

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

AN INVESTIGATION OF THE EFFECT OF INSTRUCTION IN EDWIN  
GORDON'S TONAL AND RHYTHM PATTERNS ON SECONDARY  
STUDENTS' ADVANCED MEASURES OF MUSIC AUDIATION SCORES

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

Degree

DOCTOR OF PHILOSOPHY

By

CHRISTIAN O'DONNELL

Norman, Oklahoma

2011

AN INVESTIGATION OF THE EFFECT OF INSTRUCTION IN EDWIN  
GORDON'S TONAL AND RHYTHM PATTERNS ON SECONDARY  
STUDENTS' ADVANCED MEASURES OF MUSIC AUDIATION SCORES

A DISSERTATION APPROVED FOR THE  
SCHOOL OF MUSIC

BY

---

Dr. Michael A. Raiber, chair

---

Dr. Charles Ciorba, co-chair

---

Dr. William K. Wakefield

---

Dr. Roland C. Barrett

---

Dr. Joseph L. Rodgers

©Copyright by CHRISTIAN O'DONNELL 2011  
All Rights Reserved.

## TABLE OF CONTENTS

APPROVAL PAGE .....	ii
LIST OF TABLES .....	vi
LIST OF FIGURES .....	viii
ABSTRACT.....	ix
CHAPTER	
I. INTRODUCTION .....	1
Audiation .....	2
Music Learning Theory .....	3
Stages of Music Aptitudes .....	4
Music Aptitude and Music Achievement.....	5
Musical Intelligence and Academic Intelligence .....	5
Tonal and Rhythmic Pattern Instruction .....	8
Music Aptitude Tests .....	9
Summary.....	11
Purpose of Study.....	11
Research Questions .....	12
Definition of Terms.....	13
II. REVIEW OF THE LITERATURE .....	16
Tonal and Rhythm Patterns.....	16
Audiation.....	21
Music Aptitudes .....	22
Music Aptitude and Music Achievement.....	25
The Development of Music Aptitude Tests .....	26
Gordon's Developmental and Stabilized Music Aptitude Tests .....	28
Music Learning Theory .....	34
Tonal and Rhythm Solfege in Music Learning Theory.....	35
Summary .....	36
III. DESIGN OF THE STUDY.....	39
Method.....	40
Instrument.....	41
Procedure .....	43

Learning Sequence Activities and Tonal and Rhythm Content .....	48
Data Analysis.....	52
IV. RESULTS.....	54
Reliability Analysis.....	55
Descriptive Statistics.....	56
Tonal Dimension.....	59
Rhythm Dimension .....	61
Total Dimension.....	62
Correlation Analysis.....	63
Multivariate Analysis of Covariance.....	64
Summary .....	67
V. CONCLUSIONS.....	70
Summary .....	70
Conclusions and Implications.....	73
Limitations of Study .....	75
Recommendations .....	79
REFERENCES.....	83
APPENDIX A. UNIVERSITY OF OKLAHOMA INSITUTIONAL REVIEW BOARD LETTER.....	88
APPENDIX B. INFORMED LETTER OF CONSENT TO PARENTS.....	89
APPENDIX C. INFORMED LETTER OF CONSENT.....	90
APPENDIX D. INFORMED LETTER OF ASSENT.....	92
APPENDIX E. SCHOOL DISTRICT RESEARCH STUDY REQUEST.....	94

## LIST OF TABLES

1.	Randomized Pretest-Posttest Design.....	40
2.	AMMA Reliabilities for High School and Seventh and Eighth Grade Students.....	42
3.	AMMA Means and Standard Deviations for High School Students and Seventh and Eighth Grade Students .....	42
4.	AMMA Inner-correlations Among Tests for High School and Seventh and Eighth Grade Students.....	43
5.	AMMA Reliabilities for Pre-Post Tonal and Rhythm Tests for Experimental, Control and Composite.....	56
6.	Means and Standard Deviations of Pre- and Post-test Scores of the AMMA.....	57
7.	Means and Standard Deviations of Pre-test and Post-test Scores of the AMMA for Participants in Lessons and Not in Lessons.....	59
8.	Means and Standard Deviations of Pre-test and Post-test Tonal scores of the AMMA of Students in Private Lessons.....	60
9.	Means and Standard Deviations of Pre-test and Post-test Rhythm scores of the AMMA of Students in Private Lessons.....	61
10.	Means and Standard Deviations of Pre-test and Post-test Total scores of the AMMA of Students in Private Lessons.....	63
11.	AMMA Inter-correlations Between Pre- and Post-test Scores.....	66

12. Multivariate Analysis of Covariance Tests of Between Subjects Effects.....	67
--	----

## LIST OF FIGURES

1.	Administration of the AMMA.....	45
2.	Semester Schedule of Treatment.....	46
3.	Comparison of Rhythm Syllables .....	47
4.	Gordon's Content Learning Sequence.....	48
5.	Estimated Marginal Means of Post-Tonal Dimension.....	67



## ABSTRACT

The purpose of this study was to determine if the use of Edwin Gordon's patterns in Music Learning Theory, when used twice a week in one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). This experiment was conducted in a large public school district in the Southwest United States. There were a total of 73 students (grades 8-12) participating within the experimental group ( $n = 38$ ) and the control group ( $n = 35$ ). Participants in the experimental group were instructed using tonal patterns during a treatment week and rhythm patterns the next treatment week. The control group participated in melodic singing one week using Ottman's (2004) *Music for Sight-Singing*. Rhythmic exercises were taught the next week, using McHose and Tibbs (1957) syllables. Both experimental and control groups performed their respective exercises vocally with a maximum of five minutes of instruction per visit. The pre-test for all three dimensions of the AMMA (tonal, rhythm, and total) was used as a covariate to control for any pre-existing differences. The independent variables were: (a) gender (b) private lessons, and (c) group (experimental or control). The dependent variables were the converted percentile post-test scores for all

three dimensions (tonal, rhythm, and total) of the AMMA. A mean score analysis indicated that students who participated in private lessons, regardless of group assignment, exhibited the highest pre- to post-test mean score differences. A Multivariate Analysis of Covariance (MANCOVA) revealed no significant main effects although a significant interaction existed between private lessons and group assignment in the post-test tonal dimension,  $F(1,72) = 4.61, p. < .04$ .

## CHAPTER ONE

### INTRODUCTION

Music educators are continually seeking methodologies that will enhance their students' potential to grow musically. Toward this end, some have used Edwin Gordon's tonal and rhythmic patterns from his *Music Learning Theory* to teach the theory and understanding of music. According to Gordon (2003), the use of his patterns, in hierarchy, enhances music audiation, which is defined as the ability to hear and comprehend music without sound physically being present. Audiation is believed to be a crucial and necessary component of music aptitude (Gordon, 2003).

There are a number of studies that use tonal and rhythmic patterns to determine if they enhance music achievement and raise developmental music aptitude (Flohr, 1981; Rutkowski, 1986, 1996). However, there is little research that investigates whether the use of Gordon's own hierarchy of tonal patterns and rhythmic patterns affects long term stabilized music aptitude. The purpose of this study is to determine if the use of Gordon's patterns in music learning theory, when used twice a week in one semester, affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation*.

## *Audiation*

Audiation is the ability to hear and comprehend music without sound physically being present (Gordon, 2003). Gordon compares the term audiation in music with Taylor's (1964) term *auding* when describing spoken language. Auding is what people do when they hear and process the sound of language inside their heads without those sounds being physically present. One is able to hear and perceive a sound that is physically present, but in order for that sound to be intelligible, one needs to undergo the process of auding or audiation.

According to Gordon (2003), there are eight types of audiation.

They are as follows:

- We audiate when we listen to music for its syntactical tonal and rhythm patterns.
- We audiate when we read notation and hear what we read, with or without making an external sound.
- We audiate when we write music from dictation.
- We audiate when we recall music from our past.
- We audiate when we write music we have recalled.
- We audiate when we improvise music on the spot.

- And we audiate when we write down the music we have created or improvised (pp. 10-13).

### *Music Learning Theory*

Gordon's (2003) *Music Learning Theory* (MLT) combines the knowledge of sequential music learning, music aptitude, and audiation. MLT is a combination of skill learning sequences and content learning sequences. Skill learning sequences include discrimination and inferential skills that are taught sequentially in conjunction with tonal or rhythm content learning sequences. Tonal content learning sequences include tonal classifications and functions. Rhythm content learning sequences include rhythm classifications and functions. It is believed that through the use of MLT, students will have a better understanding of music through the development of their audiation skills.

According to Gordon (1998), when learning a new piece of music, students who are in the developmental music aptitude stage can only concentrate on one musical dimension at a time. For example, students are able to make reliable decisions about a tonal pattern once the rhythmic dimension is removed. In addition, students are able to make reliable decisions about a rhythmic pattern once the tonal dimension is removed.

### *Stages of Music Aptitude*

Gordon (2003) stated that music aptitude is a measure of a student's potential to achieve in music. Furthermore, music aptitude is normally distributed across the entire population. It is believed that a child's music aptitude remains in the developmental stage until age nine. From that point forward, his or her music aptitude becomes stabilized. Prior to stabilization, music aptitude is constantly changing in association with the child's environmental influences. Some neurologists believe these changes are influenced by: (a) the relaxation between the myelination of the great cerebral commissures and (b) the intricate activation of the frontal lobes during the stabilization process (Gordon, 2003). Gordon and Grunow (1989, 1991) stated that the quality of a child's musical environment, in combination with his or her innate music capacity, has an impact on his or her developmental music aptitude. Gordon (1998) added that younger children who receive appropriate guidance and formal instruction in music have the potential to attain high levels of music aptitude

According to Gordon (1987) stabilized music aptitude does not increase after the age of nine. He considers that involvement in musical activities, private lessons, or participation in music theory may enhance but not significantly increase one's stabilized music aptitude. Unlike

developmental music aptitude, stabilized music aptitude is thought to be immune to these variables.

Research conducted by Gordon (1965) on the *Music Aptitude Profile* (MAP) indicated that there are small increments of improvement in raw scores in relation to chronological age. Gordon (2003) stated that a person's percentile rank retains its relative position even though the raw scores may show some increase related to an increase in age. However, there have been some investigations that suggest stabilized music aptitude scores can be enhanced through instruction and participation (Azzara, 1993; Estrella, 1992). If stabilized music aptitude can be enhanced, teachers may be able to employ a curriculum that will help their students achieve a greater potential of musical understanding.

When a person enters stabilized music aptitude, there are two non-preferential dimensions (tonal and rhythm) and one preferential dimension (sensitivity) (Gordon, 1998). The tonal dimension consists of harmony and melody, while the rhythm dimension consists of tempo and meter. The sensitivity dimension consists of phrasing, balance, and style.

#### *Music Aptitude and Music Achievement*

In reference to the relationship between music aptitude and music achievement, Gordon (1993) stated:

Music aptitude is a measure of a student's potential to learn. It points beyond itself. Music achievement is a measure of what a student has already learned in music... Although a student who demonstrates a high level of music achievement must also have a high level of music aptitude, it is not necessarily true that a student who demonstrates a low level of music achievement must also have a low level of music aptitude (pp. 39-40).

It is important to note that while music aptitude and musical achievement are related, they should not be confused as the same construct. Music aptitude involves person's potential to learn music while music achievement is considered to be a measure of what a student has already learned (Gordon, 2003).

#### *Musical Intelligence and Academic Intelligence*

There has been some debate between psychologists as to how music intelligence and academic intelligence integrates into musical learning and understanding. Gordon (1989) explained how he developed his *Advanced Measures of Music Audiation* (AMMA) in the administrator's manual:

Regarding music aptitude, there are two general beliefs: the Gestalt and the atomistic. The Gestalt group believes that music aptitude is a unitary trait of which overall intelligence is a significant part. The atomistic group contends that music aptitude is multidimensional: it has various parts, none of which is significantly related to overall intelligence. Gestalt psychologists insist that a music aptitude test must yield only a total score without subtest scores, that the content of the test questions be in music context, that each test question include as many music



dimensions (tonal and rhythmic) as possible, and that the stimulus for each question be a music instrument. If the music aptitude test has many parts, as the atomists believe, subparts also must exist and need to be considered. Researchers have addressed this area, suggesting that pitch discrimination, pitch recognition, pitch memory, and “absolute pitch” are all subparts of the tonal dimension, and that there is a difference between melodic aptitude and harmonic-contrapuntal aptitude. As to the rhythm dimension, they suggest that rhythm recognition, rhythm memory, and time discrimination are all parts of the rhythm dimension, and that there are differences between aptitudes for melodic rhythm, meter, and tempo. For the aesthetic-expressive-interpretive dimension, differences in aptitudes for phrasing, balance, style, melody, harmony, rhythm, and intensity have been established. Recent findings suggest that although there are probably not separate aptitudes (but possibly personality traits and psychomotor abilities) for composition, improvisation, conducting, and instrumental and vocal performance, still there are separate parts and subparts of music aptitude, including preference as well as non-preference measures (pp.10-11).

Gordon’s (1987) research indicated that music aptitude has a low correlation with general intelligence. According to Gordon, music aptitude cannot be accurately predicted by performance on a general intelligence test or an academic achievement test, nor can general intelligence be accurately predicted by performance on a music aptitude test. There have been some studies that compare musical achievement and academic achievement. McMahon (1979) studied music instruction and reading skills with the discrimination of major and minor triads. Students who received music instruction were able to discriminate phoneme changes

more accurately than musically untrained children. Kehrberg (1984) found that music aptitude, music achievement, and attitude towards music were not related to frequency of listening to music. Further findings indicated that musical aptitude was a strong predictor of music achievement among grade school students. Music aptitude, home musical environment, “outside-of-school” instrumental playing activities, and the degree of partaking in school musical activities were strong predictors of general music achievement among high school students.

Zdzinski (1992) studied the relationships among parental involvement, music aptitude, and musical achievement of instrumental music studies. Results indicated that there was a significant relationship between parental involvement and both musical achievement and music aptitude as well as a strong relationship between music aptitude and both musical achievement and performance achievement.

### *Tonal and Rhythmic Pattern Instruction*

Several studies have identified difficulty levels of rhythm patterns (Bradford, 1995; Lai, 1999) and tonal patterns (Jones, 1979; Lai, 1999; Sinor, 1984). Grutzmacher (1985) emphasized tonal conceptual development using tonal patterns as content with harmonization and vocalization versus a traditional single-note identification approach involving music symbols and pitches taught from notation. Studies have

suggested that students who experienced tonal pattern instruction scored significantly higher on music achievement and tonal audiation tests than students who did not receive such instruction (Azzara, 1993; Gamble, 1989; Grutzmacher, 1985). Further research has indicated that students who received an emphasis in rhythmic pattern instruction exhibited greater musical achievement than students who did not receive such instruction (Azzara, 1993; Coley, 1987; Gouzouasis, 1990; Kitts, 1993; Palmer, 1976; Shehan, 1987).

### *Music Aptitude Tests*

The first standardized test designed to measure music aptitude was the Seashore Measure of Musical Talent (1919), with a battery of subtests that included: (a) sense of pitch, (b) sense of loudness, (c) sense of rhythm, (d) sense of time, (e) sense of timbre, and (d) tonal memory. This test was later renamed the Seashore Measures of Musical Talent (1939). Another test designed to measure the same dimensions in the Seashore battery, although designed and titled differently, was the Kwalwasser-Dykema Music Tests (1930), followed by the Kwalwasser Music Talent Test (1953).

The next major development in music aptitude testing was Wing's *Standardized Tests of Musical Intelligence* (1948), which was later revised and titled the *Tests of Musical Ability and Appreciation* (1970). This test

included seven subtests with three non-preference tests requiring students to count notes in a chord and detect slight alterations of one note in a chord or melody. The four preference subtests ask the students to choose: (a) better rhythmic accent, (b) harmonization, (c) phrasing, and (d) dynamic\_expression in two performances. Drake (1957) published the *Drake Musical Aptitude Tests*, which included only two subtests on: (a) rhythm and (b) musical memory. The Bentley *Measure of Musical Abilities* (1966) was designed for children as young as seven years old, and included subtests on: (a) pitch discrimination, (b) rhythmic memory, (c) tonal memory, and (d) chord analysis.

Gordon (1965) developed a series of music aptitude tests. His first test is titled the *Music Aptitude Profile* (MAP), which is designed to measure stabilized music aptitude. Gordon then created two developmental music aptitude tests titled the *Primary Measures of Music Audiation* (PMMA) (1979) and the *Intermediate Measures of Music Audiation* (IMMA) (1982). The *Advanced Measures of Music Audiation* AMMA (Gordon, 1989) combines both tonal and rhythm aspects into one test. The AMMA is considered to be an advanced test, as it is designed to measure the stabilized music aptitude of high school aged students and beyond. Students are expected to concurrently audiate: (a) tonality, (b) key, (c) melody, (d) harmony, (e) rhythm, (f) meter, and (g) tempo.

### *Summary*

Gordon has established that developmental and stabilized stages of music aptitude exist. Research has shown that developmental music aptitude scores can be enhanced as a result of a student's age and musical surroundings. Gordon has also stated that stabilized music aptitude solidifies by age nine, and scores on a stabilized music aptitude test cannot be enhanced by environment, private lessons, and/or participation in musical activities. There are, however, some investigations (Azzara, 1993; Estrella, 1992) that suggested stabilized music aptitude scores can be enhanced through instruction and participation.

Through MLT, students are taught to understand music through the development of their audiation skills. MLT combines the knowledge of sequential music learning, music aptitude, and audiation. If scores on a reliable stabilized music test can be affected by the use of Gordon's tonal and rhythm syllables in learning sequence activities, teachers may be better equipped to create a curriculum that helps their students achieve a greater understanding of music.

### *Purpose of the Study*

The purpose of this study was to determine if the inclusion of Edwin Gordon's patterns in music learning theory, when used twice a week in

one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). Findings of this study may aid in structuring curriculum for musical performance programs to enhance musical understanding.

### *Research Questions*

The following questions will be investigated:

1. Do any differences exist between the pre- and post-test dimensions according to the following groups: (a) experimental/control, (b) private lessons, (c) and gender?
2. What inter-relationships exist between the pre-test and post-test scores on the AMMA?
3. Does the use of Gordon's rhythm syllables in learning sequence activity patterns significantly enhance rhythmic audiation in middle school and high school students?
4. Does the use of Gordon's tonal syllables in learning sequence activity patterns significantly enhance tonal audiation in middle school and high school students?
5. Does gender or participation in private lessons influence the mean scores of the AMMA with middle school and high school students?

## DEFINITION OF TERMS

**Audiation:** The ability to assimilate and comprehend sound in our minds that may or may not be physically present. It is neither imitation nor memorization. Audiation is to music what thought is to language (Gordon 1980-2003).

**Aural Perception:** Hearing music for which the sound is physically present.

**Classification:** A tonality or meter.

**Classroom Activities:** Traditional activities that take place in band, choir and orchestra outside of learning sequence activities.

**Content Learning Sequence:** Tonal content learning sequence includes all tonal classifications and functions. Rhythm content learning sequence includes all rhythm classifications and functions. The classifications and functions are taught sequentially in combination with skill learning sequence.

**Developmental Music Aptitude:** Music potential that is affected by the quality of environmental factors. A child is in the developmental music aptitude state from birth to approximately nine years old (Gordon, 1980-1993).

**Keyality:** The pitch name of the tonic. A keyality is audiated, whereas a key signature is seen in notation. C is the keyality in C major, in C harmonic minor and Aeolian, in C dorian, in C Phrygian, and so on. A tonic is associated with a keyality, whereas a resting tone is associated with a tonality (Gordon, 1998).

**Learning Sequence Activities:** Those activities that include skill-learning sequence, content learning sequence (tonal and rhythm), and pattern learning sequence (tonal and rhythm). The eight sequences constitute learning sequence activities that take place during the first or last ten minutes of class or rehearsal.

**Macrobeats:** The fundamental beats in a rhythm pattern. In usual duple meter with a measure signature 2/4, quarter notes are the performed or underlying macrobeats (Gordon, 1998).

**Microbeats:** The equal divisions of a macrobeat.

**Multimetric:** Music in which two or more meters are represented.

**Multitonal:** Music in which two or more tonalities are represented.

**Music Achievement:** Accomplishment in music.

**Music Aptitude:** The student's potential to achieve in music.

**Music Learning Theory:** The analysis and synthesis of the sequential manner in which we learn music (Gordon, 2003).

**Proper Names:** The names of tonality classifications, tonal functions, meter classifications, and rhythm functions.

**Rhythm Syllables:** Different names that are chanted for different durations in a rhythm pattern. The rhythm syllables that are used in learning sequence activities are based on beat functions rather than on the time-value of notes.



**Skill Learning Sequence:** A curriculum that includes all of the discrimination and inference skills that are taught sequentially to students in conjunction with tonal or rhythm content learning sequence.

**Stabilized Music Aptitude:** Music potential that is no longer affected by environmental factors. A child enters stabilized music aptitude stage at approximately nine years old, and remains there throughout life (Gordon, 2003).

**Syllable Names:** Also called vocabulary names in learning sequence activities. For example, syllable names in a tonal pattern are “do so” and syllable names in a rhythm pattern are “du ta de ta.”

**Tonal Syllables:** Different names that are sung for different pitches in a tonal pattern. The tonal syllables that are used in learning sequence activities are based on the movable “do” system with “la” based minor.

## CHAPTER TWO

### REVIEW OF THE LITERATURE

The purpose of this study is to determine if the use of Gordon's patterns in music learning theory, when used twice a week in one semester, affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). The following chapter will examine literature concerning: (a) tonal and rhythm patterns, (b) audiation, (c) music aptitudes, (d) music aptitude and music achievement, (e) the development and evolution of music aptitude tests, (f) Gordon's developmental and stabilized music aptitude tests, and (g) Music Learning Theory.

#### *Tonal and Rhythm Patterns*

Gordon's taxonomy of audiated tonal and rhythm patterns remains the core of pattern research. Although several studies have identified difficulty levels of tonal performance patterns (Jones, 1979; Lai, 1999; Sinor, 1984) and rhythm patterns (Bradford, 1995; Lai, 1999), no equivalent taxonomy of tonal and rhythm performance patterns has been established.

In an investigation of the relationship of tonal pattern instruction, Grutzmacher (1985) emphasized tonal conceptual development using tonal patterns as content with harmonization and vocalization versus a traditional single-note identification approach involving music symbols and pitches taught from notation. Three measures of music achievement were compared: (a) scores of a melodic sight-reading achievement test designed by the investigator, (b) pre-test and post-test scores of Gordon's (1970) *Iowa Test of Musical Literacy (ITML) Level 2, Tonal Aural Perception* and (c) *ITML Level 2, Tonal Reading Recognition*. Beginning instrumental students in fifth and sixth grades were taught by either of two methods. One method emphasized tonal concept development through vocalization and harmonization of tonal patterns, and the other method emphasized technical skills development through music notation. The results from this study indicated that the group using tonal patterns scored significantly higher on the aural identification of major and minor tonalities and in melodic sight-reading achievement.

In a study that emphasized Gordon's skill sequence activities in Music Learning Theory (MLT), Gamble (1989) noted that the application of MLT to beginning clarinet instruction best provides the fundamental skills necessary for students to develop a tonal understanding of music in major and minor tonalities. When compared to students who did not received

tonal pattern instruction, beginning clarinet students who used skill sequence activities based upon music learning theory with a concept of arpeggio patterns achieved superior skills in tonal audiation and performance of notated music.

In a comparative study with guitar students, Gouzouasis (1990) studied the effects of tonal patterns on the guitar performance of individuals who possessed high and low levels of tonal music aptitude. Gouzaousis found that there was a significant treatment effect for unfamiliar triple meter criterion rhythm patterns. Additionally, the mean achievement of students who possessed high rhythm aptitude was significantly higher than the mean achievement of students who possessed low rhythm aptitude for both the criterion tonal patterns and the criterion rhythm patterns. It was concluded that hierarchically ordered tonal pattern instruction did not enhance tonal aspects of guitar performance skills, although hierarchically ordered pattern instruction enhanced rhythm aspects of guitar performance skills. It was also reported that students who possessed high music aptitudes achieved higher levels of guitar performance skills than students who possessed low levels of music aptitude.

Music teachers have used Gordon's tonal and rhythm patterns to foster a level of creativity with improvisation. Azzara (1993) found that

elementary instrumental students who experienced tonal and rhythm patterns through learning sequence activities performed at a significantly higher achievement level than students who received instruction without such an emphasis. Students in this study were tested with the *Music Aptitude Profile* (Gordon, 1965) and had completed one year of instruction with *Jump Right In: The Instrumental Series* (Gordon & Grunow, 1989, 2001). The experimental group received an improvisation supplement for 10 to 15 minutes of each lesson for 27 weeks. The experimental group scored significantly higher in tonal, rhythm, and expression dimensions based on individual performances on three researcher-composed criterion etudes designed to evaluate music achievement.

More specific studies have focused on rhythmic patterns in instruction as opposed to melodic patterns. Kitts (1993) found that students who received Gordon's rhythm learning sequence instruction for five minutes during private piano lessons over a seven month period had increased rhythm achievement over traditionally-taught piano students and Suzuki piano students.

Using twelve rhythm patterns in duple and triple meters, Colley (1987) compared the rhythm reading methods of Kodaly, Gordon, and a word method designed by the researcher for improving rhythm literacy. Participants were second and third grade students who responded to

three different cues that were spoken using the same rhythm patterns. The researcher found that a syllabic system that distinguishes between duple and triple meter sub-divisions improved students' beat recognition skills.

Also focusing on rhythm patterns in different educational situations, Palmer (1976) researched the effectiveness of two rhythm-readiness approaches based on the methods of: (a) Richards (1971), (b) Gordon (1971), and (c) a third traditional approach that did not include rhythm-reading instruction with fourth-grade students. Groups taught using the Richards and Gordon methods had significant gains in overall rhythm reading compared with the control groups who received traditional instruction.

In a study examining second and sixth grader students' rhythm learning retention, Shehan (1987) presented two-measure rhythm patterns aurally and visually with and without a mnemonic cue. The researcher found that the simultaneous use of auditory and visual channels during two-measure rhythm patterns facilitated the learning and retention of rhythms for students in both grades. According to Shehan, the older students learned the patterns twice as quickly as the younger students.

Studies have suggested that students who experienced tonal pattern instruction (Azzara, 1993; Gamble, 1989; Grutzmacher, 1985)

scored significantly higher on music achievement and tonal audiation. Students who received an emphasis in rhythmic pattern instruction (Azzara, 1993; Coley, 1987; Gouzouasis, 1990; Kitts, 1993; Palmer, 1976; Shehan, 1987) exhibited greater musical achievement than students who did not receive an emphasis.

### *Audiation*

Audiation involves hearing and comprehension in one's mind of musical sound that is not or may never have been physically present (Gordon, 2003). Gordon stated that no one can teach children or adults to audiate and that audiation comes naturally. By providing children with appropriate experiences and knowledge, children can be taught how to use their audiation potential as determined by music aptitude to maximize their musical achievement. Because audiation is the basis of music aptitude and achievement, it becomes the foundation of music learning theory.

According to Gordon (2003), there are eight types and six stages of audiation. Although they are not hierarchical, some types of audiation serve as readiness for others. The first type of audiation occurs when we *listen* to familiar and unfamiliar music. The second type takes place when we are *reading* notation of familiar and unfamiliar music. The third type takes place when *writing*, also referred to as notational audiation. A fourth

type occurs when *recalling* without the aid of notation. A fifth type takes place when *writing familiar recalled tonal and rhythm patterns through audiation*. A sixth type takes place when *creating and improvising* unfamiliar music, using familiar and unfamiliar patterns, and performing music silently, vocally, or on an instrument. The seventh and eighth types of audiation happen when *reading and writing unfamiliar music that we have created or improvised*.

The six stages of audiation are both hierarchical and cumulative. Stage one of audiation is *momentary retention*. Stage two is *imitating and audiating tonal patterns and rhythm patterns and recognizing and identifying a tonal center and macrobeats*. Stage three is *establishing objective or subjective tonality and meter*. Stage four consists of *retaining in audiation tonal patterns and rhythm patterns that have been organized*. Stage five involves *recalling tonal patterns and rhythm patterns organized and audiated in other pieces of music*. Stage six involves *anticipating and predicting tonal patterns and rhythm patterns*. Audiation, as described in the previous types and stages is the basis for Gordon's Music Learning Theory.

### *Music Aptitudes*

Music aptitude is a measure of a student's potential to achieve in music (Gordon, 2003). Gordon has classified music aptitude into two



separate stages: (a) developmental music aptitude and (b) stabilized music aptitude. According to Gordon, children in the developmental aptitude stage can only concentrate on one dimension of music at a time. They can make reliable decisions about tonal patterns if they are listening to patterns void of a rhythmic context. Children can also make reliable decisions about rhythm patterns if the patterns are void of a tonal context. Only tonal and rhythm dimensions of developmental music aptitude have been identified and they are considered non-preferential. Gordon (1981) discovered that regardless of the manner in which questions were asked, children in the developmental music aptitude stage were unable to make reliable judgments pertaining to their music preference. It was further discovered that children in the development music aptitude stage lost their focus and concentration when: (a) a musical instrument was used as the stimulus and (b) they were asked to compare two tonal or rhythm patterns. These students were more preoccupied with the concepts of *sameness* and *difference* of what they were listening to instead of the music content. Gordon stated that the level of developmental music aptitude a student attains at approximately age nine becomes his or her permanent level of stabilized music aptitude.

Research with younger children has shown that developmental music aptitude can be affected through instruction. Flohr (1981)

discovered short-term music instruction influenced five year olds' developmental music aptitude. Participants received 12 weeks of music instruction, which resulted in a significant difference between their pre- and post-test PMMA scores.

Rutkowski (1986) studied kindergarten children's vocal achievement and developmental music aptitude over time. The areas studied were: (a) modes of instruction, (b) gender, (c) teacher differences, and (d) nature of the relationship before and after instruction. Rutkowski concluded that a small relationship existed between developmental music aptitude and use of the singing voice. In a separate study, Rutkowski (1996) studied kindergartners for 9 months in small groups and individual participation. Rutkowski found that both individual instruction and small group participation had an effect on singing voice and developmental music aptitude.

Gordon (1998) stated that there are at least two stabilized tonal aptitudes (melodic and harmonic), two stabilized rhythm aptitudes (tempo and meter), and three stabilized preference aptitudes (phrasing, balance, and style). Rarely is one's aptitude high or low in most or all of those capacities. Gordon (2003) suggested that whereas innate music potential and music environment continuously interact and thus contribute to a student's level of developmental music aptitude at any given time, music

environmental factors have no effect on a student's level of stabilized music aptitude.

Gordon has established that there are two types of music aptitude, developmental and stabilized. Developmental music aptitude occurs from birth and levels off approximately at nine years of age. A child who is in the developmental music aptitude stage is only able to comprehend one musical dimension at a time. It is during this time that developmental music aptitude can be influenced by instruction (Flohr, 1981; Rutskowski, 1986, 1996). Gordon (2003) stated that when a person enters stabilized music aptitude, there are at least two tonal aptitudes, two rhythm aptitudes, and three preferential aptitudes. Music environment or training will not affect the level of stabilized music aptitude.

#### *Music Aptitude and Music Achievement*

In a study that examined the relationships between selected "outside-of-school" factors in a rural, ethnic community, Kehrberg (1984) studied five musical characteristics that included: (a) music aptitude, (b) music achievement, (c) level of school music participation, (d) attitude towards music, and (e) school music achievement. Kehrberg found that music aptitude, music achievement, and attitude towards music were not related to frequency of listening to music. There was some evidence suggesting that among high school students, going to concerts and

musical style preference were moderately and positively related to music aptitude, music achievement, and attitude towards music. It was also suggested that the high school music teacher might be a vital influence of the musical characteristics, excepting musical attitude of the students. Further findings included that musical aptitude was a strong predictor of music achievement among grade school students. Music aptitude, home musical environment, “outside-of-school” instrumental playing activities, and the degree of partaking in school musical activities were strong predictors of general music achievement among high school students.

Zdzinski (1992) studied the relationships among parental involvement, music aptitude, and musical achievement of instrumental music studies. Results indicated that there was a significant relationship between parental involvement and both musical achievement and music aptitude. A strong relationship was also found to exist between music aptitude and both musical achievement and performance achievement.

#### *The Development of Music Aptitude Tests*

The first standardized test of music aptitude was the *Seashore Measure of Musical Talent* (1919), later renamed the *Seashore Measures of Musical Talent* (1939). The battery of subtests included: (a) sense of pitch, (b) sense of loudness, (c) sense of rhythm, (d) sense of time, (e)

sense of timbre, and (d) tonal memory. This test was designed to measure students from the fourth grade through college seniors.

Midway between Seashore's first and second editions, Kwalwasser and Dykema published the *Kwalwasser-Dykema Music Tests* (1930). Six of the ten subtests in the battery were developed to measure the same dimensions in the Seashore battery, although designed and titled differently. Kwalwasser used orchestral instruments and the Duo-Art Reproducing Piano as stimuli for some of the subtests. Another music aptitude test, the *Kwalwasser Music Talent Test* (1953), was developed with only four discrimination factors measured. Unlike his earlier test, this test excluded preference measures.

The next major development in music aptitude testing was Wing's *Standardized Tests of Musical Intelligence* (1948). This test was also revised and labeled *Tests of Musical Ability and Appreciation* (1970). Gordon (1987) noted that Wing's test was an attempt to apply Gestalt principals to study music aptitude including the performance of traditional musical instruments. There are seven subtests with three non-preference tests requiring students to count notes in a chord and detect slight alterations of one note in a chord or melody. The four preference subtests ask the students to choose better rhythmic accent, harmonization,

phrasing, and dynamic\_expression in two performances. This test was designed for students eight years of age through adulthood.

Drake (1957) published the *Drake Musical Aptitude Tests* with only two subtests, rhythm and musical memory. In the rhythm subtest, participants must determine the number of beats that would have occurred during a period of silence. The musical memory subtest requires subjects to compare two melodies and detect slight changes in melody, rhythm, and key, or to determine if the two melodies are the same. The test was designed for students in elementary school through adulthood.

The *Bentley Measure of Musical Abilities* (1966) published with four subtests in the battery, was designed for children as young as seven years old who were in grade two. Subtest categories included pitch discrimination, rhythmic memory, tonal memory, and chord analysis. The last two parts were constructed similarly to Wing's memory and chord Analysis. Gordon (1998) believed that Bentley did not think there was a difference between the description of music aptitude of younger and older children

#### *Gordon's Developmental and Stabilized Music Aptitude Tests*

Developmental music aptitude tests are designed specifically to assess the music aptitudes of children from three to nine years of age. Examples of developmental music aptitude tests are *Audie* for children

three and four years old, the *Primary Measures of Music Audiation* (PMMA) for students in kindergarten through third grade, and the *Intermediate Measures of Music Audiation* (IMMA) for students in first through the sixth grade. Each of these tests consist of a tonal subtest and a rhythm subtest. The tonal subtest is without rhythm and the rhythm subtest is without variable pitch (Gordon, 1998). Although the IMMA is designed to be a test of developmental music aptitude, it functions as a test of stabilized music aptitude when administered to persons nine or older Gordon (1989). Gordon hypothesized that developmental and stabilized music aptitudes are more a matter of attributes of the mind rather than the properties of the test. According to Gordon (1998), the design of a developmental music aptitude test for very young children, three and four years old, must have characteristics in common with stabilized music aptitude tests that were designed specifically for both young adults and adults in order for test results to yield satisfactory reliability and validity.

A stabilized music aptitude test is designed to assess the music aptitudes of students nine years and older. Examples of stabilized music aptitude tests include *Musical Aptitude Profile* (Gordon, 1965) for students in fourth through twelfth grades, and the *Advanced Measures of Music Audiation* (Gordon, 1989) for students in the seventh grade through

adulthood. The dimensions measured by the MAP battery are: (a) tonal imagery, (b) rhythm imagery, and (c) musical sensitivity. There are seven subtests in the battery. Two subtests are provided for each of the two non-preference total tests: (a) melody and harmony for the tonal imagery and (b) tempo and meter for the rhythm imagery. The preference total test, musical sensitivity, contains: (a) balance, (b) phrasing, and (c) style sections. The word *imagery* was used in the original edition of the MAP test battery and has continued to be used in subsequent editions because of its familiarity in the use of the test. Gordon (1995) stated that the word *imagery* is vague and has come into question in recent years. The verb *audiate* was not coined until 1976, more than ten years after the first printing of the MAP. The complete battery requires approximately one-hour fifty minutes to administer.

The AMMA is a stabilized music aptitude test that measures two separate dimensions (tonal and rhythm) and takes 20 minutes to administer. The AMMA has no separate tonal and rhythm subtests. Students with stabilized music aptitude respond to tonal aspects and rhythm aspects in the same question. The main difference between the MAP and the AMMA is that the MAP offers an extensive diagnosis with seven subtest scores, whereas the AMMA offers only two test scores. The AMMA offers a *composite* score, which Gordon (1998) considers the most



valuable part of the AMMA because information is gathered in a shorter length of test.

When choosing any music aptitude test, it is important that the test be a valid and reliable instrument. The AMMA was found to be a valid and reliable measure of stabilized music aptitude (Gordon, 1989,1990; Miceli, 1998). Fullen (1993) investigated whether the *Advanced Measures of Music Audiation* was a valid test of music aptitude for secondary school students. He also sought to determine the effect of participation in choral ensembles had on the students' AMMA scores. The AMMA was administered to five junior high and four senior high choirs. The results of the first administration were used to determine predictive validity. The results of the first and second administration were used to estimate test re-test reliability. The first and third administrations were used to determine the effects of typical music instruction on student's AMMA scores. During the last three weeks of music instruction, the students sang two melodies with their performances recorded and rated independently by two judges using the same three-dimensional rating scale. The means for the combined judges' ratings on each dimension separately and all dimensions for the junior high students who scored in the top 20% on the AMMA were significantly higher than the means of students who scored in the lower 20%. Senior high students that scored in the upper 20% on the

AMMA rated significantly higher than the lower 20% on the tonal dimension. The reliability coefficient for the test retest total was .81 for the senior high students. The reliability coefficient for the test retest total was .72 for the junior high students. The mean difference for the total AMMA raw score gain between the first and third administrations was 1.15 for junior high students and 1.62 for senior high students. Neither of these differences was statistically significant. Fullen (1993) concluded that the AMMA accurately predicted musical achievement of secondary students who demonstrated high and low levels of music aptitude and predicted less accurately the music achievement of individual students. The AMMA also predicted less accurately the music achievement of students who have similar levels of music aptitude. The AMMA scores were not sensitive to music instruction, achievement in music, or familiarity with taking the test itself.

McCrystal (1985) studied the reliability of the AMMA with college level students. His study, similar to Fullen's research, also set out to determine if the AMMA was immune to instruction, practice, and maturation. McCrystal also sought to determine if the AMMA scores could serve as predictors of success in music study. The AMMA served as a pre-test and post-test to determine the test's immunity to instruction, practice, and maturation. McCrystal stated that the highest and lowest

AMMA scores were better predictors of success in music achievement. The lack of a significant difference between the student's pre-test and post-test total mean raw scores suggested that the instruction received by the students during the fall term and the spring term had little or no influence on how they performed on the AMMA. The failure to obtain statistically significant different mean scores between the pre-test and post-test scores also supports the assertion that the AMMA is a test of stabilized music aptitude rather than a test of music achievement.

Estrella (1992), however, found that through 5 months of treatment using tonal and rhythm patterns, his experimental group had significant improvement in the tonal and rhythm subtests on the AMMA. Using two experimental groups and two control groups at the university and high school level, the experimental groups received treatment from Macintosh computers using tonal syllables and synthesized clarinet sounds in patterns not using syllables. The students were asked to identify pattern functions and were evaluated by measuring how often they correctly identified the patterns. The students in the experimental group were also taught to determine if patterns were the same or different. Tonalties used for this experiment were major, minor, aeolian, mixolydian, dorian, phrygian, and lydian. Estrella concluded that tonal audiation ability can be improved through specialized training in tonal audiation and rhythm

audiation ability can be improved through a combination of specialized training in tonal audiation and participation in college-level music training. It is important to note that Miceli, McCrystal, and Estrella are all former students of Gordon or Grunow. In a review of the AMMA, Radocy (1995) suggested that further studies of reliability and validity by individuals other than Gordon or his students may help determine the true significance of the information provided by the AMMA.

### *Music Learning Theory*

Gordon's Music Learning Theory (MLT) is an analysis and synthesis of the sequential manner in which music can be learned. MLT can be categorized into three separate areas. The first area, skill learning sequence, is divided into two major parts that are categorized into discrimination learning and inference learning. This sequence is based upon skill learning theory (Gordon, 2003). Discrimination learning is also known as rote learning. Inference learning is conceptual learning. Both discrimination learning and inference learning have hierarchical levels and subparts. Discrimination learning includes aural/oral, verbal association, partial synthesis, symbolic association, and composite synthesis. Inferential learning includes generalization, creative/improvisation, and theoretical understanding.

The second category in Gordon's MLT is tonal content learning sequence. Tonality classifications include major, harmonic-minor, dorian, phrygian, lydian, mixolydian, aeolian, and locrian. Pattern functions within each classification may include but are not exclusive to tonic, dominant, subdominant, cadential, multiple, modulatory, chromatic, expanded, characteristic tone, and mediant functions.

Rhythm content learning sequence is the third category of MLT. Meter classifications include usual duple, usual triple, usual combined, unusual paired, unusual unpaired, unusual paired intact, and unusual unpaired intact. Pattern functions include macro/microbeats, divisions, elongations, divisions/elongations, rests, ties, and upbeats.

#### *Tonal and Rhythm Solfege in Music Learning Theory*

Gordon utilizes moveable "do" syllables with a "la" based minor in Music Learning Theory. By using this tonal system over others, Gordon (2003) wants to maximize audiation. By using this system, only the audiation of patterns as they relate to the syllable associated with the resting tone is necessary to become aware of a tonality. Another advantage of the "do" based major and "la" based minor system is that it provides for chromatics with logical independent syllables. Typical modulations in multitonal and multikeyal music can be performed without difficulty, there are not consonant syllable endings, and verbal

associations remain logically consistent within a tonality regardless of keyality.

Gordon's relations among rhythm syllable names are derived from meter, the underlying macro and micro beats, and the melodic rhythm of the rhythm patterns. The syllables, much like the McHose and Tibbs (1957) syllables, are based on beat function rather than counting. The McHose and Tibbs syllables uses a system of counting based on visual representation of time signatures and traditional theory. When students utilize Gordon's rhythm syllables based on beat function, their audiation skills are enhanced and the need for traditional music theory or counting to explain rhythm is unnecessary (Gordon, 2003).

### *Summary*

This review of the literature examines the use of tonal and rhythmic patterns, music audiation and musical achievement, the different types of music audiation, and the different stages and levels of Gordon's music learning theory. Several studies have identified difficulty levels of tonal patterns (Jones, 1979; Lai, 1999; Sinor, 1984) and rhythm patterns (Bradford 1995; Lai 1999). Studies have suggested that students who are taught via tonal pattern instruction (Azzara, 1993; Gamble, 1989; Grutzmacher, 1985) score significantly higher on tests of music achievement and tonal audiation. Students who received instruction with

an emphasis in rhythmic pattern instruction (Azzara, 1993; Coley, 1987; Gouzouasis, 1990; Kitts, 1993; Palmer, 1976; Shehan, 1987) generally exhibited greater musical achievement than students without such an emphasis.

According to Gordon (2003) there are two distinct levels of music aptitude. Developmental music aptitude occurs from birth to the age of nine. Environmental factors and music instruction may influence developmental music aptitude. Tests that measure developmental music aptitude include *Audie*, the *Primary Measure of Music Audiation* (PMMA), and the *Intermediate Measures of Music Audiation* (IMMA). Stabilized music aptitude begins at approximately nine years of age, remains constant through adulthood, and is not affected by environmental factors. Stabilized music aptitude tests include the *Music Aptitude Profile* (MAP) and the *Advanced Measures of Music Audiation* (AMMA). The AMMA was found to be a valid test of music aptitude for secondary school students (Fullen 1993).

Research into developmental and stabilized music aptitude has led to some expected and some conflicting results. Flohr (1981) and Rutkowski (1986) discovered that developmental music aptitude was affected through music instruction. This appears to be contrary to Gordon's (2003) assertion that musical environmental factors will have no

effect on stabilized music aptitude. Additionally, Estrella (1992) found that treatment of tonal and rhythm patterns can have significant improvement on the AMMA. Music aptitude was also found to be a strong predictor of music achievement (Kehrberg, 1984; Zdzinski, 1992) among grade school students.

Gordon's (2003) Music Learning Theory contains eight types and six stages of audiation. Although not hierarchical, some types of audiation serve as readiness for others. The types of audiation include *listening, reading, writing, recalling, writing familiar recalled patterns through audiation, and creating and improvising*. The six stages of audiation are both hierarchical and cumulative. These stages include *momentary retention, imitating and audiating patterns and identifying a tonal center and macrobeats, establishing objective or subjective tonality and meter, retaining in audiation tonal and rhythm patterns that have been organized, recalling tonal and rhythm patterns organized and audiated in other pieces of music, and anticipating and predicting tonal and rhythmic patterns*. This study attempts to determine if the use of Gordon's own MLT in hierarchy can affect the scores of the AMMA.



## CHAPTER THREE

### DESIGN OF THE STUDY

#### METHODS AND PROCEDURES

The purpose of this study is to determine if the use of Gordon's patterns in music learning theory, when used twice a week in one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation*. In this study, the following questions will be investigated:

1. Do any mean score differences exist between the pre- and post-test dimensions according to the following groups: (a) experimental/control, (b) private lessons, (c) and gender?
2. What inter-relationships exist between the pre-test and post-test dimensions on the AMMA?
3. Does the use of Gordon's rhythm syllables in learning sequence activity patterns significantly enhance rhythmic audiation in middle school and high school students?
4. Does the use of Gordon's tonal syllables in learning sequence activity patterns significantly enhance tonal audiation in middle school and high school students?
5. Does gender or participation in private lessons influence the mean scores of the AMMA with middle school and high school students?

### *Method*

This study used a randomized pretest-posttest design. Participants' names were catalogued in a Microsoft Excel® spreadsheet into two columns. The first column (A) contained the names of the students and the second (B) was blank. In the B column, the formula "=RAND()" was entered. This generated a column of random numbers in column B. The researcher then selected columns A and B and sorted them based on the column B's numbers. The researcher then alternated assigned groupings from top to bottom in a separate column (C) alternating between experimental and control group assignments. Table 1 shows the design of the study in detail.

Table 1

---

*Randomized Pretest-Posttest Design*

---

Group	Randomization	Pretest	Treatment	Posttest
1	<i>R</i>	<i>O</i>	$X_1$	<i>O</i>
2	<i>R</i>	<i>O</i>	$X_2$	<i>O</i>
Experimental	$X_1$			
Control	$X_2$			

---

At the beginning of the study, the AMMA was administered to both groups. The second administration occurred at the conclusion of the

instructional period with the scores compared via statistical analysis. This design permitted the researcher to conduct this study limiting possible bias to the experimental group.

### *Instrument*

The AMMA was chosen over the *Music Aptitude Profile* (MAP) to measure stabilized music aptitude because of the time constraints of the MAP. The MAP has seven subtests that are each over 40 minutes in length versus the AMMA that combines two subtests into one unit and requires 20 minutes to administer. Both tests have been shown to be reliable and valid instruments for measuring stabilized music aptitude of high school and middle school students (Gordon 1989, 1997). Table 2 and Table 3 show the reliabilities, standard deviations and means from the AMMA manual (Gordon, 1989). Table 2 shows the AMMA reliability coefficients for both high school and middle school students.

Table 2

*AMMA Reliabilities for High School and Seventh and Eighth Grade Students*

	Reliabilities		
	Tonal	Rhythm	Total
High School	.81	.82	.84
7 <sup>th</sup> and 8 <sup>th</sup> Grade	.80	.83	.85

The split halves reliability coefficients are based upon the scores of the entire sample of students in each norm group that participated in the standardization of the test.

Table 3 shows the AMMA means and standard deviations for both high school and middle school students. Gordon concluded that the overall difficulty is suitable for high school and middle school students.

Table 3

*AMMA Means and Standard Deviations for High School and Seventh and Eighth Grade Students*

	<i>M</i>	<i>SD</i>
High School		
Tonal	23.8	4.37
Rhythm	26.8	4.03
Middle School		
Tonal	22.6	4.27
Rhythm	24.8	4.37

Table 4 shows the correlation coefficients for the AMMA among high school students. The correlations between the norms of the tonal test and the rhythm test are extraordinarily high when compared with inter-correlations found among comparable types of tests. Gordon (1989) suggested the high correlations between the tonal and rhythm dimensions were due to the fact that half the questions for both dimensions had “same” as the correct response.

Table 4

*AMMA Inter-correlations Among Tests for High School and Seventh and Eighth Grade Students*

	Tonal and Rhythm
High School	.74
7 <sup>th</sup> and 8 <sup>th</sup> Grade	.73

*Procedure*

The participants in this study were drawn from one large school district in the southwest United States. There were approximately 900 students participating in band, orchestra, and choir in grades 8 through 12. There were a total of 73 students (grades 8-12) participating within the

experimental group ( $n = 38$ ) and the control group ( $n = 35$ )) constituting approximately 8% of the total population. Participants were selected from two high schools and four middle schools. The experiment began January 23, 2006 and ended on April 28, 2006. After receiving approval from the university Institutional Review Board and the cooperating school district, the researcher distributed: (a) information that outlined the study, (b) informed consent forms, and (c) informed assent forms to the school ensembles. It is from these returned consent and assent forms that the students' names were entered into a Microsoft Excel® spreadsheet and randomized. After random participant assignment, the groups were assigned to either experimental or control conditions.

During the first week of the study, the researcher administered the AMMA to all of the student participants in the study. Figure 1 shows the testing schedule for administration of the AMMA.

	Tuesday	Wednesday	Thursday
8:00 - 8:30	HS 1 Bands	HS 2 Bands	
8:45 - 9:10			
9:40 - 10:00	MS 1 Choir		MS 4 Band
10:00 - 10:30	MS 1 Band		HS 2 Philharmonic
10:40 - 11:15	HS 1 9 <sup>th</sup> Orch		HS 2 9 <sup>th</sup> Orch
11:00 - 11:30		HS 3 Orchestra	
12:25 - 12:50	MS 2 All		
1:15 - 1:40	MS 3 Band	HS 2 Symp Orch	HS 1 Symp Orch

*Figure 1. Administrations of the AMMA*

The class schedules allowed the researcher to meet with the experimental and control groups twice a week, either Monday and Thursday, or Tuesday and Friday. However, schedule conflicts in some weeks restricted the researcher to meet with both groups once a week. As seen in Figure 2, the experimental and control groups met with the researcher for five minutes per each meeting. This schedule allowed for travel time to and from schools.

The experimental group participated in Gordon's learning sequence activities for five minutes at the beginning of class or at the end of class. Students were instructed in tonal patterns during one week and rhythm patterns the next treatment week. The control group participated in melodic singing one week and rhythmic exercises the next week using

Ottman's (2004) *Music for Sight-Singing*. This particular text was selected for its extensive collection of melodies and rhythms, and familiarity to the researcher. Both experimental and control groups performed their respective exercises with voice only.

	Monday-Thursday	Tuesday-Friday
8:30 - 8:40	HS 1 Bands	HS 2 Bands
9:25 - 9:35	MS 1 Choir	
9:40 - 9:50	MS 1 Band	MS 4 Band
10:20 -10:30		HS 2 Phil
10:50 -11:00	HS 1 9 <sup>th</sup> Orch	HS 2 9 <sup>th</sup> Orch
11:40 -11:50	MS 3 Orch	
12:25 -12:35		MS 2 Band/Orch
12:55 - 1:05	HS 1 Symph	HS 2 Symph
1:35 - 1:45	MS 3 Band	

Figure 2. Semester schedule of treatment

For the experimental group, tonal and rhythm patterns were selected from the *Jump Right In, The Instrumental Series* (Gordon & Grunow 1989, 2001). The tonal and rhythm patterns were selected to maximize audiation skill in the sequence of music learning theory. A moveable *do* system with a *la* based minor was used as suggested by Gordon to maximize tonal audiation. The rhythm syllables selected for the experimental group was from Gordon's (2003) rhythm content in music



learning theory and are based on beat function. The control group received rhythmic instruction in the McHose and Tibbs (1957) rhythm syllables, which were used by this school system in a classroom setting. A neutral syllable was used when singing through individual exercises in the Otmann collection of melodies. Gordon's rhythm syllables are closely related to the McHose and Tibbs patterns but differed slightly. The McHose and Tibbs patterns are based on counting, rather than audiation, and relied heavily on music theory and notation. Gordon is a graduate of the Eastman School of Music where the McHose and Tibbs counting system was used. Participants in the control group received instruction in the McHose and Tibbs or Eastman counting system because this was the counting system with which the students were already familiar. Figure 3 shows a comparison of the rhythm syllables.

McHose-Tibbs Rhythm Syllables	Gordon Rhythm Syllables
<p style="text-align: center;">Duple</p> <p>1   2   3   4</p> <p>1-te-2-te-3-te-4-te</p>	<p style="text-align: center;">Duple</p> <p>Du   Du   Du   Du</p> <p>Du-de-Du-de-Du-de-Du-de</p>
<p style="text-align: center;">Triple</p> <p>1   2</p> <p>1-la-li-2-la-li</p>	<p style="text-align: center;">Triple</p> <p>Du   Du</p> <p>Du-da-di-Du-da-di</p>

*Figure 3.* Comparison of McHose-Tibbs and Gordon Rhythm Syllables

Not all types and levels of Music Learning Theory were included in the presentation of patterns. This was also considered by Gordon and Grunow (1989, 2001) when choosing content for the *Jump Right In: the Instrumental Series*. Both tonal and rhythm content learning sequence have classifications and functions. Figure 4 shows the content for tonal and rhythm learning sequences for this study.

<b>TONAL CONTENT</b>	<b>RHYTHM CONTENT</b>
MAJOR/MINOR	DUPLE/TRIPLE
Tonic	Macrobeats
Dominant	Microbeats
Subdominant	Divisions

*Figure 4. Gordon's Content Learning Sequence*

Tonal content consisted of major/minor tonalities with tonic, dominant and subdominant functions. Rhythm content consisted of duple/triple meter classifications with macro-beats, micro-beats, and divisions.

*Learning Sequence Activities and Tonal and Rhythm Content*

When introducing tonal patterns to the experimental group in the aural/oral mode, the researcher established tonality by singing a tonicization pattern selected from Cho's (1983) Melodic, Dyadic and Harmonic Singing. The tonicization pattern established tonic and dominant

in major or harmonic minor, in the appropriate keyality. After singing the tonicization pattern, the researcher immediately sang the first tonal pattern. After a short pause, the students echoed the tonal pattern. A series of patterns used from the *Jump Right In, the Instrumental Series* was implemented to establish a familiar order. The same procedure was used for teaching three-note and two-note tonal patterns. When the students could perform the first series of patterns as a group, individuals performed the patterns as a solo. The researcher then presented patterns in an unfamiliar order. The researcher used this sequence in the aural/oral mode, using neutral syllables, and in the verbal association mode, using solfege syllables.

When teaching rhythm patterns at the aural/oral and verbal association levels, the researcher used a metronome to initially established meter and tempo for either duple or triple meter. After the meter and tempo were established, the students were instructed in movement in tempo. The researcher immediately chanted a rhythm pattern. The class echoed the pattern. There was not a pause between the researcher's patterns and the students' echoes. The rhythmic patterns and teaching modes were also chosen from the *Jump Right In* series.

The researcher taught the proper names in verbal association with tonal patterns. The classification of tonality and function of tonality are

considered proper names. When using tonal patterns in an arrangement of do, mi, so in any order, the patterns were called a major tonic pattern. The researcher then sang and identified a number of familiar tonic patterns in major tonality. Using familiar order, the same procedure was followed for teaching dominant and subdominant patterns. The researcher questioned the students by asking them if the pattern names and the tonal syllables constituted the correct patterns. Using the techniques for the teaching/evaluation mode, the researcher sang a pattern with tonal syllables and asked students to respond solo by singing the proper name of that pattern. Similar procedures were used for all tonalities.

Teaching proper names of rhythmic syllables constituted the next sequence of activities. Proper names for rhythmic syllables are the classification of usual duple and the function of macro and microbeats. After establishing meter and tempo, the researcher chanted macro and microbeats, explaining that in duple meter, macrobeats are called du and microbeats are du de. Macro and microbeats in triple meter are du for macro and du da di for microbeats. The researcher questioned the students by asking them the pattern names and the rhythm syllables that constituted those patterns. These described procedures were also used for teaching divisions within the microbeat.

When teaching a new type of language, it is important for the students to organize their own thoughts to demonstrate a level of understanding (Gordon, 2003). Learning sequences accomplish this at the next level by improvising tonal and rhythm patterns. After establishing tonality for teaching tonal patterns, the researcher sang a tonic, dominant, or subdominant pattern in a specific tonality. After the students were instructed the proper name of the function of the pattern that was sung, they were asked to audiate, with tonal syllables, a different pattern using different pattern functions. After establishing meter and tempo for rhythm patterns, the researcher chanted one or more macro/microbeats, or division in any order. After the students were taught the proper name of the function of each pattern that was chanted, they were asked to audiate with rhythm syllables, different patterns using the same or different pattern functions.

At the tonal partial synthesis level, the researcher did not establish tonality or keyality for the students. The researcher sang a series of three or four familiar tonal patterns, pausing and breathing between the patterns, with a neutral syllable and without rhythm. The students were told that if do is audiated as the resting tone of the series, the tonality is major. If la is audiated as the resting tone of the series, the tonality is harmonic-minor.

The researcher then chanted three or four familiar rhythm patterns when teaching partial synthesis of rhythm. The patterns were in familiar or unfamiliar order in a neutral syllable. The patterns were performed at the same tempo. The students were told that if du de is audiated as the macrobeats and microbeats of the series, the meter is duple. If du da di is audiated as the macrobeats and microbeats of the series, the meter is triple. By the conclusion of the treatment, the experimental group achieved verbal association using proper names with tonal and rhythmic patterns and began to improvise rhythmic patterns.

#### *Data Analysis*

At the conclusion of the treatment period, both the experimental and control groups were administered the AMMA as a post-test. A raw score is a composite of the number of items scored correctly and incorrectly. These raw scores were converted into percentile scores to compare to standardized test scores as reported by Gordon (1989). A Multivariate Analysis of Covariance (MANCOVA) was used to determine if significant main effects or interactions occurred between the control group, experimental group, and any other subgroups. During the administration of the pre-test, the participants were asked to provide the following information for subgroup classification: (a) grade, (b) instrument, (c) teacher, (d) classroom, and (e) participation in private lessons. The pre-

test was used as a covariate to control for any pre-existing differences. At the conclusion of the post-test, the researcher used the following independent variables: (a) experimental or control group, (b) gender, and (c) participation in private lessons. The dependent variable was the converted percentile post-test scores and the covariate were the converted pre-test scores. Descriptive statistics were analyzed to provide a demographic profile of participants.

## CHAPTER FOUR

### RESULTS

The purpose of this study is to determine if the use of Gordon's patterns in music learning theory, when used twice a week in one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). It is hoped the findings derived from this study may aid in structuring curricula for performance programs to enhance musical understanding.

Participants in this study were drawn from one large school district in the southwest United States. Within this district, approximately 900 students participated in band, orchestra, and choir in grades 8 through 12. There were a total of 74 participants (grades 8-12) divided between the experimental group ( $n = 38$ ) and the control group ( $n = 35$ ). The overall sample was comprised of 26 male and 46 female participants, with 26 participating in private lessons and 47 not participating in private lessons. Even though the participants were randomized, those who took private lessons were evenly distributed between the experimental group ( $n = 13$ ) and the control group ( $n = 13$ ). The overall sample included participants enrolled in middle school ( $n = 30$ ), ninth grade ( $n = 10$ ), and high school ( $n$



= 34). It should be noted that ninth grade orchestra members participated in a separate class during the course of the study. Participants were selected from two high schools and four middle schools. Middle schools were labeled as: (a) middle school 1 (MS1) ( $n = 10$ ), (b) middle school 2 (MS2) ( $n = 7$ ), middle school 3 (MS3) ( $n = 6$ ), and middle school 4 (MS4) ( $n = 7$ ). Participants were also classified by participation in; (a) choir ( $n = 2$ ), band ( $n = 34$ ), or (c) orchestra ( $n = 38$ ).

#### *Reliability Analysis*

Previous research has shown the AMMA to be a reliable test in the measurement of music aptitude of high school students and eighth grade students (Gordon 1989, 1991). When used in the present study, the reliability coefficients for the pre- and post-test variables ranged from .82 to .89, indicating the scales were internally consistent. Table 5 shows the reliability coefficients for the pre- post-test scores for the experimental group, control group, and composites for each.

Table 5

*AMMA Reliabilities for Pre-Post Tests for Experimental, Control and Composite*

	Reliabilities	
	Pre-test	Post-test
Experimental	.83	.82
Control	.89	.86
Composite	.87	.84

*Descriptive Statistics*

Table 6 shows the means and standard deviations of the pre- and post-test scores of the AMMA. The participants in the experimental group exhibited higher means scores from the pre- and post-test scores than control group. It should also be noted that the means scores declined for participants in the control group.

Table 6

*Means and Standard Deviations of Pre- and Post-test Scores of the AMMA*

	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<hr/>				
Experimental				
Tonal	52.55	20.80	54.39	26.27
Rhythm	53.29	26.27	58.44	25.08
Total	53.13	21.44	55.90	26.06
<hr/>				
Control				
Tonal	63.31	20.58	60.71	27.63
Rhythm	65.34	24.51	64.49	24.00
Total	64.97	24.46	64.77	24.10
<hr/>				
Composite				
Tonal	57.71	21.26	57.42	26.45
Rhythm	59.07	21.76	61.34	24.58
Total	58.81	21.66	60.15	25.37
<hr/>				

The means and standard deviations between the pre- and post-test scores for both the experimental and control groups appear to be consistent among the dimensions. The experimental group made slight gains between the pre- and post-test scores in the tonal, rhythm, and total dimensions. Means for the pre- ( $M = 53.29$ ) and post-test ( $M = 58.44$ ) rhythms scores representing the experimental group showed the highest gain with a mean difference of 5.15. The control group scores showed a slight decrease between the: (a) pre- ( $M = 63.31$ ) and post-test scores ( $M = 60.71$ ) in the tonal dimension, (b) pre- ( $M = 65.34$ ) and post-test ( $M =$

64.49) scores in the rhythm dimension, and (c) pre- ( $M = 64.97$ ) and post-test ( $M = 64.77$ ) scores in the total dimension. The tonal scores revealed the largest mean difference of -2.6. The total mean scores between pre- and post-test revealed little change for all three dimensions, reinforcing Gordon's (1987) assertion that stabilized music aptitude is immune to the use of tonal and rhythms syllables in Music Learning Theory (MLT).

A stratification of groups (see Table 7) revealed the means and standard deviations between participants who participated in private lessons and those who did not. Results indicated that students who participated in private lessons exhibited higher mean score differences between pre- and post-test scores than the students who did not participate in private lessons. Between the pre- and post-test measurements, participants who studied privately had a mean score increase of: (a) 2.16 in the tonal dimension, (b) 6.89 in the rhythm dimension, and (c) 4.00 in the total dimension. Participants who did not participate in private lessons had a mean differences of: (a) -.36 in the tonal dimension, (b) -0.56 in the rhythm dimension, and (c) 1.58 in the total dimension.

Table 7

*Means and Standard Deviations of Pre-test and Post-test Scores of the AMMA for Participants in Lessons and Not in Lessons*

Participated in Lessons ( <i>N</i> = 26)	M	SD
Pre-Tonal	61.96	21.66
Post-Tonal	64.12	25.33
Pre-Rhythm	60.96	20.97
Post-Rhythm	67.85	22.97
Pre-Total	61.96	21.12
Post-Total	65.96	24.23
Did not Participate in Lessons ( <i>N</i> = 47)	M	SD
Pre-Tonal	55.36	20.89
Post-Tonal	53.72	26.60
Pre-Rhythm	58.30	22.38
Post-Rhythm	57.74	24.94
Pre-Total	55.36	20.89
Post-Total	56.94	25.66

### *Tonal Dimension*

Table 8 shows the means and standard deviations for the pre- and post-test tonal scores of the AMMA. As before, the control group participants who participated in private lessons scored higher on their pre- and post-test scores than their counterparts in the experimental group.

Table 8

*Means and Standard Deviations of Pre-test and Post-test Tonal Scores of the AMMA of Students in Private Lessons*

	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Experimental				
Without Lessons	52.64	20.81	55.52	27.37
Lessons	52.38	31.65	52.23	24.97
Control				
Without Lessons	58.45	21.03	51.68	26.18
Lessons	71.54	7.62	76.00	20.18

Participants' in the control group who participated in private lessons exhibited the highest increase on their mean scores with mean difference of 4.46. Participants in the control group who did not participate in private lessons exhibited a decrease in their mean scores with a mean difference of -6.77. The participants in the experimental group who did not participate in private lessons scored slightly higher between pre- and post-test scores, with a mean difference of 2.88. Participants in the experimental group who participated in private lessons, showed a decrease between tests, exhibiting a mean difference of -0.15. In the tonal dimension, participants in the control group who took private lessons had higher mean differences than those participants who did not study privately.

### *Rhythm Dimension*

Table 9 shows the means and standard deviations for the pre- and post-test rhythm scores of the AMMA. The participants in private lessons appear to have the most gain from pre- to post-test.

Table 9

#### *Means and Standard Deviations of Pre-test and Post-test Rhythm Scores of the AMMA*

	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Experimental				
Without Lessons	56.12	23.77	59.52	24.91
Lessons	47.85	15.82	56.38	26.30
Control				
Without Lessons	60.77	20.96	55.73	25.42
Lessons	73.08	17.90	79.31	11.10

Participants in the control group who participated in private lessons achieved higher standardized scores in the rhythm dimension when compared to students who did not participate in private lessons.

Participants in the experimental group, both in lessons and not taking lessons, scored lower pre- and post-test means scores when compared to the participants in lessons in the control group. Participants in the control group who participated in private lessons achieved a pre- to post-test mean increase of 6.23. Participants in the experimental group who

participated in private lessons had a mean increase of 8.53. Scores for the participants in the control group who did not participate in private lessons exhibited a pre- to post-test mean score decrease of -5.04. Regarding the rhythm dimension, participants who participated in private lessons exhibited an increase in their mean scores between pre- and post-test measurement.

#### *Total Dimension*

The means and standard deviations of the total pre- and post-test scores for the AMMA are shown in Table 10. Participants in the experimental group in showed slight gains between pre- and post-test mean scores. The participants who participated in private lessons had a mean difference of 3 and participants who did not participate in private lessons had a mean difference of 2.64. Control group participants who did not participate in private lessons exhibited a decrease of -3.27 between their pre- to post-test means.

Participants in the control group who participated in private lessons increased their pre- to post-test means by 5 points. In the summation of total scores, the mean differences of the participants in private lessons were higher than the participants that were not in private lessons.



Table 10

*Means and Standard Deviations of Pre-test and Post-test Total Scores of the AMMA*

	Pre-test		Post-test	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Experimental				
Without Lessons	54.56	22.80	57.20	26.56
Lessons	50.38	19.11	53.38	25.97
Control				
Without Lessons	59.91	21.19	56.64	25.27
Lessons	73.54	16.55	78.54	14.36

*Correlation Analysis*

Correlation coefficients, which were computed among the pre- and post-test scores for the tonal, rhythm, and total dimensions, ranged from  $r = .27$  between Pre-rhythm and Post-tonal to  $r = .94$  between Pre-tonal and Pre-total (see Table 11). These results are similar to those reported by Gordon (1989), who suggested the high correlation between the tonal and rhythm dimensions were due to ten questions having “same” as the correct answer on half of the questions on the tonal test, and “same” as the correct answer on half of the questions on the rhythm test.

Table 11

*AMMA Inter-correlations Between Pre-and Post-test Scores*

	Pre-tonal	Pre-rhythm	Pre-total	Post-tonal	Post-rhythm	Post-total
Pre-Tonal	—	.74**	.94**	.36**	.38**	.34**
Pre-Rhythm		—	.93**	.23*	.31**	.27*
Pre-Total			—	.32**	.35**	.31**
Post-Tonal				—	.73**	.92**
Post-Rhythm					—	.87**
Post-Total						—

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

Results further indicated that 13 out of 15 correlations were statistically significant beyond the  $p < .01$  level. The remaining correlations were found to be statistically significant beyond the  $p < .05$  level. Gordon (1989) stated that although the tonal and rhythm tests have much in common, there is a variance of uniqueness of each dimension and that each question is measuring different dimensions.

*Multivariate Analysis of Covariance*

A Multivariate Analysis of Covariance (MANCOVA) was conducted to determine if significant main effects or interactions occurred between the control group, experimental group, and any of the following subgroups:

(a) gender and (b) participation in private lessons (see Table 12). The pre-test for all three dimensions of the AMMA (tonal, rhythm, and total) was used as a covariate to control for any pre-existing differences. The independent variables included: (a) gender (b) private lessons, and (c) group (experimental or control). The dependent variables were the converted percentile post-test scores for all three dimensions (tonal, rhythm, and total) of the AMMA. Results indicated the main effects were not significant. However, a significant interaction was found between private lessons and group assignment in the post-test tonal dimension  $F(1,72) = 4.61, p. < .04$  (see Figure 5).

Table 12

<i>Multivariate Analysis of Covariance Tests of Between Subjects Effects</i>							
Source	DV	df	MS	F	p	Partial $\eta^2$	Observed Power
Corrected Model	Post-tonal	10	1542.54	2.74	.01	.31	.94
	Post-rhythm	10	1157.70	2.25	.03	.23	.88
	Post-total	10	1226.47	2.23	.03	.27	.84
Intercept	Post-tonal	1	4747.57	8.06	.01	.12	.80
	Post-rhythm	1	7884.96	15.03	.00	.20	.97
	Post-total	1	7322.17	13.32	.00	.18	.95
Pre-tonal	Post-tonal	1	1387.90	2.50	.12	.04	.34
	Post-rhythm	1	185.89	.36	.55	.01	.09
	Post-total	1	845.78	1.54	.22	.02	.23
Pre-rhythm	Post-tonal	1	240.34	.43	.52	.01	.10
	Post-rhythm	1	47.14	.09	.76	.00	.06
	Post-total	1	189.68	.35	.56	.01	.09
Pre-total	Post-tonal	1	379.92	.67	.42	.01	.13
	Post-rhythm	1	3.74	.02	.90	.00	.05
	Post-total	1	245.37	.45	.50	.01	.10
Lessons	Post-tonal	1	101.04	.18	.67	.00	.07
	Post-rhythm	1	383.93	.75	.39	.01	.14
	Post-total	1	157.60	.29	.59	.00	.08
Group	Post-tonal	1	491.82	.87	.35	.01	.15
	Post-rhythm	1	276.35	.57	.47	.01	.11
	Post-total	1	826.47	1.50	.26	.02	.23
Gender	Post-tonal	1	869.08	1.54	.22	.02	.23
	Post-rhythm	1	819.33	1.59	.21	.03	.24
	Post-total	1	834.20	1.51	.22	.02	.23
Lessons* Group	Post-tonal	1	2600.34	4.61	.04*	.07	.56
	Pre-rhythm	1	1515.35	2.94	.09	.05	.39
	Post-total	1	2067.90	3.76	.06	.03	.48
Lessons* Gender	Post-tonal	1	1687.42	2.99	.09	.05	.40
	Post-rhythm	1	1036.98	2.01	.16	.93	.29
	Post-total	1	934.06	1.70	.20	.03	.25
Group* Gender	Post-tonal	1	291.66	.52	.48	.01	.11
	Post-rhythm	1	12.17	.02	.88	.00	.53
	Post-total	1	12.61	.02	.88	.00	.53
Lessons* Group* Gender	Post-tonal	1	782.38	1.39	.24	.02	.21
	Post-rhythm	1	.31	.00	.98	.00	.05
	Post-total	1	461.32	.84	.36	.01	.15

\*p. &lt; .05

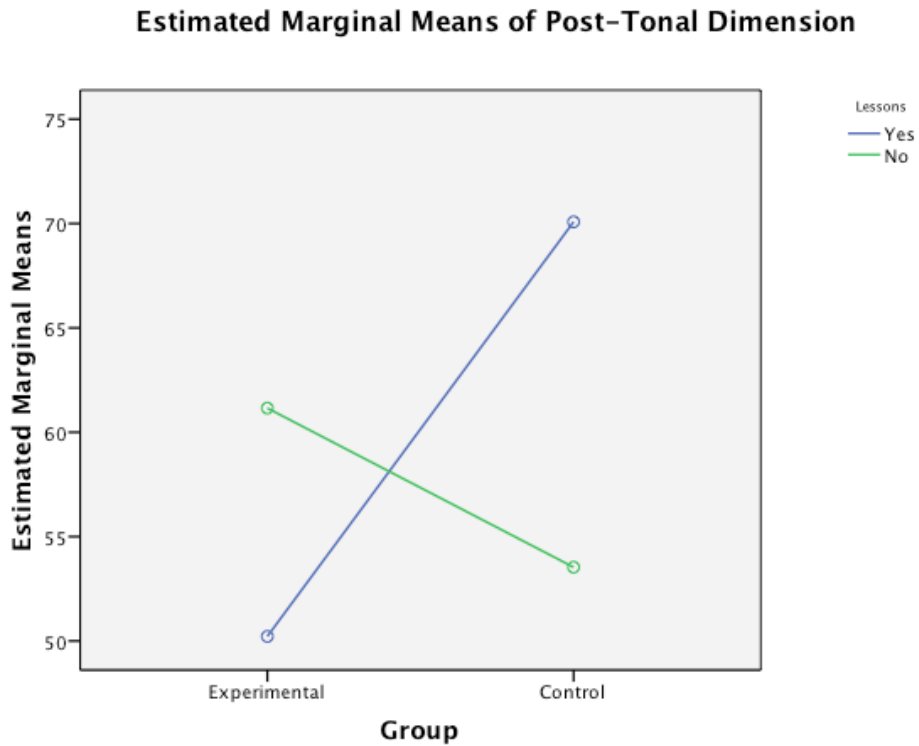


Figure 5. Estimated Marginal Means of Post-Tonal Dimension

### Summary

The purpose of this study was to determine if the use of Edwin Gordon's patterns in music learning theory, when used twice a week in one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). There were a total of 73 students (grades 8-12) participating within the experimental group ( $n = 38$ ) and the control group ( $n = 35$ ). This experiment was implemented in a large public

school district in the Southwest United States from January 23, 2006 and ended on April 28, 2006.

Results indicated the reliability coefficients for the pre- and post-test variables ranged from .82 to .89, indicating the scales were internally consistent. The means and standard deviations between the pre- and post-test scores for both the experimental and control groups appear to be consistent across all three dimensions. The experimental group made slight gains between the pre- and post-test scores in the tonal, rhythm, and total dimensions. Means for the pre- and post-test rhythms scores representing the experimental group showed the highest gains. The control group scores showed a slight decrease between the pre- and post-test scores in the tonal, rhythm, and total dimensions.

Students who participated in private lessons scored higher gains on all three post-test dimensions (tonal, rhythm, and total), than their counterparts who did not participate in private lessons. Students in the control group who participated in private lessons achieved the highest gains in rhythm and total dimensions. A correlation analysis revealed that 13 out of 15 correlations were statistically significant beyond the  $p < .01$  level. The remaining correlations were found to be statistically significant beyond the  $p < .05$  level. Mean scores between experimental and control groups show slight gains between the pre- and post-tests. A Multivariate

Analysis of Covariance (MANCOVA) revealed no significant main effects although a significant interaction existed between private lessons and group assignment in the post-test tonal dimension.

## CHAPTER FIVE

### CONCLUSIONS

#### *Summary*

The purpose of this study was to determine if the inclusion of Edwin Gordon's patterns in music learning theory, when used twice a week in one semester, can affect the tonal and rhythm scores of the *Advanced Measures of Music Audiation* (AMMA). Findings of this study may aid in structuring curriculum for musical performance programs to enhance musical understanding.

The following questions were investigated:

1. Do any mean score differences exist between the pre- test and post-test dimensions according to the following groups: (a) experimental/control, (b) private lessons, (c) and gender?
2. What inter-relationships exist between the pre-test and post-test dimensions on the AMMA?
3. Does the use of Gordon's rhythm syllables in learning sequence activity patterns significantly enhance rhythmic audiation in middle school and high school students?
4. Does the use of Gordon's tonal syllables in learning sequence activity patterns significantly enhance tonal audiation in middle school and high school students?
5. Does gender or participation in private lessons influence the mean scores of the AMMA with middle school and high school students?



The participants in this study were drawn from one large school district in the southwest United States with approximately 900 students participating in band, orchestra, and choir in grades 8 through 12. There were a total of 73 students participating in the experimental group ( $n = 38$ ) and the control group ( $n = 35$ ). This experiment began on January 23, 2006 and ended on April 28, 2006. After receiving approval from the University of Oklahoma Institutional Review Board (IRB) and the cooperating school district, the researcher distributed the following information: (a) an outline of the study, (b) informed parental consent forms, and (c) informed student assent forms to members within the school ensembles. It is from these returned consent and assent forms that the participants were randomly placed in two groups. One group was assigned as the experimental group and the other as the control group.

Data collection commenced when the researcher administered the AMMA as a pre-test to all of the participants. The class schedules allowed the researcher to meet with the experimental and control groups twice a week, either Monday and Thursday, or Tuesday and Friday. The experimental and control groups met with the researcher for a maximum of five minutes each visit.

Participants were instructed in tonal patterns during a treatment week and rhythm patterns the next treatment week. The control group

participated in melodic singing one week and rhythmic exercises the next week using Ottman's (2004) *Music for Sight-Singing*. The control group also had a maximum of five minutes with each visit. Both experimental and control groups performed their respective exercises with voice only.

For the experimental group, tonal and rhythm patterns were selected from the *Jump Right In, The Instrumental Series* (Gordon & Grunow 1989, 2001). Tonicization patterns (Cho, 1983) were chanted to establish tonality before tonal pattern instruction. Tonal content consisted of major/minor tonalities with tonic, dominant and subdominant functions. Rhythm content consisted of duple/triple meter classifications with macro-beats, micro-beats, and divisions. The control groups received rhythmic instruction in the McHose and Tibbs (1957) rhythm syllables, and used a neutral syllable when singing melodies from Ottman's (2004) *Music for Sight-Singing*.

At the conclusion of the treatment period, both the experimental and control groups were administered the AMMA as a post-test. Cronbach's Alpha was used to determine the reliability of the test variables. When used in the present study, the reliabilities for the pre- and post-test variables ranged from .82 to .89, indicating the scales were internally consistent and reliable.

### *Conclusions and Implications*

Descriptive statistics were used to analyze the first question. Means for the pre- and post-test rhythms scores representing the experimental group showed the highest gains, while the control group scores showed a slight decrease between the pre- and post-test scores in the tonal, rhythm, and total dimensions. Students who participated in private lessons, however, scored higher gains on all three post-test dimensions (tonal, rhythm, and total), than their counterparts who did not participate in private lessons. These results may suggest that participation in private lessons can influence music aptitude scores. This research appears to support Estrella (1992) who found that through 5 months of instruction of tonal and rhythm patterns, the experimental group showed significant improvement at the university and high school level. However, Gordon (2003) stated that music environment and training did not affect the level of stabilized music aptitude. Furthermore, Fullen (1993) stated that AMMA scores were not sensitive to music instruction, achievement in music, or familiarity with taking the test.

The second research question stated, "What inter-relationships exist between the pre-test and post-test dimensions on the AMMA?" Correlation coefficients were computed among the pre-and post-test scores for the tonal, rhythm, and total dimensions. Although there were

moderate to correlations among the dimensions, Gordon (1989) stated there is a variance of uniqueness of each dimension in the AMMA and that each question is measuring different dimensions.

A Multivariate Analysis of Covariance (MANCOVA) revealed no significant main effects, although a significant interaction was found between groups and private lessons in the post-tonal dimension. These findings may suggest that participation in private lessons is important towards the development of musicianship through musical achievement. Furthermore, private lessons may positively influence the development of music aptitude. This appears to contradict Gordon's (2003) assertion that music environment or training would not affect the level of stabilized music aptitude.

Although this study set out to discover if Gordon's tonal and rhythm syllables significantly enhance scores on the AMMA, it was discovered that students who participated in private lessons exhibited the highest pre- to post-test mean scores differences. Parents and ensemble directors in public and private schools have known of the benefits of individualized instruction for years. The musical benefits from private instruction include, but are not limited to: (a) technique, (b) tone production, (c) hand position and posture, (d) development of range, (e) advancement of literature and history, (f) personal guide to musical interpretation, and (g) developing a

unique understanding of the instrument that can't be qualified in a classroom setting. The non-musical benefits of private instruction include: (a) task analysis, (b) working in a timeline, (c) problem solving, (d) coping with stress, and (e) how to work as team member. Given the results of the current study, one might consider the positive influence private instruction may have on music aptitude.

### *Limitations of the Study*

This study occurred between January and April of 2006, including pre-test and post-test administrations. This type of study may have exhibited different results if the experiment spanned an entire school year, thus providing a longer instructional period for the experimental and control conditions. There were numerous occasions when the researcher was not able to meet with the participants due to conflicts in daily and weekly schedules. Although the researcher could not control all scheduling conflicts, doing so would have provided more time for the instruction of tonal and rhythm pattern content. A previous study using Gordon's tonal and rhythm sequences (Azzara, 1993) reported a statistically significant increase in music aptitude scores for participants who were exposed to a year long instructional sequence using *Jump Right In: The Instrumental Series* (Gordon & Grunow 1989, 2001), a 27 week

exposure to improvisational patterns, and included a take home study cassette of music learning theory patterns.

School scheduling of band, orchestra, and choir festivals and contests in the months of February, March, and April limited the instructional time for both the experimental and control groups during their regular schedules. Other school activities, including sports, academic contests, and concurrent administration of state mandated end of instruction (EOI) tests to meet graduation requirements, during the regular school day also limited the time available for the researcher and students. It was not uncommon for the researcher to visit a school and have the entire class gone for a field trip one day, and a track meet another day, making it impossible for instruction to occur.

The timing of the post-test at the end of the school year may have had an effect on the post-test scores on the AMMA. Prior to the administration of post-test, participants at the high school had been in EOI tests for the previous two weeks. EOI tests are administered by all high schools in the state to fulfill graduation requirements. It is possible that the participants had test fatigue at the end of the school year and were not giving their entire concentration towards the post-test. In a recent study by Ackerman (2009), subjective fatigue increased with increasing time-on-task, while mean performance increased in longer test length conditions,

compared with shorter length test conditions. The AMMA takes 20 minutes to administer and is a shorter length test when compared to the Music Aptitude Profile (MAP) and EOI tests. In addition, many students at the high school level had conflicts at the end of the school year and could not be available to take the post-test AMMA.

This study included band, orchestra, and choir students in high school and eighth grade middle school. This was an attempt to have as many students with stabilized music aptitude involved in the study. There were only two choir students at the end of the study. It is not known why there was a lack of participation from middle school choir students in this study. Increased support from the middle school vocal teachers to have their students participate in a semester long study may have been helpful in the recruiting of vocal students. Most of the conflicts of scheduling and lack of availability occurred at all four middle schools. High school students may have given a better representation and more even distribution of musicians.

The researcher taught tonal and rhythm sequences for a maximum of five minutes for each visitation. It is not known if a longer instruction period would have a greater effect of post-test scores. Gordon (2003) recommends using the first ten minutes of a class period to implement

learning sequences and also suggests that older students can receive more instruction time in learning sequences.

When this study began, there was an evenly distributed number of students between the experimental ( $N = 48$ ) and control ( $N = 46$ ) groups. At the conclusion of this study, the numbers between the experimental ( $N = 38$ ) and control groups ( $N = 35$ ) were evenly distributed between sizes even though there had been some experimental mortality between the pre- and post-test administrations. The class sample for this study included participants that were in private lessons ( $N = 26$ ) and were not in private lessons ( $N = 47$ ). The sample size difference between those participants who participated in private lessons and those who did not participate in private lessons could have been a contributing factor in the outcome of this research.

It is not known what content or curriculum was used in participants' individual private lessons. Participants may have been preparing band, choir, or orchestral contest music, solo and ensemble literature, or specific etudes. It is also not known if the private lesson teachers played for their students or only gave verbal instruction during lessons. Participants could also have been taking private lessons on piano or another instrument. It is presumed that the McHose and Tibbs (1957) syllables were used in



lessons, but it is unclear if instrumental private instructors had their students sing in their lessons.

### *Recommendations*

Because of the limitations in this study, it is recommended to use an entire academic school year when implementing another study of this type. There were many disruptions in the regular scheduling of the researcher's visitations. Many of these disruptions were not conveyed to the classroom teacher or researcher until the day of visitation, with the majority of disruptions occurring at the middle schools. If a similar design could be implemented for an entire school year, while controlling for the loss of instructional time in the daily schedules, the results may better reflect the experimental nature of the research design. For example, Azzara (1993) had fifth-grade participants use a take home cassette of patterns throughout the study of improvisation. The results of the experimental group scored significantly higher in tonal, rhythm, and expression dimensions of based on individual performances on three researcher-composed criterion etudes designed to evaluate music achievement. Estrella's (1993) research utilized high school and university students who were exposed to 5 months of instruction of tonal and rhythm patterns. The experimental group showed significant improvement between pre- and post-test scores at the university and high school levels.

This study attempted to use a cross section of middle school and high school students whose music aptitudes were stabilized. According to Gordon (2003) stabilized music aptitude does not increase after the age of nine. He contends that involvement in musical activities, private lessons, or participation in music theory may enhance but not significantly increase the scores on tests designed to measure stabilized music aptitude. Unlike developmental music aptitude, stabilized music aptitudes are thought to be immune to practice. A child who is in the developmental music aptitude stage is only able to comprehend one dimension at a time. It is during this time that developmental music aptitude can be influenced by instruction (Flohr, 1981; Rutkowski, 1986, 1996). It is not known if the inclusion of middle school students affected the resulting scores, although high school students appeared to be more willing to partake in the current study. A better cross section of participants in choir, orchestra, and band can be addressed at the high school campuses. Since there would be a smaller number of sites for the researcher to travel, it would be easier for the schools and researcher to potentially re-arrange any scheduling conflicts that occur during the school year.

The researcher taught tonal and rhythm sequences within a five-minute interval, which is the low end of exposure suggested by Gordon (2003). Because of the limitation of scheduling and exposure during this

semester, it might be worthy to increase the instructional time from five to ten minutes. Gordon also suggested that high school students might be more inclined to spend more time on skill level sequences in the tonal and rhythm dimensions.

Further studies should not only investigate whether Gordon's tonal and rhythm syllables significantly enhance music aptitude score, but should also investigate the curriculum and content of private lessons. Compact discs and mp3s could be used as practice materials for the experimental group. A year-long study with high school students might give the researcher a larger population of vocalists and instrumentalists with less concern over school interruptions. Other studies might just use one group with private lessons and another without private lessons to see if there is a difference between pre- and post-test scores of the AMMA. Researchers might employ a hybrid quantitative-qualitative study that investigates not only the mean scores on the AMMA, but also tracks the content of the private instructor.

Researchers can draw from Zdzinski's (1992) study of relationships between parental involvement, music aptitude, and musical achievement of instrumental music studies. Zdzinski's results indicated that there was a significant relationship between parental involvement and both musical achievement and music aptitude. A strong relationship was also found to

exist between music aptitude and both musical achievement and performance achievement. Although the author stated that the collection of data might not have been well suited for his research question, further studies may investigate the relationship between parental support and students' participation in private lessons.

Although this study initially investigated the use of Gordon's tonal and rhythm syllables and their possible impact on AMMA scores, it was discovered that students who were participating in private lessons had greater gains between the pre- and post-test mean scores. It is not known what content was employed by the private instructors. That aside, these results may indicate that private lessons are not only beneficial for musical achievement and enrichment, but may also suggest that private lessons can influence stabilized music aptitude scores.

## REFERENCES

- Ackerman, P.L., Kanfer, R. (2010). Cognitive fatigue during testing: An examination of triat, time-on-task, and strategy influences. *Human Performance* 23(5), 381-402.
- Azzara, C.D. (1993). Audiation-Based improvisation techniques and elementary instrumental students' music achievement. *Journal of Research in Music Education*, 41(4), 328-342.
- Bentley, A. (1966). *Measures of musical abilities*. London: Harrap Audio-Visual.
- Bradford, P. (1995). The aural/oral difficulty levels of selected rhythm patterns among kindergarten children. (Doctoral dissertation, University of Oklahoma, 1995). *Dissertation Abstracts International*, 56, 3044.
- Cho, G.J. (1983). *Melodic, dyadic and harmonic singing graded exercises*. Dubuque: Kendal/Hunt Publishing Co.
- Colley, B. (1987). A comparison of syllabic methods for improving rhythm literacy. *Journal of Research in Music Education*, 35(4), 221-235.
- Drake, R.M (1954). *Drake musical aptitude tests*. Chicago: Science Research Associates.
- Estrella, S. (1992). Effects of training and practice on advanced measures of music audiation scores (music software, audiation, aptitude tests). (Doctoral dissertation, Temple University, 1992). *Dissertation Abstracts International*, 53, 05A.
- Flohr, J.W. (1981). Short term music instruction and young children's development music aptitude. *Journal of Research in Music Education*, 29(3), 219-224.
- Fullen, D.L. (1993). An investigation of the validity of the advanced measures of music audiation with junior high and senior high students. (Doctoral dissertation, Temple University, 1993). *Dissertation Abstracts International*, 54, 02A.

- Gamble, D.K. (1989). A study of the effects of two types of tonal pattern instruction on the audiological and performance skills of first-year clarinet students. (Doctoral dissertation, Temple University, 1989). *Dissertation Abstracts International*, 50, 04A.
- Gordon, E.E. (1965). *Music aptitude profile*. (Vol. 1-3). Chicago: GIA Publications, Inc.
- Gordon, E.E. (1971). *Iowa tests of music literacy*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1971). *The psychology of music teaching*. Englewood Cliffs: Prentice-Hall, Inc.
- Gordon, E.E. (1979). *Primary Measures of Music Audiation*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1982). *Intermediate Measures of Music Audiation*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1987). *The nature, description, measurement, and evaluation of music aptitudes*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1989). *Advanced measures of music audiation*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1990). *Predictive validity study of AMMA: A one-year longitudinal predictive study of the Advanced Measures of Music Audiation*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (1998). *Introduction to research and the psychology of music*. Chicago: GIA Publications, Inc.
- Gordon, E.E. & Grunow, R.F. (1989, 2001). *Jump right in: The instrumental series*. Chicago: GIA Publications, Inc.
- Gordon, E.E. (2003). *Learning sequences in music; skill, content, and patterns*. (Vols. 1-6). Chicago: GIA Publications, Inc.

- Gouzouasis, P. (1990). An investigation of the comparative effects of two tonal pattern systems and two rhythm pattern systems for learning to play the guitar. (Doctoral dissertation, Temple University, 1991). *Dissertation Abstracts International*, 51, 08A.
- Grutzmacher, P.A. (1985). The effect of tonal pattern training on the aural perception, reading recognition and melodic sight reading achievement of first year instrumental music students. (Doctoral dissertation, Kent State University, 1985). *Dissertation Abstracts International*, 46. 05A.
- Jones, M.S. (1979). An investigation of the difficulty levels of selected tonal patterns as perceived aurally and performed vocally by high school students. (Doctoral dissertation, University of Michigan, 1979). *Dissertation Abstracts International*, 40. 2532.
- Kehrberg, D.A. (1984). An investigation of the relationships between music aptitude, general music achievement, attitude towards music, school music participation, school music achievement, and students' outside-of-school environment in a rural ethnic community. (Doctoral dissertation, University of Illinois, 1985). *Dissertation Abstracts International*. 45, 07A.
- Kitts, W.L. (1993). The effects of Edwin Gordon's rhythmic learning sequence on private traditional piano and Suzuki piano students. (Masters thesis, University of Louisville, 1994). *Masters Abstracts International*. 32, 05.
- Kwalwasser, J. & Dykema, P. (1930). *Kwalwasser-Dykema Music Tests*. New York: Carl Fischer.
- Kwalwasser, J. (1953). *Kwalwasser Music Talent Test*. New York: Mills Music.
- Lai, C. (1999). *An investigation of developmental music aptitude and music achievement of children in Taiwan*. Unpublished master's thesis. Temple University, Philadelphia.

- Marxer, L.C. (1999). Learning to read through music: the impact of Kodaly methodology on language development in the second-grade. Paper in partial fulfillment of the requirements for the degree Master of Education. University of California, Los Angeles.
- McCrystal, R. (1985). A validity study of the advanced measures of music audiation among undergraduate college music majors. (Doctoral dissertation, Temple University, 1985). *Dissertation Abstracts International*, 56,04A.
- McHose, A.I. & Tibbs, R.N. (1957). *Sight-singing manual*. (3<sup>rd</sup> ed.). New York: Appleton-Century-Crofts.
- Miceli, J. (1998). An investigation of an audiation-based high school general music curriculum and its relationship to music aptitude. (Doctoral dissertation, University of Rochester, Eastman School of Music, 1998). *Dissertation Abstracts International*, 59, 02A.
- Ottman, R. (2004). *Music for sight-singing*. (6<sup>th</sup> ed.). New Jersey: Pearson Prentice-Hall.
- Palmer, M. (1976). Relative effectiveness of two approaches to rhythm reading for fourth-grade students. *Journal of Research in Music Education* 24(3): 110-118.
- Radocy, R. (1995). Review of the advanced measures of music audiation. *Mental Measurements Yearbook*. Retrieved from [http://frontier-s.unl.edu/cgi-bin/buros\\_display.cgi](http://frontier-s.unl.edu/cgi-bin/buros_display.cgi).
- Richards, M.H. (1971). *Threshold to music*. Belmont: Fearon Publishers.
- Rutkowski, J. (1986). The effects of restricted song range on kindergarten children's use of singing voice and developmental music aptitude. (Doctoral dissertation, State University of New York at Buffalo, 1986). *Dissertation Abstracts International*, 47.06A.
- Rutkowski, J. (1996). The effectiveness of individual/small-group singing activities on kindergartners' use of singing voice and developmental music aptitude. *Journal of Research in Music Education*, 44(4), 353-368.



- Seashore, C.E. (1919). *The psychology of musical talent*. New York: Silver-Burdett.
- Shehan, P. (1987). Effects of rote versus note presentation of rhythm learning and retention. *Journal of Research in Music Education* 35(2): 117-126.
- Sinor, E. (1984). The singing of selected tonal patterns by preschool children. (Doctoral dissertation, Indiana University, 1984). *Dissertation Abstracts International*, 45, 3299.
- Taylor, S.E. (1964). Listening, What research says series, no. 29. Washington, D.C.: Association of classroom teachers of the NEA, 4.
- Wing, H.D. (1948). *Standardized tests of musical intelligence*. Sheffield, England: City of Sheffield Training College.
- Zdzinski, S.F. (1992). Relationships among parental involvement, music aptitude, and musical achievement of instrumental music students. *Journal of Research in Music Education*, 40, 114-125.

## APPENDIX A



*The University of Oklahoma*

OFFICE FOR HUMAN RESEARCH PARTICIPANT PROTECTION

IRB Number: 11080  
Approval Date: November 03, 2005

November 04, 2005

Christian O'Donnell  
Music  
500 W. Boyd Street, CMC 116  
Norman, OK 73019

**RE: An Investigation of the Effects of Edwin Gordon's Tonal and Rhythm Patterns on Secondary Students' Advanced Measures of Music Audation Score**

Dear Mr. O'Donnell:

On behalf of the Institutional Review Board (IRB), I have reviewed and granted expedited approval of the above-referenced research study. This study meets the criteria for expedited approval category 6 & 7. It is my judgment as Chairperson of the IRB that the rights and welfare of individuals who may be asked to participate in this study will be respected; that the proposed research, including the process of obtaining informed consent, will be conducted in a manner consistent with the requirements of 45 CFR 46 as amended; and that the research involves no more than minimal risk to participants.

This letter documents approval to conduct the research as described:

Assent Form Dated: November 01, 2005  
Consent form - Parental Dated: November 01, 2005  
Recruitment flyer Dated: November 01, 2005 Letter for parents  
Survey Instrument Dated: October 20, 2005  
IRB Application Dated: October 20, 2005  
Protocol Dated: October 20, 2005  
Letter Dated: April 20, 2005 Permission from Public Schools

As principal investigator of this protocol, it is your responsibility to make sure that this study is conducted as approved. Any modifications to the protocol or consent form, initiated by you or by the sponsor, will require prior approval, which you may request by completing a protocol modification form. All study records, including copies of signed consent forms, must be retained for three (3) years after termination of the study.

The approval granted expires on November 02, 2006. Should you wish to maintain this protocol in an active status beyond that date, you will need to provide the IRB with an IRB Application for Continuing Review (Progress Report) summarizing study results to date. The IRB will request an IRB Application for Continuing Review from you approximately two months before the anniversary date of your current approval.

If you have questions about these procedures, or need any additional assistance from the IRB, please call the IRB office at (405) 325-8110 or send an email to [irb@ou.edu](mailto:irb@ou.edu).

Cordially,

A handwritten signature in black ink, appearing to read "Lynn Devenport".

Lynn Devenport, Ph.D.  
Vice Chair, Institutional Review Board

*Ltr\_Prot\_Fappv\_Exp*

660 Parrington Oval, Suite 316, Norman, Oklahoma 73019-3085 PHONE: (405) 325-8110 FAX: (405) 325-2373

## APPENDIX B

### INFORMED CONSENT FORM

Dear Musical Parent,

Your child is invited to participate in a study of *The Effects of Gordon's Tonal and Rhythm Learning Sequences on the Advanced Measures of Music Audiation* being conducted by Christian O'Donnell and sponsored by Dr. Nancy H Barry of the University of Oklahoma. The purpose of this letter is to fully inform you about the nature of this study before your consent to participate.

The Advanced Measures of Music Audiation is a test designed by Ed Gordon to measure music aptitude. According to Gordon, developmental music aptitude levels off after the age of 9. Gordon also states that once developmental aptitude has leveled off, it is very likely the student will have the same aptitude or be in stabilized music aptitude for the rest of his or her lifetime. Research has shown that the introduction of tonal and rhythm learning sequences has enhanced scores on the Music Aptitude Profile, another music aptitude test developed by Gordon.

The purpose of this study is to see if students that are introduced to Gordon's tonal and rhythm learning sequences will effect the scores of the Advanced Measures of Music Audiation.

If you agree for your child to participate, they will receive the Advanced Measures of Music Audiation (AMMA). This takes 20 minutes to administer. Students will then be placed into one of two groups; one that received normal class instruction and one that receives tonal and rhythm sequences at the beginning of class. Both groups will take the AMMA at the end of this study.

No risks beyond those present in normal classroom testing situations are anticipated in this study.

Participation in the study should provide insight in the development of future curriculum in music and in the development of future research in music aptitude tests.

Your child's participation in this study is strictly voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

All information collected about your child during this study will be kept completely confidential. Your child's personal identity will be protected at all times.

If you would like more information about this study you may contact Christian O'Donnell at 405-317-1286, or Dr. Nancy H. Barry at 405-325-4146. If you have any questions about your rights as a research participant, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405.325.8110 or [irb@ou.edu](mailto:irb@ou.edu).

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

I hereby agree for my child to participate in the above-described research. I understand that his or her participation is voluntary and that they may withdraw at any time without penalty or loss of benefits.

Parent's signature \_\_\_\_\_

Date \_\_\_\_\_

## APPENDIX C

### INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY

**PROJECT TITLE:** An Investigation of the effect of Edwin Gordon's Tonal and Rhythm Patterns on Secondary Students' Advanced Measures of Music Audiation Scores

**PRINCIPAL INVESTIGATOR:** Christian O'Donnell, Ph.D. Candidate, University of Oklahoma

**CONTACT INFORMATION:** 405-317-1286

Your child is being asked to volunteer for a research study. This study will be conducted in the Norman Public Schools during normal school hours. Your child was selected as a possible participant through randomization of music classroom rosters. Please read this form and ask any questions that you may have before agreeing to take part in this study.

The sponsor of the study is: Dr. Nancy H. Barry, the University of Oklahoma.

#### **Purpose of the Research Study**

The purpose of this study is: to see if students that are introduced to Gordon's tonal and rhythm patterns in a music learning sequence will affect the scores of the Advanced Measures in Music Audiation (AMMA).

#### **Procedures**

If you agree for your child to be in this study, they will be asked to do the following things: Students will receive the AMMA as a pre-test. This test takes 20 minutes to administer. Students will then be placed into one of two groups; one that received normal classroom instruction and one that receives tonal and rhythm sequences at the beginning or the end of class twice a week for approximately five minutes. Both groups will take the AMMA at the end of this study and the scores will be compared. This study will be conducted in the Norman Public Schools from January 2 to April 28, 2006.

#### **Risks and Benefits of Being in the Study**

No risks beyond those present in normal classroom testing situations are anticipated in this study.

The benefits to participation are: providing insight in the development of future curriculum in music and in the development of future research in music aptitude tests.

**Voluntary Nature of the Study**

Participation in this study is voluntary. Your decision whether or not to have your child participate will not result in penalty or loss of benefits to which they are otherwise entitled. If you decide to let them to participate, they are free to not answer any question or withdraw at any time.

**Confidentiality**

The records of this study will be kept private. In published reports, there will be no information included that will make it possible to identify the research participant. Research records will be stored securely in the possession of the investigator, and only approved researchers will have access to the records.

**Contacts and Questions:**

If you would like more information about this study you may contact Christian O'Donnell at 405-317-1286 and at [cdonnhaill@ou.edu](mailto:cdonnhaill@ou.edu) or Dr. Nancy H. Bary at 405-325-4146 and at [barynh@ou.edu](mailto:barynh@ou.edu). You are encouraged to contact the researchers if you have any questions.

If you have any questions about your rights as a research participant, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405.325.8110 or [irb@ou.edu](mailto:irb@ou.edu).

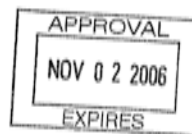
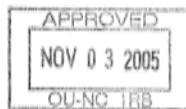
***You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.***

**STATEMENT OF CONSENT**

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

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



## APPENDIX D

### INFORMED ASSENT TO PARTICIPATE IN A RESEARCH STUDY

**PROJECT TITLE:** An Investigation of the effect of Edwin Gordon's Tonal and Rhythm Patterns on Secondary Students' Advanced Measures of Music Audiation Scores

**PRINCIPAL INVESTIGATOR:** Christian O'Donnell, Ph.D. Candidate, University of Oklahoma

**CONTACT INFORMATION:** 405-317-1286

You are being asked to volunteer for a research study. This study will be conducted in the Norman Public Schools during normal school hours. You were selected as a possible participant through randomization of music classroom rosters. Please read this form and ask any questions that you may have before agreeing to take part in this study.

The sponsor of the study is: Dr. Nancy H. Barry, the University of Oklahoma.

#### **Purpose of the Research Study**

The purpose of this study is: to see if students that are introduced to Gordon's tonal and rhythm patterns in a music learning sequence will affect the scores of the Advanced Measures in Music Audiation (AMMA).

#### **Procedures**

If you agree to be in this study, you will be asked to do the following things: Receive the AMMA as a pre-test. This test takes 20 minutes to administer. You will then be placed into one of two groups; one that received normal classroom instruction and one that receives tonal and rhythm sequences at the beginning or the end of class twice a week for approximately five minutes. Both groups will take the AMMA at the end of this study and the scores will be compared. This study will be conducted in the Norman Public Schools from January 2 to April 28, 2006.

#### **Risks and Benefits of Being in the Study**

No risks beyond those present in normal classroom testing situations are anticipated in this study.

The benefits to participation are: providing insight in the development of future curriculum in music and in the development of future research in music aptitude tests.

**Voluntary Nature of the Study**

Participation in this study is voluntary. Your decision whether or not to participate will not result in penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to not answer any question or withdraw at any time.

**Confidentiality**

The records of this study will be kept private. In published reports, there will be no information included that will make it possible to identify the research participant. Research records will be stored securely in the possession of the investigator, and only approved researchers will have access to the records.

**Contacts and Questions:**

If you would like more information about this study you may contact Christian O'Donnell at 405-317-1286 and at [cdonnell@ou.edu](mailto:cdonnell@ou.edu) or Dr. Nancy H. Barry at 405-325-4146 and at [nbarryh@ou.edu](mailto:nbarryh@ou.edu). You are encouraged to contact the researchers if you have any questions.

If you have any questions about your rights as a research participant, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405.325.8110 or [irb@ou.edu](mailto:irb@ou.edu).

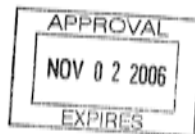
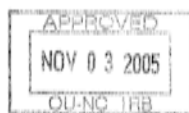
***You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.***

**STATEMENT OF ASSENT**

I hereby agree to participate in the above-described research. I understand my participation is voluntary and that I may withdraw at anytime without penalty or loss of benefits.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



APPENDIX E

Research Study Request

*PUBLIC SCHOOLS*

I hereby request permission to conduct a research study in the Norman Public School District during the period November 7, 2005 to April 28, 2006.

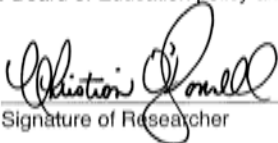
Topic Investigation of Ed Gordon's Tonal and Rhythm Patterns and their effects on the Advanced Measures of Music Audiation, a music aptitude test.

Date Submitted April 20, 2005 Daytime Phone Number 405-317-1286

Reason for Request: Doctoral Dissertation

If this request is granted, I agree to abide by the Board of Education policy and administrative procedures.

Christian O'Donnell  
Typed Name of Researcher

  
Signature of Researcher

University of Oklahoma  
Institution of Higher Education

School of Music-Music Education  
Sponsoring College

Dr. Nancy Barry  
Typed Name of Faculty Member

  
Signature of Faculty Member

Submit approval letter from the IRB \_\_\_\_\_  
(can't proceed until approved by IRB)

Endorsement: This request was <u>✓</u> Approved _____ Disapproved _____ <u>4-20-05</u> <i>pending IRB approval</i> (Date) <u>Kimberling</u> Educational Services Staff Member
---



## PROPOSAL FOR RESEARCH

### *PUBLIC SCHOOLS*

#### Purpose and Description of Study:

The purpose of this study is to determine if singing and chanting Edwin Gordon's tonal and rhythm patterns will effect the scores of the Advanced Measures of Music Audiation (AMMA), a music aptitude test. Audiation is the ability to hear and comprehend music without sound physically being present. Specific research questions are:

1. Does the introduction of Gordon's patterns enhance music audiation?
2. Does the use of Gordon's patterns improve music aptitude?
3. Does the use of Gordon's patterns improve the scores on a music aptitude test?
4. If the scores are changed through the use of patterns, is this test truly measuring aptitude?
5. Can aptitude scores be manipulated or enhanced?
6. Does the AMMA measure stabilized music aptitude?

Findings of the study may aid in structuring curriculum for performance programs to enhance musicality.

#### Research Protocol:

This study will be conducted with a randomized experimental pretest-post design.

Students in the bands, orchestra, and choirs in the 8<sup>th</sup> grade in the middle school and all ages at the high schools, will be used for this study. These students have not been previously exposed to the Gordon patterns in their band curriculum. Students will be randomly assigned into experimental and control groups. The investigator will administer

the AMMA to both groups. The investigator will serve as instructor for the introduction of Gordon's patterns. The experimental group will be singing and chanting Gordon's patterns two times a week, alternating tonal patterns one week and rhythm patterns the other week. The control group will receive their normal curriculum by their classroom teacher. The experimental group will receive instruction in Gordon's patterns for no more than 10 minutes at a time. At the end of the Gordon instruction, the students will integrate back into the classroom to join in classroom activities. At the end of the prescribed time, the AMMA will be administered for a second time to the experimental and control groups. The scores of the AMMA will be compared for an analysis by the investigator.

Confidentiality:

The results and reports generated from this study will be referred to by pseudonym. The site of this study will be referred to as "choir, band, and orchestra students from four large middle schools and two large high schools in the same district in the southwestern United States."

Number and Description of Students Required:

Age Range: 13-18 year old

Male and Female Students

Orchestra, Choir, Band students from

Time Required of Each Student:

Each administration of the AMMA for the control and experimental groups will be twenty minutes. Students in the experimental groups will receive instruction from the investigator twice a week, no more than ten minutes each session.

Time Required of Classroom Teacher:

None

Information Needed from School Records:

Rosters of students from teachers are to be placed in Microsoft Excel to be randomized and to determine experimental and control groups. All names will be excluded from the results and publication of the study.

Include copies of any data-gathering instruments:

See attached documents

Equipment and Materials to be Used:

Portable CD player to administer the AMMA

Facilities Needed:

Adjacent room (practice or ensemble room) for the experimental group to receive instruction.

Major Investigator:

Christian O'Donnell, Ph.D. candidate, School of Music, Music Education, The University of Oklahoma.

Research Assistant:

None

Starting Date:

November 7, 2005 Consent Forms-January 2, 2006 Experiment

Finishing Date:

April 28, 2006

Preferred Days and Times for Collecting Data:

Schedule to be determined with full cooperation of teachers in study.

Special Conditions and Restrictions:

None

Subject Benefit/Risks:

Each subject will be required to have a signed and dated Informed Consent Form requiring parent's signature before participation in the study. Subjects are not at risk of harm or physical danger at any time during the project. A slight risk of subject

identification exists, but is controlled for prior to the release of the data. There is also a slight risk of test anxiety among the participants. Findings of this study may aid or change the philosophy of music educators and help in curriculum design. The redesign of curriculum could help the students meet more of the standards prescribed by the Music Educator's National Conference.

Use of the Results:

Findings of this study may aid or change the philosophy of music educators and help in curriculum design. All teachers having students participate and the Director of Fine Arts will receive immediate feedback and results from the investigator. If needed and requested, the investigator will meet and debrief the music staff with the results. The final results will be part of the investigator's dissertation document.