2020

The effects of peer-assisted learning on rhythmic and melodic sight-reading in a middle school chorus

BOSTON UNIVERSITY

COLLEGE OF FINE ARTS

Dissertation

THE EFFECTS OF PEER-ASSISTED LEARNING ON RHYTHMIC AND MELODIC SIGHT-READING IN A MIDDLE SCHOOL CHORUS

by

MARIE FRANCES GRAHAM

B.A., University of Hartford, 1984
M.A., Lesley College, 1997

Submitted in partial fulfillment of the

requirements for the degree of

Doctor of Musical Arts

2020

Approved by

First Reader _____

Diana R. Dansereau, Ph.D.
Assistant Professor of Music, Music Education

Second Reader _____

Ronald P. Kos Jr., Ph.D.
Assistant Professor of Music, Music Education

Third Reader _____

Karin S. Hendricks, Ph.D.
Associate Professor of Music
Chair of Music Education

Dedication

I dedicate this dissertation to my supportive and loving family; to Stephen for your words of encouragement, to Katie for your creative inspiration, to Jonathan for our lively academic conversations on statistics, and to Albert, for your great passion for music. To my children, that you may know that the obstacles in life are meant to direct your paths; do not be overcome by them.

Acknowledgments

To those who have inspired and motivated me, from the onset of my journey to the end of this endeavor, you have my most profound respect and gratitude. To my fellow doctoral work peers, especially to Pam Oviedo and Dr. Joey Lord, for the discussions, proofreading and academic inspiration that you gave me early on in this process. To my Boston University cohort and especially to my peer review partners, Dr. Christie Blute and Dr. Byron Graves, for your collective honesty, brutal but lovely, feedback that redirected me. I wish to thank Dr. Karen Hendricks and Dr. Kinh Vu for believing in my analytical process and research direction. To Kimberly Morgan, Jessica Daniels, and Rebecca Vickers and Christian Pann, I could not have done this without you. I appreciate your organization, flexibility, and attention to deadlines. I wish to acknowledge my supervisor, Dr. Diana Dansereau, for the clarity and attention to detail that you provided throughout the research, analysis, and writing process to the final stages of completion: I appreciate and am grateful for the privilege of walking this academic road with you. Finally, I wish to acknowledge Dr. Susan Conkling whose inspiration lives on in me and countless others she mentored in the field of music education. I am honored to be among the last of her Boston University DMA students.

THE EFFECTS OF PEER-ASSISTED LEARNING ON RHYTHMIC AND MELODIC SIGHT-READING IN A MIDDLE SCHOOL CHORUS

MARIE FRANCES GRAHAM

Boston University College of Fine Arts, 2020

Major Professor: Diana R. Dansereau, Ph.D., Assistant Professor of Music, Music Education

ABSTRACT

In this research, I investigated the ways that children engaged in collaborative processes with adults and their peers and music sight-reading skill acquisition. Using a quasi-experimental pretest/posttest non-equivalent control group design, I assessed melodic and rhythmic sight-reading among intact groups of sixth-, seventh-, and eighth-grade choruses at a North Carolina middle school. The purpose of the study was to compare the effectiveness of a teacher-only and two types of peer-assisted learning models on rhythmic and melodic sight-reading in middle school choral students. The instruments I used to evaluate melodic and rhythmic sight-reading included an adapted version of the Vocal Sight-Reading Inventory and a researcher-developed Rhythmic Skills Hierarchy. Composite scores were analyzed using analyses of covariance to compare differences between groups on adjusted posttest scores and to examine the potential benefits of peer-assisted learning (PAL) treatment types. There were significant differences between the teacher-only (T-O) and the symmetrical peer-assisted learning (SPAL) groups when compared to the asymmetrical peer-assisted learning group (APAL). The T-O and SPAL treatment types were both effective learning models for melodic sight-reading achievement but with nonsignificant results on rhythmic sight-

reading.

Collaborative learning models are not new in the field of education; however, in the field of music education, traditional teacher-directed instruction is predominant. I conclude that teacher modeling encourages the internal music representations necessary for sight-reading in choral students. Also, symmetrical peer-assisted learning strategies improve melodic sight-reading skills and are a suggested practice as a complement to teacher-directed instruction. Furthermore, symmetrical peer-assisted learning is effective in supporting melodic sight-reading. This study contributes to the body of research in music education, rhythmic and melodic sight-reading, and peer-assisted learning strategies in a chorus.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AMEB…… Australian Music Examinations Board

ANCOVA….. Analysis of Covariance

APAL……. Asymmetrical Peer-Assisted Learning

BU……..Boston University

CFA……....College of Fine Arts

CITI……Collaborative Institutional Training Initiative

CWPT…….Classwide Peer Tutoring

HSR……Human Subjects Research

IEP……..Individualized Education Program

IRB……..Internal Review Board

MPA……....Music Performance Adjudication

NAfME……....National Association for Music Education

PAL……..Peer-Assisted Learning

SES……..Socioeconomic Status

SPAL……...Symmetrical Peer-Assisted Learning

TDI……..Teacher-Directed Instruction

T-O……..Teacher-Only

VSRI……Vocal Sight-Reading Inventory

VSRI/MS…….Vocal Sight-Reading Inventory adapted for Middle School

WFPS……...Watkins-Farnum Performance Scale

ZPD……..Zone of Proximal Development

Chapter One

Introduction

As a choral music educator who has taught students from kindergarten to college, I have often reflected on how children learn to read music and upon effective practices for teaching rhythmic and melodic sight-reading. The majority of my teaching assignments have been with economically disadvantaged students in urban Title I schools. For many students, the development of musicianship skills, such as reading and writing music, is limited to what they can learn in general music, band, or chorus classes, in part because few can afford private music lessons. The obstacles that my students face with rhythmic and melodic sight-reading initiated my research interest in the learning contexts that help support those processes.

As a music educator, I hold two primary objectives for my choruses: quality ensemble performances and the development of individual music literacy skills. Music performance involves a range of skills, which include recalling the melody, memorizing the lyrics, and singing or playing technique. Music literacy, in part, is defined as the ability of individuals to sight-read music and to understand the elements of music. Individual sight-reading competency strengthens an ensemble's overall sight-reading, practice, and performance. The National Core Arts Standards for Music (NAfME, 2014) listed music literacy as a central focus of music education with an emphasis on the processes in which musicians engage, including creating, performing, and responding. Performing includes the ability to identify, read, and write the elements of music, including rhythm, melody, harmony, and structure. Sight-reading rhythm and melody are

essential components of performing and in the cultivation of music literacy skills. In my choruses, the collective effort of students in sight-reading had a positive impact on the musicianship and performance level of the ensemble.

My interest in peer-assisted learning and sight-reading began at a high school where I had taught for many years. At that school, advanced students had opportunities to serve as mentors to novice students across the curriculum. One student, in particular, excelled in her role as a student mentor in chorus class and demonstrated the possibilities of peer-assisted learning for me. She applied herself vocally and worked diligently at music reading and writing. She practiced key identification, solfege, and rhythmic sight-reading to assist other choral students better. Novice singers seemed to understand her way of explaining musical skills and terminology. The opportunity to serve as a peer mentor contributed to her musical accomplishments and her later decision to become a music educator. During her audition and interview process as a music major, the student was asked, “with whom have you studied private voice”? She told the music panel that everything she had learned, she learned in chorus class. She entered the music education program the next semester. This student overcame her limitations for private instruction through her role as a peer mentor. Her success caused me to question my previous years of teacher-directed instruction when I had not included peer mentoring. Reflection on my teacher-only approach required me to reconsider the opportunities I offered for collaboration in the development of music sight-reading.

From these classroom experiences, my research interest unfolded in two parts. First, I wished to understand the ways in which students problem-solve music symbols

into sight-reading and accurate performance. Second, I wanted to understand what learning context, teacher-only or types of peer-assisted learning (PAL), support the independent problem-solving of sight-reading.

Problem-Solving

For the purposes of this study, cognition and thinking are liberally defined as problem-solving. According to Rogoff (1990), problem-solving is "functional, active, and grounded in goal-directed action" (p. 8) and the learner makes use of social guidance. Problem-solving, as an active process, includes the integrated mental processes of "remembering, planning, and categorizing" and uses social guidance to reach goals, construct narratives, and to communicate successfully (p. 9). According to Vygotsky (1978), this social context of learning is one of guided instruction, which is essential to model actions, to determine the meaning of events, to label objects, and to provide information for the learner. To Vygotsky, the guidance provided by an adult or more capable peer assists the child to problem-solve that which they cannot problem-solve alone. Guided instruction is a means of communication between the child, the subject, and their environment (inter-psychological), which upon conversion to "internal speech" (intra-psychological) helps to organize the child's thoughts, negotiate symbols, and independently problem-solve (Vygotsky, 1978).

Mental Representations of Music

Children in the early phases of music-making sing, play and interact with sound without the encumbrance of music symbols (McPherson & Gabrielsson, 2002). The young child internalizes mental representations of sound before the introduction of those

sounds as symbols in music notation (Lehmann et al., 2007). A mental representation generally refers to the internal reconstruction of the outside world. According to Lehmann, Sloboda, and Woody (2007) "It is important to emphasize mental representations because they underlie the whole range of musical skills, starting with remembering music to reproducing it and creating it" (p. 21). The higher-level mental skills of perception, kinesthetics, problem-solving, and memory work together to reconstruct the learner's internal music representations when sight-reading music; examples include decoding notes, recognizing patterns, and engaging motor skills for performance (Lehmann & McArthur, 2002). Emphasis on the development of mental representations of music is foundational to music sight-reading and to all musical skill development, including "remembering, "reproducing," and "creating" (Lehmann et al., 2007, p. 21).

Music Symbols

According to McPherson and Gabrielsson (2002), "Sound before symbol" approaches to music literacy help students to develop their mental representations through active music-making long before learning to read and write music. Playing by ear "as preparation for literacy development" is important in the beginning stages of music-making (McPherson & Gabrielsson, 2002, p. 113). Singing and performing by ear develops the child's internal mental representations of music and continues to be important after the introduction of music symbols.

Music symbols as with other forms of symbolic representation are tools which support cognitive adaptations in the process of music learning. Lehmann et al. (2007)

encourage “novices to rely on and train their internal music representations instead of merely cueing motor programs through visual input” (p.111). Internal music representations include patterns of sound that will be accessed when interpreting patterns of music symbols later. For the learner, music reading is a “reconstructive process that depends on previous knowledge” (Lehmann et al., 2007, p.110) acquired in the development of those mental representations.

Individuals must develop listening skills to improve their mental representations of rhythmic and melodic patterns and to recognize those patterns in symbolic form in order to sight-read music. Musical behavior is the ability to perform those mental representations of sound. Instead of reading note-by-note, the reader looks for units of rhythmic or melodic patterns that are meaningful (Lehmann et al., 2007; McPherson & Gabrielsson, 2002). Patterns of information, or “chunking,” link the visual input to previously stored information or knowledge acquired from hearing rhythmic and melodic patterns (Lehmann et al., 2007). Chunking is a “memory mechanism” that links perception to that previously-stored musical knowledge (Lehmann et al., 2007, p.112). Sight-reading then is an indicator of the individual’s ability to form mental representations of music and to reconstruct them through performance.

Music Sight-Reading

Sight-reading is defined as the interpreting and performance of a music example, on first sight, or non-rehearsed (Henry, 2001; Lehmann & Kopiez, 2008). As with young children, the prerequisite skill for sight-reading is singing and performing music by ear, which assists musicians in the development of internal music representations or mental

representations of music. The learner develops expectations for the visual stimulus based on their mental representations of similar patterns previously performed (Lehmann et al., 2007). The learner's development of internal music representations precedes and facilitates their ability to problem-solve and sight-read music, and to perform accurately.

Rhythm and Melody

Researchers suggest that the mental representations for rhythm and melody are discrete processes (Schön & Besson, 2002; Henry, 2001). When sight-reading musical symbols, individuals process rhythmic and melodic components separately, first rhythm, then melody (Schön & Besson, 2002). The speed at which a child processes visual input plays a role in sight-reading ability (Kopiez & Lee, 2008). The ability to read, interpret and reproduce symbols and the processing speed of visual input increase on a continuum of sight-reading skills and achievement (Lehmann & McArthur, 2002).

Pattern and Note Chunks

In order to improve the speed in which a learner processes visual input into performance, rhythmic and melodic patterns need to be practiced both by ear and in combination with music notation. Practicing pattern recognition and chunking note events may enhance the capacity to process music information (Kopiez & Lee, 2008). The size of musical chunks varies according to the individual's ability level and previous exposure. According to Lehmann et al. (2007), "similar to the grammar of spoken language, musical meaning is also enabled by the regular and predictive structure of music" (p. 112). Predictive structures in music should first be practiced through singing and listening by ear and later looked for as patterns or chunks in music sight-reading.

Music Literacy in Social Learning Contexts

Music literacy is the desired outcome when an individual attains a high degree of proficiency to hear and reproduce musical symbols. The ability to analyze musical elements and sight-read helps to develop individual musicianship and inform performance, both alone and with others (McPherson, 1994). Just as a young child's cognition develops in social contexts as a reconstructive process of inner speech (Vygotsky, 1978), so too, a musician's ability to sight-read develops in social contexts as a reconstructive process of internal mental representations of music (Lehmann et al., 2007). The social context of learning needs to support the development of internal mental representations of music and sight-reading. Understanding this connection between the reconstructive process and the social context in which music learning occurs is paramount to this research.

Sight-Reading and Middle School Chorus

Young adolescents in middle school face significant social, emotional, and physical and vocal changes that may make music sight-reading challenging. According to Nichols (2012), the middle school years mark "the beginning of adolescence and bridges the formative elementary years of general music to the often-performance-based experiences of high school ensemble study" (p. 88). In middle school, opportunities exist for a strong foundation in music appreciation and the development of musical skills, yet extensive research shows wide discrepancies in the amount of time given to music reading in choral classrooms (Daniels, 1986; Demorest, 1998; Nichols, 2012). Middle school choral students need opportunities to develop music reading skills, yet Nichols

(2012) reported 10.5 % of middle school teachers surveyed (N=161) did not teach sight-reading to all of their choirs in a study of chorus teachers' instructional practices. Reasons for not teaching sight-reading cited by respondents was a lack of time and materials or reliable assessments.

Sight-Reading Assessment and Chorus

Individual assessment of singers is limited in many choral programs due to the constraints of time, structure, and lack of appropriate assessments; however, there is evidence that individual sight-reading assessment might both measure and facilitate musical skill progress (Demorest, 1998; Henry, 2001). In an examination of the impact of individual assessment on sight-singing achievement in advanced and beginner choirs at six high schools, Demorest (1998) found that the schools that received the experimental treatment of individual assessment demonstrated significant differences from the schools that did not have the individual assessment. If incorporating meaningful sight-reading assessments reinforces discrete sight-reading processes, then music directors need to examine traditional rehearsal structures that limit individual assessment.

Guided Instruction in Chorus

Learning partnerships between teachers and students impact music learning in the middle school chorus. Freer (2008) investigated the quality of guided instruction with the use of instructional scaffolding language in a study on the relationship between teacher language use and the student quality of experience during choral rehearsals at a middle school. By comparing the instructional language of two middle-level choral teachers in a rehearsal setting, Freer (2008) found strong associations between the use of scaffolding

language, sequential units of instruction, and the quality of peer-based student experiences. Learning occurred when the student accepted a new challenge, higher than those previously presented, and from the social support found in group work with peers. Freer (2008) described the multi-faceted social context of music learning as requiring coordination among diverse intellectual and physical skill levels, which co-occur at the individual and group level. In conclusion, Freer (2008) determined that "music teachers should be encouraged to re-envision the middle school choral rehearsal-dispelling any notion that choruses must be rehearsed in a rigidly organised, large-group formation without opportunities for individual student contributions" (para. 42).

Collaborative Learning

Pedagogical movements rooted in social development theory have made inroads toward democratic teaching models that are student-directed, cooperative, and collaborative. A child learns in social contexts by negotiating speech and symbols in an individual developmental process that reconstructs the child's cognition as inner speech (Vygotsky, 1978). These processes are simultaneously inter-psychologic and intra-psychologic; first, the child learns with others and next, within. Functions in the process of maturation exist in a dynamic developmental state known as the zone of proximal development [ZPD] (Vygotsky, 1978). The ZPD is that in which the child cannot problem-solve alone, but can with the help of an adult or more capable peer. Teacher-only approaches that do not include peer-based opportunities may result in a surface approach to learning (Topping & Ehly, 1998). A potential solution to a surface approach

to music learning may exist between a student's ZPD and their problem-solving of sight-reading and the implementation of peer-assisted learning strategies.

Peer-Assisted Learning

PAL strategies have been successful in inclusion music classrooms and hold potential for music instruction in other settings, as well, such as general music classes and performance ensembles (Jellison, Brown, & Draper, 2015). Topping and Ehly (1998) defined PAL as symmetrical (SPAL) when it occurs between peers of equal cognition and asymmetrical (APAL) when it occurs between peers with one peer of higher content cognition. Reciprocal PAL is a structure in which partners alternate roles as the helper and the helped (Topping, 2005). PAL research has revealed achievement benefits to varied student populations, grade levels, and across academic subject areas and classroom structures (Rohrbeck, Ginsburg-Block, Fantuzzo & Miller, 2003); however, music directors typically do not structure rehearsals to include opportunities for collaboration (Allsup, 2012; Green, 2008; Johnson, 2017; Lebler, 2008; Shieh, 2008).

PAL and Sight-Reading

Traditional music instruction that is either Teacher-directed (TDI) or Teacher-only (T-O) may limit music development for some students when compared to PAL approaches. In a study of the effects of reciprocal PAL activities on rhythmic sight-reading, Johnson (2011) compared reciprocal PAL to traditional teacher-led or teacher-only music instruction. Johnson (2011) found that PAL had significant effects for all instrumental and choral participants. The most significant results occurred with chorus participants whose initial rhythmic sight-reading scores were lowest. Johnson (2011)

found PAL strategies to be more effective on rhythmic sight-reading than teacher-guided instruction. Johnson (2011) found that chorus students who participated in reciprocal PAL did significantly better on rhythmic sight-reading than chorus students who only received traditional teacher-guided instruction. It is then, the overuse of teacher-directed instruction that limits the sight-reading abilities of music students (Allsup, 2012; Green, 2008; Johnson, 2017; Lebler, 2008; Shieh, 2008) and leads to a "surface level of learning" (Topping, 2005, p.638).

Problem Statement

Sight-reading in middle school chorus classrooms, as an indicator for and the development of internal mental representations of music, is underutilized (Kopiez & Lee, 2008; Lehmann et al., 2007). The failure to reveal in order to assess the mental representations of singers limits our understanding of their abilities to represent sound (Demorest, 1998; Henry, 2001). The negative impact for singers may be an increased reliance on an aural model to problem-solve rhythmic and melodic music notation (Rogoff, 1990). In music education practice, the social context in which sight-reading is learned, such as teacher-only approaches, may limit sight-reading effectiveness to a "surface level" of understanding (Topping, 2005). Despite the success of PAL strategies in varied educational and music settings (Johnson, 2017; Lebler, 2008), traditional structures persist in music classrooms and ensemble settings (Freer, 2008; Johnson, 2017), potentially negatively impacting the ability of students to independently problem-solve rhythmic and melodic sight-reading.

Purpose and Research Question

There is a void in the body of research in music education that examines the extent to which the social context of the learning model impacts the development of sight-reading abilities in choral students. Consequently, the purpose of this study was to investigate the effects of teacher-only, reciprocal symmetrical PAL, and reciprocal asymmetrical PAL learning models on the rhythmic and melodic sight-reading ability of middle school choral students. The specific research question addressed in this study was:

> What, if any, significant differences exist in the effectiveness of teacher-only, symmetrical peer-assisted, and asymmetrical peer-assisted, learning models on rhythmic and melodic sight-reading proficiency among middle school choral students?

Theoretical Framework

A collaborative instructional framework may improve sight-reading proficiency with the implementation of peer-assisted learning (PAL) strategies. Research in music education has demonstrated benefits to peer-assisted learning on individual sight-reading skills (Johnson, 2011); however, there are inconsistencies in the scholarship as to which types of collaborative learning facilitate music learning and specifically, rhythmic and melodic sight-reading skills (Johnson, 2017; Kusek, 2017).

Peer Mentoring

One type of peer-assisted learning is peer mentoring. Peer mentoring is a one-to-one relationship in which a more experienced learner works with a less experienced learner in a common area of interest. Characteristics of peer mentoring include positive

reinforcement, peer role modeling, counseling, and joint problem-solving. (Topping, 2005; Rogoff, 1990). In a study of reciprocal peer mentoring in a post-secondary piano lab, Foster (2014) observed music literacy benefits in the area of rhythm. The participants for this study included ten piano lab participants with little to no previous piano instruction. In the area of music literacy, Foster (2014) observed improvement in rhythm on a benchmark assessment after providing reciprocal peer mentoring opportunities in instruction. Using a variety of data collection techniques including observation, interviews, and artifacts, Foster documented emergent themes related to reciprocal peer mentoring, including positive interactive learning and peer validation. Peers reported enhanced comprehension and communication, motivation, and self-management acquired from peer interactions. Additional peer perceptions included social bonding, interdependent relationships, enhanced efficacy, and personal satisfaction. Foster (2014) reported that peers held a negative view of traditional instruction and group learning models that did not embrace shared authority and dialogue between knowledgeable peers. Ultimately, Foster (2014) concluded that there is merit in using reciprocal peer mentoring models in music education because they may benefit rhythmic reading.

Reciprocal PAL strategies may be effective for rhythmic sight-reading in music settings (Foster, 2014; Johnson, 2011). Reciprocal PAL strategies may facilitate rhythmic and melodic sight-reading achievement in chorus ensembles. While there have been studies on forms of PAL in general music settings (Darrow, Gibbs, & Wedel, 2005; Green, 2008) and instrumental ensembles such as jazz settings (Goodrich, 2007; Kenney, 2014) and middle school band (Johnson, 2011, 2013) and orchestra ensembles (Kusek,

2017; Webb, 2012) there has been limited research in chorus ensembles.

Peer Mentoring In Chorus

VanWeelden, Heath-Reynolds, & Leaman (2017) investigated the impact of peer mentoring in a chorus where students with disabilities worked in pairs with typical chorus students. The structure of the dyads for this study was asymmetrical and non-reciprocal. VanWeelden et al. (2017) matched seven participants based on their voice part and the individual personalities of students. Before the study, each group received training in which roles and types of giving or receiving assistance to expect. The researcher trained the mentors on ways to provide support and mentees on how to receive assistance. During the 12-week study, mentors assisted mentees with score reading, with following the conductor, and with music-related skills in chorus class. VanWeelden et al. (2017) reported discrepancies between the mentors' and the mentees' perceptions of success; positive and negative, respectively. The mentors reported improvement and success in their mentees' musical progress. The mentees reported enjoyment in their relationships with their mentors and wished to continue those relationships socially despite losing interest in continued music study. VanWeelden et al. (2017) concluded that the mentees' loss of interest in music study resulted from mentees gaining a more realistic awareness of deficits in their musical abilities. Whereas VanWeelden et al. (2017) reported a positive social result of peer mentoring for the choral students with disabilities, there was not a comparable result in their musical skills. The focus of this study was on the perceived improvements in music-related tasks of the choral students with disabilities. It did not address potential improvement in the music-specific skills of the mentors.

The benefits of PAL approaches found in other academic subjects, instrumental ensembles, and conservatory settings may also have value in middle school choral ensembles. Whereas there is extensive PAL research at the elementary level, there is limited research on PAL in secondary schools or music content areas, and more specifically, choral programs. Although conscious music learning, as an intra-psychologic process (Vygotsky, 1978), is known to help learners progress from a surface level of learning to a deeper level of learning; and that such learning is likely enhanced by "role reciprocation" (Topping, 2005, p. 638), there is a dearth of PAL research in choruses. There is a need to investigate how types of PAL enhance this deeper level of learning in sight-reading. There is a need to determine which PAL types most effectively encourage individual rhythmic and melodic sight-reading skill development. There is a need to investigate the music literacy benefits of reciprocal-type PAL strategies in choral ensembles. Also, in order are studies that compare asymmetrical and symmetrical PAL types and traditional teacher-only learning models, separately and in combination, in music ensembles.

Significance of the Problem

There is a need to understand how children engage in collaborative processes with adults and peers in musical skill acquisition. There is a need for better understanding of melodic and rhythmic sight-reading as independent problem-solving. There is a need to understand the importance of sight-reading as an indicator for and the development of internal mental representations of music. In music education practice, the social context in which sight-reading is learned, such as teacher-only approaches, may limit sight-

reading effectiveness to a "surface level" of understanding. Therefore, it is important to investigate the efficacy of types of learning models on rhythmic and melodic sight-reading in music ensembles such as chorus.

Summary

In this investigation, I compared the social contexts of the learning model (teacher-only, reciprocal symmetrical peer-assisted learning, and reciprocal asymmetrical peer-assisted learning) in which music learning occurred and how the types of peer-assisted learning impacted the development of sight-reading skills. The results of this research of PAL on rhythmic and melodic sight-reading may have implications for the improvement of sight-reading achievement in music education practice, especially in middle school choral settings. The results of this study may provide insight into the role of sight-reading as an indicator for and the development of internal mental representations of music. The results of this study will help music educators understand the degree in which the efficacy of sight-reading is influenced by the learning model, specifically; teacher-only, SPAL, and APAL. Furthermore, the results of this PAL study add to the base of knowledge in peer-assisted learning, education, and music education research.

Chapter Two

Literature Review

A review of the literature on forms of collaborative learning such as PAL approaches provides insight into how children learn. Research about the ways that children engage in collaborative processes with adults and their peers may lead to more effective instruction and increase skill acquisition across content areas. Development and learning are components of an interdependent process of external learning in social contexts in which children later internalize and learn to independently problem-solve complex tasks such as reading. Similarly, children engage in collaborative processes with adults and peers in musical skill acquisition and acquire new understandings of melodic and rhythmic sight-reading. Their engagement takes the form of both interdependent and independent problem-solving processes. Collaborative learning models are not new in the field of education; however, traditional teacher dominated instruction persists in the field of music education. Research on peer-assisted learning in music contexts and its implications for music educators informs practice, assessment, and the development of music literacy skills.

Collaborative Learning

In his book, Mind in Society (1978), Vygotsky laid the foundations of social development theory, which has greatly influenced educational theory and practice. Vygotsky (1978) theorizes that children develop through interactions with others as part of an interdependent process in which children learn in two ways. First, they learn externally in relationship with others. Second, they learn internally. Vygotsky focused on

the influence of social relationships on the underlying psychological processes more so than he did on the external outcomes (1978). Paramount to Vygotsky's social development theory is the role of children's relationships with adults and more capable peers in the developmental learning process. Vygotsky's advancements in the field of psychology had a significant impact on educational theory and practice, which later credited him as the father of sociocultural learning theory.

Sociocultural Learning Theory

Sociocultural learning theory connects the cognitive development in children with social relationships and sociocultural tools and practices (Rogoff, 1990). The relationship between learning and development is rooted in social contexts or that which connect the child both to a world of objects and with other people (Vygotsky, 1978). According to socio-cultural learning theory, for young children, the development of cognition is first an external activity. That is, it takes the form of an inter-psychological process in response to the world of objects and people around the child, such as parents and caregivers. Internally, an intra-psychological process of signs, tools, and speech reconstructs the child's cognition as inner speech. Cultural development occurs first on a social level and second on an individual level: processes happen concurrently as inter-psychologic and intra-psychologic (Vygotsky, 1978). Vygotsky (1978) referred to this developmental process and learning capability as a dynamic zone between the actual developmental level and the potential developmental level.

Zone of Proximal Development

Learning is the result of a long series of developmental events that occur within a dynamic developmental state. Vygotsky (1978) defined this dynamic developmental state as that where “those functions…have not yet matured but are in the process of maturation" (p. 86). According to sociocultural learning theory, the child’s level of mental development results from the completion of developmental cycles in which learning occurs during the process of developing culturally. However, according to Vygotsky (1978), learning and development are not the same; instead, they are interdependent. If instruction occurs in a social context, then the intra-psychologic or inner speech of the individual ensues learning. Learning then involves the transformation of an interpersonal process into an intrapersonal one that is mediated by language. According to Vygotsky (1978), "developmental processes do not coincide with learning processes. Rather, the developmental process lags behind the learning process; this sequence results in zones of proximal development" (p. 90). The child’s ability to problem-solve is related to the dynamic developmental state between the actual and the potential developmental levels that Vygotsky (1978) terms the zone of proximal development (ZPD). That is, the child’s problem-solving ability transforms their interpersonal process into an intrapersonal one; that transformation results in learning.

Independent Problem-Solving

The child’s actual developmental level is what the child knows and can do independently. The potential developmental level is what the learner will know and be able to do in the future. According to Vygotsky (1978), children can imitate a variety of

actions well beyond the limits of their capabilities. Adults and peers play an essential role in the child's actual developmental level and what they know and can do alone. Vygotsky (1978) asserted that "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers" (p. 86). Once the child internalizes these processes, they become part of the child's independent developmental achievement. Problem-solving then is an integrated process of thinking and action, cognition, and skills which may occur independently, with guided instruction or in collaboration with others.

Collaborative Problem-solving

In attempting to understand how children engage in collaborative processes with adults and peers, new opportunities for instruction emerge. When children take an active role in learning and make use of social guidance in skill acquisition, a bridge to new understandings develops (Rogoff, 1990). The role of a more capable peer is beneficial for tasks related to skill development (Rogoff, 1990; Vygotsky, 1978). In shared problem-solving, a skilled partner may bring clarity to the nature of a problem and provide direction for reaching the desired goal. The more capable peer helps the less experienced peer process new information as it arises during the problem-solving process and helps his/her partner understand the relevance of actions taken.

There are added educational benefits derived by the skilled partner as they acquire a better understanding of the process they facilitate, the topic, and in communication. According to Vygotsky (1978), language is central to the collaborative problem-solving process and "arises initially as a means of communication between the child and the

people in his environment. Subsequently, upon conversion to internal speech, does it come to organize the child's thought, that is become an internal mental function" (p. 89). The cognition and skills children acquire through shared problem-solving may include explanation, discussion, expert models, active participation and observation, and role arrangements (Rogoff, 1990). When a child acquires the ability to communicate through language, it is possible to understand more fully the relationship between their learning, their social environment, and individual development.

Guided Instruction

Language is central to traditional educational models where guided instruction is a teacher-directed privilege. Images of a typical classroom may consist of neat rows of desks with the teacher in a lecturing role. A typical lesson may consist of information, direction, and explanation that are teacher-led. Guided instruction is important for children to model actions, to determine the meaning of events, to label objects, and to provide information (Vygotsky, 1978). Teachers help children to find connections between old and new situations and draw similarities across situations (Rogoff, 1990). Guided instruction is a means of communication between the child, the subject, and their environment, (inter-psychological) which upon conversion to "internal speech" (intra-psychological) helps to organize the child's thoughts (Vygotsky, 1978). Properly organized learning, as with guided instruction, results in mental development that facilitates both cultural and psychological developmental processes within the dynamic zones of proximal development.

Zone of Proximal Development and Music

A comparison between language acquisition and music reading acquisition provides insight into the differences between the actual music developmental level and the potential musical developmental level for individual music students. An individual's actual music level is what the individual knows and can do independently in music. The potential music level is what the individual will know and be able to do musically in the future. Just as dynamic zones of proximal development require properly organized learning in language development, so do dynamic zones of proximal development in music content.

According to Vygotsky (1978), one would not expect a young child to read in the early stages of learning to speak, and so it ought to be with music learning. Children must first listen, sing, and play by ear to develop unified patterns of music in preparation for literacy (McPherson & Gabrielsson, 2002). A problem with most instrumental method books is the early emphasis on symbols and music notation before the child has developed an awareness of sound (Sloboda, 2004). Before an introduction to symbols of music notation, beginning instrumentalists first must hear and develop music knowledge as internal music representations or patterns of information (Sloboda, 2004). Previously stored music information precedes the introduction of music symbols and notation (Lehmann et al., 2007). The ZPD for music content would be the dynamic zone between the sounds and music patterns that the child has internalized and can reproduce, to those which they will be able to read and reproduce later.

Sight-Reading Processes

Sight-reading music is the interpreting and performance of a piece of music at first sight (Henry, 2001; Lehmann & Kopiez, 2008). According to Lehmann & McArthur (2002), sight-reading involves multiple psychological processes, which include perception, kinesthetics, memory, and problem-solving skills. Visual perception involves both "data-driven, bottom-up" and "conceptually driven, top-down" processes (Lehmann & McArthur, 2002, p. 137). In the first, the reader perceives "the physical properties of an object" such as "shapes, sizes, and pitches" (Lehmann & McArthur, 2002, p. 138). The second is conceptually driven, and interfaces with concepts learned and stored in long-term memory, such as the gestalt principles of proximity; how the human eye draws connections between visual elements; and continuation, the connectedness between design elements as a whole.

There is a link between the visual input and previously-stored knowledge that is essential for sight-reading music. According to Lehmann & McArthur (2002), the ability to perform from notation without rehearsal is a "reconstructive process that involves higher-level mental processes, primarily initiated by visual input but also by conceptual knowledge and specific expectations" (p.135). At first sight, as a "bottom-up process, the performer scans the music for familiar features which include recognizable melodic and rhythmic patterns. Instead of reading note-by-note, the skilled reader looks for units of rhythmic or melodic patterns that are meaningful (Lehmann et al., 2007). Patterns of information, or "chunks," of visual input result in the reader's inner hearing of familiar patterns in their head. The kinesthetic action of singing or playing follows the visual

pattern recognition as an auditory representation and active reconstruction of the music.

Teaching sight-reading supports the reader's ability to produce "mentally imagined sound" through visual pattern recognition and the development of internal music representations (McPherson & Gabrielsson, 2002, p. 102). Pre-notational skills that help formulate a child's internal music representations include singing, playing and the hearing of, and imitation of, sound. Music instruction guides the child to listen for similarities and differences in musical patterns. According to Kopiez & Lee (2008), practicing pattern recognition and chunking note events facilitates the music sight-reading process. Teaching sight-reading through pattern recognition may improve the individual's ability to form mental representations of music and to reconstruct them in performance. According to Lehmann & McArthur (2002), "It may be that the musician's main problem in sight-reading is to supply enough patterns and rules from memory for the described semiautomatic deciphering and pattern-matching process, so that most of the music is executed effortlessly" (p.144). It is then the role of the music educator to identify and reinforce a variety of rhythmic and melodic patterns into instructional practice.

In a study on the early stages of pitch and temporal information processing in music reading, Schön & Besson (2002) determined that pitch and duration are independent processes. In this study, Schön & Besson (2002) presented 18 amateur French-speaking musicians with a key and time signature immediately followed by a target note. The purpose of the study was to determine whether pitch and duration are processed as two separate dimensions or as integrated dimension processes. To create

strong expectancies for the pitch and duration of the target note, the key and time signatures were given first as a probe. The participants then were asked to quickly decode the note for matched or not matched tonal or metrical information. The participants were required to judge only one dimension (pitch or duration) of the target note. Schön and Besson (2002) determined whether or not the irrelevant dimension produced an interference effect on the relevant dimension. Based on data analysis, Schön and Besson (2002) concluded that melodic and rhythmic functions are independent sight-reading processes: first of pitch and second of rhythm.

Kopiez and Lee (2008) researched a combination of practice-related and practice non-related skills with sight-reading achievement in a study of 52 piano-major students and college graduates. There were significant relationships between inner-hearing and sight-reading expertise. The time spent on activities related to sight-reading skills determined the level of sight-reading expertise. The speed at which individuals processed information was significant but un-related to sight-reading practice length. The authors found that fluency in sight-reading was more influenced by mental speed than by memory capacity or general cognition. Kopiez and Lee (2008) concluded that the way to enhance information processing is to practice pattern recognition and chunking of note events.

Sight-Reading in Chorus

Music literacy, or the ability to read, interpret, and reproduce symbols into vocal performance, is vital in choirs. The National Core Arts Standards for Music standards (2014) emphasize music literacy of which sight-reading is a process component. An

analysis of the musical elements of time signature and meter, melodic and rhythmic notation informs vocal sight-reading and performance. Understanding the sounds that the notes represent and the melodies and phrases they form in combination lead to music skill development. Understanding the relationship between written symbols and internal music representations or remembered sound informs teaching methodology for sight-singing (Lucas, 1994). Sight-reading sets a pathway to music literacy.

Before the 1980s, the development of sight-reading skills was a primary objective in music education programs (Daniels, 1986). Choral pedagogy that focused on sight-reading skills as the basis for instruction gave way to rote teaching of choral literature in subsequent years (Daniels, 1986). In a descriptive study that investigated sight-reading performance in 20 high school choruses in the southeastern United States, several predictor variables were identified, including the school, the music curriculum, the teacher, and individual student characteristics. Daniels (1986) did not attempt to show cause and effect but rather pointed to relationships between variables, alone or in combination that influenced individual sight-reading ability. Daniels (1986) concluded that the most significant factors of sight-reading ability were the ethnic make-up of the school, the individual students, and the teacher, rather than the chorus curriculum. Daniels (1986) cited the teacher's promotion of sight-reading as an important curriculum objective as the most influential factor in sight-reading achievement.

Demorest & May (1995) examined the individual sight-reading skills of members five of the top secondary choirs at four Texas high schools. This investigation included a comparison of the system used for group sight-singing instruction; two schools used a

movable-do system, and two used a fixed-do system. Additional investigation of individual members' private musical training, their years of choral experience, and the relative difficulty of the melodic material took place. Demorest & May (1995) concluded that both years of experience and the inclusion of sight-reading into choral instruction were the two most important variables of sight-reading success. Private music study also was a predictor of sight-reading success with piano study achieving more significant results than instrumental or vocal private study. Background variables played a notable role in predicting sight-singing success with the exception of choral experience outside of school. There were significant results associated with movable-do sight-reading systems. The authors attributed the higher results with a moveable-do system to the frequent and systematic individual assessment of choir students on sight-reading however, did not determine which system to use. Consistent with Daniels (1986), it was the focus of sight-reading into the curriculum that indicated favorable results.

Individual Vocal Assessment

Demorest (1998) examined the impact of individual assessment on sight-singing achievement in advanced and beginner choirs at six Washington State high schools. Using a quasi-experimental pretest/posttest design, Demorest (1998) measured the effects of individual assessment on individual sight-reading ability. All choirs received sight-singing instruction. Three choirs received the experimental treatment of individual assessment, three times in one semester; the remaining three choirs acted as control groups and received classroom instruction only. The sight-reading assessment included one major melody and one minor melody. Demorest (1998) found significant results for

the experimental group when reading the major melody, but not for the minor melody. Demorest (1998) attributed this finding to the classroom instructional emphasis on major melodies. The schools that received the experimental treatment of individual assessment demonstrated significant differences from the schools that did not have individual assessment. Demorest (1998) noted significant between-school differences; instruction was a contributing factor. Demorest (1998) concluded that there was a need for further study on the interaction between individual testing and specific instructional approaches. Consistent with the body of research (Daniels, 1986; Demorest & May, 1995) Demorest (1998) argued that individual sight-reading assessment might both assess and facilitate musical skill progress.

Opportunities for individual assessment in choirs differ from those in instrumental programs. Concert performances have historically been used to evaluate choral program success rather than individual achievement (Henry, 2001; Nichols, 2012). Opportunities for individual assessments of singers are limited in choir rehearsals due to the constraints of time and structure (Nichols, 2012). According to Henry (2001), problems associated with teacher scoring measures are subjective and vary widely among choral educators. In contrast, instrumental music programs have had greater continuity for individual assessment with the use of the Watkins-Farnum Performance scale (WFPS) (Watkins, 1970) which requires instrumentalists to perform works from a set syllabus for each grade with set guidelines and procedures for consistency by evaluators.

Sight-Reading Assessment Tools

In a study of 101 high school clarinet and trumpet students preparing for the Australian Music Examinations Board (AMEB), McPherson (1994) examined factors and abilities connected to music sight-reading skills; specifically, the relationship between sight-reading and performing rehearsed repertoire. McPherson (1994) identified the types of and most common mistakes made by instrumentalists and students' strategies for sight-reading. McPherson (1994) found no significant correlations between sight-reading and students' ability to perform a repertoire of rehearsed music for beginner instrumentalists. McPherson (1994) did find a significant correlation between sight-reading and performance for the more advanced instrumentalists who demonstrated self-regulating procedures or mental rehearsals before sight-reading attempts. Examples of mental rehearsal skills that successful readers used included paying attention to the time signature, key, and scanning notation for difficult passages before sight-reading. McPherson (1994) chose the WFPS assessment tool for this study due to attention to the accuracy of pitch, rhythm, technical and dynamic, and expressive markings. The rhythmic and tonal aspects of WFPS represent those that instrumentalists commonly experience in repertoire.

VSRI

No comparable instrument to assess music sight-reading in choral singers had been available until Henry (2001) developed a Vocal Sight-Reading Inventory (VSRI). In a similar process to WFPS, Henry (2001) extracted the tonal and rhythmic components from choral repertoire commonly performed to develop the VSRI. Sight-reading

examples are structured in a manner to include meaningful units or patterns, rather than intervals in isolation (Henry, 2001; Lehmann et al. 2007). Perceptual inputs are grouped into "chunks," in which a selection of music may contain several meaningful components (Lehmann et al., 2007). Sight-reading assessments and instruction are purposely planned to include contextually based units of measure, both melodic and rhythmic, on tonic and dominant scale degrees. Henry (2001) provided a model for vocal assessment that successfully measures inner music representations internalized by the singer.

Cooperative Learning

Cooperative learning models trend toward a more student-centered approach. With cooperative learning, the teacher structures groups with a shared goal or task (Topping, 2005). Cooperative learning, by design, is a structured, positive interdependence between group members toward a common learning task. According to Topping (2005), this type of small group learning requires training to ensure participation by all members of the group. The teacher exclusively determines the tasks, projects, or goals of cooperative learning and the role assignments, resources, and associated rewards (Topping, 2005). One might consider cooperative learning as an extension of teacher-direction. Teacher-directed, rather than child-directed approaches, may result in a surface approach to learning (Topping & Ehly, 1998). Cooperative learning models are more child-centered than teacher-directed instruction alone, so are peer-assisted learning approaches.

Peer-Assisted Learning and Types of PAL

Peer-assisted learning is categorized as a "distinct subset" of cooperative learning and often as a separate but related field of study (Topping & Ehly, 2001, p.114). Peer-assisted learning is a collaborative teaching model in which students work in pairs or small groups. PAL covers multiple learning structures where the learners are not professional teachers (Topping & Ehly, 2001). Learning occurs through "active and interactive" strategies that complement but do not replace professional teaching (Topping & Ehly, 2001). Topping & Ehly (2001) succinctly define PAL as "the development of knowledge and skill through explicit active helping and supporting among status equals or matched companions, with the deliberate intent to help others with their learning goals" (p. 114).

PAL models for classroom instruction take many forms and structures. There are positive attributes of all forms of PAL that make possible a shared understanding of the material, comparison of notes taken, and quick correction. According to research on the types of PAL instructional models, PAL improves retention and students' ability to apply skills and knowledge to new learning challenges (Topping & Ehly, 1998). PAL approaches, as joint cognitive activity, may be more efficient than didactic-only teaching models in part by reducing the teacher to pupil ratio. We also learn from the research that PAL approaches raise standards, are cost-effective, and have social and emotional benefits. Regardless of how PAL is structured, there are learning outcomes from joint cognitive activity.

Joint cognitive activity facilitates the restructuring of a child's internal,

independent cognitive functioning (Topping & Ehly, 1998). Exchanges and communication that occur during PAL happen within the zone of proximal development and stretch the learner's comprehension (Topping, 2005). Peer-assisted learning complements direct teaching approaches and may be effective for the development of skills and cognition for both the helper and the helped.

Asymmetrical PAL

Complementary relationships occur in PAL models where a more knowledgeable peer instructs, encourages and leads a less knowledgeable one, also known as, asymmetrical PAL (Topping & Ehly, 1998). Peer tutoring is one type of asymmetrical PAL arrangement. With peer tutoring, the teacher assigns tutor and tutee roles. These roles are fixed assignments with clear procedures set for interactions, structured tasks, and materials. Peer tutoring models of PAL have a strong focus on curriculum content and generally require some training for tutors (Topping, 2005). Peer tutoring helps students who need to acquire information or skills for cognitive growth (Rogoff, 1990).

Peer mentoring is an asymmetrical model where a one-to-one relationship exists, and positive role-modeling and peer counseling occurs. With peer mentoring, there is a common interest and joint problem-solving but not only focused on curriculum (Topping, 2005). Roles are structured and clearly yet defined as encouraging, supportive, and promoting aspirations (Topping, 2005). Peer mentoring may be cross-age or cross institutions such as high school to middle or elementary schools. The peer mentoring model is frequently targeted at disadvantaged populations (Rohrbeck et al., 2003; Topping, 2005). Peer mentoring is an asymmetrical PAL type that fosters role-modeling

and positive reinforcement, and one-to-one relationships.

Reciprocal PAL

Reciprocal PAL is a collaborative form of PAL in which the individual abilities are not made known, and the dyads make their own rules for communication and share problem-solving. Reciprocal PAL structures encourage all partners to assume the role of both helper and helped (Topping, 2005). Attributes of reciprocal PAL present equal opportunities for all participants to be engaged in the educational process without social distinction, by perceived ability or status (Topping, 2005). Each partner, both the helper and the helped, ought to be challenged by the joint activity. According to Topping (2005), projects could apply to the whole class or targeted to specific subgroups such as gifted students or students with disabilities, at-risk populations or minorities. With a focus on shared problem-solving and equal status, reciprocal PAL strategies are effective collaborative learning models.

Symmetrical PAL

Symmetrical PAL arrangements are reciprocal models commonly used collaborative learning. A definition of SPAL is the placement of pairs with matched or similar ability levels. In reciprocal symmetrical PAL models, the dyads take turns as tutor or tutee, alternating instructional roles (Topping & Ehly, 1998). According to Topping & Ehly (1998), some critics of nonreciprocal PAL approaches cite the issue of power as problematic. Symmetrical PAL models are often used to discourage peer relationships of power from developing in the classroom. There is an aspect of power in all group situations. Power may be undetermined, implied, or given to another peer perceived as

more knowledgeable. Research studies in reciprocal PAL approaches have yielded a solution to problems in power, perceived inequities of ability, and unequal status (Johnson, 2013, 2017; Topping, 2005). Symmetrical PAL holds potential as a reciprocal collaborative learning model.

PAL Effectiveness

Rohrbeck et al. (2003) conducted a meta-analysis of PAL research at the elementary school level and found that PAL is effective with academic achievement and student engagement in learning across varied populations, academic subjects, and classroom arrangements. The authors analyzed 90 studies that spanned 30 years with three objectives: a) to identify hypotheses on PAL effectiveness components derived in relevant theories of developmental and educational psychology, b) to conduct a meta-analysis to test those hypotheses, and c) to review variables of ecological validity or the usefulness of PAL interventions in the classroom. Rohrbeck et al. (2003) concluded that student-centered instruction and peer interaction were central to the evaluation of classroom structure and effectiveness of PAL interventions.

Rohrbeck et al. (2003) further analyzed moderator variables, including demographic characteristics and school settings. The authors found that younger students generally achieved more benefit from PAL than older elementary school students and that students in urban settings received the most significant gains in achievement across subjects. Minority students showed greater achievement gains than non-minority students. Students of low SES also benefited from PAL interventions more than students of middle- or higher SES. The authors concluded that the “greatest intervention effects

occur with students demonstrating the greatest academic needs" (Rohrbeck et al., 2003, p. 250). The social interactive and instructional benefits of PAL may yield the greatest gains in urban schools, regardless of grade level or academic subject.

Topping (2005) ascribed five sub-processes to PAL learning structures that apply to both the helpers and the helped. The five sub-processes include the extension of declarative knowledge, procedural skill, and conditional and selective application of knowledge and skills by extending each's current capabilities. Topping (2005) connects PAL to cognition and Vygotsky (1978) as, "PAL involves support and scaffolding from a more competent other, necessitating management of activities to be within the zone of proximal development of both parties" (p. 637). When carefully implemented, PAL fosters engaged practice, sound-to-symbol consolidation, fluency of concepts (Topping, 2005) into an intra-psychological process (Vygotsky, 1978) demonstrated by core skills. PAL structures benefit learning for both the helper and the helped.

According to Topping (2005), the social context of PAL as a learning relationship develops as a mutual partnership of explicit and implicit rewards in the form of feedback. Feedback in PAL arrangements is increased and frequent. Verbal and nonverbal praise in social interaction may occur unknowingly or explicitly (Topping, 2005). Explicit feedback may be formalized as peer assessment in which peers address the "level, value or worth of the work, products or outcomes of learning," (Topping & Ehly, 2001, p. 118). The focus of peer assessment ought to be on helping the learner to improve performance. Both partners need to regulate their learning with a conscious awareness of their learning interactions to own their learning strategies across a variety of learning contexts

(Topping, 2005). This conscious learning, as an intra-psychologic process (Vygotsky, 1978) is how learners progress from surface level to deep learning and likely enhanced by "role reciprocation," (Topping, 2005, p.638). A mutual learning partnership based on feedback with explicit and implicit rewards is one reason PAL is so effective.

A positive shift occurs with the student's perception of themselves and their peers and their education. PAL learning models promote a cohesive and caring learning environment. The educational result may change a student's attitude toward school and the teacher (Topping, 2005). According to Topping (2005), PAL may promote extended thinking skills rather than 'drill and skill' practice only. Where helping is the norm, a culture of community encourages both personal and social development, cooperation and communication, as well as listening, all of which become transferable skills across educational contexts (Topping, 2005).

Peer-Assisted Learning and Music

The connection of social contexts on learning and development suggests that the music lives of children with disabilities can be improved when interactions with same-age peers in inclusion music environments are frequent, positive, and reciprocal (Jellison et al., 2015). Similarly, PAL may benefit at-risk students, such as in urban schools where significant socio-economic, cultural, or language barriers exist (Jellison et al., 2015). Green (2008) reported positive benefits from informal collaboration in music instruction for underachieving and culturally disenfranchised students. Green (2008) found that disaffected students demonstrated hidden musicality and often took leadership roles in collaborative music projects with their peers.

Classwide Peer Tutoring in General Music

In a study on the effects of classwide peer tutoring (CWPT) in an elementary general music class setting, Darrow et al. (2005) found CWPT to be effective in teaching key signatures. The study included two elementary school fifth-grade general music classes in a Midwestern town. Using the peer tutoring model, Darrow et al. (2005) assigned students to roles as tutor or tutee for two sessions of highly structured and scripted sessions on key signature identification. All participants took a pretest on key identification. The first tutoring session involved flat-key identification in which tutors read scripted worksheets to tutees. Immediately a posttest test was given on flat key signatures. In a second session, tutors and tutees switched roles for a session on sharp key identification. Darrow and colleagues (2005) administered a posttest on key signatures at the end of the session with significant results.

Darrow et al. (2005) found significant differences in pretest and posttest data for all students. They found no significant differences between tutors and tutees in the flat-key subtest, but found significant differences between tutors and tutees in the sharp-key subtest. Over time, the participants lost the immediate recall of the sharp-subtest. The authors found significant results after the second intervention but with short-term effects and raised questions regarding differences in subtest material based on comparison ease or difficulty, flats versus sharps, respectively (Darrow et al., 2005).

Darrow et al. (2005) also encouraged participants to comment on their experiences with tutoring sessions, both as tutor and tutee. Some of the positive comments reported by students included enjoyment in the helping role during sessions;

negative comments by participants most often related to boredom with the material. Student reflections may be essential to evaluate peer tutoring success.

Darrow et al. (2005) concluded that CWPT was effective as a teaching strategy for key signature instruction and that children are capable teachers of musical concepts and of learning the musical concepts they teach. The researchers suggested that some music material may be more suitable for peer tutoring than other materials. As part of the general music curriculum, the targeted skill of key identification was selected as a necessary skill to transition to middle school performance classes. The authors proposed that while children may be capable of peer tutoring roles in general music class, preparing students to serve as peer tutors in music performance contexts may be more complicated (Darrow et al., 2005).

Peer-Assisted Learning in Music Ensembles

PAL approaches to learning have implications for varied educational content areas, including general music, and potentially performance ensembles. Vygotsky (1978) posited that each school subject has a specific relation to the course of child development, which "varies as the child goes from one stage to another" (p. 91). PAL, through purposeful social interaction, may be effective in supporting higher functions in music.

Music ensemble environments designed for participatory group and shared learning opportunities may promote a dynamic, collaborative creative process. The subject-specific import and priority incorporation of PAL-styled instructional methods offer alternatives to traditional, teacher-led, music ensemble rehearsal structures. Music ensembles like a band, chorus, or orchestra tend to follow a traditional class set-up and

involve lesson-plans similar to those of didactic, or teacher-led instruction (Allsup, 2012). Images of a typical music room may include rows of vocal or instrumental sections with the conductor/director in the front. A typical music rehearsal may consist of explanation, direction, and strict observation of conductor cues. The expectation frequently placed on students during rehearsal is to practice their musical part independently after a brief skill demonstration. The limitations of didactic or directed instructional approaches in music ensembles are similar to those in other school subjects. However, music educators have been behind the pedagogical trend toward more student-centered approaches (Allsup, 2012; Shieh, 2008). The actual musical developmental level and the potential music developmental level of individual students may be inhibited without the benefits peer collaboration. Creating an environment within the music ensemble that is conducive to peer learning is preferable.

Cross-Age Tutoring in Applied Music Setting

In a study of cross-age tutoring with string players, Webb (2012) examined the learning process of high school string players as they tutored younger string players. The purpose of this study was to explore the choices, thought processes, and construction of knowledge as the string players served as peer tutors to their younger counterparts. Webb's (2012) research demonstrated that shared-learning experiences increased ownership and motivation for learning for the tutor. In this study, Webb (2012) took videos of four high school peer tutors giving three 30-minute private tutoring sessions. Webb collected information through researcher observation, reflections of the peer tutors, and semi-structured interviews with a focus on the peer tutors, not the tutees. Webb

(2012) determined that tutors were able to reorganize and communicate music concepts and make pedagogical choices based on their prior knowledge and experience. Webb (2012) concluded that shared learning experiences increased ownership and motivation for learning in general and as an impetus to understanding the learning and instructional process.

Classwide Peer Tutoring in Orchestra

In a study of a middle school string orchestra program, Kusek (2017) examined the impact of CWPT form of PAL on student skills in notating and rhythm counting. The focus of this research was to compare Teacher-directed instruction (TDI) with CWPT in a sixth-grade, seventh-grade, and eighth-grade string orchestra classroom. The second area of focus concerned the levels of satisfaction towards learning for each approach. Kusek's (2017) research site was a middle school in eastern Kansas with a mostly Caucasian population. The researcher included all students enrolled in the orchestra class (N = 143). Parental consent was received for some of the orchestra population (n = 107) and student assent (n = 105) for CWPT treatment groups. Parental consent and student assent was not obtained for 37 participants in the TDI control group. Kusek (2017) reported that one student withdrew from the study, changing the total population sample (n=142). Kusek (2017) placed students whose parents declined their participation in the study in the TDI group. Kusek (2017) acquired parental consent and student assent for the satisfaction survey portion of the study. However, Kusek (2017) included all rhythm counting pretest and posttest data in the study from the total sample, n=142. Kusek (2017) randomly assigned the students who agreed to participate in the study to either CWPT or TDI

groups. The researcher set the classroom into two sections, one for TDI and the other for CWPT. During the four-week window, Kusek (2017) administered a series of pretests and posttests on levels of rhythm counting material. The TDI groups received 4 days of TDI on the pretest material, and the CWPT served alternately as tutor or tutee, both with ten-minutes of instruction during the same class period. The researcher repeated this process each week of the data collection period with the random reassignment of tutor and tutee pairs for the CWPT group.

Kusek (2017) conducted a series of ANOVAs to compare TDI and CWPT and reported no significant differences between methods of instruction. Kusek (2017) reported no differences in learner satisfaction according to the method of delivery, CWPT or TDI. In conclusion, Kusek (2017) stated that this study results did not support previous research that compared PAL and TDI in a music classroom (Johnson, 2011) which favored PAL strategies. Kusek's (2017) conclusions may be considered with care due to cited concerns with internal validity. Specifically, the author cited concerns related to confounding variables such as logistics and interruptions to the calendar, i.e., field trips and a week of school break. Kusek (2017) did not report significant differences between TDI and CWPT instructional methods, in contrast to other researchers of peer tutoring in music.

Peer Tutoring in Jazz Ensembles

Kenney (2014) identified shared learning practices, both formal and informal, that have applications for teaching and learning. Leadership and collaboration in music improvisation and jazz performance may help inspire creativity as a negotiated process

sustained by the group. In this study, Kenney (2014) investigated formal and informal approaches to musical and social processes facilitated by a tutor leader and group members in an immersion jazz learning experience. In this asymmetrical model, the role of the tutor was to lead the group by both challenging and offering opportunities for creative practice. Kenney's (2014) research supports the conclusion that music ensembles are conducive environments for shared learning and collaborative creativity that is student-facilitated, sustained by the group, and negotiated by rules of performance.

Peer Mentoring in Jazz Ensembles

In a similar study, Goodrich (2007) examined the role of mentoring within a high school jazz ensemble. Following in the tradition of jazz music, less experienced players apprenticed under adult jazz masters and more experienced peer musicians. According to data, peer mentoring was effective in the success of the jazz ensemble and contributed to school climate, culture, and student relationships. Goodrich (2007) concluded that peer mentoring might assist directors with the efficiency of rehearsals and become self-sustaining. Goodrich (2007) further concluded that connections to jazz traditions for peer coaching models and required planning and training for peer mentors are vital to program implementation and success. The requirements of jazz repertoire for co-creation invites social and musical relationship between student performers and directors that are well-suited for PAL.

According to Allsup (2012), the social and musical structures of traditional ensembles like band or chorus may promote the educational ideals of freedom, agency, empowerment, otherness, and self-reliance. The ensemble experience provides

opportunities to build relationships in music-making and to connect to artists of past cultures and varied styles. A downside of many performance ensembles is the strong, teacher-directed, focus on performance and competitions. However, ensembles still hold potential as a shared space for all its stakeholders, teachers, students, and the community, to foster the moral and educational independence of individuals (Allsup, 2012).

Peer Mentoring in Chorus

VanWeelden et al. (2017) studied a peer mentorship program in a high school choral ensemble which paired typical choral students with choral students with disabilities. The site for this study was at a midsized suburban city in the Southeastern United States. The participants included seven students with no disabilities and seven students with disabilities on an individualized education program (IEP). Considerations for matching students included the choral ensemble, voice part, and the individual personalities of students.

Researcher-developed pretest/posttest surveys were given to both mentors and mentees and measured on a five-point Likert-scale. VanWeelden et al. (2017) worded survey questions to focus on mentors' or mentees' comfort talking or working with an able or disabled peer; their comfort in giving or receiving assistance; music and nonmusical skill sets and feelings of success in chorus class. Both groups trained for their mentor and mentee roles and for the types of giving or receiving assistance to expect. During the 12-week study, mentors assisted the mentees in chorus class with music and nonmusical related skills. Musical skills included: following the score, lyrics, or music system. Nonmusical skills included: staying on-task behaviors and verbal and nonverbal

redirection, such as watching the conductor. For additional music practice, peers met once a week during lunch. Both groups maintained a weekly journal with writing prompts to chart progress and perceptions.

VanWeelden et al. (2017) found negative changes for mentees in their feelings of success in chorus and perceptions of the teacher and mentor towards their success in chorus. This change was in contrast to the mentors who had more positive feelings towards their mentee's progress and in their comfort with assisting them with music and nonmusical tasks. There was no change for mentors related to the comfort they felt in talking and working with their peer pair. The authors concluded that the difference between the positive perception by mentors on their peers' progress and the negative change of the mentees toward their success was a result of a more realistic self-awareness of their musical abilities. The mentees were interested in continued relationship and friendship with their mentors; however, they did not express interest in continuing in chorus class or pursuing their music skills (VanWeelden et al., 2017).

Effects of PAL on Sight-reading

As with most pedagogical trends in education, the implementation of innovative and more democratic practices requires evaluation. Johnson (2011) evaluated the effects of PAL on rhythm reading achievement. In a randomized, posttest only, experimental design, Johnson (2011) examined the effects of instructional method, either teacher-led or reciprocal peer-based, on a large sample of urban band and choral students. Using a process where learners influenced and learned from each other's knowledge and skill, the author investigated the benefits of PAL, which may have occurred during the process of

helping a peer construct new knowledge. Peer-to-peer feedback promoted self-awareness and reflection. The second objective of this study was to determine whether music reading self-concept or ensemble type would impact the results of the method of instruction on rhythm reading achievement and assessment.

Johnson (2011) found that students who received peer-based instruction demonstrated significantly higher levels of rhythm reading achievement than those who received traditional teacher-led instruction. Music reading self-concept did not significantly moderate rhythm reading achievement. The researcher did find a significant interaction between ensemble type, band or choir, and method of instruction with peers. The most significant results that Johnson (2011) found were among choral students and students of low socioeconomic status (SES) in band or chorus. The author attributed additional positive outcomes to reciprocal PAL, including social interaction, motivation, communication, and accountability. Lesson activities that incorporate explaining and questioning into peer-based instruction may help develop skills in the areas of reflective knowledge-building and communication of knowledge. Johnson (2011) concluded that reciprocal peer-based instruction is an effective strategy for learning rhythm reading and may have implications for other skills such as sight-singing, sight-reading, rhythmic dictation, and composition.

Informal Peer Learning in Post-Secondary Music

Lebler (2008) researched a program of study at the Queensland Conservatorium at Griffith University, South Brisbane, Australia. In this formal program of popular music, informal learning and learning activities are scaffolded, "autonomous, self-directed, self-

assessed and intrinsically motivated" (Lebler, 2008, p. 194). Central to student success in this program were self-assessment strategies combined with an exchange of peer feedback. Lebler (2008) defined the popular music program as "it relates a formal popular music pedagogical practice to the ways this music is learned in informal settings" (p.194). Informal learning experiences were not teacher-directed but instead based on participation in music activities, technology, recordings, self-reflective journal writing, and outcome observations, given by self and peer feedback. Through journal writing, learners reflected on their strengths and weaknesses, assessed, planned, and managed their musical process. Creative ideas and "patterns of order" (p. 194) emerged from journal entries and informal music experiences (Lebler, 2008).

According to Lebler (2008), traditional educational assessments measure a learner's understanding of curricular content which informs areas for further study, namely: that is, assessment for learning. The assessments in the popular music program of study are different in that self-assessment and peer-assessment are the impetus for learning: that is, assessment as learning. Music content learning in this approach is in direct contrast to traditional approaches of classical and jazz formal study where the teacher is master, and the student is the apprentice. This informal approach involves no one-on-one private study or teacher-directed study but rather the development of student skills and music knowledge through recording technologies and interactions with peers and staff within their learning community.

Lebler (2008) analyzed the study survey results and found that while most participants had some private study, they engaged in learning in varied and mostly

informal ways. Students described themselves as self-directed learners engaged in interdependent activities whose primary source of assessment was self, feedback from others, including audiences. In summary, Lebler (2008) affirmed "The teaching context provided by the programme reflects the student factors, explicitly valuing the expertise of students and encouraging interdependent learning rather than relying on the transmission of knowledge from expert mentor/teacher to the compliant student/apprentice" (p. 201). Lebler (2008) concluded that effective formalization of the "feedback mechanisms" into course structures, such as with track reports of recordings and reflective journals, promotes and integrates positive engagement and self-monitoring for students. There is a shift of responsibility from teacher to student, rather than a "displacement" of the teacher role, as mentor and valuable source of feedback (Lebler, 2008). The researcher concluded that learning systems that emphasize peer learning, and assessment in which students are deemed capable of interdependent music learning, are effective, even in conservatory settings that are traditionally teacher-to-student directed.

Foster's (2014) findings in a study at a post-secondary piano lab highlighted the areas students improved after informal peer learning. Participants included ten non-music majors who had little or no previous prior piano instruction. All the students were 18 years of age or older. Seven out of ten participants had previous experiences with PAL in educational settings. Throughout one semester, Foster (2014) gathered data regarding perceptions of PAL in a piano lab setting through researcher observation, informal dialogue, and artifacts of student work. Students demonstrated improvement in music literacy, specifically in rhythm, on benchmark assessments, after reciprocal PAL. In the

data analyses, Foster (2014) noted emergent themes on PAL perceptions, including enhanced comprehension from constructing knowledge with others, motivational, and self-management benefits. Positive academic, technical, and social benefits from peer interactions, including interdependent relationships, social bonding, and enhanced efficacy, were reported. Foster (2014) reported that peers held a negative view toward traditional instruction and group learning that lacked shared authority (asymmetrical) and dialogue among knowledgeable peers. Consistent with Lebler (2008), Foster (2014) concluded that mentoring was a successful strategy at the postsecondary level even without any special training.

Secondary Music Ensembles and Sight-Reading

Secondary school music ensembles often follow a similar traditional conservatory model that is teacher-directed. Johnson (2013, 2017) examined music achievement and learner engagement and the effects of two specific reciprocal PAL types, symmetrical or asymmetrical, in a secondary instrumental music classroom. In this study, Johnson (2013, 2017) used six bands from one large school district, urban and suburban, where students worked in pairs for a 4-week duration. Using a pretest/posttest design, Johnson (2013, 2017) randomly assigned each band one of the PAL treatment types. The dependent variable in this study was to sight-read a 16-measure etude composed by the researcher. Johnson (2013, 2017) measured music theory achievement by a pretest/posttest handwritten paper assessment. The student engagement variable was measured using a self-report researcher adaption of the Engagement vs. Disaffection with Learning Scale (Wellborn, 1991). In addition to comparing PAL types of collaborative instruction,

Johnson (2013, 2017) investigated socioeconomic status (SES) and motivation orientation as moderating variables.

Johnson (2013, 2017) also established symmetrical PAL dyads as the collaboration between peers of similar cognition and ability. Johnson (2013, 2017) established asymmetrical PAL dyads as the collaboration between peers in which one peer had a higher cognition and ability level. The delivery of the PAL-treatment for this study differed from that in previous PAL research. Typical APAL treatment occurs in fixed roles of the more advanced helping the less advanced student. For this study, regardless of PAL type, both students in a pair took turns as helper and learner: reciprocal PAL.

In addition, Johnson (2013, 2017) investigated the interaction effects that engagement and motivation have on music achievement. Johnson's (2017) results showed that students in all six bands made a significant improvement in sight-reading ability and the understanding of music theory. Johnson (2103, 2017) found similar achievement growth for both PAL treatment groups and that SES and motivation had no significant impact on music achievement growth. However, outcomes in learner engagement suggest that PAL type may improve engagement for students of different SES. Johnson (2013, 2017) found that the asymmetrical PAL treatment group increased learner engagement in students of low SES but lowered learner engagement in students of average and high SES. Johnson (2013, 2017) concluded that when considering which PAL type to incorporate, music teachers should consider SES and population characteristics of the ensemble. Perhaps the most important finding in this study is that

students in symmetrical PAL experienced gains in skill acquisition regardless of other potential factors.

Conclusion

The review of the literature on socio-cultural learning theory and instruction, sight-reading processes, and sight-reading achievement in a chorus, highlights areas requiring further study. First, there is a need for further investigation of the effects of PAL and teacher-only approaches and music sight-reading. There is also a need to understand how children engage in collaborative processes with adults and peers in musical skill acquisition and new understandings of melodic and rhythmic sight-reading, as independent problem-solving. Teacher-only approaches alone may foster passivity and limit potential learning for chorus students who may benefit from an interdependent approach such as PAL. The benefits of PAL approaches found successful in other academic subjects, instrumental ensembles, and conservatory settings may also have benefits in middle school ensembles.

While there is extensive PAL research at the elementary level, there is limited research of PAL in secondary schools or music content areas, and--more specifically, choral programs. Identifying practices that foster individual melodic and rhythmic sight-reading skill development and research on variations of PAL types and teacher-only learning models, alone and in combination are essential. The results of PAL research and vocal sight-reading may have implications for the improvement of sight-reading achievement in music education practice, especially in middle school choral settings.

Chapter Three

Method

Introduction

Upon receipt of approval from BU's IRB, the participating school district's IRB, and the administration at the site of the study, I implemented research procedures and protocols. In this study, I used a quasi-experimental, pretest/posttest non-equivalent experimental-group, control-group design (Gall et al., 2007) of sixth-, seventh-, and eighth-grade choruses. Participants were assigned to the experimental and control groups. All groups received the teacher-led instruction in rhythmic and melodic sight-reading; however, in the treatment groups, participants were paired in reciprocal symmetrical peer-assisted learning (SPAL) dyads or reciprocal asymmetrical peer-assisted learning (APAL) dyads.

Research Design

A pretest of all individual participants determined their rhythmic and melodic sight-reading ability. I paired students in the SPAL group according to matched ability levels on composite rhythmic and melodic scores. For the SPAL group, I paired the student who ranked lowest with the next lowest ranked student, and so forth, until all student pairs were similar in terms of score. Similar to Johnson (2013) students in the asymmetrical PAL group were paired with a student of divergent ability in which the lowest-scoring student below the median rank was paired with the lowest scoring student above the median rank, and so forth.

The SPAL and APAL treatment groups received ten 15-minute sessions in their dyads in conjunction with teacher instruction. The teacher-only control group worked independently after teacher instruction. After a one-month treatment window, I administered a posttest to assess the amount of growth in musical literacy achievement and to compare PAL types for between-group and within-group differences in mean scores. The dependent variables were composite rhythmic and melodic sight-reading posttests, rhythmic posttests, and melodic posttests. The independent variables were teacher-only, PAL type, either SPAL or APAL.

Research Site

The research site was a rural/fringe middle school located in the Southeastern United States in the state of North Carolina. According to the United States Census Bureau, a rural/fringe locale is defined as a territory that is less than or equal to five miles from an urbanized area, as well as rural territory that is less than or equal to two and a half miles from an urban cluster (U.S. Census Bureau, 2010). The student body was 69% White, 14% African American, 11% Hispanic, and 6% other (North Carolina Department of Public Instruction [NCDPI], 2017). Twenty-eight percent of the student population received free or discounted lunch. The population was typical for a rural/fringe middle school in the Southeast (U.S. Census Bureau, 2010).

I chose this school for a research site based on the variety of elective chorus classes offered to students with varied levels of choral experience ranging from none to more than one year of chorus. Chorus electives at this site included separate course offerings for two sections of sixth-, seventh-, and eighth-grade students, including a year-

long chorus and a semester-long chorus class for each grade level. According to Gall et al. (2007), the generalizability of findings and population validity improves by limiting the experimental sample to a defined population. The results at this study site may be generalizable to a larger target population of middle school choral students in the sixth-, seventh-, or eighth-grade.

IRB and Ethical Considerations

This study was approved by the Boston University Institutional Research Board as well as the participating school district's IRB. During the research process, the identities of the participants and the data collected were coded for anonymity and stored according to protocols for human subjects. I required all participants to provide signed informed parental consent and student assent forms. Copies of consent and assent forms were made available in English (see Appendices A and B) and Spanish (see Appendices C and D). A certified ESL instructor with a BA in Spanish Language and TESOL certification translated the parental consent and student assent forms into Spanish.

Study Recruitment and Training

In this study, I recruited the help of one qualified instructor with four years of music conservatory training who was supervised by the site's choral director with twenty-five years of experience. I trained both the instructor and the supervising choral director on IRB protocols, treatment guidelines, and procedures. The guidelines included directions for how to structure and facilitate the T-O, APAL, and SPAL sessions. For example, the qualified instructor could not participate or interact with the T-O individual practice or the APAL and SPAL treatment sessions. No leading questions or comments

were permitted by the teacher.

Before the study, I held informational meetings for parents and potential participants. During these meetings, I disclosed the purpose of the research vis-à-vis my dissertation, my affiliation with BU, and the voluntary nature of participation in the study. I read and provided copies of the consent and assent scripts to meeting attendees. Both scripts included a general description of participation activities and explained how data would be kept anonymous and confidential. I held a question/answer time for parents and prospective participants to address areas of concern.

I informed the school principal and the participating teacher of the local school district's IRB protocols for the confidentiality of participant information. Procedures for the storing of data during the study were detailed. I also explained how the disposal of data would occur upon completion of the study.

Participant Sample

Upon receipt of signed parental consent and student assent forms, study participants were organized according to intact groups of six chorus classes, two sections per grade level. Due to the relatively large sample size (N=88), the assumption of homogeneity of treatment population variance was met for this study (>30) (Gall et al., 2007). There were two teacher-only control groups, including one section of an eighth-grade chorus and one section of a sixth-grade chorus, with a combined total of 31 participants (n=31). The other section of eighth-grade and sixth-grade chorus received an experimental treatment of SPAL and APAL, respectively. To account for differences of age, grade, and chorus level, one each of two seventh-grade groups received an

experimental treatment of SPAL or APAL. There was a combined total of 28 participants who received SPAL treatment (n=28), and 29 participants who received the APAL treatment (n=29).

Both experimental treatment groups engaged in a combination of peer-assisted learning and teacher-led instruction during the intervention period. The purpose of the equal treatment design was to reduce the potential for compensatory rivalry or the Hawthorne effect (Gall et al., 2007). The Hawthorne effect posed a minimal threat to this study because the treatment structure of dyads was reciprocal, and the type of PAL was unperceivable to the participants: The comparison groups had no perception of competition with each other since the classes met at different times. Study participants were not aware of their assignments to symmetrical or asymmetrical dyads or to the teacher-only control group.

Procedure

The qualified instructor administered instruction and supervised all PAL treatments. All participant groups received the same teacher-led instruction with the same method of instruction, thus limiting potential threats to internal validity or personological variables (Gall et al., 2007). The teacher-led contributions to this study were provided in a consistent manner and with one approach to music sight-reading. The rhythmic and melodic sight-reading examples used during T-O individual practice and APAL and SPAL treatment sessions were gathered from previous years of the North Carolina Music Performance Adjudication samples (MPA).

I used a pretest-posttest design to measure rhythmic and melodic sight-reading.

The pretest was used to establish each singer's individual baseline of sight-reading ability. A posttest was administered to determine growth in sight-reading achievement. Chorus classes met daily for 35 minutes. Ten 15-minute sessions of sight-reading practice occurred over a four-week study window for all participant groups. The four-week study window was agreed upon by the cooperating teacher, the site administrator, and the researcher to accommodate the constraints of the school calendar. The abbreviated treatment period of four weeks minimized the attrition of participants since attrition could adversely impact the statistical strength of the repeated measure design if individual posttests were incomplete (Gall et al., 2007; Hancock, 2010).

Intervention

All study participants engaged in rhythm counting, key-identification, solfege, and sight-reading of sample exercises and repertoire. The 15-minute sessions generally occurred after teacher-led instruction in the middle of the class period. The teacher-only control group participants independently practiced sight-reading for ten 15-minute sessions using solfege and rhythm syllables. Each experimental group received ten 15-minute treatment sessions of PAL, either in symmetrical or asymmetrical dyads. Student dyads determined their own rules for taking turns and interactions during treatment. Dyads spent sessions working interdependently on problem-solving rhythmic examples and using strategies such as solfege for unknown melodies and rhythm syllables. The teacher did not interfere or interject in the treatment sessions but rather allowed the pairs to proceed with their own rules of engagement.

To collect accurate pretest and posttest data, I needed the participation and

cooperation of the participants. I assumed that the participants fully engaged in instruction and treatment activities. During the four-week testing window, the prescribed treatments of ten 15-minute sessions were completed, and the continuity of chorus class schedules remained consistent.

Assessment and Measures

The sight-reading assessments I chose evaluated rhythm and melody as separate skill sets (Henry, 2001; Schön & Besson, 2002). I assessed melodic achievement by numeric scores of the Vocal Sight-reading Inventory (Henry, 2001). I developed a Rhythm Skills Hierarchy by which I evaluated rhythmic achievement using a numeric score system. I used composite rhythmic and melodic scores and subtest scores for data collection and analyses.

VSRI

Henry (2001) developed the Vocal Sight-Reading Inventory (VSRI) to have an assessment measure suitable for singers. For the VSRI, Henry (2001) extracted tonal and rhythmic components from choral repertoire commonly performed at the high school level. VSRI's sight-reading examples appear as meaningful units of information as opposed to random or isolated intervals (Henry, 2001; Lehmann et al. 2007). Musical examples occur as complete melodies rather than as isolated intervals. Their tonal function determined meaningful "chunks" of information. Henry's (2001) use of contextually based units of measure on tonic and dominant scale degrees contributed to the use of VSRI as a suitable sight-reading assessment for high school all-state auditions and in high school choral programs. Melodic exercises were contextually derived and

contributed to the reliability of the performance assessment (Lucas, 1991).

Henry (2001) identified seven skills categories for melodic patterns in a single tonal harmonic or scalar function including the following: a) conjunct, b) tonic, c) dominant, d) sub-dominant, e) cadential, f) modulatory, and g) chromatic. VSRI examples included a single melody line without accompaniment in treble and bass clef in the following keys: C and F. Henry (2001) ordered pitch skills by the level of difficulty. VSRI's targeted scoring process only evaluated the performance of those pitches within the identified component skill pattern (see Appendix E). Inaccurately sung pitches in an example that were not part of the component skill pattern did not affect the final score.

Henry (2001) established reliability and validity for VSRI's targeted scoring system by comparing inter-rater scores using traditional sight-reading scoring procedures; the percentage of correct individual pitches performed and entire measures correctly performed. Henry (2001) collected sight-reading results from 138 subjects (n = 183) with a mean score of 10.70 out of 28 skills or approximately 38% accuracy. Henry (2001) found a high correlation between the two different scoring systems (r =.96) with no significant differences for 22 of the identified 28 pitch skills. Henry's (2001) VSRI targeted scoring system adequately represents the necessary skills to sight-read tonal music and confirmed the validity and reliability of the testing instrument.

VSRI for Middle School

I made adjustments to VSRI for the middle school (VSRI/MS) choral level based on information gathered upon analysis of the North Carolina Music Performance Adjudication (MPA) sight-reading examples. Melodic passages appeared in the key of C

(sometimes in F) and with simple notations such as quarter, half, and whole notes (see Appendix F). Chromatics, accidentals, and modulations did not occur in the NC/MPA sight-reading examples. For the VSRI adapted for Middle School (VSRI/MS), I removed the modulatory and chromatic skill categories from Henry's (2001) original VSRI for high school and reduced the number of pitch skills to 24. I used this version of VSRI/MS in the pilot study of middle school students.

Pilot Study

I conducted a pilot study at a separate middle school site during the previous semester to ensure the reliability of the testing instrument and to analyze testing directions and procedures. According to Gall et al., (2007), a pilot study is useful to train test raters on the performance assessments. I administered the VSRI/MS and the rhythmic skills hierarchy sight-reading assessment to a small sample of fifteen students at a separate site. The melodic testing instrument I used was the adapted version of VSRI for middle school students in which I reduced the number of melodic skill components from VSRI's original 28 components to 24 melodic component skills. I included 22 rhythmic components on the rhythmic skills hierarchy for middle school. Participants in the pilot study demonstrated tester fatigue due to the length of the melodic and rhythmic assessments; in some cases, participants did not finish the assessments at all. After the pilot study, it was clear that I needed to further adapt the VSRI/MS and the rhythmic skills hierarchy to include fewer skill components. The pilot study was an important step to determine the reliability of the testing instrument and procedures (Gall et al., 2007).

Adapted Measures

I further adapted VSRI/MS and reduced the number from 24 to 15 melodic skill components. I arranged the 15 VSRI/MS individual pitches and intervals in the order of difficulty according to stepwise movement, ascending intervals, and descending intervals (See Appendix G).

Rhythm Skills Hierarchy

Likewise, I adapted the Rhythmic Skills Hierarchy and reduced the number from 22 to 15 rhythmic skill components. I sequenced rhythmic patterns according to degrees of difficulty determined by an analysis of published rhythmic sight-reading examples from the NC/MPA (NCMEA, 2015). I sequenced commonly found chunks of rhythms in the order of difficulty within more extended rhythmic examples (see Appendix H). I included familiar rhythmic chunks in varying meters. I developed a targeted scoring system with only the representative rhythmic units (see Appendix I). I established content validity for VSRI/MS and the Rhythm Skills Hierarchy testing instruments by an analysis of middle school choral repertoire and the North Carolina Large Choral Music Performance Adjudication guidelines for sight-reading (NCMEA, 2015).

Reliability

Test raters received training in VSRI/MS scoring before the pilot study. A comparison analysis of given scores determined the needed adjustments in the testing instrument and procedure to protect intra-rater reliability (Gall et al., 2007). The raters received additional training before the research study to increase inter-rater reliability. I compared the inter-scorer reliability correlation for the pretest (.89) and the posttest (.97).

Testing Protocols

I administered individual testing in a separate space in the site's media production room. Each participant received instructions for the testing procedures, and a set of melodic and rhythmic examples to read at sight. For each melodic example, I established the key with a chord progression and repeated the starting pitch. The participants had one minute to review the sight-reading example. At the end of the review period, I started the recording, replayed the chord progression, and the starting pitch, followed by the participant's vocal sight-reading. I repeated this procedure for each melodic sight-reading example. At the end of the participant's melodic sight-reading subtest, I paused the recording for the rhythmic subtest portion.

I followed the same procedure for the rhythmic examples in which participants had one minute to review the rhythmic sight-reading example before the recording resumed. Participants established the tempo and continued to sight-read the rhythmic examples. Participants could take breaks as needed during testing. If participants chose to take a break, I removed all sight-reading examples from view.

Scoring Protocols

To minimize experimenter bias effects, I had two independent raters score the sight-reading assessments. The independent raters reviewed and evaluated the individual recordings of melodic and rhythmic subtests on scoring sheets (see Appendices J and K). The component skills had numeric codes for pitches and durations as a scoring reference (see Appendices L and M). While listening to recordings, the scorers identified correct pitches or durations by marking the numeric code of the correct pitch/rhythm. The scorers

only assessed the pitches or durations that were part of the component skill; the raters did not evaluate other pitches or durations not included in the component. Each subject received one score for the number of melodic component skills (0–15) performed correctly, and a second score for the number of rhythmic component skills (0–15) performed correctly. Composite scores consisted of combined rhythmic and melodic scores to determine overall sight-reading achievement (0-30).

I used the following VSRI guidelines (Henry, 2001) to ensure consistency in scoring and to measure student success in the tonal sight-reading assessment.

1. The first note of each melody served as a reference.
2. Raters assessed only the first attempt at a note.
3. Raters did not evaluate intonation.
4. Raters evaluated only the main portion of the note sliding or stuttering occurs.
5. The function of the pitch had to be correct within the established key. Raters did not count accurately performed intervals if the function was wrong, except when a new tonic is clearly established.
6. Subjects could use any word or syllable while sight-singing. Raters did not penalize subjects for singing an incorrect syllable or number if the pitch and the function were correct.
7. For conjunct, tonic, dominant, sub-dominant, and cadential skills, the subject must perform both pitches correctly to receive component skill credit.

I used the following guidelines for the Rhythmic Skills Hierarchy to ensure consistency in scoring and to measure student success in the rhythmic sight-reading assessment.

1. The tempo established by the individual is used as a reference.
2. Only the first attempt at a note is assessed.
3. Raters evaluated only the main portion of the note if hesitation or stuttering occurred.
4. The function of the rhythm had to be correct within the established tempo or when the subject reestablished tempo.
5. Subjects could clap, tap, or use any word or syllable when reading rhythms. Raters did not penalize subjects if they used an incorrect syllable or number in the counting system if the duration within the tempo was correct.

Data Analysis

I imported individual participant scores of VSRI/MS, rhythmic sight-reading, and composite sight-reading scores into SPSS software. I analyzed data to identify significant differences between groups in musical literacy achievement and to compare PAL types. The dependent variables were composite rhythmic and melodic scores and rhythmic and melodic subtest scores. The independent variable was the group variable, consisting of the T-O control group and the SPAL and APAL treatment groups.

I then conducted a series of analyses of covariance (ANCOVA) in which the pretest scores were the covariant. I selected the statistical technique of ANCOVA to

control for initial differences between groups and to determine a comparison of the within variance and between-groups variance (Gall et al., 2007; Hancock, 2010). MANCOVA was not an acceptable statistical test for this study due to a failed assumption of a linear relationship between dependent variables, specifically rhythmic and melodic posttests. All statistical assumptions to run ANCOVA were met in this study.

To statistically reduce the effects of initial group differences, compensating adjustments were made to the posttest means of the comparison groups; these changes ensured that group differences on the posttest were due to experimental treatment rather than pre-existing group differences (see Hancock, 2010). I examined pretest and posttest variances for interaction effects related to PAL treatment type.

Chapter 4

Results

I performed three ANCOVAs to determine the impacts of T-O, SPAL, and APAL learning models on composite rhythmic and melodic sight-reading scores and rhythmic and melodic subtests while controlling for pretest differences, using an alpha level of .05 to determine significance for all statistical tests. The research focus of this study was to identify any significant differences in the effectiveness of teacher-only, symmetrical peer-assisted, and asymmetrical peer-assisted learning models on rhythmic and melodic sight-reading proficiency among middle school choral students.

Descriptive Statistics

All 88 participants who enrolled in the study completed all study procedures; there was no attrition of the participant sample. The teacher-only group had the highest unadjusted composite pretest mean, $M = 8.58$ ($SD = 6.27$), followed by the SPAL group, $M = 3.91$ ($SD = 3.03$), with the APAL group having the lowest unadjusted composite pretest mean, $M = 3.34$ ($SD = 3.45$). The entire population scored higher on the unadjusted composite posttest, $M = 10.24$ ($SD = 5.85$), than the unadjusted composite pretests, $M = 5.37$ ($SD = 5.10$). All groups scored higher on the rhythmic posttest, $M = 7.44$ ($SD = 3.22$) than the rhythmic pretest, $M = 3.95$ ($SD = 3.66$). Finally, all groups scored higher on the melodic posttest, $M = 2.80$ ($SD = 3.55$) than the melodic pretest, $M = 1.41$ ($SD = 2.15$). See Table 1 for the unadjusted pretest and posttest means by the group variable including composite, rhythmic and melodic subtests.

Table 1

Unadjusted Means by Group

Group	N	Mean	Composite	Rhythmic	Melodic
T-O	31	Pre	8.58	6.40	2.18
		Post	13.48	8.98	4.50
SPAL	28	Pre	3.91	2.77	1.14
		Post	10.05	7.30	2.75
APAL	29	Pre	3.34	2.48	0.86
		Post	6.95	5.91	1.03
Total	88	Pre	5.37	3.95	1.41
		Post	10.24	7.44	2.80

ANCOVA Measures and Assumptions of ANCOVA

The researcher must meet basic assumptions to run an ANCOVA. First, the dependent variable and the covariate must be measured on a continuous scale (in this case, 0-30). Next, the independent variable(s) must consist of two or more categorical, independent groups (for this study, T-O, SPAL, and APAL) and there must be an independence of observations (N=88). ANCOVA requires that there is no relationship between the observations, either within each group or between any of the groups, which is supported in this study. As illustrated above, data in this study met all of these basic assumptions of ANCOVA.

Assumption of No Outlier

An additional assumption to run ANCOVA requires an examination of the residuals to detect significant outliers, or scores that fall outside of the usual pattern of scores. When analyzing residuals, there were no significant outliers (see Figure 1).

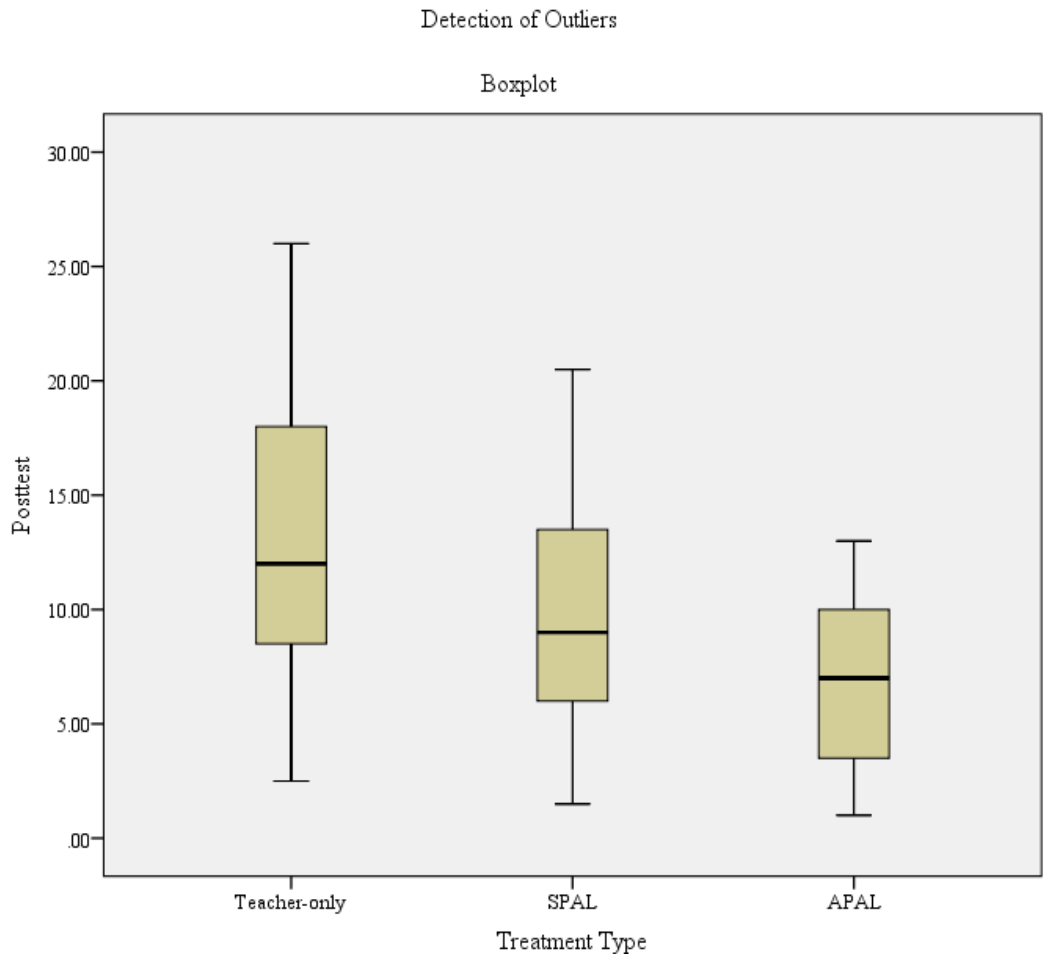


Figure 1. Boxplot of outliers. This figure demonstrates no outliers within treatment types.

Assumption of Normal Distribution of Residuals

A requisite assumption of ANCOVA is that the residuals are normally distributed for each level of the independent variable (in this case, T-O, SPAL, and APAL). Data in this study met the assumption for normal distribution of residuals demonstrated by the nonsignificant results in the Kolmogorov-Smirnov and Shapiro-Wilk tests (see Table 2).

Table 2

Normal Distribution of Residuals

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Posttest	T-O	.129	31	.200*	.961	31	.309
	SPAL	.115	28	.200*	.955	28	.259
	APAL	.144	29	.131	.945	29	.137

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Assumption of Linear Relationship

ANCOVA also requires a linear relationship between the covariate and the dependent variable; in this study, that is the pretest and posttest. This assumption was met in this study (see Figure 2).

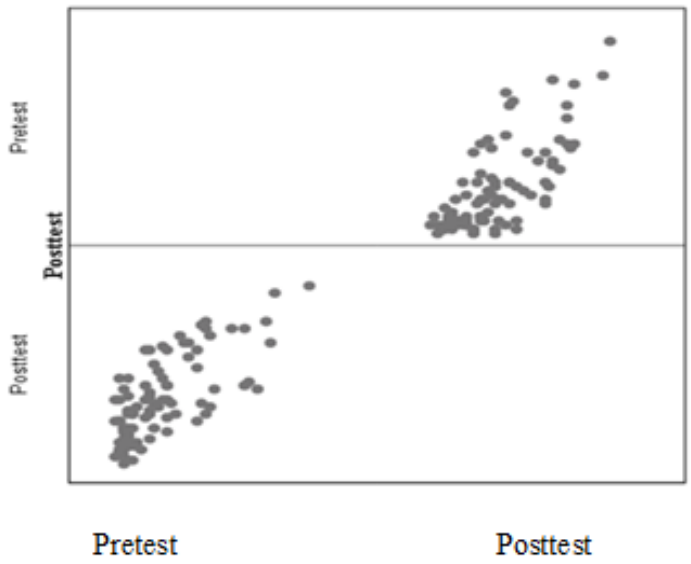


Figure 2. Linear Relationship between Covariate and Dependent Variable

The covariate is linearly related to the dependent variable at each level of the independent variable in this study, which confirms that the assumption of a linear relationship was met (see Figure 3).

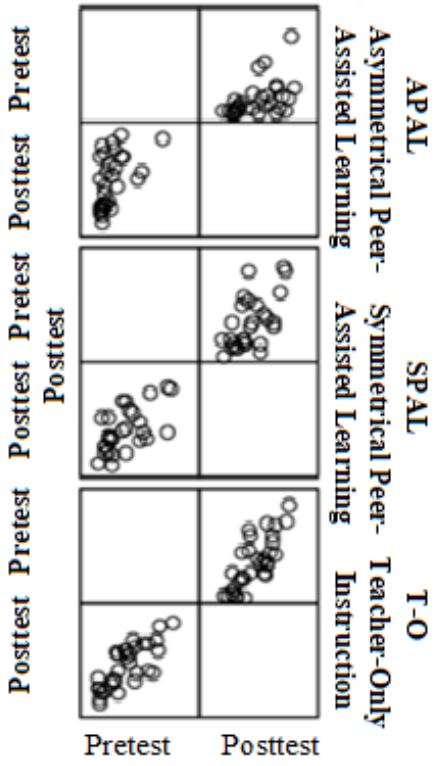


Figure 3. Linear Relationship between Covariate and Dependent Variable at each level of the Independent Variable. This figure is a matrix plot reflecting a positive linear relationship between the pretest and posttest for each level of the independent variable.

Assumptions of Homogeneity

Another assumption of ANCOVA relates to the homogeneity of both error variance and regression slopes. Homogeneity of error variance is assumed when there is a nonsignificant Levene's test. Data in this study met the homogeneity of error of variance, $F(2, 85) = 1.02$, $p = .367$. The assumption of homogeneity of regression slopes

requirement, which tests the coefficient across all groups, $F(2, 82) = 1.59$, $p = .209$ was met in this study.

Inferential Statistics

I conducted three ANCOVAs to address the research question. For the first ANCOVA, I used the group (T-O, SPAL, APAL) as the independent variable, the composite posttest as the dependent variable, and the composite pretest as the covariate to determine the influence of learning model on combined rhythmic and melodic sight-reading. For the second ANCOVA, I used the group (T-O, SPAL, APAL) as the independent variable, the rhythmic posttest as the dependent variable, and the rhythmic pretest as the covariate to determine the influence of learning model on rhythmic sight-reading. For the third ANCOVA, I used the group (T-O, SPAL, APAL) as the independent variable, the melodic posttest as the dependent variable, and the melodic pretest as the covariate to determine the influence of learning model on melodic sight-reading.

The adjusted posttest means for the T-O group are as follows: composite posttest, *M* =11.00 (.76), *CI [9.48, 12.52]*; rhythmic posttest, *M* = 7.89 (.52), *CI* [6.85, 8.93]; melodic posttest, *M* = 3.66 (.43), *CI* [2.80, 4.51]. The adjusted posttest means for SPAL are: composite posttest, *M* = 11.18 (.75), *CI* [9.68, 12.68]; rhythmic posttest, *M* = 7.83 (.51), *CI* [6.82, 8.85]; melodic posttest, *M* = 3.05 (.44), *CI* [2.17, 3.93]. The adjusted posttest means for APAL are: composite posttest, *M* = 8.51 (.75), *CI* [7.02, 10.01]; rhythmic posttest, *M* = 6.57 (.51), *CI* [5.56, 7.58]; melodic posttest, *M* = 1.65 (.44), *CI* [.77, 2.52]. Total adjusted group posttest means are as follows, *M* = 10.32 (.42), *CI* [9.40,

11.06]; rhythmic posttest, *M* = 7.43 (.28), *CI* [6.87, 7.99]; melodic posttest, *M* = 2.78 (.25), *CI* [2.29, 3.28].

Comparison of Means

Table 3 shows adjusted posttest means by the group variable, including both the composite scores and the rhythmic and melodic subtests. The adjusted posttest means resulted from using the corresponding pretest as the covariate.

Table 3

Adjusted Posttest Means with Pretests as covariates.

Group	N	Mean	Composite	Rhythmic	Melodic
T-O	31	Adjusted	11.00	7.89	3.66
SPAL	28	Adjusted	11.18	7.83	3.05
APAL	29	Adjusted	8.51	6.57	1.65
Total	88	Adjusted	10.32	7.43	2.78

a. Notes. *M* Adjusted means with corresponding composite, rhythmic, or melodic pretest as covariate. Covariates appearing in the composite model are evaluated at the following values: Pretest= 5.3693.

b. Covariates appearing in the rhythmic model are evaluated at the following values: Rhythmic Pretest = 3.9545.

c. Covariates appearing in the melodic model are evaluated at the following values: Melodic Pretest = 1.4148.

d. Total Category -Covariates appearing in the Total model are evaluated at the following values: Pretest = 5.3693.

Composite Scores ANCOVA

ANCOVA results showed significant differences among composite scores. As shown in Table 4, there was a significant difference among groups on composite scores, $F(2, 84) = 3.94$, $p = .023$, $\eta_p^2 = .086$. The partial eta squared when converted to Cohen's *d*, revealed a moderate-to-large effect size (Cohen, 1992) for the group variable ($d = .73$).

Table 4

Composite Scores ANCOVA

Source	Type III *SS*	*df*	*MS*	*F*	*P*	η_p^2
Corrected Model	1692.71[a]	3	564.24	36.80	.000	.568
Intercept	1360.28	1	1360.28	88.73	.000	.514
Pretest	1051.30	1	1051.31	68.58	.000	.449
Group	120.81	2	60.40	3.94	.023	.086
Error	1287.78	84	15.33			
Total	12205.50	88				
Corrected Total	2980.49	87				

a. R Squared = .568 (Adjusted R Squared = .552)

Fisher's (LSD) post hoc comparison tests revealed a significant difference ($p = .029$, 95% CI [0.26, 4.72]) favoring the teacher-only group when compared to the APAL treatment group on composite posttest means. As shown in table 5, post hoc tests

revealed a significant difference (p = .012, 95% CI [0.60, 4.73]) favoring the SPAL treatment group when compared to the APAL treatment group on composite posttest means.

Table 5

Composite ANCOVA Comparison with Significant Differences by Group

Group	Group	*MD*	*SE*	*P*	95% CI *LL*	95% CI *UL*
T-O	SPAL	-.178	1.110	.873	-2.385	2.029
	APAL	2.490*	1.123	.029	.256	4.724
SPAL	T-O	.178	1.110	.873	-2.029	2.385
	APAL	2.668*	1.039	.012	.602	4.734
APAL	T-O	-2.490*	1.123	.029	-4.724	-.256
	SPAL	-2.668*	1.039	.012	-4.734	-.602

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Rhythmic ANCOVA

For the rhythmic subtest ANCOVA, I used the group (T-O, SPAL and APAL) as the independent variable, the rhythmic posttest as the dependent variable, and the rhythmic pretest as the covariate. As shown in Table 6, there was a nonsignificant difference between groups on the rhythmic subtest, $F(2, 84) = 2.13$, $p = .125$, $\eta_p^2 = .048$.

Table 6

Rhythmic Subtest ANCOVA with Nonsignificant Differences by Group

Source	Type III *SS*	*df*	*MS*	*F*	*P*	η_p^2
Corrected Model	315.87[a]	3	105.29	15.13	.000	.351
Intercept	1122.58	1	1122.58	161.32	.000	.658
Rhythm Pretest	173.91	1	173.91	24.99	.000	.229
Group	29.68	2	14.84	2.13	.125	.048
Error	584.54	84	6.96			
Total	5768.25	88				
Corrected Total	900.41	87				

a. R Squared = .351 (Adjusted R Squared = .328)

Melodic ANCOVA

For the melodic subtest ANCOVA, I used the group (T-O, SPAL and APAL) as the independent variable and the melodic posttest as the dependent variable; the melodic pretest was the covariate. As shown in Table 7, there was a significant difference between groups on the melodic subtest, $F(2, 84) = 5.44$, $p = .006$, $\eta_p^2 = .115$. The partial eta squared when converted to Cohen's *d*, revealed a moderate-to-large effect size (Cohen, 1992) for the group variable ($d = .88$).

Table 7

Melodic Subtest ANCOVA with Significant Differences by Group

Source	Type III *SS*	*df*	*MS*	*F*	*P*	η_p^2
Corrected Model	635.81[a]	3	211.94	38.58	.000	.579
Intercept	89.82	1	89.82	16.35	.000	.163
Melodic Pretest	455.75	1	455.75	82.96	.000	.497
Group	59.82	2	29.91	5.44	.006	.115
Error	461.47	84	5.49			
Total	1787.75	88				
Corrected Total	1097.27	87				

Note. *P*<.05. a. R Squared = .579 (Adjusted R Squared = .564)

Melodic ANCOVA *C*omparison of *G*roups

As shown in Table 8, Fisher's (LSD) post hoc tests revealed a significant difference (p = .002, 95% CI [0.77, 3.26]) favoring the teacher-only group when compared to the APAL treatment group on melodic posttests. Post hoc tests also revealed a significant difference (p = .026, 95% CI [0.17, 2.64]) favoring the SPAL group when compared to the APAL treatment group on melodic posttests.

Table 8

Melodic Subtest ANCOVA Comparison with Significant Differences by Group

Group	Group	*MD*	*SE*	*P*	95% CI	
					LL	*UL*
T-O	SPAL	.61	.62	.334	-.63	1.85
	APAL	2.01*	.63	.002	.77	3.26
SPAL	T-O	-.61	.62	.334	-1.85	.63
	APAL	1.41*	.62	.026	.17	2.64
APAL	T-O	-2.01*	.63	.002	-3.26	-.77
	SPAL	-1.41*	.62	.026	-2.64	-.17

Note. MD = Mean Difference; SE = Standard Error; CI = Confidence Interval; LL = Lower Level; UL = Upper Level. Based on estimated marginal means*. The mean difference is significant at the .05 level. b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Ancillary Analysis of APAL Treatment Group

I was curious to see if significant differences existed in music sight-reading growth between the higher-performing and lower-performing members within APAL dyads. Specifically, I wanted to check if either subgroup may have impacted the overall results for the APAL treatment group in composite sight-reading, rhythmic sight-reading or melodic sight-reading. To do this, I conducted dependent t-tests to check for growth between composite, rhythmic, and melodic pretests and their corresponding posttests for both the higher-performing and the lower-performing members of the APAL group.

The high group scored significantly better on the composite posttest mean, (M = 8.64, SD = 3.09) than the composite pretest mean, (M = 5.68, SD = 3.74); $t(13)$=-2.86, p = .013. The low group scored significantly higher on the composite posttest mean, (M = 5.37, SD = .86) than the composite pretest mean, (M = 1.17, SD = .15), $t(14)$ = - 4.882, p = .000. The high group scored significantly higher on the rhythmic posttest mean, (M = 6.93, SD = 2.55) than the rhythmic pretest, (M = 4.12, SD = 3.32); $t(13)$ = -3.025, p =.01. The low group scored significantly higher on the posttest mean, (M = 4.96, SD = .79) than the rhythmic pretest mean, (M = .97, SD = .16); $t(14)$ = - 4.79, p = .00. Both the high group and the low group demonstrated significant growth on composite posttests and rhythmic posttests. There were nonsignificant differences within the APAL treatment group between the higher-performing members and the lower-performing members on rhythmic sight-reading and melodic sight-reading growth.

Chapter 5

Discussion

The adoption of SPAL into ensemble rehearsals may bridge the actual and potential developmental music skill levels for individual members. SPAL arrangements encourage the curricular objectives of melodic sight-reading achievement in a chorus class. Consistent with Topping (2005), when structured and implemented in a reciprocal format with matched ability peer pairs, SPAL contributes to the individual problem-solving of melodic sight-reading. The students who engaged in melodic sight-reading on an independent vocal assessment of composite and melodic-specific sight-reading skills succeeded with teacher modeling and in combination with reciprocal SPAL arrangements.

Collaborative Learning and Music

Collaborative learning structures like reciprocal SPAL arrangements in this study foster interdependence in peer learning. As Topping (2005) purported, targeted skills and shared goal-setting, like those of rhythmic and melodic sight-reading in a music class, are conducive to positive reinforcement and joint problem-solving between peers. Consistent with research on student-centered approaches for the music classroom and music ensemble (Allsup, 2012; Jellison et al., 2015; Shieh, 2008), the results of this study demonstrated significant benefits of reciprocal PAL strategies to students when structured in symmetrical formats. Especially in the improvement of melodic sight-reading, SPAL strategies were superior to asymmetrical PAL arrangements. The students' use of reciprocal SPAL strategies were effective in this study and may be used to complement

teacher instruction.

Guided Instruction

The results of this study, in agreement with Vygotsky (1978) and Rogoff (1990), indicate that the role of guided instruction by the teacher is essential to child development and music learning. The guided instruction of the T-O learning model was effective in fostering students' composite and melodic sight-reading abilities when compared to the reciprocal APAL learning model. There are important differences in the type of guided instruction received and the social context of asymmetrical peer relationships. Both T-O and APAL are asymmetrical structures; however, the teacher modeling of pitch representation and vocalization of melodic patterns during instruction likely exceeds that which a peer can offer. It was more efficacious for chorus students in this study to receive the instruction of the teacher than to receive instruction from peers of divergent ability in the APAL treatment group. The treatment sessions with a more or less capable peer were less beneficial for middle school choral students than those with a trained music educator.

Reciprocal SPAL and Music

The reciprocal SPAL learning model was effective on composite and melodic sight-reading ability when compared to the reciprocal APAL model but had similar effectiveness as the T-O control group. Peers of matched ability improved on their independent problem-solving of melodic sight-reading. This is in direct contrast to the nonsignificant APAL finding on melodic sight-reading. While all groups had some teacher-led instruction, the teacher was not permitted to assist during PAL treatments with a strict "no intervention" policy. The arrangement and structure of the social context

influenced the dynamic developmental state and maturation process as related to melodic patterns. This finding may relate to the developing maturity of middle school students in their ability to represent inner music representations and their peer influence on that ability. Alternately, as with Johnson's (2013, 2017) findings relating to the positive influence of reciprocal SPAL arrangements on student engagement for middle school band students, the social context may be an important factor, especially for those with a higher SES. The reciprocal nature of their interactions and the matched ability pairing with peers is relevant to middle school choral students and impacts their melodic sight-reading ability.

Independent Problem-Solving and Music Sight-Reading

In this study, the T-O and SPAL learning models were effective in encouraging independent problem-solving of melodies in a choral ensemble. For the T-O group, it might have been a result of repetition and individual practice of key-identification, solfege, and sight-reading of sample exercises and repertoire that supported the independent problem-solving of melodies. That combination of expert teacher instruction along with independent focused practice may have contributed to the T-O group success. For the SPAL group it was likely the combination of teacher instruction and focused practice with a similar ability peer on key-identification, solfege and melodic sight-reading practice that improved melodic sight-reading abilities.

Consistent with previous research in choral settings (Johnson, 2011; VanWeelden et al., 2017), the results of this study support the value of peer-assisted learning for the development of music-related sight-reading skills. Johnson (2011) saw significant results

for both APAL and SPAL in rhythmic sight-reading skills in choral students. Where this study diverges from Johnson (2011) is that here the benefits of peer-assisted learning were found only in symmetrical PAL arrangements; the results demonstrated significant differences favoring SPAL versus APAL on composite scores and melodic subtests, but not rhythmic subtests.

Individual Assessment

The design of the individual assessments, which included carefully sequenced rhythmic and melodic components, was central to this study. Consistent with previous research (Lehmann et al., 2007, Schön & Besson, 2002; Henry, 2001; Lucas, 1994; Sloboda, 2004), the chunking of melodic patterns and rhythmic patterns, and assessing melody and rhythm as separate skill sets, is an effective practice for music sight-reading in a chorus. In this study, the most frequently sung correct pattern was that of the ascending scale. Participants who could not sight-read most of the melodic patterns recognized the scale pattern and successfully sight-read it. Participants most often sang correctly familiar diatonic, do-based melodic chunks commonly found in middle school repertoire, including ascending and descending patterns of do, re, mi and mi, fa, sol, and sol, fa, mi, re, do. This finding points to the manner of sequencing melodic and rhythmic components as important when planning sight-reading instruction and individual assessment measures.

Limitations

There are potential limitations when conducting research relative to design or method. Researcher bias is a limitation that could impact research findings. Other

limitations might include issues with internal or external validity. What follows in this section is an account of the limitations of treatment procedures, data collection, novelty effects, and intact groups. I also include an explanation of how I addressed these limitations to reduce their potential impact on the results of this study.

Internal Validity

The care and detail of the experimental treatment procedures limited the threats to internal validity in this study. Three factors enhanced the internal validity of the experiment: the use of one teacher in the delivery of sight-reading instruction and the instruction was consistent across groups and a strict policy of "no interference" by the teacher or PAL treatments or to the T-O individual practice sessions.

In this study, I administered all pretests and posttests in attempts to improve the consistency of testing administration. All participants received a consistent test script in the same testing environment by one researcher. The reliability of the results increased due to the continuity of the testing environment, testing procedures, and testing directions. The testing protocols that I implemented limited the potential for transfer of researcher expectations to participants; however, whenever a researcher participates in research, there is the potential for bias.

I acknowledge the bias associated with being a researcher and note that I implemented controls to limit issues of bias. For example, I included the use of independent raters for the performance assessments (Gall et al., 2007). I also reduced potential problems of internal validity by holding multiple training sessions on the VSRI/MS testing instrument with the independent raters.

The role of individual assessment may have factored as a novelty effect (Gall et al., 2007) in this study. Researcher testing and the increased concentration and focus on sight-reading in class during the four-week treatment window may have contributed to student success. The students demonstrated a desire to improve even though they were aware there was no grade or external reward for doing so. The participants appeared to be competitive with their individual achievement from pretest to posttest.

External Validity

This site was not necessarily representative of middle schools in general. I obtained a representative sample of the population of chorus classes at the site; however, random assignment to control and treatment groups was not possible due to constraints of the academic schedule. Threats to the generalizability of quasi-experimental designs depend, in part, on the ability to place participants into control or treatment groups by random assignment (Gall et al., 2007); therefore, the study was limited by the use of intact groups.

Recommendations for Future Research

Peer-assisted learning is one type of collaborative instruction that appears in the literature in varied forms. For this study, I investigated SPAL and APAL versus a teacher-only instructional model, and examined the benefits of PAL to chorus students, and at a middle school. I did not attempt to examine results for all types of peer-assisted learning but only for the PAL types defined herein or in Johnson's (2011, 2013) studies. Also, in this study, my focus was only to compare the effectiveness of T-O, SPAL, and APAL learning models, but not the engagement component of Johnson's (2013) study.

Further research in PAL strategies, types of PAL and PAL interventions in the promotion of student achievement are needed to understand the full impact on sight-reading in a middle school chorus in a variety of settings. Further study on rhythmic and melodic sight-reading in choral ensembles might address population variables, student engagement and motivational characteristics of the participants, and on the nature of rhythmic and melodic sight-reading as separate skill sets.

The participants at this research site were a largely White, homogenous, student population. Further study is needed to examine reciprocal SPAL with varied student populations of choral students on composite sight-reading skills. In particular, it is necessary to examine a range of SES characteristics in population samples to identify potential differences in PAL effectiveness. Johnson (2011, 2013) found little difference in effectiveness by PAL-type for students of high SES, but students with low SES benefited from APAL and SPAL equally: Researchers could further examine PAL strategies with choral students in urban and low SES populations and then compare PAL effectiveness with choral students of higher SES for significant differences.

In addition, future study might include mixed methods that compare the effects of reciprocal PAL types on rhythmic and melodic sight-reading and collect data on student engagement and motivation through participant observation and interviews. In this study, the SPAL treatment group experienced significant gains in melodic sight-reading skills in comparison to APAL. Similar to Johnson (2013, 2017) who found positive gains in student engagement in SPAL arrangements, I found significant differences in this study between SPAL and APAL arrangements. In a future study, using mixed methods to

compare student engagement and motivation for each type of reciprocal PAL in a middle school chorus may provide clarity to SPAL benefits.

Beyond this study, one could investigate the interaction effects of PAL with the instructional method, such as moveable-do versus fixed-do systems as an extension of Demorest & May's (1998) study. PAL strategies may be more or less effective depending on the method of teacher-only (T-O) instruction given. The teacher facilitator of this study had extensive training in one approach to music sight-reading in methodology courses. In this study, all the participants received the same quality of vocal instruction and method and yet demonstrated significant differences between PAL treatment types. Potential interaction effects of teaching approach and methodology may point to effective instructional practices.

There may be merit in studying the interaction of PAL-treatment types and the effects that the level of musicianship of the teacher has on rhythmic and melodic sight-reading. The teacher facilitator of my study had excellent vocal training in classical and operatic musical styles. Such a study could examine the teacher-only quality of instruction, modeling of rhythmic and melodic patterns or chunks. Examining multiple sites with different teacher facilitators of varied levels of musicianship or methods of instruction may determine PAL effectiveness across a variety of settings.

Researchers might engage in further study of informal PAL practice, peer assessment, feedback mechanisms, and self-regulatory processes, into formal structures of secondary music ensembles. Similar to Lebler's (2008) conservatory study, one might address the effects of PAL on compositional or improvisational components of music,

including recorded performance. I believe this area of study for secondary music ensembles holds potential for 21st-century learners who are accustomed to immersion in social media and technology. Researchers might investigate reciprocal PAL strategies, both formal and informal, in popular music contexts to shed light on new directions in music education.

Implications for Music Educators

In this study, I found that teacher-only and reciprocal SPAL learning models were effective on composite rhythmic and melodic sight-reading achievement and specifically, melodic sight-reading achievement in a middle school chorus; therefore, music educators might consider the potential of varied social contexts for music sight-reading instruction, both as a collaborative and an independent problem-solving process, in choral ensembles. Teacher-only instruction supports the independent problem-solving of rhythmic and melodic sight-reading; however, perhaps by establishing varied teaching/peer mentoring structures such models may appeal to students who have different learning preferences. Music educators could use a combination of teacher-led strategies and reciprocal SPAL strategies to facilitate individual problem-solving in melodic sight-reading.

Suggested effective practices for music educators include two critical components for instruction and assessment. First, pairing students of similar abilities is an effective arrangement when problem-solving melodic sight-reading. Based upon the moderate-to-large effect size reported in the SPAL treatment on sight-reading achievement, music educators might consider providing students opportunities for reciprocal peer-assisted learning, especially in symmetrical dyads. Second, music educators might teach and

assess rhythmic and melodic patterns as separate skill sets to support the internal music representations of individuals. Assessment measures, like the vocal sight-reading inventory and the rhythmic skills hierarchy, need to be adapted to fit the population. Music educators might identify music component patterns, rhythmic and melodic chunks, and relevant music sight-reading examples. Based upon the results of this study, I recommend the following practices to music educators; T-O with associated independent study, the implementation of reciprocal SPAL strategies, separate rhythmic and melodic sight-reading instruction, and individual assessment. The application of these practices will likely improve student musicianship skills in the general music class (Darrow et al., 2005) and performance ensembles (Webb, 2012; Kenney, 2014; Goodrich, 2007).

Conclusion

In conclusion, there were significant differences between the effectiveness of types of teacher-only and peer-assisted learning models on composite rhythmic and melodic sight-reading achievement and specifically, melodic sight-reading achievement in a middle school chorus. PAL strategies in reciprocal formats and symmetrical dyads should be implemented for optimum results. The moderate to large effect sizes of the T-O and the SPAL learning models are indicators of effective instructional practices to teach and assess melodic sight-reading in middle school choral ensembles. Teacher modeling persists as the preferable approach to the development of internal mental representations of music for students; however, symmetrical peer-assisted learning may be equally effective in the promotion of musical sight-reading skills across varied music content areas.

The results of this study have implications in the field of music education. The T-O and SPAL learning models were effective on sight-reading skill development in a middle school chorus; therefore, it is worthwhile to include a combination of T-O and reciprocal SPAL strategies for sight-reading skill development in elementary school and high school choruses. General music practitioners, choral music directors, and ensemble directors of bands and orchestras should consider the social contexts of their music education practice to include peer-assisted learning as a complement to teacher-led instruction.

Appendix A

PARENTAL CONSENT FORM FOR CHILD'S RESEARCH PARTICIPATION

Study Title: The Effects of Peer-Assisted Learning on Rhythmic and Melodic Sight-reading in a Middle School Chorus

Student Researcher: Marie Graham, M. Ed

IRB Study Number: 4612X

Your child is being asked to take part in a research study. This form has important information about the reason for doing this study, what we will ask your child to do, and what we might learn from the information we gather. Your child is being asked to participate in a research study about reading music. The purpose of the study is understand the best ways to help young singers read rhythm and melody

What will my child be asked to do if my child is in this study?

Your child will be asked to practice reading rhythms and melodies, alone and/or together with a partner. We will give your child a sight-reading test at the beginning of the study and again, at the end, to measure your child's growth in reading music. Your child will not be asked any personal questions. Your child will sing as normal in chorus class. Participation will occur in twenty minute sessions during class over the period of a month. In those twenty-minute sessions your child will practice alone or with a partner of similar ability or with a more expert peer.

We would like to record an audio (Mp3) of your child as he/she reads rhythm or sings a melody. Your child's name will not be recorded but instead a code will be given by which we can track his/her progress. We will evaluate your child's sight-reading and delete the audio recording immediately at the end of the study. At no time will your child's face be recorded. The MP3 audio recording will be kept in a separate folder on a secure computer, only used by me, the researcher. An audio recording is required for participation in this study. If you or your child do not wish to be recorded, it is not possible for your child to be in this study.

What are the possible risks or discomforts to my child?

Your child's participation in this study does not involve any physical or emotional risk to your child beyond that of everyday life. Some children get nervous when singing on a microphone. Your child can take a break at any time. As with all research, there is a chance that confidentiality of the information we collect about your child could be breached – we will take steps to minimize this risk by destroying the audio recording at the end of the study.

Appendix A (Continued)

What are the possible benefits for my child or others?

There are no direct benefits from participating in this study. The possible benefits to your child from this study include learning to read rhythms and sight-sing melodies better, and to experience recording their own voice. The possible benefits from this study may help future music teachers improve the ways that music sight-reading is taught.

How will you protect the information you collect about my child, and how will that information be shared?

At no time will your child's personal information (name, address, student id) be shared or any information that could identify your child. A request will be made to the school regarding whether or not your child participates in 1) Free/Reduced lunch and, 2) ESL or LEP. Results of this study may be used for my dissertation, for publications and presentations.

Financial Information

Participation in this study will involve no cost to you or your child. Your child will not be paid for participating in this study.

What are my child's rights as a research participant?

Participation in this study is voluntary. Your child may withdraw from this study at any time. If you and your child decide not to be in this study, this will not affect the relationship you and your child have with your child's school in any way. Your child's grades will not be affected if you choose not to let your child be in this study.

Who can I contact if I have questions or concerns about this research study?

If you or your child have any questions, you may contact

Marie Graham

mfgraham@bu.edu

(980) 225-3587

Dr. Diana Dansereau

Dr1@bu.edu

If you have any questions about your child's rights as a participant in this research, you can contact the following office at Boston University's BU CRC IRB Office at 617-358-6115.

Appendix A (Continued)

Parental Consent for Child's Participation in Research

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I give permission for my child to participate in the research study described above and will receive a copy of this Parental consent form after I sign it.

The language spoken in our home is_____.

We request a translated copy of this form.

Initial one of the following to indicate your choice:
_____ (initial) I agree to…
_____ (initial) I do not agree to…

_____ _____

Parent/Legal Guardian's Name (printed) and Signature Date

_____ _____

Name of Person Obtaining Parental Permission Date

Parents, be aware that The Family Educational Rights and Privacy Act (FERPA) (20 U.S.C. § 1232g; 34 CFR Part 99) is a Federal law that protects the privacy of student education records.

Appendix B

Informed Student Assent

Dear chorus student,

I am a student at Boston University and this research is part of my dissertation work. This research study may help music teachers understand the best ways to teach music. You do not have to be in this study if you do not want to be. If you decide to stop after we begin, that's okay too. Your parents know about the study too

There are some things about this study you should know. You will be asked to record yourself reading rhythms and sight-singing melodies two times; once at the beginning of the study and again at the end. If you participate in this study you may be asked to work with a partner for 15 minutes during class-time over one month. You will practice singing with the scale names and clap rhythms in class.

When you record your voice, there will be a microphone and a computer in a practice room. Your teacher will help you with directions. Your recording will be saved with a code name, no one will know your name. If you are feeling nervous or uncomfortable during the recording, you may take a break.

Not everyone who takes part in this study will benefit. A benefit means that something good happens to you. I think a benefit might be that you may become better at sight reading rhythm and melody.

When I am finished with this study I will write a report about what was learned. This report will **not** include your name or that you were in the study. When the study is over, the recording of your voice will be deleted.

If you decide not to be in this study, this will not affect the relationship you have with me, your teacher, or your school in any way. Your grades will not be affected if you choose not to participate in this study. If you decide you want to be in this study, please sign your name.

I, _____, want to be in this research study.

_____ _____

(Sign your name here) (Date)

The language spoken in my home is_____. I would like to have a translated copy of this letter in my language.

Marie Graham

mfgraham@bu.edu

Dr. Diana Dansereau,
Dissertation Supervisor
drd1@bu.edu

You may obtain further information about your rights as a research subject by calling the BU CRC IRB Office at 617-358-6115

Appendix C

FORMA DE CONSENTIMIENTO DE LOS PADRES PARA LA PARTICIPACIÓN EN LA INVESTIGACIÓN DEL NIÑO

Título del estudio: Los efectos del aprendizaje asistido por pares en la lectura rítmica y melódica en un coro de la escuela intermedia

Estudiante investigador: María Graham, M. Ed

IRB estudio número: 4612X

Su hijo se le solicita participar en un estudio de investigación. Este formulario contiene información importante acerca de la razón para hacer este estudio, lo que le pedimos su niño a hacer, y qué podríamos aprender de la información que recopilamos. Su hijo se le solicita participar en un estudio de investigación sobre la lectura de música. El propósito del estudio es comprender las mejores formas de ayudar a jóvenes cantantes leen el ritmo y la melodía.

¿Qué mi hijo se pedirá que hacer si mi hijo está en este estudio?
Su hijo le pedirá para leer ritmos y melodías, solos o junto con un socio de la práctica. Le dará al niño una prueba de lectura a primera vista al principio del estudio y otra vez, al final, para medir el crecimiento de su hijo en la lectura de música. Su hijo no se pedirá alguna pregunta personal. Su hijo cantará como normal en la clase de coro. Participación ocurrirá en sesiones de veinte minutos durante la clase en el periodo de un mes. En esas sesiones de veinte minutos el niño practicará solo o con un socio de capacidad similar o con un compañero más experto.
Nos gustaría grabar un audio (Mp3) de su hijo como él/ella lee ritmo o canta una melodía. No se registrará el nombre de su hijo pero en su lugar un código se dará mediante el cual podemos seguir su progreso. Vamos a evaluar la lectura de su niño y eliminar el audio grabación inmediatamente al final del estudio. En ningún momento se registrará la cara de su hijo. Se mantendrá la grabación de audio MP3 en una carpeta independiente en un equipo seguro, utilizado por mí, el investigador. Una grabación de audio es necesaria para la participación en este estudio. Si usted o su hijo no desea registrarse, no es posible que su hijo a participar en este estudio.

¿Cuáles son los posibles riesgos o molestias a mi hijo?
Su participación en este estudio no implica ningún riesgo físico o emocional a su hijo más allá de la vida cotidiana. Algunos niños se ponen nerviosos cuando cantando en un micrófono. Su hijo puede tomar un descanso en cualquier momento. Como toda investigación, existe una posibilidad confidencialidad de la información que recopilamos sobre su hijo podría ser violada, tomaremos medidas para minimizar este riesgo por la destrucción de la grabación al final del estudio de audio.

Appendix C (Continued)

¿Cuáles son los posibles beneficios para mi hijo u otros?
Los posibles beneficios a su hijo de este estudio incluyen el aprendizaje para leer ritmos y vista-canta melodías mejor y a experimentar grabando su propia voz. Los posibles beneficios de este estudio pueden ayudar a profesores de música futura a mejorar las formas en que se enseña la lectura de la música.

¿Cómo se protegerá la información que recoge acerca de mi hijo y ¿cómo será compartir información?
En ningún momento se compartirá información personal del niño (nombre, dirección, identificación del estudiante) o cualquier información que pudiera identificar a su hijo.

¿Cuáles son los derechos de mi hijo como un participante de la investigación?
La participación en este estudio es voluntaria. Su hijo puede retirarse del estudio en cualquier momento. Si usted y su hijo deciden no participar en este estudio, esto no afectará la relación que usted y su niño tienen con la escuela de su hijo de ninguna manera. Calificaciones de su hijo no se afectará si no decide dejar que su niño a participar en este estudio.

¿A quién puedo contactar si tengo preguntas o inquietudes acerca de este estudio de investigación?
Si usted o su hijo tiene alguna pregunta, puede comunicarse con
María Graham
mfgraham@bu.edu
(980) 225-3587
Dr. Diana Dansereau Dr1@bu.edu

Si usted tiene alguna pregunta sobre los derechos de su hijo como participante en esta investigación, puede comunicarse con la oficina de la Universidad de Boston BU oficina de IRB de CRC en 617-358-6115.

Appendix C (Continued)

Permiso de los padres para la participación del niño en la investigación que he leído este formulario y el estudio de investigación ha sido explicado a mí. Me ha dado la oportunidad de hacer preguntas y mis preguntas han sido contestadas. Si tengo más preguntas, me han dicho que en contacto con. Doy permiso a mi hijo a participar en el estudio de investigación descrito arriba y recibirá una copia de este formulario de permiso de los padres después de lo firme.

Uno de los siguientes para indicar su elección inicial:

___ (inicial) estoy de acuerdo en...

___ (inicial) no estoy de acuerdo a...

_____	_____
Padre/tutor (imprimido) nombre y firma	fecha
_____	_____
Nombre de persona obtener los padres permiso	fecha

Los padres, ten en cuenta que los derechos educativos de la familia y ley de privacidad (FERPA) (20 U.S.C. § 1232g, 34 CFR parte 99) es una ley Federal que protege la privacidad de los expedientes de educación los estudiantes.

Appendix D

Student Assent Spanish

Estimado alumno de coro,

Soy un estudiante de la Universidad de Boston y esta investigación es parte de mi trabajo de tesis doctoral. Esta investigación puede ayudar a los profesores de música a entender las mejores formas de enseñar música. No tienes que participar en este estudio si no quieres.

Si decides que parar después de que comenzamos, eso está bien también. Tus padres saben sobre el estudio también y hay algunas cosas sobre este estudio que debes saber. Se le pedirá a grabarte leyendo ritmos y melodías de vista cantar dos veces; una vez al principio del estudio y otra vez al final. Si participas en este estudio, se le pedirá para trabajar con un socio por 15 minutos durante la hora de clase durante un mes. Practicarás el canto con los nombres de escala y aplaudirás ritmos en clase.

Cuando grabas tu voz, habrá un micrófono y una computadora en una sala de práctica. Tu profesor te ayudará con las direcciones. Su grabación se guardará con un nombre código, nadie sabrá tu nombre. Si se siente nervioso o incómodo durante la grabación, puedes tomar un descanso.

No todo el que participa en este estudio se beneficiará. Un beneficio significa que algo bueno le sucede. Yo creo que un beneficio puede ser que seas mejor en vista lectura ritmo y melodía.

Cuando he terminado con este estudio voy a escribir un informe acerca de lo aprendido. Este informe no va a incluir tu nombre o que estabas en el estudio. Cuando el estudio, se eliminará la grabación de tu voz.

Si decides que no participar en este estudio, esto no afectará la relación que tiene conmigo, tu maestro o tu escuela, de ninguna manera. Tus calificaciones no perderá si decide no participar en este estudio.

Si usted decide que desea participar en este estudio, por favor, firme tu nombre.

_____, Quiero participar en este estudio de investigación.

_____ _____

(Ponga su firma aquí) (Fecha)

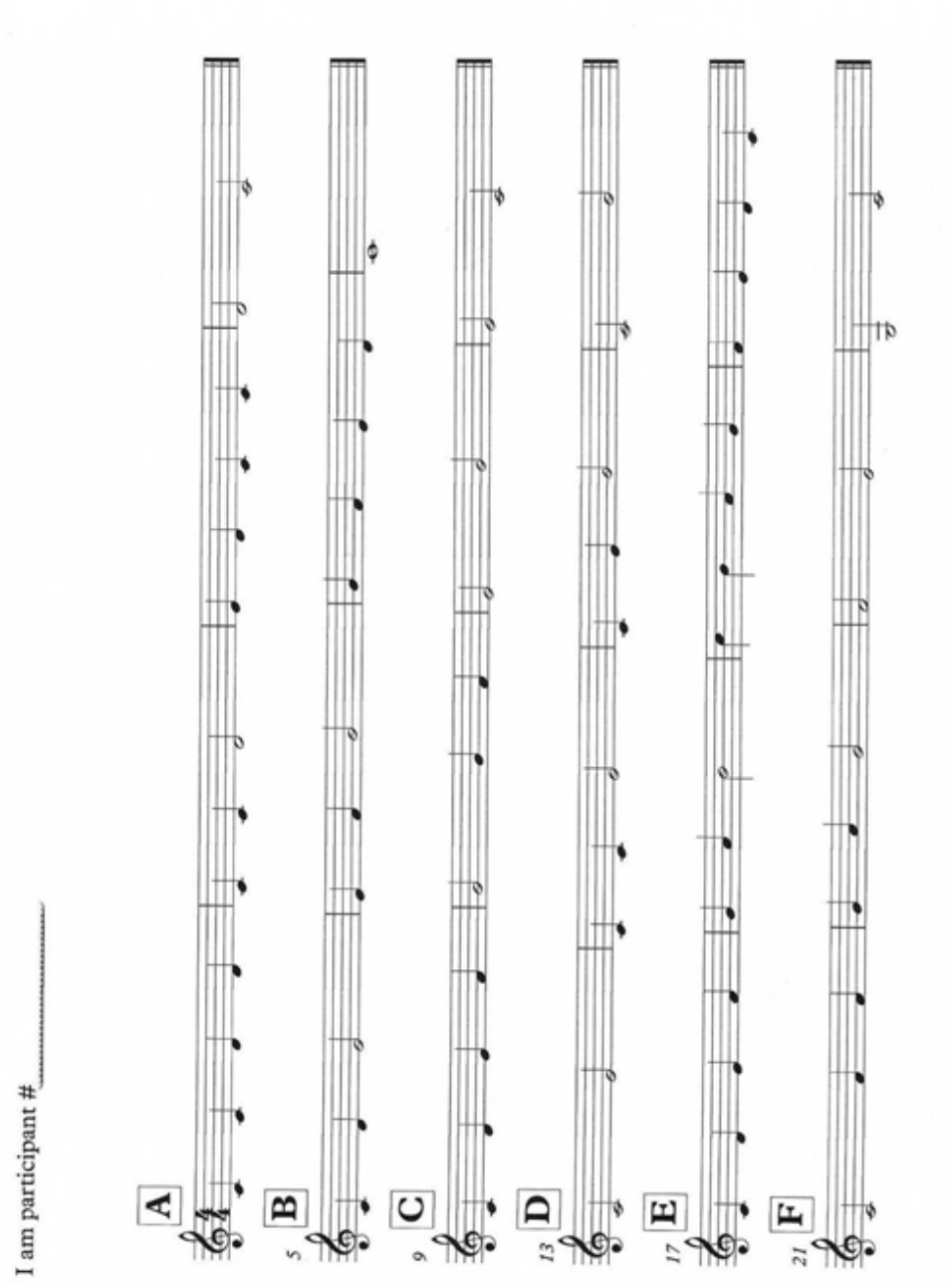
La lengua se habla en mi casa is_____. Me gustaría tener una copia traducida de esta carta en mi idioma.

Marie Graham
mfgraham@bu.edu

Dr. Diana Dansereau,
Dissertation Supervisor
drd1@bu.edu

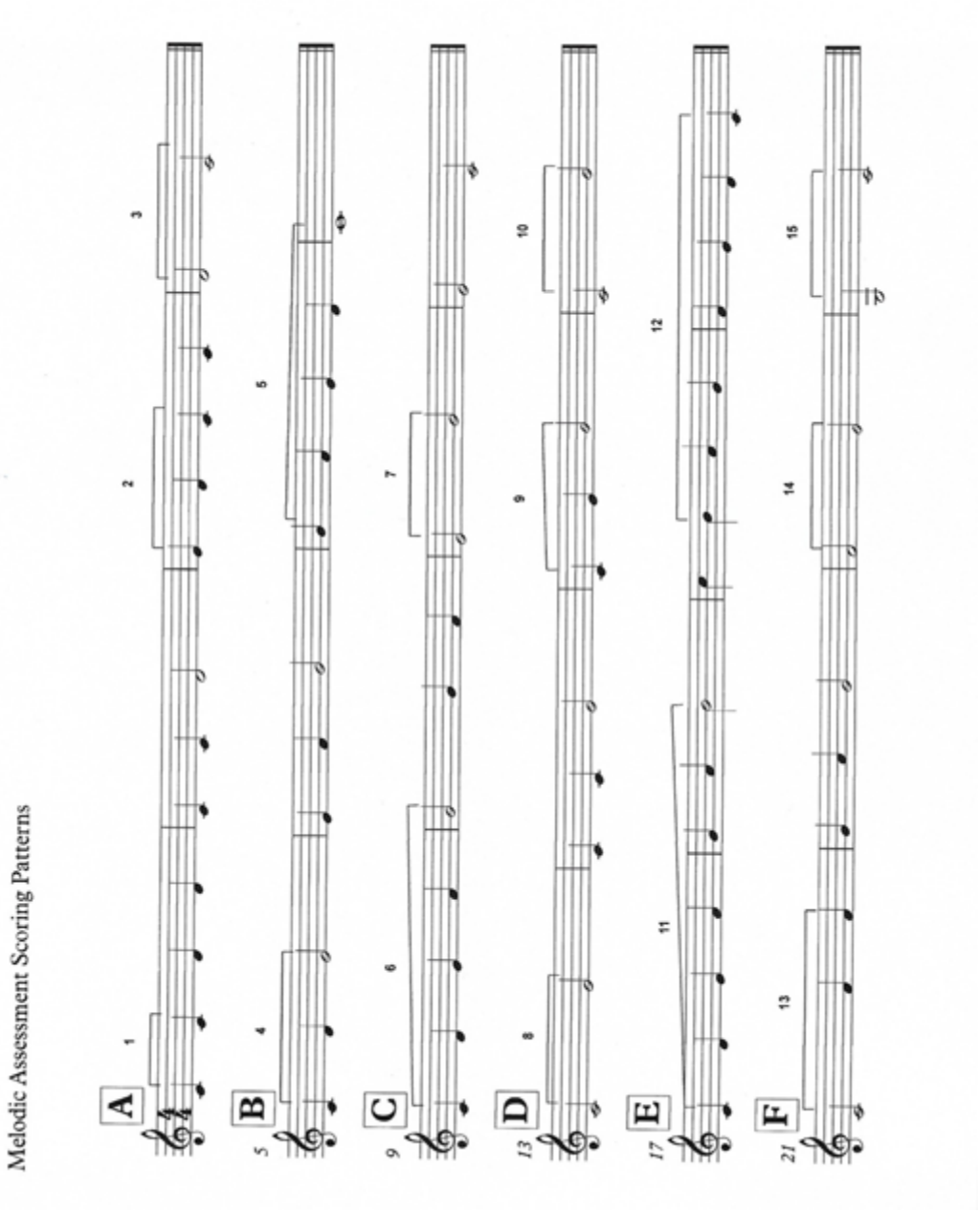
Appendix E

Melodic Assessment



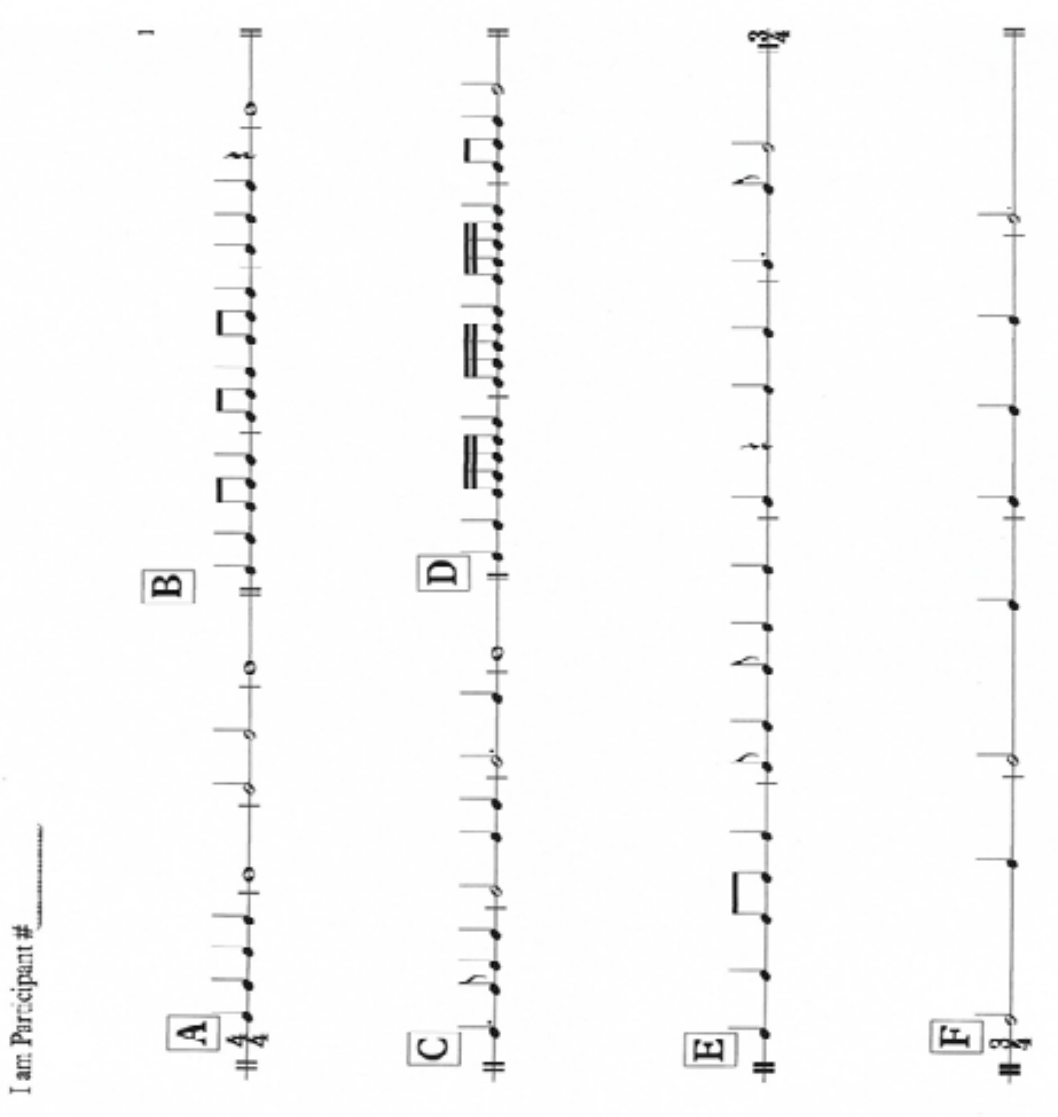
Appendix F

Melodic Assessment Scoring Patterns



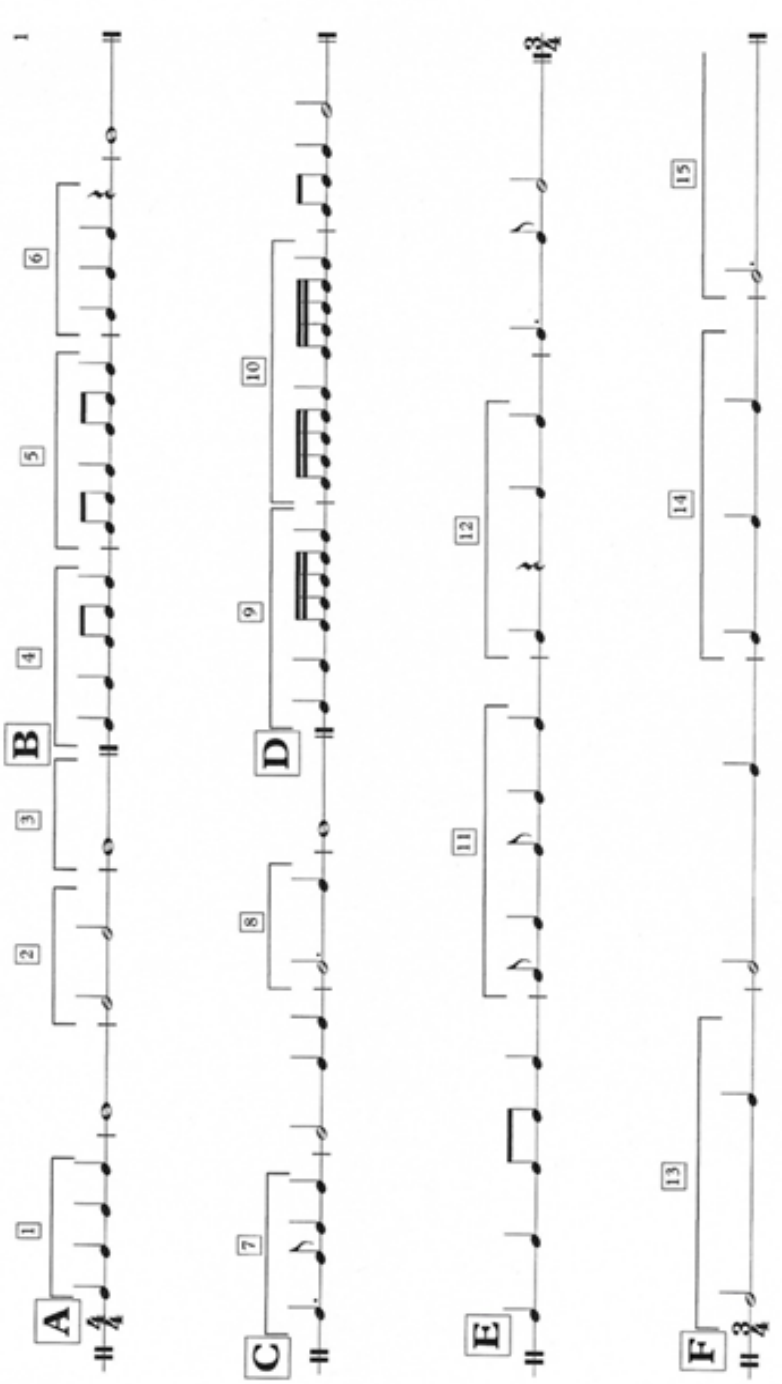
Appendix G

Rhythmic Assessment



Appendix H

Rhythmic Skills Hierarchy



Appendix I

Pre-assessment Score Sheet

Participant #_____ **Pre-assessment** Rater Initials _____

Rhythmic	**Melodic**
1._____ ¼ notes (4/4)	1. _____ Conjunct/repeated (d,d)
2. _____ ½ notes (4/4)	2. _____ Conjunct/descending (m,r,d)
3. _____ Whole note (4/4)	3. _____ Cadential/end on d
4. _____ ¼, ⅛ (4/4)	4. _____ Conjunct ascending (d,r,m)
5. _____ ⅛, ¼ (4/4)	5. _____ Conjunct descending (s,f,m,r,d)
6. _____ ¼, ¼ rest (4/4)	6. _____ Conjunct/ascending (d,r,m,f,s)
7. _____ dotted ¼, ¼ (4/4)	7. _____ Tonic/ascending (m,s)
8. _____ dotted ½, ¼ (4/4)	8. _____ Subdominant /ascending (d,m)
9. _____ ¼, 1/16ths (4/4)	9. _____ Tonic/ascending (d,m,s)
10. _____ 1/16ths, ¼ (4/4)	10. _____ Dominant (d, s)
11. _____ Syncopation (4/4)	11. _____ Conjunct (d,r,m,f,s,l,t')
12. _____ ¼, ¼ rest (4/4)	12. _____ Conjunct (t',l,s,f,m,r,d)
13. _____ ½, ¼ (3/4)	13. _____ Subdominant (d, f)
14. _____ ¼ (3/4)	14. _____ Dominant (f, m)
15. _____ dotted ½ (3/4)	15. _____ Cadential (s, d)
Rhythmic Score_____	**Melodic Score**_____

Composite Score_____

Appendix J

Post assessment Score Sheet

Participant #_____ **Post assessment** Rater Initials _____

Rhythmic	**Melodic**
1._____ ¼ notes (4/4)	1. _____ Conjunct/repeated (d,d)
2. _____ ½ notes (4/4)	2. _____ Conjunct/descending (m,r,d)
3. _____ Whole note (4/4)	3. _____ Cadential/end on d
4. _____ ¼, ⅛ (4/4)	4. _____ Conjunct ascending (d,r,m)
5. _____ ⅛, ¼ (4/4)	5. _____ Conjunct descending (s,f,m,r,d)
6. _____ ¼, ¼ rest (4/4)	6. _____ Conjunct/ascending (d,r,m,f,s)
7. _____ dotted ¼, ¼ (4/4)	7. _____ Tonic/ascending (m,s)
8. _____ dotted ½, ¼ (4/4)	8. _____ Subdominant /ascending (d,m)
9. _____ ¼, 1/16ths (4/4)	9. _____ Tonic/ascending (d,m,s)
10. _____ 1/16ths, ¼ (4/4)	10. _____ Dominant (d, s)
11. _____ Syncopation (4/4)	11. _____Conjunct (d,r,m,f,s,l,t')
12. _____ ¼, ¼ rest (4/4)	12. _____ Conjunct (t',l,s,f,m,r,d)
13. _____ ½, ¼ (3/4)	13. _____ Subdominant (d, f)
14. _____ ¼ (3/4)	14. _____ Dominant (f, m)
15. _____ dotted ½ (3/4)	15. _____ Cadential (s, d)

Rhythmic Score_____ **Melodic Score**_____

Composite Score_____

Appendix K

VSRI/MS Guidelines

VSRI/MS Guidelines for Raters

Per VSRI (Henry, 2001) the following guidelines will be used to ensure consistency in scoring and to measure student success to a **tonal** concept of sight-reading.

1. The first note of each melody served as a reference.
2. Raters assessed only the first attempt at a note.
3. Raters did not evaluate intonation.
4. Raters evaluated only the main portion of the note sliding or stuttering occurs.
5. The function of the pitch had to be correct within the established key. Raters did not count accurately performed intervals if the function was wrong, except when a new tonic is clearly established.
6. Subjects could use any word or syllable while sight-singing. Raters did not penalize subjects for singing an incorrect syllable or number if the pitch and the function were correct.
7. For conjunct, tonic, dominant, sub-dominant, and cadential skills, the subject must perform both pitches correctly to receive component skill credit.

Appendix L

Rhythm Skills Hierarchy Guidelines

Rhythm Skills Hierarchy – Guidelines for Raters

The following guidelines will be used to ensure consistency in scoring and to measure student success in the **rhythmic** skills hierarchy sight-reading assessment.

1. The tempo established by the individual is used as a reference.
2. Only the first attempt at a note is assessed.
3. Raters evaluated only the main portion of the note if hesitation or stuttering occurred.
4. The function of the rhythm had to be correct within the established tempo or when the subject reestablished tempo.
5. Subjects could clap, tap, or use any word or syllable when reading rhythms. Raters did not penalize subjects if they used an incorrect syllable or number in the counting system if the duration within the tempo was correct.

Appendix M

List of Symbols

CI……	Confidence interval
d…….....	Cohen's d
df……..	Degrees of freedom
F…..……....	F value
ll……..	Lower limit
M…….……	Mean
MD……	Mean difference
n……	Sample size, subsample
N…….	Sample size, full sample
p…….	p value
SD……..	Standard deviation
SE……..	Standard Error
UL…….	Upper limit
η_p^2……..	partial eta squared

References

Allsup, R. E. (2012). The moral ends of band. *Theory into Practice*, *51*(3), 179-187. https://doi.org/10.1080/00405841.2012.690288

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159. https://doi.org/doi:10.1037/0033-2909.112.1.155

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*(4), 279. https://doi.org/10.2307/3345261

Darrow, A. A., Gibbs, P., & Wedel, S. (2005). Use of classwide peer tutoring in the general music classroom. *Update: Applications of Research in Music Education*, *24*, 15-26. https://doi.org/doi/pdf/10.1177/87551233050240010103

Demorest, S. M. (1998). Improving sight-singing performance in the choral ensemble: The effect of individual testing. *Journal of Research in Music Education*, *46*(2), 182-192. https://doi.org/10.2307/3345622

Demorest, S. M., & May, W. V. (1995). Sight-singing instruction in the choral ensemble: Factors related to individual performance. *Journal of Research in Music Education*, *43*(2), 156-167. https://doi.org/10.2307/3345676

Dimitrov, D. M., & Rumrill, P. D. (2003). Pretest-posttest designs and measurement of change. *Work*, *20*(2), 159-165. Retrieved from researchgate.net/publication/10826237_

Foster, L. P. (2014). *Student to student: Reciprocal peer mentoring in a post-secondary piano lab* (Doctoral dissertation – Boston University). Available from ProQuest Dissertations & Theses Global. (Publication No. 3581024)

Freer, P. K. Freer (2008) Teacher instructional language and student experience in middle school choral rehearsals. *Music Education Research*, 10(1), 107-124. https://doi.org/10.1080/14613800701871538

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: an introduction* (8th Ed.). Boston, MA: Pearson.

Goodrich, A. (2007). Peer mentoring in a high school jazz ensemble. *Journal of Research in Music Education*, *55*(2), 94-114. https://doi.org/10.1177/002242940705500202

Goodrich, A. (2018). Peer mentoring and peer tutoring among K-12 students: A literature review. *Update: Applications of Research in Music Education*, *36*(2), 13-21. https://doi.org/10.1177/8755123317708765

Green, L. (2008). Group cooperation, inclusion and disaffected pupils: some responses to informal learning in the music classroom. Presented at the RIME Conference 2007, Exeter, UK. *Music Education Research*, *10*(2), 177-192. https://doi.org/10.1080/14613800802079049

Hancock, G., & Mueller, R. (2010). *The reviewer's guide to quantitative methods in the social sciences* (Kindle Digital Ed.). https://doi.org/10.4324/9780203861554

Henry, M. (2001). The development of a vocal sight-reading inventory. *Bulletin of the Council for Research in Music Education*, *150*, 21-35. Retrieved from www.jstor.org.ezproxy.bu.edu/stable/40319097

Henry, M. (2009). *The development of a rhythm hierarchy for vocal sight-reading*. Poster session presented at the Texas Music Educators Association, San Antonio, TX. https://doi.org/10.1016/s0028-3932(01)00170-1

Jellison, J., Brown, L., & Draper, E. (2015). Peer-assisted learning and interactions in inclusive music classrooms: Benefits, research, and applications. *General Music Today*, *28*(3), 18-22. https://doi.org/10.1177/1048371314565456

Johnson, E. (2017). The effect of symmetrical and asymmetrical peer-assisted learning structures on music achievement and learner engagement in seventh-grade band. *Journal of Research in Music Education, 65*(2), 163-178. https://doi.org/10.1177/0022429417712486

Johnson, E. A. (2011). The effect of peer-based instruction on rhythm reading achievement. *Contributions to Music Education*, *38*(2), 43-60. https://doi.org/www.jstor.org.ezproxy.bu.edu/stable/24127190

Johnson, E. A. (2013). *The effect of symmetrical and asymmetrical peer-assisted structures on music achievement and learner engagement in the secondary large ensemble* (Doctoral dissertation – University of Colorado at Boulder). Available from ProQuest Dissertations & Theses database. (Publication No. 3561981)

Kenney, A. (2014). 'Collaborative creativity' within a jazz ensemble as a musical and social practice. *Thinking Skills and Creativity*, *13*, 1-8. https://doi.org/doi.org/10.1016/j.tsc.2014.02.002

Kopiez, R., & Lee, J. I. (2008). Towards a general model of skills involved in sight reading music. *Music Education Research*, *10*(1), 41-62. https://doi.org/10.1080/14613800701871363

Kusek, C. R. (2017). *The impacts of peer assisted learning on rhythm counting in a middle school string orchestra classroom* (Doctoral dissertation – Olivet Nazarene University). Retrieved from digitalcommons.olivet.edu

Large choral MPA sightreading information. (2015). Retrieved from www.ncmea.net/sections-2/high-school-choral/programs/music-performance-adjudication-mpa/large-choral-mpa-sightreading-information-2/

Lebler, D. (2008). Popular music pedagogy: peer learning in practice. *Music Education Research*, *10*(2), 193-213. https://doi.org/10.1080/14613800802079056

Lehmann, A. C., & Kopiez, R. (2008). *Sight-Reading* (Oxford Handbooks Online Ed.). https://doi.org/10.1093/oxfordhb/9780199298457.013.0032

Lehmann, A. C., & McArthur, V. (2002). Sight-Reading. In R. Parncutt & G. McPherson (Ed.), *Science and psychology of music performance: Creative strategies for teaching and learning* (pp. 135-149). https://doi.org/10.1093/acprof:oso/9780195138108.001.0001

Lehmann, A. C., Sloboda, J. A., & Woody, R. H. (2007). Reading or listening and remembering. *Psychology for Musicians*, 107-126. https://doi.org/10.1093/acprof:oso/9780195146103.003.0006

Lucas, K. V. (1994). Contextual condition and sight singing achievement of middle school choral students. *Journal of Research in Music Education*, *42*(3), 203. https://doi.org/10.2307/3345700

McPherson, G. E. (1994). Factors and abilities influencing sightreading skill in music. *Journal of Research in Music Education*, *42*(3), 217. https://doi.org/10.2307/3345701

McPherson, G., & Gabrielsson, A. (2002). From sound to sign. In R. Parncutt & G. McPherson (Ed.), *Science and psychology of music performance: Creative strategies for teaching and learning* (pp. 99-114). https://doi.org/10.1093/acprof:oso/9780195138108.001.0001

NAfME. (2014). *National Core Arts Standards*. Retrieved from http://www.nafme.org/wp-content/files/2014/11/2014-Music-Standards-Ensemble-Strand.pdf

Nichols, B. (2012). The way we do the things we do: A survey of middle-school choral educators' sight-singing attitudes and influences. *Contributions to Music Education*, 39, 87-100. Retrieved from http://www.jstor.org/stable/24127246

North Carolina Department of Public Instruction. (2017). *Data and statistics: School report cards* [Census report]. Retrieved from https://ncreportcards.ondemand.sas.com/snapshots

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. Oxford University Press.

Rohrbeck, C. A., Ginsburg-Block, M. D., Fantuzzo, J. W., & Miller, T. R. (2003). Peer-assisted learning interventions with elementary school students: A meta-analytic review. *Journal of Educational Psychology*, *95*(2), 240-257. https://doi.org/10.1037/0022-0663.95.2.240

Schön, & Besson. (2002). Processing pitch and duration in music reading: A RT–ERP study. *Neuropsychologia*, *40*(7), 868-878. https://doi.org/10.1016/S0028-3932(01)00170-1

Shieh, E. (2008). Developing leadership in the ensemble classroom: Music educators have a unique opportunity to help their students become sensitive thinkers and leaders. *Music Educators Journal*, *94*(4), 46-51. https://doi.org/10.1177/00274321080940040106

Sloboda, J. (2004). *Exploring the Musical Mind: Cognition, emotion, ability, function.* Pp. 3-20. Oxford: Oxford University Press https://doi.org/10.1093/acprof:oso/9780198530121.001.0001

Topping, K., & Ehly, S. [Ed]. (1998). *Peer-assisted learning*. New York: Lawrence Erlbaum.

Topping, K. J. (2005). Trends in Peer Learning. *Educational Psychology*, *25*, 631-645. https://doi.org/10.1080/01443410500345172

Topping, K. J., & Ehly, S. (2001). Peer Assisted Learning: A Framework for Consultation. *Journal of Educational and Psychological Consultation*, *12*(2), 113-132. https://doi.org/10.1207/S1532768XJEPC1202_03

US Census Bureau. (2010). *Urban and Rural Classifications*. Retrieved from www2.census.gov/geo/pdfs/reference/GARM/Ch12GARM.pdf

VanWeelden, K., Heath-Reynolds, J., & Leaman, S. (2017). The effect of a peer mentorship program on perceptions of success in choral ensembles: pairing students with and without disabilities. *National Association for Music Education*, *36*(1), 37-43. https://doi.org/10.1177/8755123316675480

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Watkins, J. G. (1970). *Watkins-Farnum Performance Scale* (Form a) [Measurement instrument]. Retrieved from www.halleonard.com

Webb, R. S. (2012). *Construction of musical understandings: An exploration of peer tutoring in the school orchestra program* (Doctoral dissertation – Northwestern University). Available from ProQuest Dissertations & Theses Global. (Publication No. 3527642)

Wellborn, J. G. (1991). *Engaged and disaffected action: The conceptualization and measurement of motivation in the academic domain* (Unpublished doctoral dissertation). University of Rochester, Rochester, NY.

Yankeelov, M. (2016). *Relationships among auditory representations and overall musicianship of classical and non-classical music students* (Doctoral dissertation). Available from Boston University, Boston, MA. (https://hdl.handle.net/2144/16838)

Vita