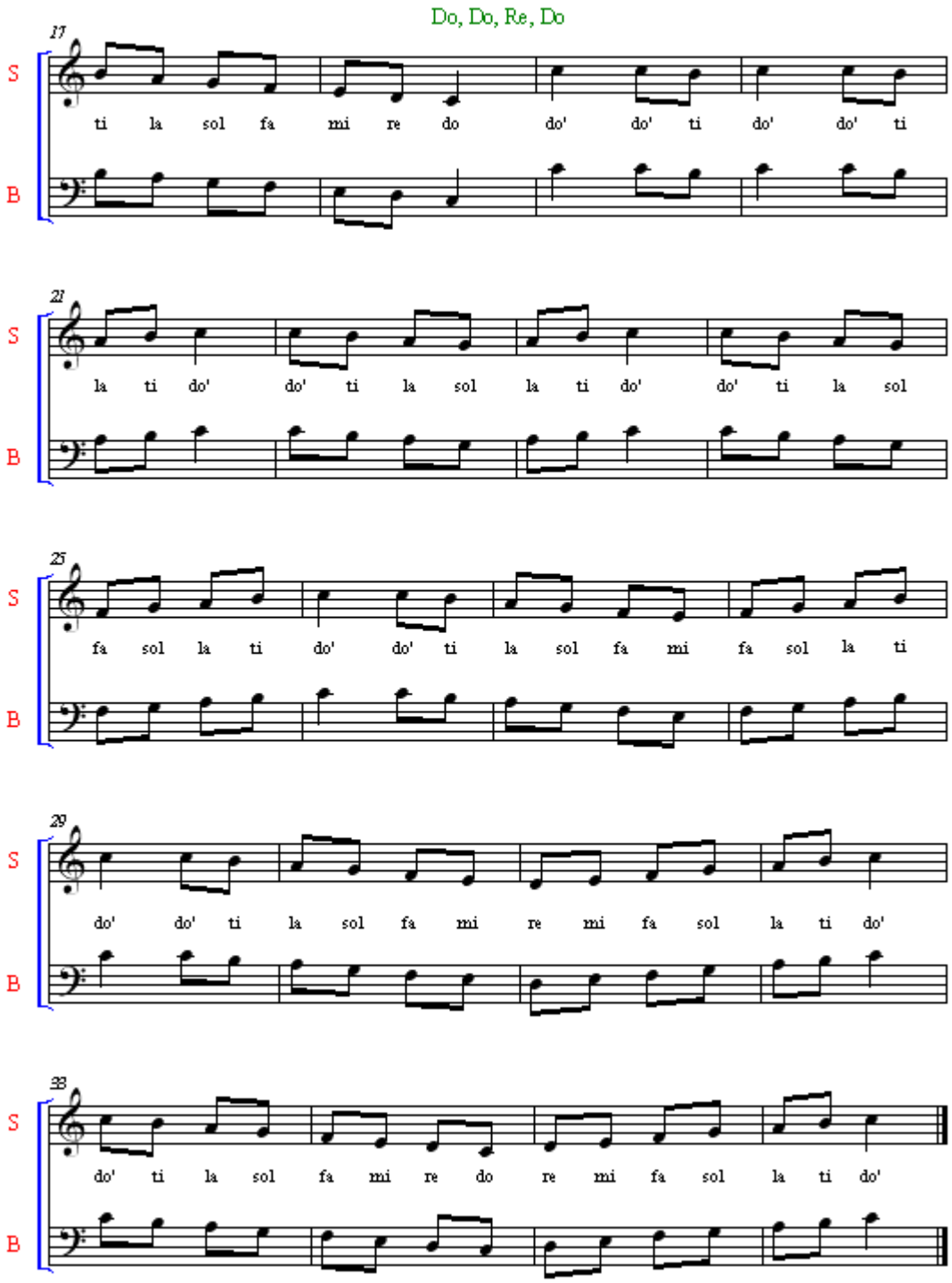
Unknown



Do, Do, Re, Do

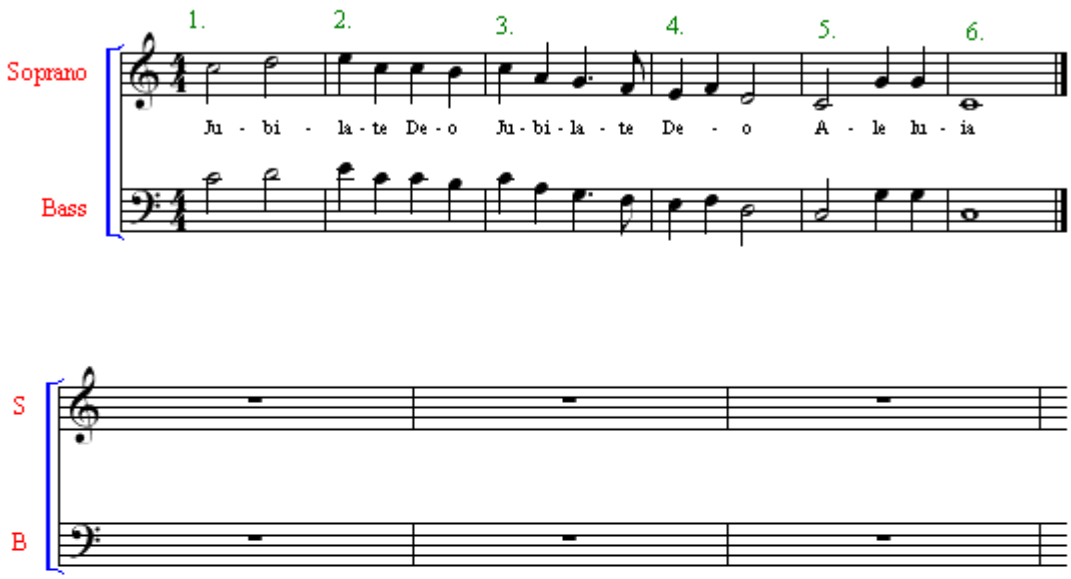
unknown




Do, Do, Re, Do
17
S
ti la sol fa mi re do do' do' ti do' do' ti
B
21
S
la ti do' do' ti la sol la ti do' do' ti la sol
B
25
S
fa sol la ti do' do' ti la sol fa mi fa sol la ti
B
29
S
do' do' ti la sol fa mi re mi fa sol la ti do'
B
33
S
do' ti la sol fa mi re do re mi fa sol la ti do'
B

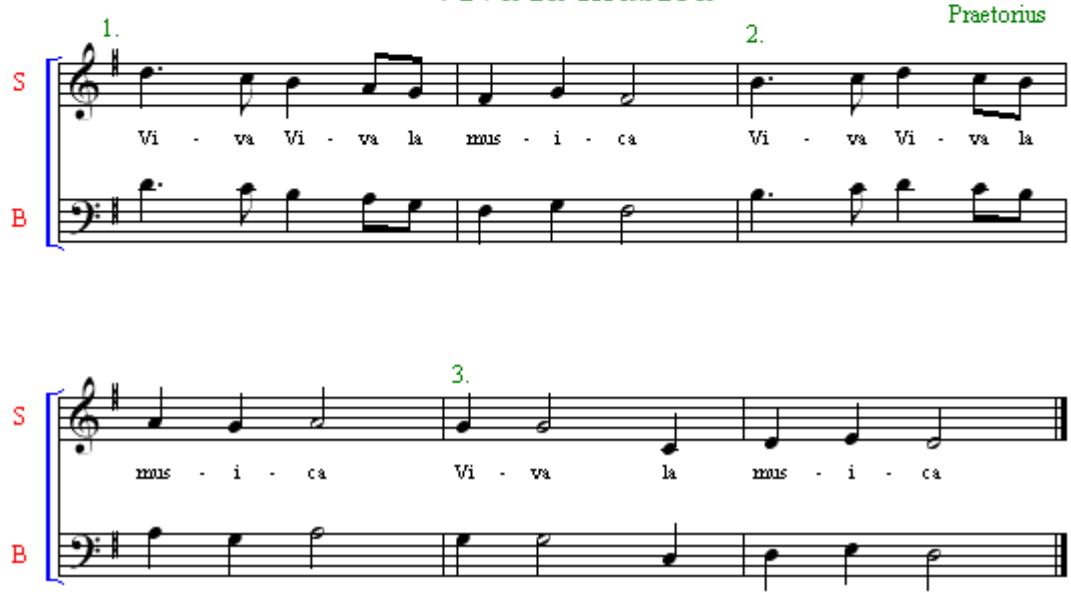
Jubilate Deo

Michael Praetorius 1571-1621



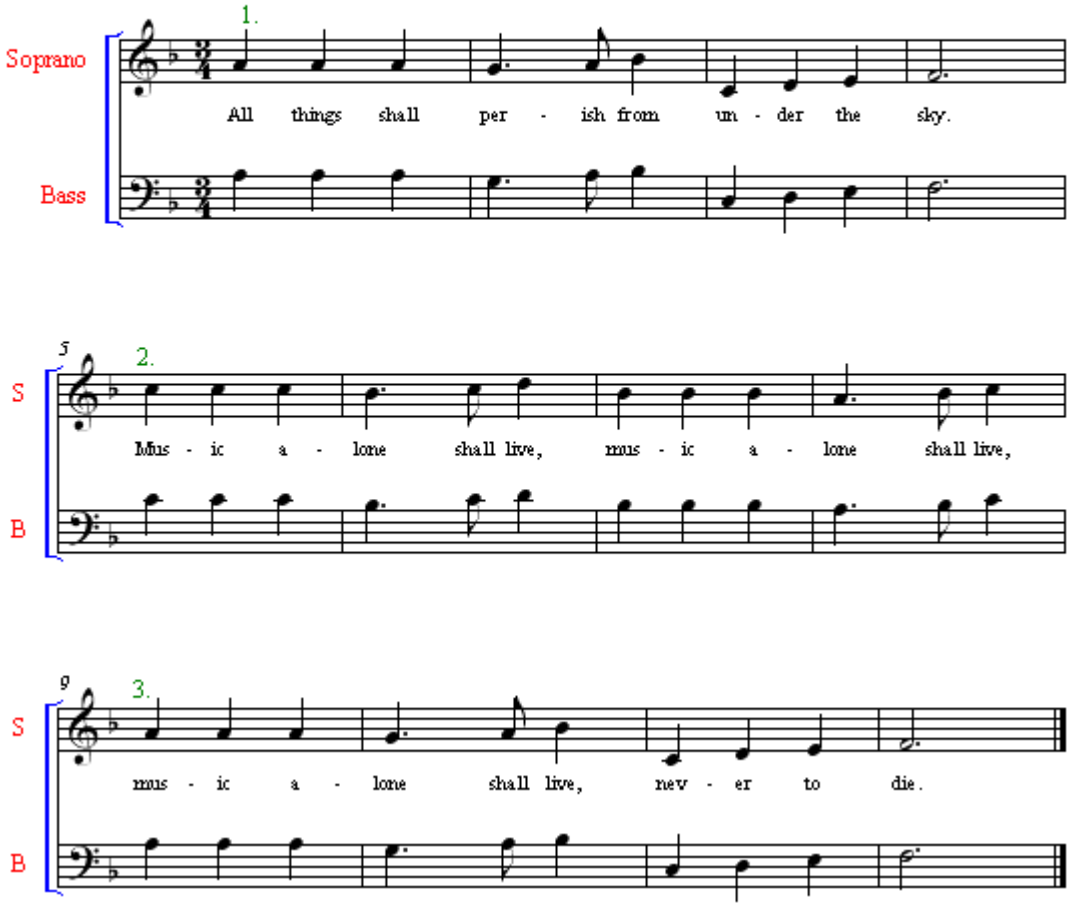
Viva la musica

Praetorius

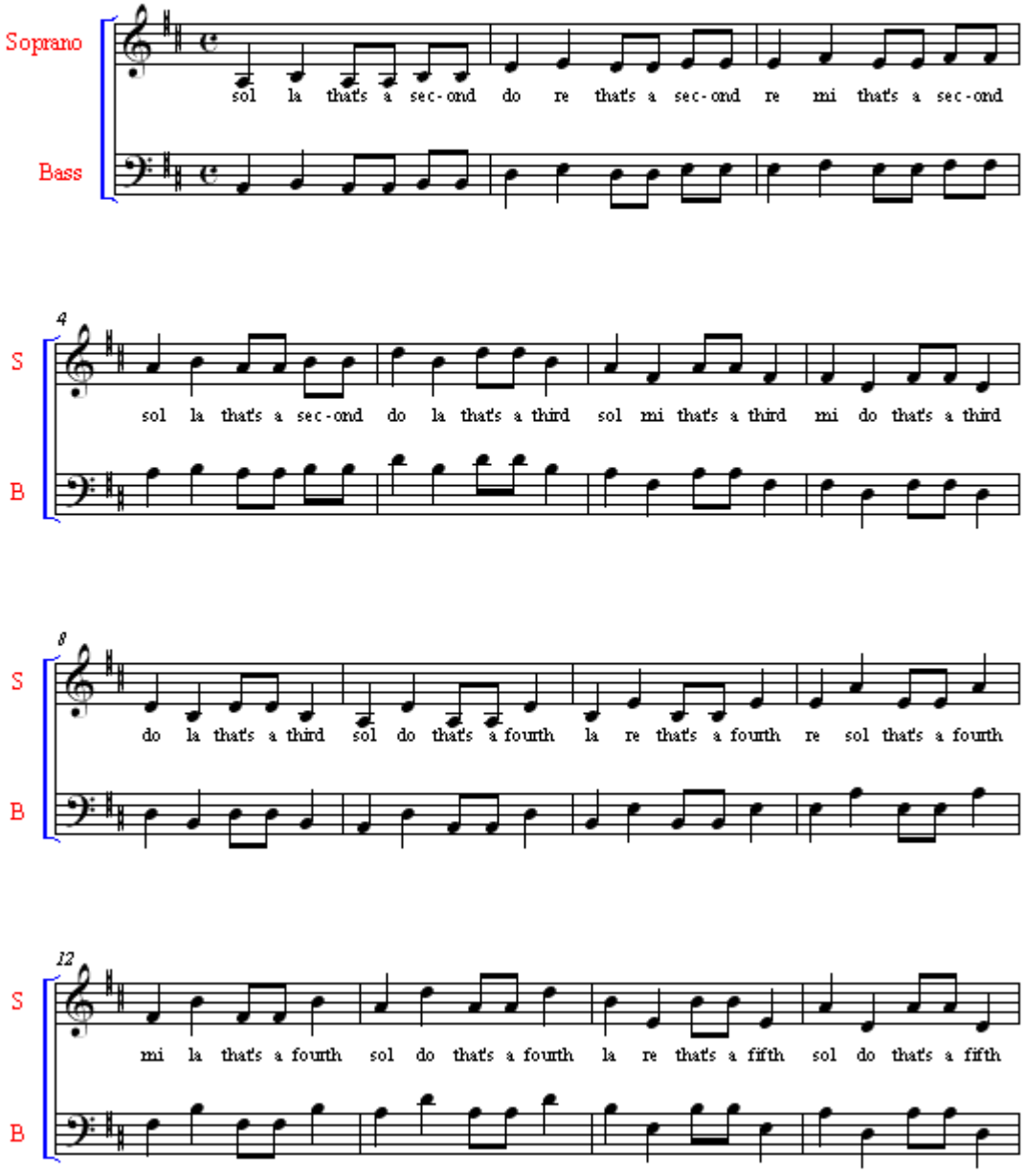


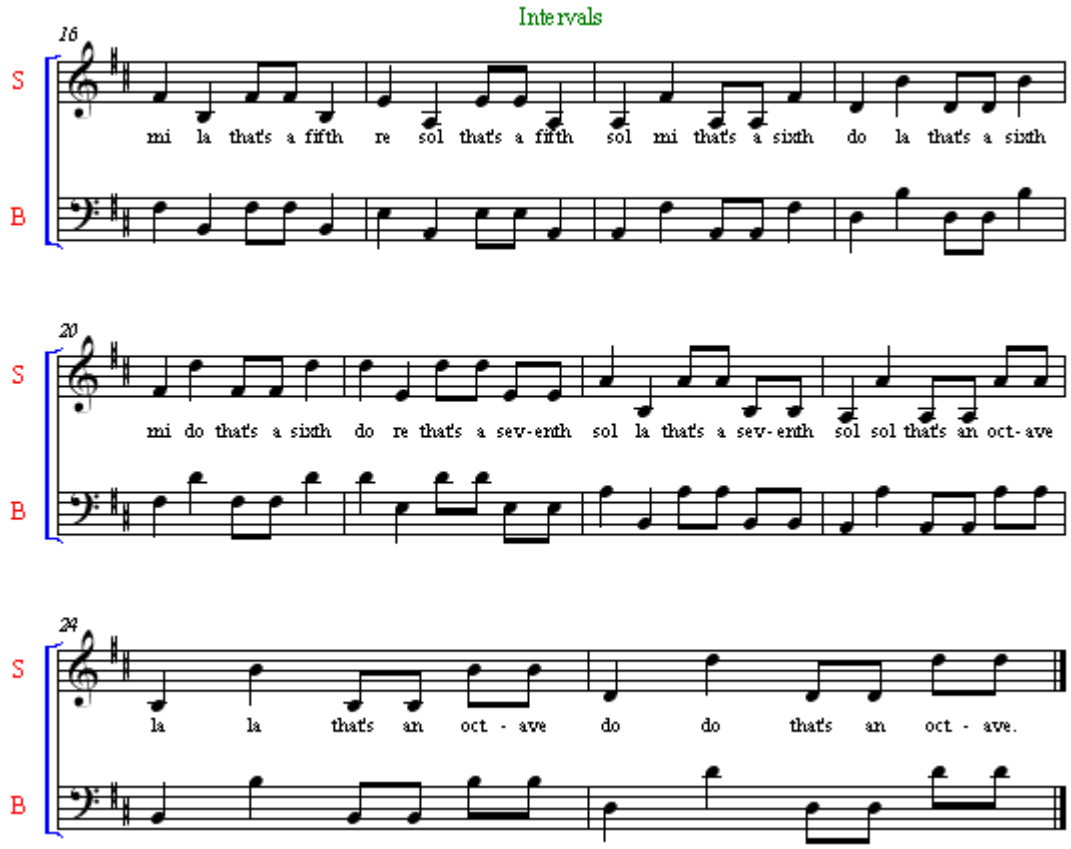
Music Shall Live

German



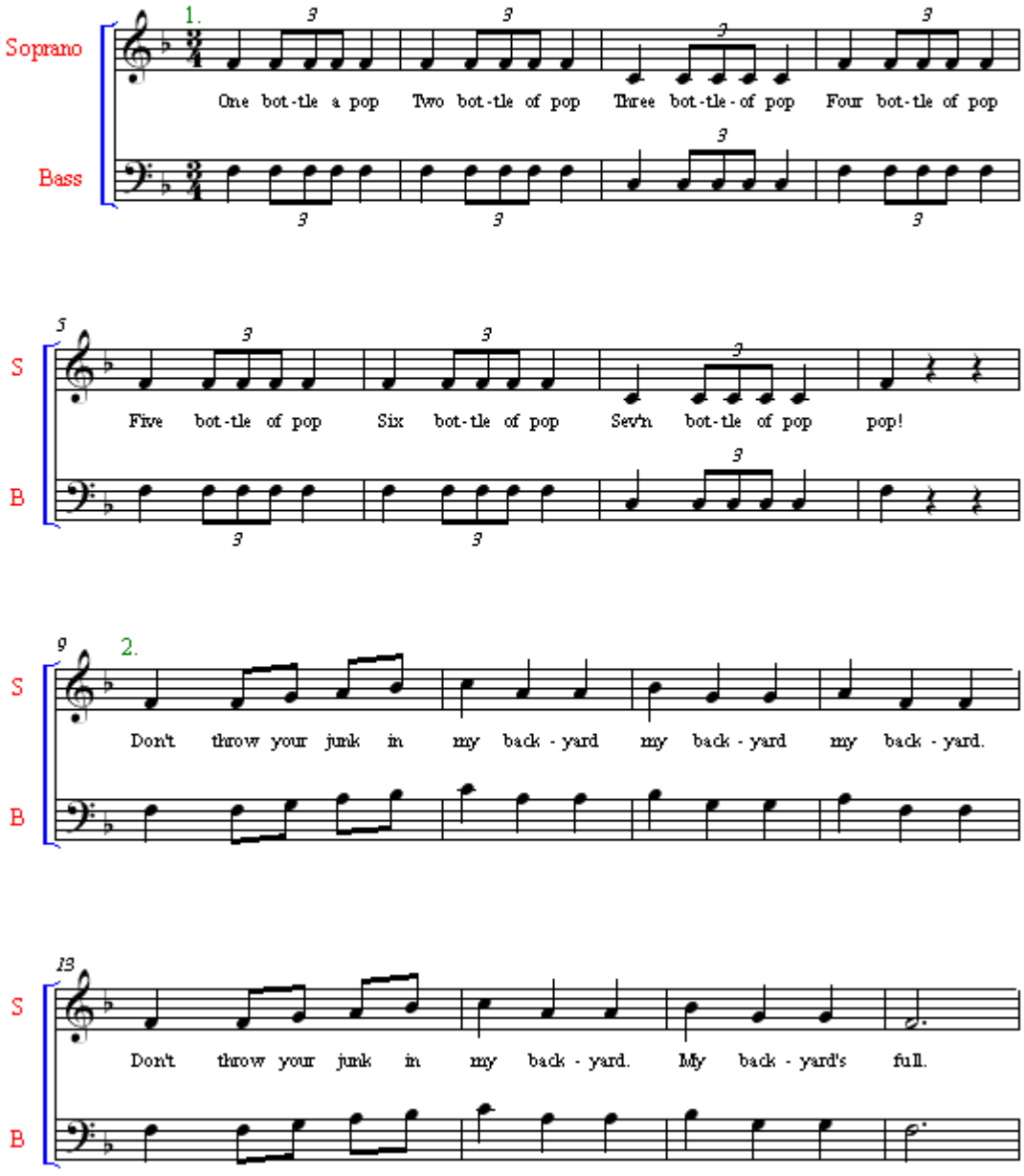
Intervals

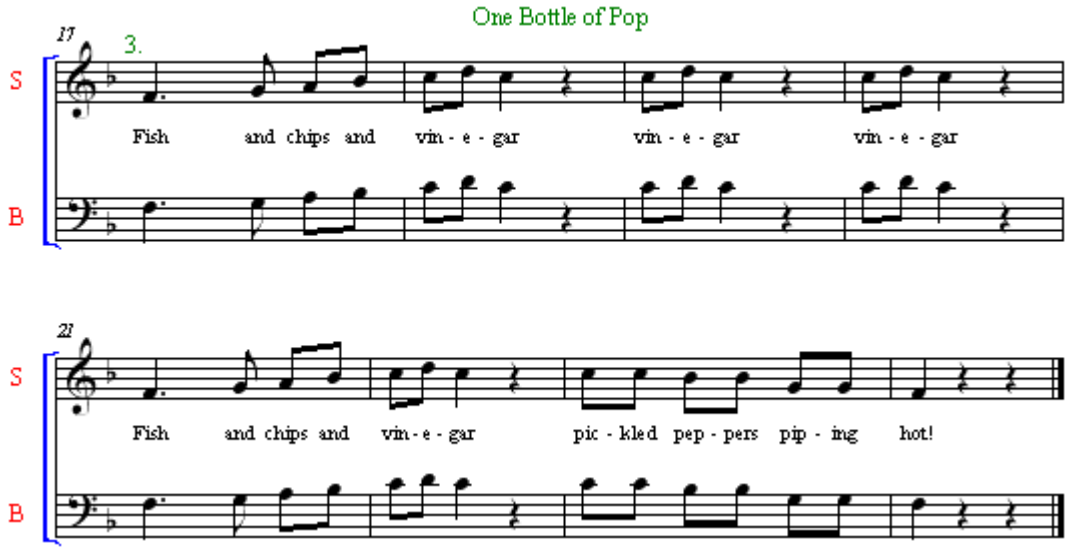

Soprano
Bass
sol la that's a sec-ond do re that's a sec-ond re mi that's a sec-ond
4
S
B
sol la that's a sec-ond do la that's a third sol mi that's a third mi do that's a third
8
S
B
do la that's a third sol do that's a fourth la re that's a fourth re sol that's a fourth
12
S
B
mi la that's a fourth sol do that's a fourth la re that's a fifth sol do that's a fifth


Intervals
16
S
mi la that's a fifth re sol that's a fifth sol mi that's a sixth do la that's a sixth
B
20
S
mi do that's a sixth do re that's a sev-enth sol la that's a sev-enth sol sol that's an oct-ave
B
24
S
la la that's an oct - ave do do that's an oct - ave.
B

One Bottle of Pop

unknown




One Bottle of Pop
17
3.
S
B
Fish and chips and vin - e - gar vin - e - gar vin - e - gar
21
S
B
Fish and chips and vin - e - gar pic - kled pep - pers pip - ing hot!

APPENDIX B

BACKGROUND STUDENT QUESTIONNAIRE

Male_____Female_____

Identification Number_____

Background Student Questionnaire

1. Do you have a piano in your home?

2. Does your father participate in music? (Check all that apply)

____church choir ____garage band
____professional musician ____community orchestra
____music teacher ____other_____

3. Does your mother participate in music? (Check all that apply)

____church choir ____garage band
____professional musician ____community orchestra
____music teacher ____other_____

4. What is the highest degree your father has completed? (Check One)

____High school diploma
____Trade school
____Two year degree
____Four year degree
____Master's
____Doctorate

5. What is the highest degree your mother has completed? (Check One)

____High school diploma
____Trade school
____Two year degree
____Four year degree
____Master's
____Doctorate

6. Have you ever taken piano lessons?

If so, how many years?

7. **Have you ever taken lessons for any other instrument?**

   If so, what instrument?

   How many years?

8. **Have you ever taken voice lessons?**

   If so, how many years?

9. **Have you been selected for any honor choir?**

10. **Did you participate in middle school band or orchestra?**

    If so, what instrument?

    If so, how many years?

11. **Have you ever participated in a talent show or musical at school, church, or in the community?**

12. **Do you sing in church choir?**

    If so, how many years?

13. **Have you had any other musical experiences not listed?**

14. **What middle school did you attend?**

15. **What is your age and grade? (16, sophomore)**

APPENDIX C

PARENTAL AND STUDENT CONSENT FORMS

University of Oklahoma
Institutional Review Board
Parental Consent to Participate in a Research Study

Project Title: *Music Literacy for Secondary Choir* in Comparison to Traditional Sight-Singing Methods
Principal Investigator: Ms. Shermie Potts
Department: Music

Your child is being asked to volunteer for this research study. This study is being conducted at his/her school in choir class. Your child was selected as a possible participant because he/she is enrolled in a beginning choir class.

Please read this form and ask any questions that you may have before consenting to your child's participation in this study.

Purpose of the Research Study

This study involves the testing of a new music literacy method for high school choir students entitled, *Music Literacy for Secondary Choir* in comparison to other sight-singing methods. The new method was developed by the researcher, Shermie Potts.

Number of Participants

About 200 high school students from Oklahoma will take part in this study.

Procedures

If you allow your child to be in this study, he/she will be asked to do the following:

He/she will be given a questionnaire concerning his/her previous musical experiences and an assessment of his/her music reading skills. One of two sight-singing methods will be assigned randomly to classes spread over a period of 12 weeks, separated by a six-week midpoint. For purposes of avoiding any student visions of special treatment, specific methods will not be revealed. After six weeks of instruction, your child will again be tested on his/her music reading abilities to determine any change in scores.

Length of Participation

The instructional period will last 6 weeks. The questionnaire and pretest will be completed before the study method instruction begins.

This study has the following risks:

To minimize a possible breach in confidentiality, all information gathered through this research study will be matched with randomly assigned identification numbers.

Benefits of being in the study

Participants, parents, and teachers could benefit from this study by knowing the extent of change in music reading skills over a period of six weeks. Although all scores will be treated with confidentiality and numbers will be used for all procedures employed throughout the study, a master list of names and ID numbers will be maintained in a secure place solely for

purposes of instructional and methodological feedback to teachers and parents, if requested.

Confidentiality

In published reports, there will be no information included that will make it possible to identify your child without your permission. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the study advisor, Dr. James Sherbon and the OU Institutional Review Board.

Compensation

Your child will not be reimbursed for his/her time and participation in this study.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw your child or decline participation, your child will not be penalized or lose benefits or services unrelated to the study. If you consent to participation, your child may decline to answer any question and may choose to withdraw at any time.

Audio Recording of Study Activities

To assist with accurate recording of participant responses, sight-singing tests will be recorded on an audio recording device. You have the right to refuse to allow such recording without penalty. Please select one of the following options.

I consent to audio recording. ___ Yes ___ No.

Access to Educational Records

To check for connections between music reading ability and verbal and math skills, your child's previous school year math and English grades will be accessed. These grades will be matched with randomly assigned identification numbers to minimize a breach in confidentiality.

You have the right to refuse access without penalty. Please select one of the following options.

I consent to access to my child's educational records. ___ Yes ___ No.

Contacts and Questions

If you have concerns or complaints about the research, the researcher conducting this study can be contacted at (405) 715-7295, Shermie.D.Potts-1@ou.edu. Research advisor, Dr. James Sherbon, can be contacted at (405) 325-4146, jwsherbon@ou.edu.

Contact the researcher(s) if you have questions or if you have experienced a research-related injury.

If you have any questions about your child's rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu.

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to my child, _____, to participate in the study.

Signature Date

University of Oklahoma
Institutional Review Board
Informed Consent to Participate in a Research Study

Project Title: *Music Literacy for Secondary Choir* in Comparison to Traditional Sight-Singing Methods
Principal Investigator: Ms. Shermie Potts
Department: Music

You are being asked to volunteer for this research study. This study is being conducted at your school in choir class. You were selected as a possible participant because you are enrolled in a beginning choir class.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

This study involves the testing of a new music literacy method for high school choir students entitled, *Music Literacy for Secondary Choir* in comparison to other sight-singing methods. The new method was developed by the researcher, Shermie Potts.

Number of Participants

About 200 high school students from across Oklahoma will take part in this study.

Procedures

If you agree to be in this study, you will be asked to do the following:

You will be given a questionnaire concerning your previous musical experiences and an assessment of your music reading skills. One of two sight-singing methods will be assigned randomly to classes spread over a period of 12 weeks, separated by a six-week midpoint. For purposes of avoiding any student visions of special treatment, specific methods will not be revealed. After six weeks of instruction, you will again be tested on your music reading abilities to determine any change in scores.

Length of Participation

The instructional period will last 6 weeks. The questionnaire and pretest will be completed before the study method instruction begins.

This study has the following risks:

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Benefits of being in the study

Participants, parents, and teachers could benefit from this study by knowing the extent of change in music reading skills over a period of six weeks. Although all scores will be treated with confidentiality and numbers will be used for all procedures employed throughout the study, a master list of names and ID numbers will be maintained in a secure place solely for

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There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the study advisor, Dr. James Sherbon and the OU Institutional Review Board.

Compensation

You will not be reimbursed for your time and participation in this study.

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Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Audio Recording of Study Activities

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You have the right to refuse access without penalty. Please select one of the following options.

I consent to access to my educational records. ___ Yes ___ No.

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You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

Statement of Consent

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

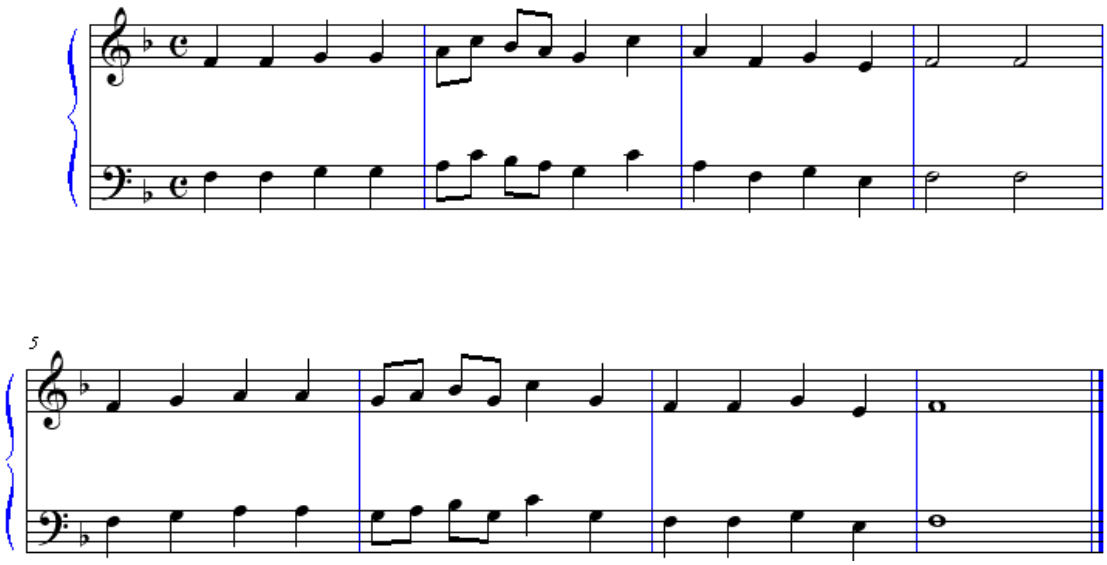
Signature Date

APPENDIX D

SIGHT-SINGING ASSESSMENT

Sight-Singing Assessment

Demorest (adapted from Ottman)



APPENDIX E

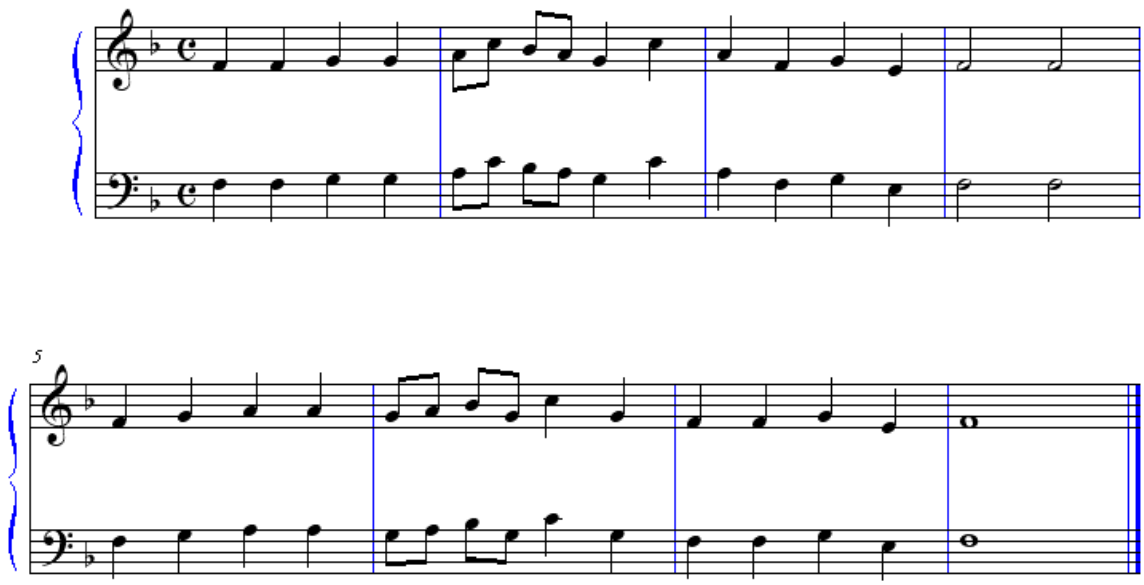
SIGHT-SINGING ASSESSMENT SCORING SHEET

Sight-Singing Assessment Scoring Sheet

Researcher-Shermie Potts

Place Tally Marks for each error in each category	Total Points
Pitch Errors (1 pt per tally mark)_____	_____
Rhythm Errors (1 pt per tally mark)_____	_____
Repeated Notes (1 pt per tally mark)_____	_____
Starting Exercise Over (2 pt per tally mark)_____	_____
Changing Key from beginning tonic (2 pts per tally mark)_____	_____
Perfect Score	**62**
Total Deductions (subtract)	
_____	
Score	
_____	

Place an "R" by rhythm errors and "P" by pitch errors



APPENDIX F

VIDEOTAPE EVALUATION FORMS

Videotape Teacher Evaluation (C)

1. The teacher exhibits a positive attitude toward sight-singing.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

2. The teacher keeps a pace appropriate for age and skill level of students.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

3. The teacher begins rehearsal with a five minute vocal warm-up using diatonic patterns utilizing vowels and solfege.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

4. After the vocal warm-up, students practice intervals using solfege, handsigns, and a solfege ladder.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

5. Following interval practice, students sight-sing from a published text or octavo.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

6. Interval practice and sight-signing last seven minutes combined.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

7. The teacher appears comfortable with teaching concepts.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

8. The teacher appears comfortable with teaching methods.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

9. The teacher encourages students to succeed.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

10. The teacher presents concepts in the order provided by the researcher.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

11. The teacher attempts to explain concepts in varying ways to help mystified students.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

Videotape Teacher Evaluation (E)

1. The teacher exhibits a positive attitude toward music literacy.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

2. The teacher keeps a pace appropriate for age and skill level of students.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

3. The teacher begins rehearsal with a five minute vocal warm-up using diatonic patterns utilizing vowels and solfege and rhythms from the concept list.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

4. After the vocal warm-up, students practice intervals using solfege, handsigns, a solfege ladder, and /or rote songs.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

5. Students engage in aural activities such as echo singing, echo clapping, and aural dictation.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

6. The students sight-read the daily exercise following the instructions in Director's Guide for *Music Literacy for Secondary Choir*.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

7. Aural training and sight-singing last seven minutes combined.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

8. The teacher appears comfortable with teaching concepts.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

9. The teacher appears comfortable with teaching methods.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

10. The teacher encourages students to succeed.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

11. The teacher presents concepts in the order provided by the researcher.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

12. The teacher attempts to explain concepts in varying ways to help mystified students.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	**2**	**3**	**4**	**5**

APPENDIX G

INFORMED CONSENT FORM FOR TEACHERS

University of Oklahoma
Institutional Review Board
Informed Consent to Participate in a Research Study

Project Title: *Music Literacy for Secondary Choir* in Comparison to Traditional Sight-Singing Methods
Principal Investigator: Ms. Shermie Potts
Department: Music

You are being asked to volunteer for this research study. This study is being conducted at your school in choir class. You were selected as a possible participant because you were matched with other Oklahoma high school choral teachers from similar towns, schools, programs, and teaching style.

Please read this form and ask any questions that you may have before agreeing to take part in this study.

Purpose of the Research Study

This study involves the testing of a new music literacy method for high school choir students entitled, *Music Literacy for Secondary Choir* in comparison to other sight-singing methods. The new method was developed by the researcher, Shermie Potts.

Number of Participants

About 200 high school students from across Oklahoma will take part in this study.

Procedures

If you agree to be in this study, you will be asked to do the following:

Hand out and collect parent/guardian permission forms and student assent forms, administer the student questionnaire, and read a script provided by the researcher to prepare students for the testing procedure. You will tape the music literacy portion of your rehearsal (warm-ups through sight-reading) once a week, on Friday, to help ensure the standardization of procedures.

Length of Participation

The instructional period will last 6 weeks. The questionnaire and pretest will be completed before the study method instruction begins.

This study has the following risks:

To minimize a breach in confidentiality, all information gathered during this research study will remain in the researcher's possession until the completion of the study. All documents, tapes and videotapes will then be destroyed.

Benefits of being in the study

Participants, parents, and teachers could benefit from this study by knowing the extent of change in music reading skills over a period of six weeks. Although all scores will be treated with confidentiality and numbers will be used for all procedures employed throughout the study, a master list of names and ID numbers will be maintained in a secure place solely for purposes of instructional and methodological feedback to teachers and parents, if requested.

Confidentiality

In published reports, there will be no information included that will make it possible to identify you without your permission. Research records will be stored securely and only approved researchers will have access to the records.

There are organizations that may inspect and/or copy your research records for quality assurance and data analysis. These organizations include the study advisor, Dr. James Sherbon and the OU Institutional Review Board.

Compensation

You will not be reimbursed for your time and participation in this study.

Voluntary Nature of the Study

Participation in this study is voluntary. If you withdraw or decline participation, you will not be penalized or lose benefits or services unrelated to the study. If you decide to participate, you may decline to answer any question and may choose to withdraw at any time.

Video Recording of Study Activities

To assist with accurate recording of your responses, music literacy lessons will be recorded on a video recording device. You have the right to refuse to allow such recording. Please select one of the following options:

I consent to video recording. ___ Yes ___ No.

Contacts and Questions

If you have concerns or complaints about the research, the researcher conducting this study can be contacted at (405) 715-7295, Shermie.D.Potts-1@ou.edu. Research advisor, Dr. James Sherbon, can be contacted at (405)325- 4146, jwsherbon@ou.edu.

Contact the researcher(s) if you have questions or if you have experienced a research-related injury.

If you have any questions about your rights as a research participant, concerns, or complaints about the research and wish to talk to someone other than individuals on the research team or if you cannot reach the research team, you may contact

the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405-325-8110 or irb@ou.edu.

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

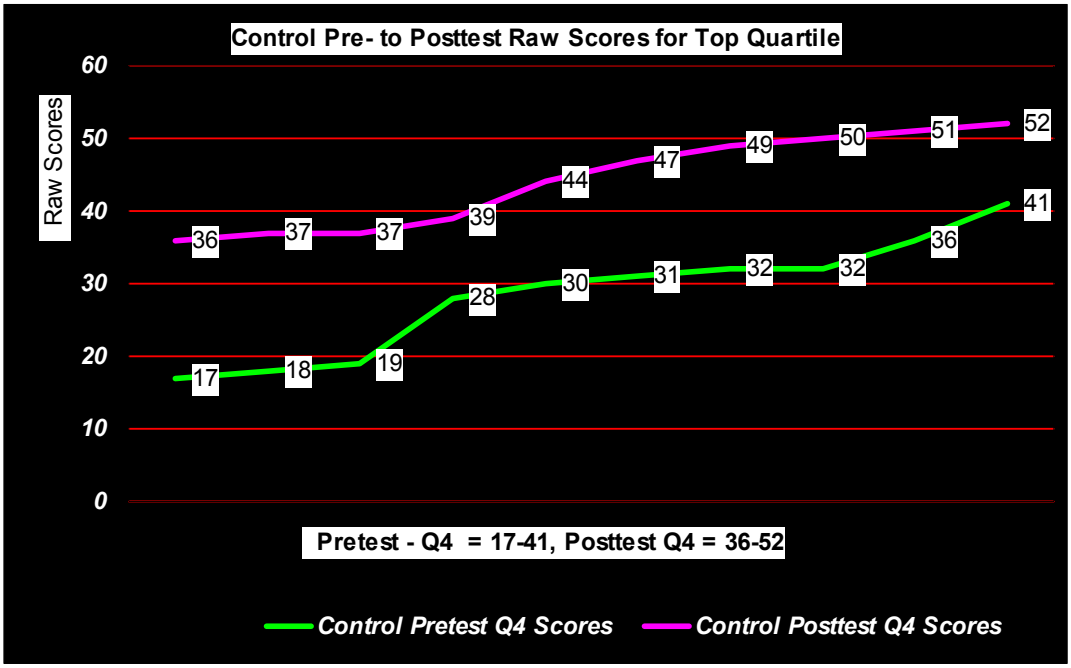
Statement of Consent

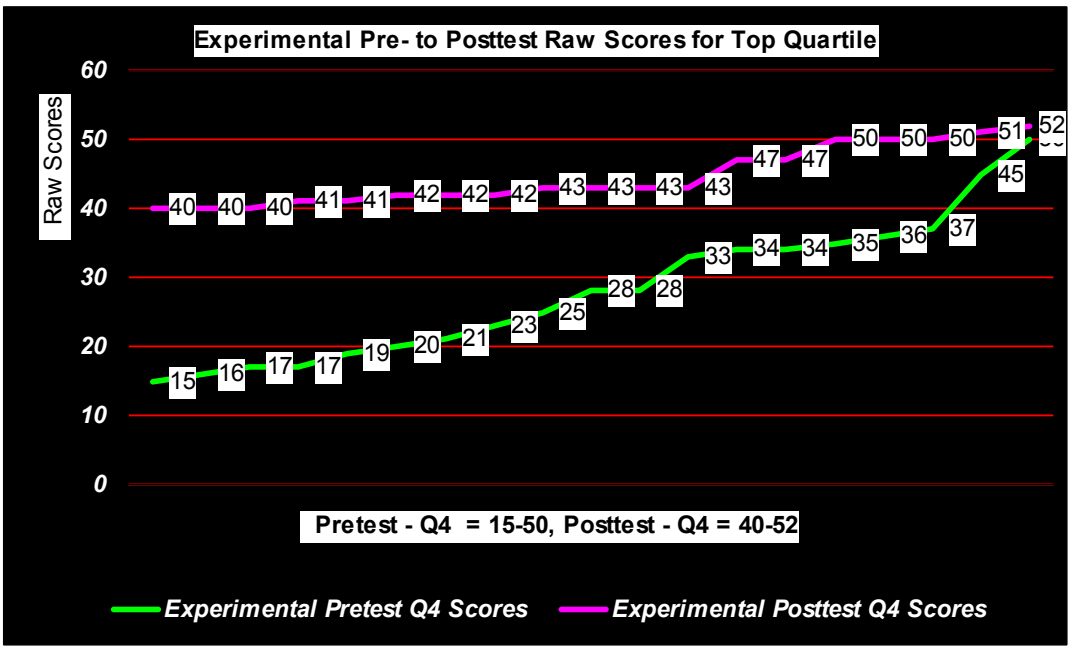
I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

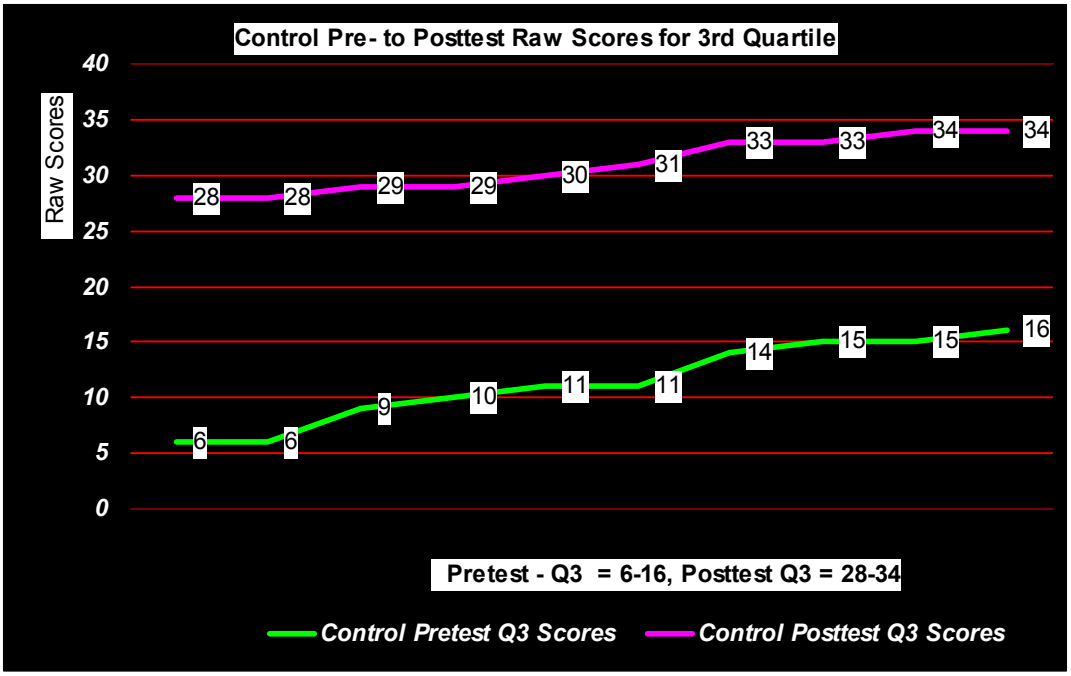
Signature Date

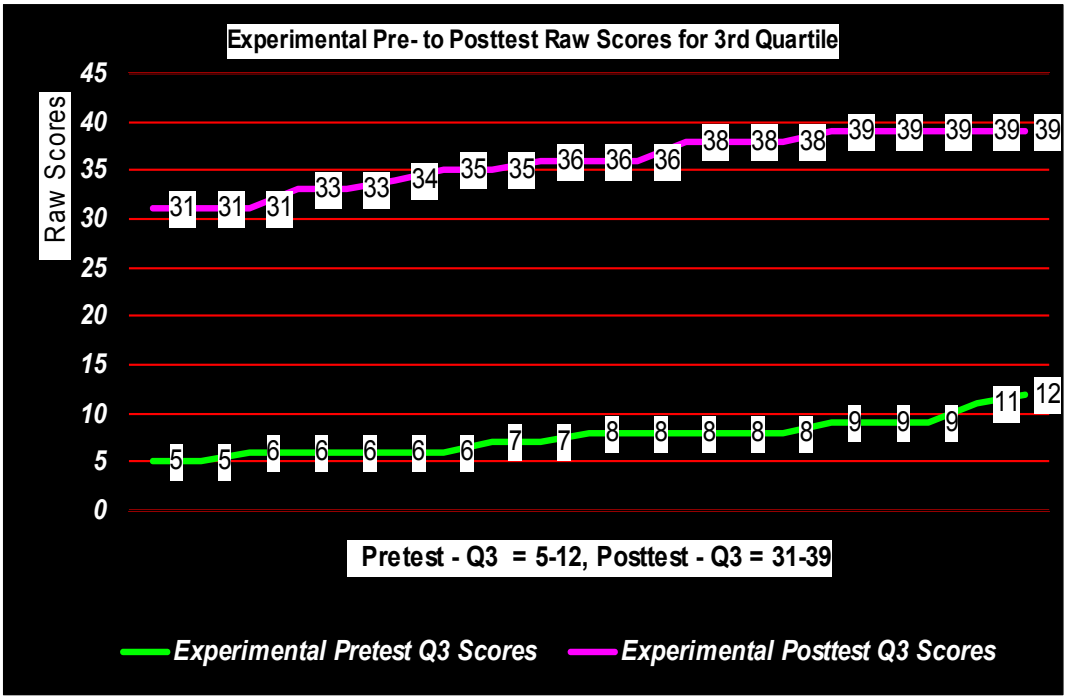
APPENDIX H

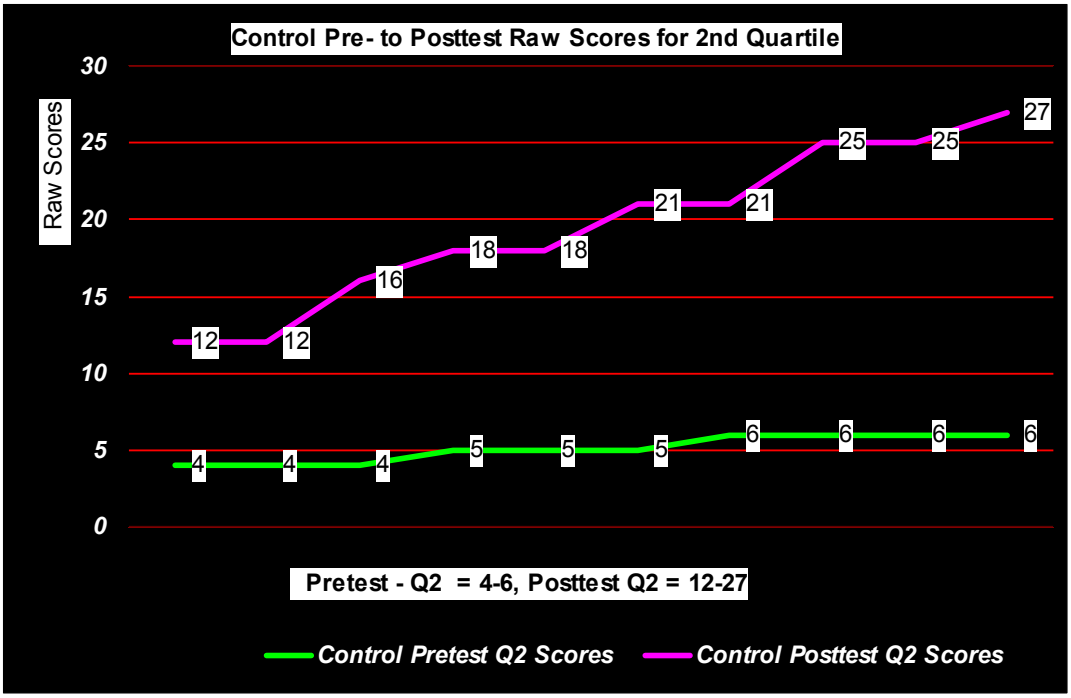
QUARTILE COMPARISONS OF POSTTEST

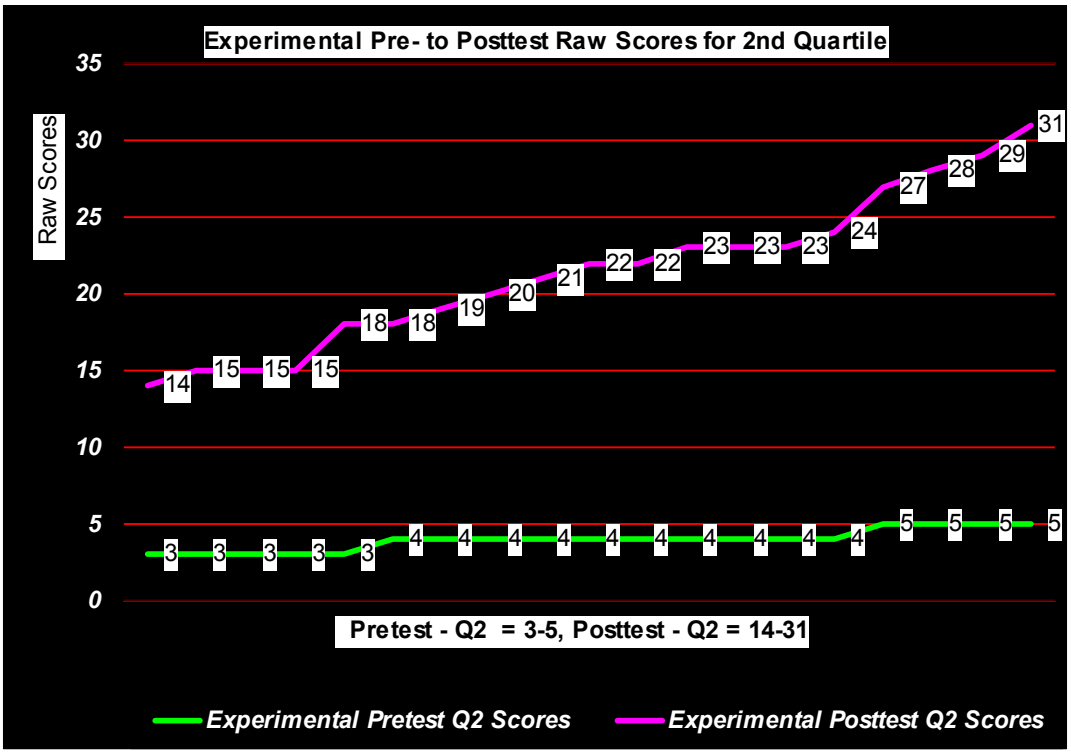

Control Pre- to Posttest Raw Scores for Top Quartile
Raw Scores
60
50
40
30
20
10
0
36 37 37 39 44 47 49 50 51 52
17 18 19 28 30 31 32 32 36 41
Pretest - Q4 = 17-41, Posttest Q4 = 36-52
Control Pretest Q4 Scores
Control Posttest Q4 Scores

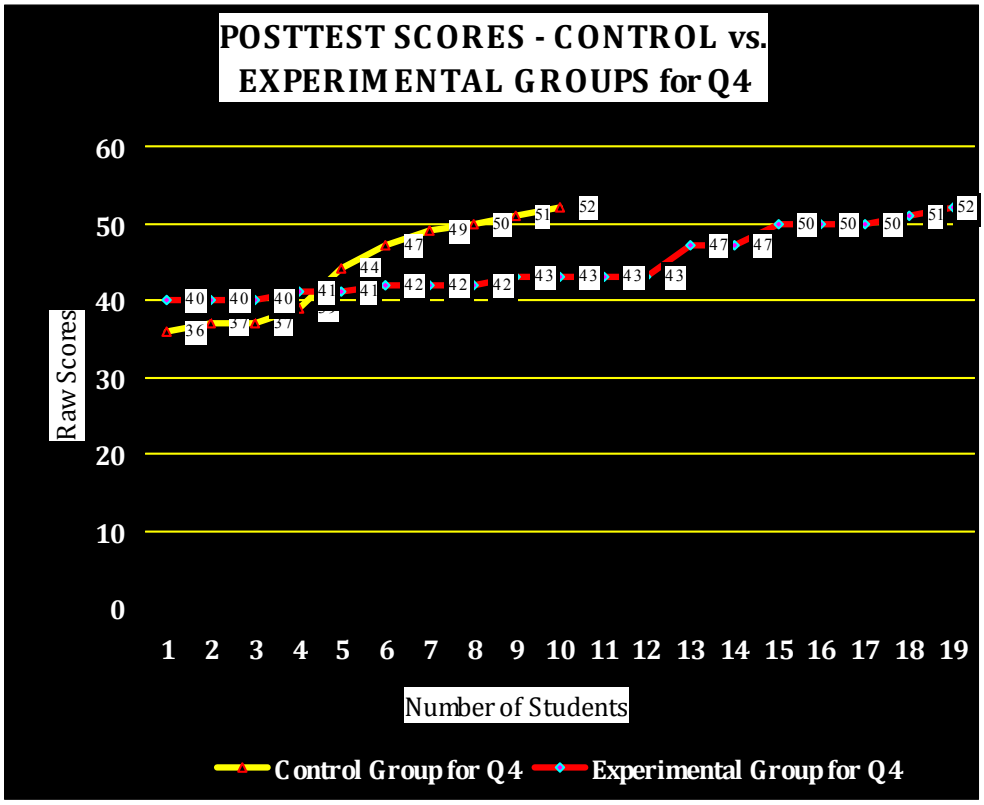

Experimental Pre- to Posttest Raw Scores for Top Quartile
Raw Scores
60
50
40
30
20
10
0
40 40 40 41 41 42 42 42 43 43 43 43 47 47 50 50 50 51 52
15 16 17 17 19 20 21 23 25 28 28 33 34 34 35 36 37 45
Pretest - Q4 = 15-50, Posttest - Q4 = 40-52
Experimental Pretest Q4 Scores
Experimental Posttest Q4 Scores

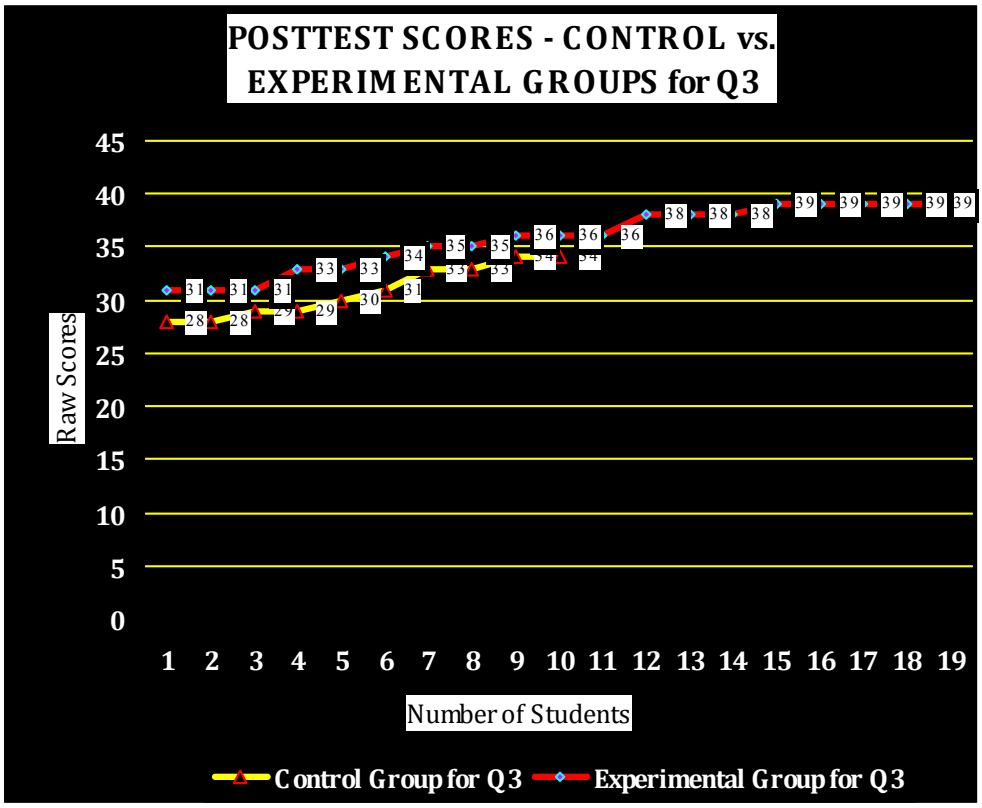

Control Pre- to Posttest Raw Scores for 3rd Quartile
Raw Scores
40
35
30
25
20
15
10
5
0
28 28 29 29 30 31 33 33 34 34
6 6 9 10 11 11 14 15 15 16
Pretest - Q3 = 6-16, Posttest Q3 = 28-34
Control Pretest Q3 Scores
Control Posttest Q3 Scores

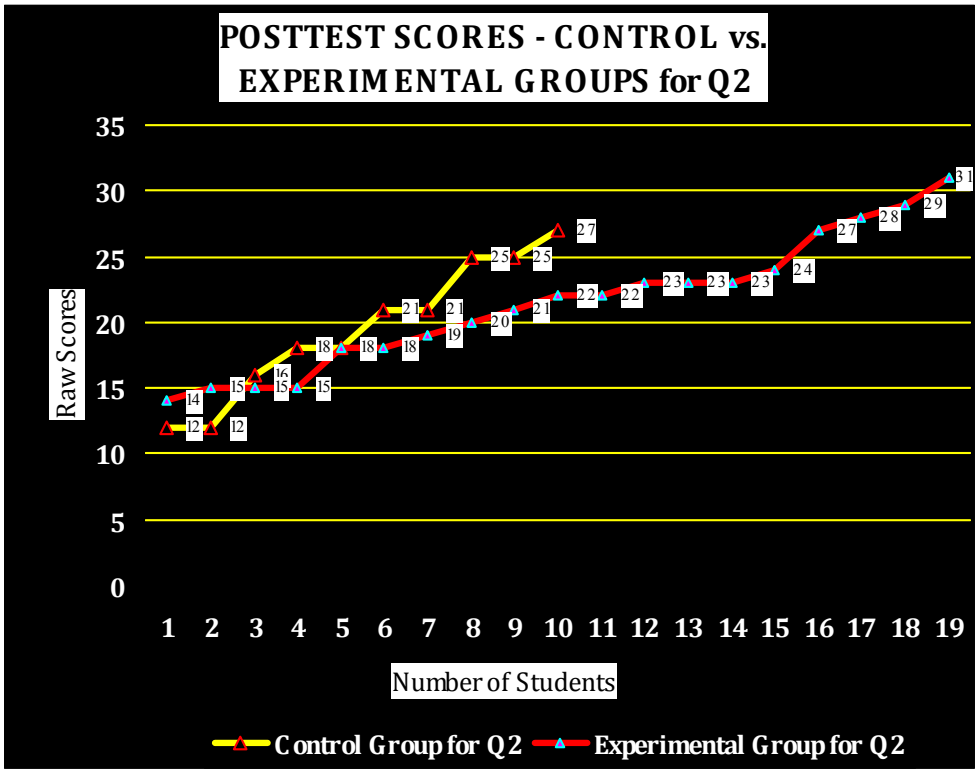

Experimental Pre- to Posttest Raw Scores for 3rd Quartile
Raw Scores
45
40
35
30
25
20
15
10
5
0
31 31 31 33 33 34 35 35 36 36 36 38 38 38 39 39 39 39 39
5 5 6 6 6 6 6 7 7 8 8 8 8 8 9 9 9 11 12
Pretest - Q3 = 5-12, Posttest - Q3 = 31-39
Experimental Pretest Q3 Scores
Experimental Posttest Q3 Scores

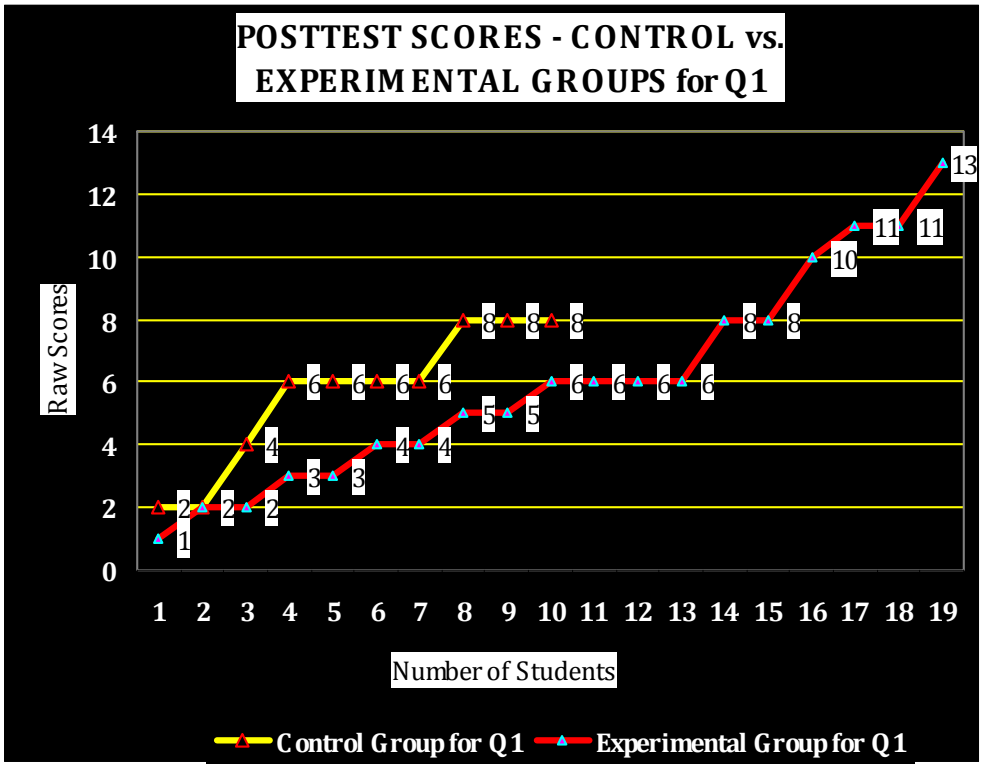

Control Pre- to Posttest Raw Scores for 2nd Quartile
Raw Scores
30
25
20
15
10
5
0
12 12 16 18 18 21 21 25 25 27
4 4 4 5 5 5 6 6 6 6
Pretest - Q2 = 4-6, Posttest Q2 = 12-27
Control Pretest Q2 Scores
Control Posttest Q2 Scores


Experimental Pre- to Posttest Raw Scores for 2nd Quartile
Raw Scores
35
30
25
20
15
10
5
0
14 15 15 15 18 18 19 20 21 22 22 23 23 23 24 27 28 29 31
3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 5 5 5 5
Pretest - Q2 = 3-5, Posttest - Q2 = 14-31
Experimental Pretest Q2 Scores
Experimental Posttest Q2 Scores


POSTTEST SCORES - CONTROL vs. EXPERIMENTAL GROUPS for Q4
Raw Scores
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Number of Students
Control Group for Q4
Experimental Group for Q4


POSTTEST SCORES - CONTROL vs. EXPERIMENTAL GROUPS for Q3
45
40
35
30
25
20
15
10
5
0
Raw Scores
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Number of Students
Control Group for Q3
Experimental Group for Q3


POSTTEST SCORES - CONTROL vs. EXPERIMENTAL GROUPS for Q2
Raw Scores
35
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Number of Students
Control Group for Q2
Experimental Group for Q2


POSTTEST SCORES - CONTROL vs. EXPERIMENTAL GROUPS for Q1
Raw Scores
Number of Students
Control Group for Q1
Experimental Group for Q1