THE EFFECTS OF SPECIFIC TRANSFER ACTIVITIES ON FIFTH GRADE ORCHESTRA AND BAND STUDENTS’ RHYTHMIC PERFORMANCE

DISSERTATION

Presented In Partial Fulfillment
Of The Requirements For The Degree
Doctor Of Philosophy
In The Graduate School Of The Ohio State University

By
Andrea Olijnek Scheuzger, B.S., M.A.

*****

The Ohio State University

2006

Dissertation Committee:

Dr. Robert Gillespie, Adviser

Dr. Jere Forsythe

Dr. John Woods

Approved by

____________________________
Adviser
Graduate Program in Music
ABSTRACT

The purpose of this study was to investigate the effect of specific transfer instruction on the rhythmic performance abilities of beginning instrumental students. The investigation examined the effectiveness of a series of instructional steps designed to transfer the application of skills from classroom rhythm activities to the performance of those rhythms on an instrument. Fifth grade students enrolled in the band or orchestra programs of the Hastings Public Schools participated in the study. The students received a total of twelve, six-minute rhythm sessions over twelve weeks, for a total of 72 minutes of instruction. Members of the treatment group received instruction that progressed from rhythmic activities to performance on an instrument. Members of the control group received identical instruction in rhythmic activities without instruments.

Students’ rhythmic accuracy was assessed through a pretest and identical posttest, which consisted of eleven four-measure etudes. Subjects were audio-recorded as they performed the etudes on their orchestra or band instruments. Students in both groups scored significantly better on single-pitched than on multiple-pitched etudes. Both groups, however, made significantly greater pretest to posttest gains on multiple-pitched versus single pitched etudes. Differences approaching significance were found in the students’ ability to play in sync with a rhythmic accompaniment in favor of the treatment group. Significant gain scores from pretest to posttest were found in both groups.
Dedicated to my grandmother, Selma Olijnek. Keep “putting in a good word” for me.
ACKNOWLEDGMENTS

In the completion of this dissertation, I extend my sincere gratitude and appreciation to the music students and parents of the Hastings Public Schools, and to my colleagues, Janis Nash, Katy Linné, Vicky Amundson, Leigh Ann Mock, and Michael Fridgen for their assistance and accommodation throughout the study. Thank you to Mark Zuzek, principal of the Hastings Middle School, for whole-heartedly supporting me, my work in the district, and this project.

I warmly acknowledge Bob Philips, the inspiration for this research, and an outstanding educator, who was most generous with his time and assistance.

A very personal thank you to Elaine Olijnek, my mom, and retired executive secretary for expert proof reading, typing, and unfailing moral support.

I sincerely thank the members of my committee, Dr. Jere Forsythe, Dr. John Woods, and especially Dr. Robert Gillespie, my advisor, for support, encouragement, and guidance. Dr. Gillespie, you have forever changed my teaching career, and I am deeply grateful to you.

Thank you to Dr. Daryl Kinney for hours of coaching and assistance with statistical analyses and SPSS.
My gratitude to the late Dr. Claire McCoy, the mentor who first inspired me to pursue a doctorate: You were stolen from us much too soon, but I will remember our lunch together always.

Thank you Linda Carlson, my high school English teacher, who taught me to write. I am greatly indebted to you.

And finally, to my husband, Thomas Scheuzger, whose love, support, audio and computer expertise, and endless patience brought everything together. This document would remain forever incomplete if not for you.
October 16, 1964.......................... Born – Minneapolis, Minnesota

1988............................................. B.S. Music Education, University of Minnesota

1988-present ............................ Orchestra Director, Hastings (MN) Public Schools
                                        Violinist, Rochester Orchestra and Chorale (MN)

1998............................................. M.A. Music Education, University of Minnesota

1999-2001 ................................. Graduate Teaching Associate
                                        The Ohio State University

2001-present ............................. Adjunct Instructor, String Methods
                                        University of St. Thomas, St. Paul, MN

FIELDS OF STUDY

Major Field:  Music
# TABLE OF CONTENTS

Abstract.................................................................................................................. ii

Dedication............................................................................................................... iii

Acknowledgements............................................................................................... iv

Vita............................................................................................................................ vi

List of Tables .......................................................................................................... ix

List of Figures ......................................................................................................... xi

Chapters:

1. Introduction ....................................................................................................... 1
   The Need for the Study ..................................................................................... 3
   Purpose of the Study .......................................................................................... 6
   Statement of the Research Questions ............................................................... 7
   Definition of Terms ............................................................................................ 9
   Limitations .......................................................................................................... 10

2. Review of Selected Literature ........................................................................ 11
   Transfer ............................................................................................................. 12
   Bob Phillips Approach to Rhythm Reading .................................................... 21
   Phillips’ Method ................................................................................................ 22
   Movement .......................................................................................................... 27
   Computer Assisted Instruction ......................................................................... 30
   Tempo and the Perception of Pulse or Meter .................................................... 30
   Teaching Methods Using Different Modes of Presentation ......................... 31
   Comparisons of Verbal Systems ...................................................................... 33
   Rhythm Reading in Relation to Sight-Reading Ability .................................... 35
   The Importance of Teacher Modeling ............................................................... 36
   Related Dissertation ........................................................................................ 36
   Summary ............................................................................................................ 39
### Table of Contents

3. **Methods and Procedures** .............................................................................................................. 41  
   - The Study Participants ................................................................................................................. 41  
   - Study Design ................................................................................................................................. 43  
   - Independent Variable and Instructional Procedures ....................................................................... 44  
   - Steps for Rhythmic Instruction in Order of Presentation (Both Groups) ........................................ 44  
   - Instructional Timeline .................................................................................................................... 50  
   - Development of Pretest and Posttest Measures ............................................................................ 50  
   - Instrumentation .............................................................................................................................. 52  
   - Scoring the Test ............................................................................................................................. 53  
   - Pilot Study ...................................................................................................................................... 54

4. **Results** ........................................................................................................................................... 57  
   - Restatement of the Research Questions ........................................................................................ 57  
   - Scoring Procedures ......................................................................................................................... 58  
   - Presentation of Data ....................................................................................................................... 61

5. **Conclusion** .................................................................................................................................... 86  
   - Summary of Research .................................................................................................................... 86  
   - Study Design ................................................................................................................................... 88  
   - Summary of Results ....................................................................................................................... 89  
   - Discussion ......................................................................................................................................... 92  
   - Recommendations for Further Research ....................................................................................... 95  
   - Implications for Teachers ............................................................................................................... 97

References ................................................................................................................................................ 102

Appendices:

A. **Letter to Participants** ...................................................................................................................... 105

B. **Permission to Participate** ............................................................................................................... 106

C. **Judging Instructions** ....................................................................................................................... 108

D. **Field Notes** ..................................................................................................................................... 110

E. **Test** ................................................................................................................................................ 115
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Study Design</td>
<td>43</td>
</tr>
<tr>
<td>2. Inter-Judge Reliability on Pretest and Posttest Scores</td>
<td>60</td>
</tr>
<tr>
<td>3. Means (M) and Standard Deviations (SD) of Pretest and Posttest Rhythm Pattern Scores Reported by Treatment Group and Instrument (Band/Orchestra)</td>
<td>63</td>
</tr>
<tr>
<td>4. Analysis of Covariance for Posttest Rhythm Pattern Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Rhythm Pattern Scores served as Covariate</td>
<td>64</td>
</tr>
<tr>
<td>5. Means (M) and Standard Deviations (SD) of Pretest and Posttest Synchronization Scores Reported by Treatment Group and Instrument (Band/Orchestra)</td>
<td>66</td>
</tr>
<tr>
<td>6. Analysis of Covariance for Posttest Synchronization Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Synchronization Scores Served as Covariate</td>
<td>67</td>
</tr>
<tr>
<td>7. Means (M) and Standard Deviations (SD) of Pretest and Posttest Total Scores Reported by Treatment Group and Instrument (Band/Orchestra)</td>
<td>69</td>
</tr>
<tr>
<td>8. Analysis of Covariance for Posttest Total Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Total Scores served as Covariate</td>
<td>70</td>
</tr>
<tr>
<td>9. Means (M) and Standard Deviations (SD) of Pretest Single-pitch and Multiple-pitch Rhythm Pattern Scores Reported by Treatment Group and Instrument (Band/Orchestra)</td>
<td>73</td>
</tr>
<tr>
<td>10. Means (M) and Standard Deviations (SD) of Posttest Single-pitch and Multiple-pitch Rhythm Pattern Scores Reported by Treatment Group and Instrument (Band/Orchestra)</td>
<td>74</td>
</tr>
</tbody>
</table>
11. 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) Repeated Measures Analysis Of Variance
Rhythm Pattern Performance Scores ................................................................. 75

12. Means (M) and Standard Deviations (SD) of Pretest Single-pitch and Multiple-pitch Synchronization Scores Reported by Treatment Group and Instrument (Band/Orchestra)........................................................................ 78

13. Means (M) and Standard Deviations (SD) of Posttest Single-pitch and Multiple-pitch Synchronization Scores Reported by Treatment Group and Instrument (Band/Orchestra)........................................................................ 79

14. 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) Repeated Measures Analysis Of Variance Synchronization Scores ................................................................. 80

15. Means (M) and Standard Deviations (SD) of Pretest Single-pitch and Multiple-pitch Total Scores Reported by Treatment Group and Instrument (Band/Orchestra) .................................................................................. 83

16. Means (M) and Standard Deviations (SD) of Posttest Single-pitch and Multiple-pitch Total Scores Reported by Treatment Group and Instrument (Band/Orchestra) .................................................................................. 84

17. 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) Repeated Measures Analysis Of Variance on Total Scores .................................................................................. 85
LIST OF FIGURES

Figure:                                                                                              Page:

1.  Line graph depicting significant interaction between excerpt type and test                      72
    on mean rhythm pattern scores..............................................................................................

2.  Line graph depicting significant interaction between excerpt type and test                      77
    on mean synchronization scores...................................................................................................

3.  Line graph depicting significant interaction between excerpt type and test                      82
    on mean total scores ......................................................................................................................
CHAPTER 1

INTRODUCTION

The development of rhythmic skills by beginning students in music making has been examined extensively. While relatively few recent studies have examined instructional methods for teaching rhythm in a school string or orchestra context, much research has been done on the acquisition of rhythm performance skills with many different populations pursuing a multitude of methods.

The present inquiry focuses on transfer learning as it relates to the development of accurate rhythm reading and performance on a string or band instrument. The manner in which transfer of learning occurs as children move through activities designed to teach rhythm performance skills is of particular interest. Haskell (2001) writes:

The aim of all education, from elementary, secondary, vocational, and industrial training, to higher education, is to apply what we learn in different contexts, and to recognize and extend that learning to completely new situations. Collectively, this is called transfer of learning. Indeed, it’s the very meaning of learning itself. (p. 3)

The problem of developing teaching strategies that facilitate the transfer of learning remains one of the fundamental issues in education. The need for this study
centers on the fact that, according to the extensive research reviewed by Haskell, in most educational settings transfer of learning seldom occurs:

> Whatever educational fads come and go, the transfer of learning problem remains with us like an antibiotic-resistant bacterium. No matter what we attack it with, it just won’t go away. (Haskell, 2001, p. 4).

While attempts at guiding children toward the acquisition of rhythmic skills take on a wide variety of teaching methods, steps designed specifically to transfer those skills to a performing context, such as playing an instrument in an ensemble, are notably absent in the literature. Gordon (2000) states:

> Few musicians would deny that what students have been and are typically being taught about rhythm hinders their musical development; however, few teachers realize the enormous difference between being told about rhythm and learning to perform rhythmically. (p. 2)

In an ensemble class, students participate in a variety of warm-up tasks, such as the performance of various scales, arpeggios, exercises, and rhythm patterns—often very successfully. It is not uncommon however, that when the students encounter the identical types of technical difficulties in the literature they fail to recognize them. Without the realization that the technical requirement in the literature is essentially identical to the skills they have just practiced, students struggle with passages that leave their teachers baffled. Convinced they have taught the material repeatedly, the teachers are frustrated and uncertain why the lesson failed. Duke and Pierce (1991) comment:
It is not uncommon in applied music teaching to observe students executing specific aspects of performance technique in familiar contexts or in isolation with high levels of accuracy, and subsequently to observe the same students experiencing considerable difficulty with the same aspects of performance in different or unfamiliar contexts. (p. 99)

When examining commonly used teaching strategies, one finds that despite much information suggesting its lack of efficacy, the practice of rhythm instruction by way of counting worksheets and blackboard drill persists. As recently as November, 2005, the following was posted anonymously on the discussion board of the American String Teacher’s Association website in response to a question about teaching rhythm skills:

Copy a part (such as 2nd violin) and have the entire orchestra write the counting for a piece your (sic) playing in orchestra. Use an overhead projector such as a Proxima with a camera so the class can see what to do. As you write the counting, be sure that you cover the measure with an index card. Here is the routine. "What is the first count of the measure?" Whole class response: "One". Write the number one then reveal what note is above "one". If it is a quarter note (say your in four-four time), say: "What does the next count have to be?" Class: "Two". Write the number two then reveal what note is above "two". If it is an eighth note, say: "What's left over?" Class: "and". Then say, "What does the next count have to be?" Class "three". Be sure you do not reveal the note until after they have given the response. Basically the two questions your [sic] asking are: “What does the next count have to be?” And, “What's left over?” Some basic rules: (quarter note gets the beat) 1. If the quarter note lands on the beat, go to the next count. 2. When you cross the barline the next count has to be one. 3. If the eighth note lands on the count, what's left over is "and". 4. If the eighth note lands on the "and", go to the next count. 5. If the quarter note lands on the "and", go to the next count. Hard to explain but it has taken many years for me to get this concrete about counting. I do believe counting is important. Seeing rhythm patterns is great but what about deciphering new and unusual rhythms? Counting gives students a tool to becoming independent sight-readers. (www.astaweb.org, November, 2005).
The writer’s desired outcome is that students will become independent sight-readers. However, as described in chapter two, Haskell’s work would assert that this method is so far removed from the skills required to actually sight-read music that transfer based on this teaching strategy is virtually impossible for all but the best, brightest students, and only then because of those individual’s strong abilities to transfer.

Leaders in educational reform have called for research-based teaching methods—referred to as best practice—across all areas of education. If music teachers are to keep pace with our colleagues in other areas of education, we must similarly create best practice strategies through research. We must understand what we teach, and the manner in which that information is best conveyed. The aim of the present study is to investigate the effectiveness of an alternative rhythm teaching strategy. Recommendations for further research include examining and comparing other commonly used music teaching strategies that are not addressed by this study.

The Need for the Study

The development of an effective pedagogical sequence that will aid instrumental students in the development of rhythm reading and performance accuracy requires an evaluation of necessary component skills, and a logical ordering of steps and activities. To lead students toward competent music performance, the sequence must necessarily leave the blackboard, that is, the mathematical process of writing counting numbers under notation as a means to teach rhythmic performance. Gordon (2000) asserts that telling students about rhythm rarely helps them perform rhythmically on an instrument.
Suppose a teacher wants to teach a group of students not only to read English but to understand what they are reading. It would seem ridiculous to try to teach this before those students had already learned to listen to and speak English with similar understanding. Logic tells us that it is equally absurd to try to teach students to read music notation before they have learned to listen to and perform music through audiation (understanding), and yet this is exactly what teachers have traditionally attempted. (p. 147)

Students must have opportunities to internalize the experience of performing rhythmically. These experiences might include rhythmic movement to music, call and response activities in which the teacher models and the students respond by playing patterns on their instruments, and exercises in which students are guided toward the ability to play one rhythm pattern while hearing others in the ensemble playing another pattern. Extrapolations from related areas must be made in the absence of literature directly examining a procedure for string players. Unlike singers, and most band instrumentalists, string players have the added and unique problem of the bow—which requires that two very different tasks be carried out in the left and the right hands simultaneously.

The literature reviewed for the purposes of this study includes research on transfer of learning—the theoretical background for the present investigation: (Chivington, 1990; Duke & Pierce, 1991; Pierce, 1992; Searle, 1985). Many different facets become involved in the practical application of teaching for transfer in the classroom. Studies most closely related to this investigation emphasize movement (Boyle, 1970; McCoy & Ellis, 1992; Rohwer, 1998), factors of tempo, meter and pulse (Duke, Geringer & Madsen, 1991; Duke, Geringer & Madsen, 1992), the use of multimodality in the teaching presentation (Persellin, 1992), a comparison of verbal systems (Bebeau, 1982),
and modeling (Delzell, 1983), as important components in the overall development of rhythmic skills.

Bob Phillips, a nationally recognized orchestra teacher in the public schools of Michigan, has created an approach to teaching rhythmic performance and rhythm reading, based in part on the work of Edwin Gordon and James Froseth. Phillips had the opportunity to work directly with Froseth, a professor of music at the University of Michigan, during his undergraduate studies, and credits him with establishing the basic elements in the approach.

Phillips has gained recognition for the success of his program and his performing ensembles, including several performances by his students at the White House. The author of several string method publications and arrangements for young string ensembles, Phillips has frequently presented his rhythm teaching sequence at music educators’ conferences and workshops throughout the country. His approach has produced successful, observable results in terms of student performance, and is highly regarded by current leaders in the field of music education, yet, the Phillips’ method has never been shown to be effective through empirical methods. Therefore there is a need to study its effectiveness through systematic inquiry.

Phillips’ method draws together many of the important aspects of rhythm pedagogy, in a sequence that involves physical movement, chanting, the successive layering of skills through a rote-to-note approach, and specific steps that move rhythm patterns to performance on the instrument. A very close adaptation of Phillips’ learning sequence was examined by this study. For the sake of brevity, the learning sequence will henceforth be referred to as the Phillips’ method.
Purpose of the Study

The specific questions under investigation concern the assessment of students’ abilities to transfer the application of skills from rhythmic patterns learned by rote to performing those patterns while playing an orchestral or band instrument. The learning sequence to be investigated is closely modeled on the work of Bob Phillips. The effectiveness of the Phillips’ method to facilitate the application of rhythm reading and performance skills on an instrument will be assessed. Both single-pitched rhythm patterns, and multiple-pitched rhythm patterns will be examined.

Given the review of relevant literature (see Chapter 2), it is hypothesized that students receiving instruction that includes a series of transfer steps leading from rote rhythmic activities to rhythmic reading performance on orchestra and band instruments will perform single-pitch rhythmic exercises and simple melodic rhythms with greater accuracy than students who receive no transfer instruction. Use of the instrument during the learning sequence allows students to practice rhythm performance skills in a way that is directly related to the desired outcome: the accurate performance of rhythms in orchestra or band literature.

After 18 years of teaching young instrumentalists, the investigator questioned whether the activities commonly found in general music classes effectively develop rhythmic reading and performance skills among children. The challenges facing the elementary orchestra director were well known to the investigator: Why, despite much time and effort in the general music classes, do beginning instrumentalists struggle with the application of basic rhythmic skills? Are rhythmic performance skills adequately developed to serve the needs of young instrumentalists as children move from the
elementary general music classroom into beginning bands and orchestras, or is the process of operating the instrument the complication, regardless of comprehension? It appeared that critical connections needed to be made for many beginning instrumentalists before they could utilize the knowledge they possessed. It could not be assumed that all students could effectively apply what they had learned in classroom music to performance on an orchestra or band instrument.

Children received weekly general music instruction, grades K-5, in the schools participating in this study. The general music teachers were well regarded, experienced teachers with master’s degrees. Each of the instructors provided children extensive experience with recorders, Orff instruments and rhythm reading using the Kodaly syllable system. Given this comprehensive background, what were the additional steps required to lead children from classroom music activities, to reading and performing similar rhythms on an instrument in an ensemble?

**Statement of the Research Questions**

The specific research questions investigated in the study are as follows:

**Question 1:** Does an instructional sequence designed to develop rhythmic ability improve students’ performance of rhythmic patterns on orchestra and band instruments?

**Question 2:** Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ ability to perform in sync with an imposed tempo?
Question 3: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ overall ability to perform rhythmic patterns (i.e., rhythmic performance and synchronization scores combined)?

Question 4: Are there differences between the control and treatment groups’ rhythmic performances of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 5: Are there differences between the control and treatment groups’ abilities to synchronize with an imposed tempo when performing multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 6: Are there differences between the control and treatment groups’ overall performances (i.e., rhythmic performance and synchronization combined) of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?
Definition of Terms

The following operational definitions are used in the study:

**Melodic rhythm (also referred to as Multiple-pitch rhythm):** A four-beat pattern of notes written on the staff, which includes the meter and key signature. Melodic rhythms in this study are stepwise, comprised of the first four pitches introduced in a nationally published beginning instrumental method book.

**Phillips’ Method:** A learning sequence of rhythm activities closely adapted from the work of Bob Phillips. The sequence including physical movement, chanting, the successive layering of skills through a rote-to-note approach, and specific steps that move students’ performance of rhythm patterns from physical (clapping or other movement activities) or vocal responses to performance on an orchestra or band instrument.

**Rote-to-note:** Patterns are first presented by the teacher and echoed by the students without the use of notation. Once the pattern has become familiar, the students are asked to perform the same patterns while reading the notation.

**Rote Instructional:** Presentation of patterns without the use of written notation.

**Single-pitch rhythm:** A four-beat pattern of notes written on a single pitch on the staff, with the meter signature indicated.
Transfer of learning: The ability to transfer specific musical learning from one context (without instruments) to another (with instruments).

Limitations

The present study is limited by the following:

1. The subjects in this study were fifth grade band and orchestra students in a small Minnesota school system.
2. The instructional treatment phase of the experiment was limited to a twelve-week period.
3. The researcher served as the teacher of both the experimental and control groups, allowing for the possibility of unintentional bias within the study.
4. The Phillips’ method used in the study is an adaptation of Phillips’ work, based on the researcher’s understanding and application of the technique.
CHAPTER 2

REVIEW OF SELECTED LITERATURE

Rhythmic reading skills have been examined in numerous ways. Relatively few recent studies have examined rhythmic teaching methods with school string or orchestra programs specifically. Salzberg and Wang’s 1989 study, which compared foot tapping and counting methods as prompts to aid sight-reading, is the only project conducted exclusively with string players found by the investigator at the time of this research.

Much research has been done on the acquisition of rhythmic skills with many different populations. The following review of the literature demonstrates the breadth of extant research, including various teaching methodologies, computer-assisted instruction, alterations to traditional notation, different teaching modalities, tempo ranges, and movement instruction.

This chapter will be divided into two main sections: the first describing some of the theoretical background on teaching-for-transfer of learning that informs the present study, and the second a review of literature most closely focused on relevant means of applying those theoretical principles in the classroom.
Transfer

Problems lie in promoting transfer of learning by students. Anecdotally, the investigator has observed that students sometimes fail to recognize basic rhythm patterns in string class that they have sung, moved, and performed in their elementary classroom music experiences. When presented with identical rhythm values and patterns in notation form, whether as flash cards or an example in a method book, students initially appear to be unfamiliar with the patterns altogether, and few can accurately perform the rhythm on their instruments. Even fewer can perform the patterns while synchronizing their efforts with an imposed tempo, such as a metronome.

In his 2001 book, *Transfer of Learning: Cognition, Instruction, and Reasoning*, Haskell compiled an extensive review of literature on transfer of learning research over the past 99 years. Spanning a range of fields from education to cognitive psychology to business and industrial training, Haskell’s review makes several summaries important to the present study. One of Haskell’s definitions of transfer is as follows:

Transfer refers to how previous learning influences current and future learning, and how past or current learning is applied or adapted to similar or novel situations. Transfer, then, isn’t so much an instructional and learning technique as a way of thinking, perceiving, and processing information. Therefore, it’s fundamental to all learning. Without it we couldn’t engage in our everyday thinking and reasoning nor even acquire the most basic of motor skills; transfer is responsible for the simplest of ideas and for the highest achievements of humankind. (Haskell, 2001, p. 23).

The problem, Haskell suggests, is that we in education have failed to succeed on any significant scale in causing general transfer of learning to occur.
Transfer of learning, however, is the very foundation of learning, thinking, and problem solving. Despite the importance of transfer of learning, research findings over the past nine decades clearly show that as individuals, and as educational institutions, we have failed to achieve transfer of learning on any significant level. (Haskell, 2001 p. xiii)

Haskell details a number of principles necessary for facilitating transfer of learning. Among those, the need to poses a large knowledge base in the primary area of study, and a wide and varied experience with examples and problems, followed by extensive drill and practice. Haskell (2001) states:

The research on teaching for transfer clearly shows that for transfer to occur, the original learning must be repeatedly reinforced with multiple examples or similar concepts in multiple contexts, and I would add, on different levels and orders of magnitude. Teaching that promotes transfer, then, involves returning again and again to an idea or procedure but on different levels and in different contexts, with apparently “different” examples. The great psychologist Jean Piaget referred to this method as epigenetic, as a kind of spiral where each new turn is a higher order manifestation of the order below it, just as 2 is to 4 and 4 is to 8. (p. 27)

The problem of relating what is learned in preparatory exercises to the actual performance presents a challenge to the orchestra director that extends beyond rhythmic skills. In a 1998 study, this investigator found that students learned, and performed vibrato exercises out-of-context beautifully. Unfortunately, they performed the exercises far better than the vibrato itself, which was rated as substantially less successful by two independent judges (Olijnek, 1998).

Since music teachers strive to guide students toward independent performance of music, and not exercises, an investigation of the manner in which good pedagogy might be combined with appropriate sequence, leading toward the development of competent
musicianship, is most important. There is a relatively small body of literature, specific to
music education, available in this area to date. Information on transfer of learning can be
found, however, within educational psychology. Shuell’s essay (1988) relates
foundational psychological principles to the music classroom. The definition of transfer,
as stated by Shuell is as follows:

Transfer is concerned with the extent to which previously learned
knowledge and/or skills (including affective predispositions)
influence subsequent learning, problem solving, and/or
application—in short, the person’s ability to deal with and learn
from novel situations. (Shuell. See Fowler, 1988, p. 143).

As it relates to transfer of learning in the music classroom, Shuell (1988) states:

Learning and performance, in and of themselves, are extremely
limited goals. It is impossible to teach students “everything” they
need to know in order to cope with the many different situations
and problems that they will encounter after leaving the classroom.
Without transfer, a student’s musical competence would be limited
to that domain of specific skills and knowledge acquired as a result
of the instruction that he or she has received. (p. 147)

According to Shuell, learning from a cognitive perspective occurs in acquiring
and remembering schemata and in building networks of information that stress the
relationships between component parts. The relationship of part work in a rehearsal, for
example, to the desired outcome must be illustrated and shared with students if we strive
for musical understanding. Shuell (1988) writes:

Cognitive conceptions of learning stress that learning is an active,
constructive, and goal oriented process that is dependent upon the
mental activities of the learner. (p. 147)
In other words, to command the violin section to “play softer” is far less effective than making students aware that they must play softer because they have an accompaniment figure, and are overpowering the melodic line. Relating musical directions to the role each section plays at a given moment within a composition is critical. It is important to understand that this process is not automatic, and that these connections and relationships should be made obvious to students.

The importance of teaching methods that aim for transfer of learning is described by Duke and Pierce (1991):

Understanding the processes by which individuals generalize previously learned cognitive and psychomotor skills to novel situations is of particular importance in areas of skill development involving large numbers of task-specific variables and extraneous distracters and in which the accurate interpretation and execution of critical component tasks is inherent in the overall task structure. (p. 94)

According to Duke and Pierce (1991), student success in learning, across a wide variety of areas, depends on motivation, appropriate successive approximations, a logical sequence of learning tasks, and ample opportunities for success, and praise. Success strongly effects motivation to pursue greater levels of skill. Teachers, however, too often make the critical mistake of assuming that transfer occurs, without specifically taking steps to ensure that it occurs. Duke and Pierce (1991) write:

A commonly held belief among educators is that when a student has learned to perform a musical figure or passage in one context, the information and skills acquired in the process will “automatically” transfer (i.e., generalize) to other, novel contexts. However there is much evidence to suggest that such transfer of learning (or transfer of training) does not necessarily occur without specific instruction that is directed to facilitate transfer. (p. 94)
In their 1991 inquiry, Duke and Pierce focus on the transfer of learning, in a study of performance skills involving the rhythmic and melodic accuracy of students performing passages that were initially learned out of context. The target passage appeared in a test example, this time embedded within a musical context, in which Duke and Pierce varied the performance tempo, and the difficulty level of the musical material preceding and following the target measures. The investigators found that altering the given metronome marking significantly effected performance tempo accuracy, and pitch accuracy, among their subjects, particularly when the test tempo was slower than the tempo of the learning phase. Duke and Pierce conclude with a paragraph that succinctly emphasizes the necessity of a careful examination of what we are teaching, what we think we are teaching, and what we are clearly not teaching, and the need for further research in this area of music pedagogy:

Since it has been demonstrated both formally and informally that transfer is not necessarily an automatic part of learning and experience, understanding the variables that affect students’ ability to transfer information and skills from isolated learning situations to different contexts is perhaps one of the most important tasks for teachers of music. The topic of transfer would seem to be of paramount importance in the study of music education methodology and in the practice of teaching. At all levels of instruction in vocal as well as instrumental music, there are innumerable activities and exercises that are designed to introduce new techniques, to develop skills, or to present knowledge in rather limited contexts, with the intention that students may more readily acquire “whatever it is” that is being taught if it is first experienced in a less complex setting than may be encountered in common practice. It is possible, however, that a primary impediment to many student’s successful participation in music making involves a fundamental inability to generalize and apply knowledge and skills across the various situations that are related to behaviors of music (e.g., performing, listening, composing, dancing, thinking). If this is true, then teachers may structure more successful experiences and facilitate greater independence on the part of their students by
devoting time and attention on the application of knowledge and skills across a variety of music contexts. (Duke & Pierce, 1991, p. 99).

Several types of transfer have been defined and delineated among scholars in educational psychology. An in-depth discussion of each type is beyond the scope of the present study. To generalize, however, research that has been examined in the preparation of the present study point to non-specific transfer, in which generalizations are made based on building knowledge through basic ideas, as the core of the educational process (Chivington, 1990). Edwards (1988) writes:

. . . music teachers are implicitly aware of something called non-specific transfer. . . non-specific transfer is characterized by the influence of the mental states and attitudes the learner brings from one situation to another. While not sanctioned by some contemporary psychologists, many still accept warm-up effects, attention, and motivation as examples of transferable states that can influence learning in subsequent, related situations. (Edwards. See Fowler, 1988, p. 124).

In summarizing the major points of his essay, Edwards (1988) provides a number of teaching strategies that promote transfer in music classes, which are relevant here, and will be encountered again in the model teaching sequence to be presented. His suggestions include the following:

- All transfer is not automatic. Make your students musical thinkers, not musical robots.
- Use verbal labels (“conceptual pegs”) to help students store away musical ideas and see relationships between musical situations.
- In general, attach labels after the phenomenon has been experienced.
• Since auditory models may or may not be retained in memory well enough for later use, be prepared to sharpen the memory by repeating the model.

• Verbalize often, but be brief and to-the-point.

• Developing too many skills at one time results in confusion. Break complex problems into component parts to achieve mastery.

• Componenting can be overdone, however. Too much of it may stifle integration and development of a good final product.

• Slow practice does not suddenly transfer to rapid, accurate performance. Have students “shape” difficult passages, gradually bringing them up to tempo.

• In teaching specific musical tasks, teach students the “why” of what you want. For example, relate “louder” and “softer” to ensemble balance.

• Students tend to see learning in bits and pieces and miss the “big picture.” Keep students informed about how their individual work relates to the final product.

• Encourage students to develop the habit of distributed rather than concentrated practice; it is more effective.

• Treat technique books as transfer exercises based on common musical patterns and situations. They are not magical routes to total musicianship.

• To develop musical thinking and maximize transfer, make students apply what they have learned elsewhere to the situation at hand.

• Use demonstration frequently. Add just enough verbalization to focus attention on the salient point. (Edwards. See Fowler, 1988).

Transfer occurs, Edwards asserts, when we simply remind students to make transfers. The teacher must remind students to use what they already know to solve problems in similar situations. (Edwards. See Fowler, 1988, p.135). By way of example, the general music classes of the school district participating in this study teach the Kodaly syllable system extensively. Students in the string classes respond quickly and positively when reminded that the rhythms in the orchestra literature can be dealt with in terms of “ta” and “ti,” just as they were in “Mrs. Amundson’s class.” However, it is
important to note that the students do not automatically make this association on their own.

Only a few other projects that deal specifically with transfer as it relates to rhythmic skills have been found. Pierce (1992) tested middle school band members playing their band instruments on single-pitched and melodic rhythm patterns after receiving different methods of rhythmic instruction. Students clapped patterns, counted, sizzled, and clapped while counting. Students performed test exercises at a variety of tempi—some slower, and some faster than the original teaching tempo.

Pierce found no significant differences in the mode of presentation, however, he asserted that students required a significantly shorter amount of time to learn the rhythms correctly when sizzling. Pierce reports that when the method of instruction was most closely patterned on the overt behaviors used in the actual performance task to be tested, students learned more quickly. Similarly, when the tempo used in the test was most similar to that of the lessons, students made significantly fewer note errors.

Chivington (1990) studied the effects of presenting rhythmic and melodic patterns outside of and within the context of a song. In her review of literature, Chivington highlights several elements which promote the transfer of learning, including task conditions which are varied and practiced during the initial phases of learning, a sequence in which task requirements move from simple to more complex, task similarity, guiding students to an understanding of the general rules and principles appropriate to solving problems, and the importance of coaching and teacher feedback to the students (Chivington, 1990, p. 66-67).
In a 1987 study with music majors, Geringer and Madsen examined the ability of college students to transfer information from research studies to applied music instruction. Members of the experimental group participated in a course on research in music education, while the control group did not. The specific application of research methods to applied music was not discussed with either group. Subjects were then asked to “design a series of investigations which could help evaluate the benefits of applied music instruction for college students.”

The investigators found that the students who had participated in the research course were far better able to write relevant research proposals for a closely related subject than members of the control group. In the discussion section, Geringer and Madsen note that the most critical variable affecting the amount of transfer possible is the similarity in the skills between the variables, citing a 1966 study by Underwood. In the case of this study, college music majors were able to transfer a substantial amount of information from a course in music education research to the specific task of writing a proposal for a study in applied music. The researchers state:

The main point of the present study concerns the ability of students to transfer. Most previous research indicates that little transfer occurs unless transfer is specifically taught. Research students in this study, having analyzed articles in order to identify variables, modes of inquiry and design, and possibilities for generalization to other subjects and situations, were able to apply research knowledge to design proposed studies in applied music. Clearly, much additional inquiry is needed regarding the integration of research with music education practice. (Geringer and Madsen, 1987, p. 49).
Bob Phillips Approach to Rhythm Reading

Bob Phillips, a retired school orchestra teacher who served for thirty years in the public schools of Saline, Michigan, has created an approach to teaching rhythmic performance and rhythm reading based in part on the work of Edwin Gordon and James Froseth.

Both Professors Froseth and Gordon are the authors of numerous works on music education topics related to rhythm performance skills and learning sequence. Those most relevant to the present study include:

Froseth and Blaser (1988) *Rhythm Flashcards Set One with CD*, which was used in the treatment phase of this study. Flashcards are written in standard notation on a single line. The accompaniment CD features selections in various meters, keys and tempi, and is intended to be used as a rhythmic background during flashcard lessons.

Froseth and Weikart (1981). *Movement to Music in Confined Spaces* was used to create movement patterns during the treatment phase of this study. The instruction book diagrams rhythmic movement activities that students can do from their seats in the classroom.

Gordon (2000). *Rhythm. Contrasting the Implications of Audiation and Notation* provided much of the logical and theoretical basis for the present study.

Phillips’ method was observed in detail by the investigator during the Summer String Teacher’s Workshop at the Ohio State University, followed by a field visit to his classroom in 2002. Phillips’ method was chosen as the teaching method to be examined in this study for the following reasons: The practical application of Phillips’ method in the classroom is very accessible to public school teachers of instrumental music,
requiring a minimum of training, and readily available materials. In addition, the method was observed to be fun and motivating for the students in Phillips’ classes, who were clearly engaged and on-task during the rhythmic training portion of his lesson. As a result of his many workshops and clinic appearances, Phillips’ approach is now frequently used throughout the country in school string classes.

Phillips acknowledges Dr. Froseth for the foundational principles and the scope and sequence of this specific series of steps. A student of Froseth while at the university of Michigan, Phillips has not researched or published this method, although he has presented it extensively at teacher’s workshops and conferences. The Phillips method serves as a model for the practical application of a transfer process in rhythm performance skills instruction. While teaching in Saline, Phillips worked with extremely large (i.e. over 50 students), string classes. The steps, as observed and transcribed by the researcher, were presented to the students in the following sequence:

**Phillips’ Method**

1. Move to the rhythm. Use rhythmic movements such as clapping, patting, arm circles, and marching. The teacher leads the students through movements that represent various note values and rhythm patterns that will be studied in subsequent steps. This activity should be done while playing fun, rhythmically dominated background music, which functions as a metronome. One example might be a piece like Gloria Estefan’s “Conga.” The goal is to help students feel various rhythmic patterns through movement, and to synchronize their efforts with an imposed tempo.
2. Say similar patterns on syllables. The teacher leads the students in a call-and-answer chant of rhythm patterns using syllables. For example, the teacher says, “My turn—ta ta ti-ti-ta. Your turn.” To which the students’ reply, “Ta ta ti-ti ta.” Phillips uses Du and De, but believes that any system will work. This investigation will use the Kodaly syllables, because the students participating in the study have learned them, and used the system extensively in their general music classes. The syllable chant is done while a rhythmic music background is played, to once again require the students to synchronize their efforts with an imposed tempo.

3. Flash cards are presented to the students. Phillips begins with patterns that are one measure long, made up of the same note values and rhythms that have been taught by rote in the first two steps. The flash cards are written in standard notation as a “drum line,” without specific pitches. The teacher chants the pattern in syllables while showing the class the notation. The students give an echo response. The use of the rhythmic background music continues throughout the lesson.

4. The teacher presents the flash card to the class, saying: “Ready, now look and say.” The class chants the pattern on syllables without hearing it first, in sync with the tempo of the background music.
5. The teacher presents flash cards one after the next in constant succession. The students must chant the patterns, reading the new card while they are chanting the last card. The rapid succession of cards is intended to approximate what a musician must do while reading music and performing at tempo.

6. Application to the instrument. Now that the rhythm patterns are familiar, the Teacher selects from steps 2 - 5 above as needed. Rather than moving or chanting, the teacher models and the students respond by plucking the patterns on an open string of their orchestra instruments.

7. Making applications to the instrument using the bow. The teacher selects from steps 2 - 5 above as needed. The teacher models familiar rhythm patterns, and the students respond by bowing the patterns on an open string of their orchestra instrument. Instruction and modeling the various aspects of bow speed and bow distribution is required in this step in order for students to perform the rhythm patterns accurately. For example, many students do not intuitively use very short bows for short durations, in contrast to long bows for longer durations.

8. The teacher incorporates melodic patterns. The teacher models by playing a pattern that requires the student to imitate a melodic rhythm pattern in which several different pitches are presented. The teacher may present patterns by
rote, or ask students to play a particular rhythm pattern for every pitch of a scale or familiar tune. This step does not make use of pitched notation.

9. The teacher presents two rhythmic patterns, to be played by different sections of the class simultaneously. These can be performed on a single pitch, and/or making use of a melodic pattern. This step is intended to approximate what musicians do when playing their independent musical line in an ensemble.

10. The teacher relates melodic and rhythmic patterns that the students have experienced through the previous steps, to musical examples. Students should identify the pattern the teacher has played by finding that measure in their music. The class plays the identified measure together. Students may be asked to find similar measures, or to identify “what is different” in selected measures. Students may also be asked to look for any unfamiliar patterns, and to see if they are able to figure out the pattern and play it before the teacher models.

Phillips does not provide a detailed written description of his leaning sequence in his published works, but does provide the following summary in the teacher’s manual of *String Explorer: An Explorer’s Guide to Teaching Strings* (2002):

**General Right-Hand Preparatory Routine for Ready, set, BOW!**

Teachers are urged to prepare for the Ready, set, BOW! sections by drilling students in chanting and/or counting of the objective rhythms and note values. Use of a consistent method for the vocalization of beats is recommended, such as numbers (1-and -2-
and, etc.) or counting syllables (e.g., doo-doo, doo-day; ta-ti-ti; one-tay, two-tay, etc). Note that in the first exercise, counting prompts are provided to assist in this purpose. It is recommended that teachers use the corresponding flash cards found in the Teacher’s Resource Kit to reinforce learning and assess student progress. Playing the CD recording of the exercises with accompaniments (or other background music that maintains a steady beat in the appropriate meter) while counting the rhythms and/or using flashcards is also recommended.

After counting the rhythms as described above, it is recommended that all students clap, and then “air-bow” those rhythms presented in the Ready, set, BOW! exercises. Students may simultaneously sing the notes of the exercises (using solfege or note names) while listening to the CD recording. Students should be sure to vocalize or otherwise indicate all rests.

A brief theoretical/mathematical explanation of new rhythms is appropriate after the notes are learned aurally, with subsequent visual association of the rhythmic symbols. Note: Depending on a student age and development, a theoretical/mathematical explanation may be ineffective, as some students may not yet understand mathematical concepts of division and multiplication (such as “two eights equal on quarter”).

Following a thorough preparation routine of the Ready, set, BOW! Rhythms, it is recommended that students play the exercises pizzicato, then arco.

Practicing the echo exercises (indicated by notes printed in alternating grey and black) will help solidify student achievement. A teacher or student may provide the primary voice while the rest of the class echoes the example. (p. 19)

To summarize, Gordon and Froseth’s ideas have been employed by Phillips’ in a learning sequence that presents students with rhythmic skills experiences in a methodical system. Students experience rhythms through movement, chanting, teacher modeling followed by student imitation in cycles, playing rhythms on band and orchestra
instruments, synchronizing rhythmic performance with the pulse of a background CD, and reading and playing the rhythms independently.

The discussion that follows is a sampling of studies that relate most closely with the different components of rhythmic instruction that are represented in the Phillips’ method.

**Movement**

The 1970 study of the effects of rhythmic movements on children’s abilities to sight-read music by J. David Boyle is often cited by the researchers in this review of selected literature. Boyle states that problems with music sight-reading are in large part due to students’ difficulties with rhythm patterns, and that, at the time of this study, “... the performance of rhythm is still recognized as the most deficient element in the performance of school bands” (Boyle, 1970, p. 308).

Boyle conducted his study with 24 junior high bands in 22 schools. Using the *A Rhythm A Day* text by Hunadoff, each band teacher conducted rhythm-training exercises in class. Members of the control group were asked to prohibit foot tapping or other types of body movements, while members of the experimental groups listened and clapped along to musical examples, clapped rhythm patterns while tapping their feet, and performed rhythm patterns on an instrument with a foot tap.

On a sight-reading test, Boyle found the scores of the experimental group to be significantly higher than those of the control. A high degree of correlation between students’ rhythm sight-reading accuracy and music reading accuracy was also found. Boyle asserts that while one does not prove the other, there is strong support for such a
thesis. Based on his findings, Boyle recommends that instrumental music teachers make use of bodily movements such as clapping and toe tapping in the training of rhythm patterns in class.

Various ways to help non-musicians discriminate meter were investigated by McCoy and Ellis (1992). One hundred twenty-eight college students enrolled in introductory music classes were divided into three groups. One listened to musical examples after various meters were explained, the second listened to similar musical examples that had been enhanced with a click-track to highlight the pulse, and the third listened to unaltered examples while performing various physical motions such as clapping, marching, and patting the pulse on a partner’s hand.

McCoy and Ellis found that the motion group scored higher than any other, followed by the listening group. Researchers found that the click-track group, to their surprise, scored lower than the group that listened to the unaltered recordings. McCoy and Ellis strongly advocate the use of movement instruction to aid students to discriminate musical meter based on their findings.

In her 1998 study, Rohwer also investigated the effect of movement instruction on students’ ability to maintain a steady beat and to perform in synchronization with the perceived beat. Rohwer conducted her study with 102 beginning instrumental students in the sixth grade of a mid-western public school district. The control group participated in rhythmic activities that were consistent with everyday classroom activities. Teachers used verbal modeling, flashcards, and modeling on instruments. The treatment group focused on movements while listening to music that included leg patting, clapping, conducting, tossing objects, and imagined movements synchronized to musical examples.
The members of the movement group were found to score significantly higher than the control group on the ability to synchronize taps with a musical stimulus. The performance scores of students’ playing an exercise on their own instrument were significantly higher in the treatment group as well, and treatment group subjects were more likely than control group members to correct their own performances. Rohwer concluded that instrumental teachers should not assume that all students have an established sense of steady beat at the time that instrument lessons begin, and that a kinesthetic approach appears to be a useful way to bridge the gap between students’ body knowledge and early instrument skills.

Salzberg and Wang (1989) conducted a comparison of foot tapping, counting-out-loud, and simultaneous counting and tapping on rhythmic sight-reading with 46 young string players. Students ranged in age from 8-16, with a range of 1-7 years of instruction on instruments. Based on researcher designed tests and researcher engineered placements into ability groups, Salzberg and Wang found a significant difference between the mean scores for “counting” and “no prompt,” in favor of the counting treatment. There was a significant difference between counting and ability groups, indicating that counting was more effective for the younger, less experienced students. There were no significant differences within the other treatments or ability groups.

The researchers note that some students had difficulty tapping accurately, and/or counting accurately. Students sometimes expressed a preference for one mode over others, but the preferred mode did not necessarily correlate to better scores. Salzberg and Wang suggest that prompts for rhythmic reading may need to change as students’
abilities develop. Foot tapping and counting together seemed to distract rather than help students.

It must be noted that many aspects of this particular study appear to be only rather loosely controlled, and the effectiveness, validity, and reliability of the researchers’ test, and their method of ability grouping has not been substantiated.

**Computer Assisted Instruction**

Various means of computer-assisted music instruction have been studied, including a project by Deal (1985), which examined the error-detection skills of music majors through two different types of programs. Both methods, one in which the students heard and detected errors in full band scores, and one in which a reduction was played on synthesizers, were determined to help improve the student’s ability to accurately detect rhythm and pitch errors.

**Tempo and the Perception of Pulse or Meter**

Duke, Geringer, and Madsen (1991) studied ways in which the pulse of music is perceived with 240 students in four age groups. Included were junior and senior high school students, college undergraduate, and graduate students. Half of the subjects in each group were enrolled in formal music study, and half had had less than one year of music training.

Participants were asked to listen to musical examples and to tap the perceived pulse with their hands. The study found that musicians and non-musicians were likely to perceive beat in different ways. The musicians were more likely to abstract the beat
through either subdivision of slow tones, or grouping of faster notes, while non-musicians were likely to perceive the stimulus tones as the beat itself. Tempi that fell into a band between 70 bpm and 120 bpm were found to be the most “comfortable,” and that the musicians tended to group or subdivide in order to stay within that range. Younger students and non-musicians tended to tap at the rate of the stimulus tones across all tempo ranges.

The same trio conducted further work in the area of tempo and perceived beat in 1992. In an investigation with 60 college music majors, Duke, Geringer and Madsen asked subjects to identify the underlying pulse of various musical examples (made up of three synthesized rhythm-instrument sounds). Participants then indicated through the use of a dial when they perceived the tempo to have increased or slowed. The range of 70 to 120 bpm was again identified as the most common range that musicians focus on as the beat tempo, with 90 bpm being the most often identified.

The study also found that there were considerable differences in the perception of beat and tempo between musicians, and that the various timbres of the instruments significantly affected the perception of pulse and tempo.

**Teaching Methods Using Different Modes of Presentation**

Various means of presenting rhythmic instruction to children via auditory, visual, and kinesthetic modalities were investigated by Persellin’s 1992 study. Two hundred ten first, third, and fifth graders served as the subjects for this research, which included seven groups: a visual only, auditory only, kinesthetic, visual and auditory, visual and
kinesthetic, auditory and kinesthetic, and finally a combined visual, auditory and kinesthetic group.

Children were presented with rhythm patterns in each of these seven subgroups, and then asked to reproduce the pattern by clapping or patting. Persellin found that maturation improved the children’s abilities to reproduce rhythmic patterns across all groups. She found that students were not confused by the presentation of a rhythmic pattern through multiple modalities, and that, in fact, the use of multi-modality presentations would likely give rhythmic icons more meaning, especially for young children.

Shehan (1987) examined the effect of rote versus note presentations on rhythm learning, finding that for beginners especially, the combination of visual and auditory channels enhanced the rhythm learning and retention of young students. “While aural training may be vital to developing auditory and musical sensitivity, music reading skills are learned most efficiently through a multifaceted approach that includes rhythm sound, its associated mnemonics, and the notational symbols.” (Shehan, 1987, p. 125).

The effect of colored notation was examined by Rogers (1996). In a study that included 134 first and second grade students, members of the experimental group received rhythmic reading instruction that made use of various colors for different note values. The colors were consistent within each exercise, but were varied from exercise to exercise and day-to-day, to prevent a dependence on color-coding in the children.

Rogers found that children in both the treatment group and the control scored significantly higher on performance tests using colored notation as opposed to black and white. The researcher further found that children expressed a clear preference affectively.
for the colored notation. Some children believed that it “looked easier” than the black and white notation. The heightened attention of the children when viewing colored notation seemed to have a short-term, positive effect on both groups—even though for the control group, the test was literally their first exposure to the colored notation.

Comparisons of Verbal Systems

Bebeau (1982) examined a combination Orff-Kodaly method of rhythm instruction for very young children. The researcher designed a “simplified speech cue” method that included the use of both a syllable for each note value, paired with a physical movement. Movements were coordinated in such a way that in performing them, students would likely also be performing the correct time value relative to other movements and values for each rhythm pattern. She compared her speech cue method with a traditional approach to rhythm reading instruction with twenty-seven private-school third graders.

Finding that the members of the treatment group were significantly more accurate in the performance of rhythms than the control, Bebeau stated that, “Data from the present study suggest that the inability to read phrase rhythms accurately is not a function of an inability to maintain a steady pulse. Rather it is more likely a function of the student’s inability to process the information in time to make the desired response.” (Bebeau, 1982, p. 118).

Similarly, Colley (1987) compared the syllable systems of Gordon and Kodaly with an investigator-designed “whole word” system with third-grade children. Testing after treatment was based on the children’s ability to recognize the notation for a measure
that was played, to write the notation for the measure, and to accurately clap the measure.

Colley found that the word group and the Gordon group showed significant gains in all three levels of evaluation. The Kodaly group did not show statistically significant gains over the control. Intact words for rhythm patterns were easier to remember, and provided built-in metrical stress that nonsense syllables did not.

Farrell (1997) observed the method of teaching employed in London schools with eight to eleven-year-old children learning to play the North Indian drum. Each beat or subdivision of a beat was paired with a syllable and a hand movement, or combination of movements, as students learn different types of pieces on the drum. The teacher made use of a rote-to-note presentation, emphasizing the correctness of the stroke before the metrical emphasis or notation. Farrell observed that children played “in time” naturally as a consequence of correctly executed strokes. He concluded that the integration of speech with hand movements allowed for learning complex rhythms.

Levinowitz and Scheetz (1998) examined the differences between group and solo responses to echo patterns, using Kodaly syllables. In a study of 117 third-grade students, Levinowitz and Scheetz found no significant differences between group singers and solo singers on the PMMA. The growth in low aptitude students was significantly higher than for high aptitude students. In a sight-reading measure, high aptitude students performed significantly better than low, and students in the solo group performed better than the “group singers.”

The Gordon syllable system in relation to teaching class guitar was examined by Gouzouasis (1992). Fifty-eight sixth graders receiving classroom guitar instruction were taught using specifically ordered tonal and rhythmic patterns based on Gordon’s
Jump Right In curriculum. Gouzouasis stated: “On the basis of the results of this study, it can be concluded that although hierarchically ordered tonal pattern instruction does not enhance tonal aspects of guitar performance skills, hierarchically ordered rhythm pattern instruction does enhance rhythm aspects of guitar performance skills” (Gouzouasis, 1992, p. 17).

Rhythm Reading in Relation to Sight-Reading Ability

Boyle (1969) examined the relationships of music sight-reading, rhythm sight-reading, intelligence, and rhythm aptitude in a study of 191 junior high band students. Boyle found that the mean score on the rhythm sight-reading test was nearly double the mean score of the measure of music sight-reading (the Watkins Farnum Performance Scale). The correlation between rhythm aptitude and rhythm sight-reading was reported as “substantial,” while relationships between rhythm aptitude and intelligence, or rhythm aptitude and the WFPS were given as “slight.” A very high degree of relationship was found between rhythm sight-reading and music sight-reading ability. Boyle concluded that rhythm aptitude scores are poor predictors of rhythm sight-reading scores, and that students can sight-read rhythms on a single pitch far more easily than music reading.

McPherson (1994) came to similar conclusions in a study with 101 high-school trumpet and clarinet players, preparing for a specific music performance examination in Australia, (AMEB). In the early stages of learning an instrument, the researcher found that sight-reading ability was not strongly correlated with the ability to perform prepared repertoire. The best sight-readers reported taking note of musical information such as the
time and key signature, while the poorest did much less so. Rhythmic errors far outweighed all other types of errors made on the WFPS.

The Importance of Teacher Modeling

Dickey (1992) reviewed and summarized research studies and findings on teacher modeling in music classes. Citing research studies dating from 1907 through 1988, Dickey asserts that although modeling had been shown to be an effective means of music teaching, demonstration was used only infrequently in the classroom. Dickey’s review of literature concluded (in part) that:

- Teacher demonstration-student imitation cycles can contribute significantly to the development of musical skills.
- Positive relationships exist between teacher modeling and student performance.
- Students learn to make increasingly complex musical discriminations through modeling.
- Modeling is an effective strategy throughout a wide age distribution.
- Modeling is a more effective strategy than verbal description for teaching musical performance.
- ...kinesthetic response cannot be improved through discussions of tempo, meter, and subdivision. (Dickey, 1992, p. 36).

Related Dissertation

The study most closely related to the present inquiry is the 1985 dissertation of Joseph Searle, advised by Dr. James Froseth. Searle examined students’ rhythmic performance skills, comparing prepared and sight-read examples, and the students’ ability to synchronize their performances to a rhythmic background CD. It was Searle’s contention that teaching the rhythmic value of an isolated note did not improve a child’s ability to perform rhythms in a musical context—such as in an ensemble. Using the
writings and teaching sequence theories of Edwin Gordon and James Froseth as the primary sources informing his research, Searle focused on rhythmic movement exercises and pattern recognition in his treatment methods.

Searle cites Froseth’s 1983 book, *The Teacher’s Planning Guide to the Comprehensive Music Instructor: Listen, Move, Sing and Play*, as the source of his teaching sequence, summarized here:

- Listen to the music, watch your teacher, and move (rhythmic warm-up).
- Lap-pat, listen to your teacher, and echo (imitation).
- Lap-pat, listen to the rhythmic pattern, and associate (rhythmic verbal association).
- Listen, echo, look at the rhythmic pattern, and associate (rhythmic visual association).
- Look at the rhythmic pattern and say (at-a-glance pattern recognition) (Searle, 1985, p. 9).

The sequence employed by Bob Phillips (as previously discussed) clearly follows this model, and is similarly credited to Dr. Froseth.

Searle worked with 138 fifth and sixth grade students in the homeroom sections of a rural community in Michigan. Students were divided into a control and three different treatment groups. Searle examined the differences between students who received rhythmic movement experiences, students who saw rhythmic patterns in the form of flash-slides (patterns projected on a screen for a controlled duration of time), and students who received a combination of movement and flash-slide training. Students responded to the teacher by lap patting, chanting syllables, and playing patterns on a soprano recorder.
The present study is also indebted to Searle’s work for its test format. In an author-developed test, Searle presented his students with several examples prepared with teacher help, examples that students prepared independently, and sight-reading examples. (In a telephone interview conducted by the researcher in the spring of 2003, Dr. Froseth recommended this method for the test development of the present study as well).

After a sixteen-week study period, Searle concluded that the analysis of the total population indicated: (1) kinesthetic training programs contribute significantly to the development of rhythmic movement-to-music synchronization abilities of fifth and sixth grade music students, as measured by the TKRRM [teacher-developed test], and (2) kinesthetic training programs used in conjunction with rhythmic pattern reading flash-slide programs contributed significantly to the development of rhythmic movement-to-music synchronization abilities of fifth and sixth grade music students, as measured by the TKRRM (Searle, 1985).

Searle found significant differences favoring the flash-slide training method among fifth-graders’ scores on musical achievement, and on sight-reading scores, but the variance was no longer significant when the sixth grade subjects were included in the measure. As no one treatment group was consistently shown to be superior to the others in the many statistical analyses that Searle conducted, he ultimately concluded that:

…kinesthetic training programs and rhythmic pattern reading flash-slide training programs, when used individually or in conjunction with one another, do not contribute significantly to the development of music performance or music sight-reading achievement of fifth and sixth grade music students. (Searle, 1985, p. 131).
Summary

Despite the broad range of studies that have dealt with aspects of rhythmic skills training, very little appears in the literature that directly addresses beginning instrumentalists’ abilities to perform rhythms on their orchestra or band instruments, and only one study has been found in the literature to date that deals specifically with how various types of rhythmic instruction effects the rhythmic performance abilities of beginning string players. The literature selected for discussion here is a representation of work that has been done examining the various component parts of rhythmic instruction that are represented in the Phillips’ method as a combined set of coordinated learning activities.

Recall Haskell’s assertion regarding the factors necessary for transfer to occur:

The research on teaching for transfer clearly shows that for transfer to occur, the original learning must be repeatedly reinforced with multiple examples or similar concepts in multiple contexts, and I would add, on different levels and orders of magnitude. Teaching that promotes transfer, then, involves returning again and again to an idea or procedure but on different levels and in different contexts, with apparently “different” examples. The great psychologist Jean Piaget referred to this method as epigenetic, as a kind of spiral where each new turn is a higher order manifestation of the order below it, just as 2 is to 4 and 4 is to 8. (Haskell, 2001, p. 27)

The learning sequence employed by Phillips, and selected for the present study appears to represent a functional application of Haskell’s principles for classroom use. Students experience rhythms through movement, chanting, teacher modeling followed by student imitation in cycles, playing rhythms on band and orchestra instruments, synchronizing rhythmic performance with the pulse of a background CD, and reading
and playing the rhythms independently. The patterns to be learned are presented repeatedly, in all of the various modes listed above.
CHAPTER 3

METHODS AND PROCEDURES

The major purpose of this study was to investigate the effect of specific transfer instruction on the rhythmic performance abilities of beginning instrumental students. In order to construct a useful test and to better prepare for the investigation, a pilot study was conducted one year prior to the formal research study. An explanation of the pilot, and the ways in which it shaped this study appears at the end of this chapter.

This chapter includes detailed descriptions of (a) the participants and the setting in which the study took place, (b) the experimental design, (c) the instructional procedures, (d) the test and testing procedures used in the study, and (e) the pilot study conducted prior to the formal research study.

The Study Participants

Members of the fifth-grade orchestra and band program in the Hastings, Minnesota public schools participated in the study. All of the participants were beginning instrumentalists who were participating in weekly general music classes as a part of their elementary school curriculum, and who were receiving weekly lessons and class instruction in band or orchestra during the study.
Hastings is a town of approximately 18,000 people located in the outlying suburbs of St. Paul, Minnesota. There is one kindergarten center, three elementary buildings (grades 1-5), one middle school (grades 6-8), and one high school (grades 9-12) in the district. During the 2003-2004 school year the average population per grade level was approximately 400 students.

The students included in the study participated in either band or orchestra. Membership in the orchestra or band program is voluntary, and open to any interested student in the fifth through twelfth grades. When the present investigation began there were 413 fifth-grade students in the district, 33 students enrolled in orchestra and 180 enrolled in band. All orchestra and band members were invited to participate in the study. Sixty-seven students (45 in band and 22 in orchestra) returned consent forms and completed the entire study.

Both groups met in large ensemble classes once a week for approximately forty-five minutes. In addition to the weekly rehearsal, all of the students attended small-group lessons with their orchestra or band teacher. Due to the large size of the band, the band teacher divided the students into two smaller subgroups that met on different days. The Monday band was a large ensemble comprised of 96 students drawn from two of the district’s three elementary schools. For practical purposes, the investigator worked with the Monday band and the Tuesday orchestra. This logistical decision allowed the investigator to present a short lesson in both groups as a part of every class period from January through early May of 2004.

The investigative period began in January of 2004, after students had received twelve weeks of instruction in their band and orchestra ensembles. The elementary band
and orchestra instructors were asked to conduct the same rhythmic activities they might ordinarily use prior to the study period (movement, and very simple use of Kodaly syllables were commonly incorporated into early band and string lessons), but to refrain from any formal rhythm training with either group, outside of that provided by the researcher, once the study had commenced.

**Study Design**

The study employed a pretest-posttest control group design, in which students from existing classes were randomly assigned to a treatment or control group ($N = 67$. Band control group $n = 26$, band treatment group $n = 19$. Orchestra control group $n = 10$, orchestra treatment group $n = 12$). In Table 1 below, R1 denotes the orchestra students, while R2 denotes the band students. One treatment and one control group was made up of orchestra students, and one treatment and one control group was made up of band students, as follows:

<table>
<thead>
<tr>
<th>R1</th>
<th>O</th>
<th>X</th>
<th>O</th>
<th>Orchestra Treatment Group</th>
<th>$n = 12$</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Orchestra Control Group</td>
<td>$n = 10$</td>
</tr>
<tr>
<td>R2</td>
<td>O</td>
<td>X</td>
<td>O</td>
<td>Band Treatment Group</td>
<td>$n = 19$</td>
</tr>
<tr>
<td>R2</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>Band Control Group</td>
<td>$n = 26$</td>
</tr>
</tbody>
</table>

Table 1

*Study Design*
Independent Variable and Instructional Procedures

Instruction was provided during regularly scheduled band and orchestra rehearsals. Students received either a red or a blue index card (which assigned them into treatment and control groups without their knowledge), and referred to themselves as the red group or the blue group. The red (treatment) and blue (control) groups were pulled from rehearsal in two separate sectionals. Each group would receive instruction on the same day, at approximately the same time, in the same place. The band or orchestra director continued the rehearsal with the rest of the class, while the study participants moved into a different room for the rhythm lesson.

Instruction took place over twelve weeks, consisting of one six-minute session per week, beginning in January of 2004. As the study began, the members of the fifth grade band and orchestra had received approximately twelve weeks of instruction on their instruments prior to the study. The following steps represent the investigator’s adaptation of the Phillips’ method. All rhythm patterns were presented in duple meter. Each rhythm pattern was four beats in length. The researcher’s field notes from each lesson presented throughout the study appears in appendix D.

Steps for Rhythmic Instruction in Order of Presentation (Both Groups)

1. The students began with physical movement, including clapping, patting, arm circles and so on, synchronizing their efforts to music with a stable, and clearly audible pulse. Movements, as led by the teacher, corresponded to quarter, half, and eighth-note values or rests.
2. The students verbalized patterns similar to those that had been performed through movement on Kodaly syllables. The students were asked to echo the teacher. Use of the musical background was continued, providing a constant sense of pulse, steady beat, and meter.

3. The teacher presented flash cards, showing the notation for the identical patterns presented in steps one and two. The investigator used a set of flashcards in which patterns were four beats long, written in standard notation without staff lines or specific pitches. The teacher verbalized the pattern on Kodaly syllables while showing the class the notation. The students were asked to echo the teacher. It should be noted that the Kodaly syllables were chosen because the students had experienced chanting rhythm patterns on Kodaly syllables in their general music classes, and were familiar with this system. (Elementary general music specialists provided the researcher with lists of note-values and syllables that had been presented in their classes through December of the children’s fifth-grade year. These included Ta (quarter-note), ti-ti (eight-notes in pairs), tika-tika (sixteenth notes in groups of four), Ta-o (half-note), Ta-o-o (dotted quarter note), and Ta-o-o-o (whole note).

4. The teacher presented the familiar flashcard to the class, saying: “Ready, now look and say.” The class chanted the pattern on syllables without hearing the teacher model first.
5. The teacher presented a line of four flashcards, displayed by taping them to the blackboard. Students were asked to clap, and/or chant the entire four measures in succession.

6. The teacher presented the flashcards one after the next in constant succession, causing students to read and chant without pause between patterns--as they might while reading a continuous line of music notation.

**Transfer Steps (presented to the treatment group only, study weeks 6-12)**

7. The teacher repeated the presentation of rhythmic patterns following the methods in steps 2-6 above. The students were asked to respond by air-bowing the rhythm patterns on their shoulders or across their palms, depending on the instrument each plays (violins and violas on the shoulders, cellos and basses on the palms). Band students were asked to sizzle (hiss as air is blown through lips and teeth, without truly engaging the mouthpiece) by blowing air rhythmically through their instruments. Percussionists air-tapped snare drum sticks (mimicking play, without actually striking the drum). Students were instructed to synchronize their performance with the musical background, at 70 bpm. Air bowing, sizzling and air tapping in this step refer to mimicking the movements required to play the rhythms with the bows, breath, and sticks, without actually playing on the instruments.
8. The teacher repeated the presentation of rhythmic patterns following the methods in steps 2-6 above. The students were asked to respond by plucking or bowing the rhythm patterns on the open D string of their string instruments. Band students played a single pitch (concert B-flat) on their instruments. Percussionists used their bell kits for all subsequent lessons so they could play pitched notation with the rest of the group. The musical background used was consistently set at 70 bpm, and pitched in the key of D major for orchestra, and B-flat major for band. It was the intention of the investigator that the rhythmic and melodic sounds created by the students be integrated into the musical background going on in the room. As they played, students were encouraged to join the musical context of, rather than compete with, the musical background. The investigator encouraged students to listen, play in time with the background music, and to move rhythmically—especially on rests—while they played.

9. The teacher repeated the presentation of rhythmic patterns following the methods in steps 2-6 above. The students responded by bowing the patterns on an open string of their orchestra instrument, or playing concert B-flat on their band instrument. The teacher then asked students to play rhythms with changing pitches by displaying a line of four flashcards on the board, placing one letter name on each flashcard. Pitches used in this exercise consisted of the first stepwise pitches learned in the string and band method books used in
class. For strings, these pitches include D, E, F-sharp and G on the D string; band students played pitches including concert B-flat, C, D and E-flat.

10. Finally, the students were presented with three exercises that were four-measures in length, written in standard notation and printed using Finale software to look like sheet music. Students were instructed by the investigator in the correct performance of the examples, two of which stayed on a single-pitch, and one that made use of several beginning pitches in a simple stepwise melody. The exercises used in this portion of the instruction appear as etudes 1, 3 and 5 on the test, shown in appendix E.

The series of transfer steps, taught only to the treatment groups, served as the independent variable in the study. Students in both treatment and control groups received the same amount of instruction time. All students experienced classes that presented rhythmic skills training as detailed in steps one through six above. The treatment group received rhythmic instruction that included the transfer steps, in which rhythm activities were performed on the students’ orchestra or band instruments, as detailed in steps seven through ten above. In the instruction of the control group the transfer steps were omitted—students never performed on their instruments as a part of their rhythm instruction sessions, but over the course of the twelve-week study period, members of the treatment groups received the entire series of steps in successive lessons. Members of the control groups received identical instructional time, but experienced only steps 1-6.
A typical six-minute lesson involved large body movement (e.g. marching or sikilar), specific patting or clapping movements which corresponded to the values of notes and rests, call and response sequences with and without notation, and rhythm reading using flashcards. As the study progressed, students moved from general to increasingly more specific movements and rhythm reading activities. When treatment group students began using their instruments, the control group received the same lesson. The control group responded to the teacher without instruments, either vocally (sizzling or Kodaly syllables) or physically (clapping or other movements as directed by the instructor). For a detailed description of each lesson, please refer to appendix E.

Throughout the entire series the musical background during instruction remained constant. The music was chosen specifically to have an easily identifiable sense of pulse, steady beat, and meter. Students were always instructed to listen for the beat, and to synchronize their efforts. Background music used in this study was selected from the CD that accompanies the Froseth and Blaser *Rhythm Flashcards*, set one. As the students progressed through the lessons, the investigator substituted a Yamaha keyboard with a preprogrammed style and drum machine function, which allowed for precise control of the tempo.

The tempo during rhythmic activities lessons was consistently set at 70 bpm. Students performed the test exercises to the same background music from the keyboard, at the same tempo—70 bpm. The tempo setting was in part determined by student performance in the pilot study, where a faster tempo was used, and thought to have an undesirable effect on student’s ability to synchronize. At this early stage in their studies, many simply could not play the examples faster.
Instructional Timeline

The students received a total of twelve, six-minute rhythm sessions, for a total of 72 minutes of instruction. The twelve-week study was divided as follows: Five weeks of identical instruction, pretest, seven weeks of treatment, posttest. During the first five weeks of the study, each group received identical instruction in steps one through six as detailed above. At the conclusion of the fifth week of instruction, students were recorded as they performed a pretest to assess and compare the rhythmic performance abilities of the groups.

After the pretest had been recorded, members of the treatment group received lessons that began to incorporate the use of their instruments and the transfer steps as a part of their rhythm instruction, while the control group received varied and continuing practice in steps one through six, for a total of seven weeks. At the conclusion of the study period all of the students were once again recorded using the same procedures as in the pretest. The test appears in appendix E.

Development of Pretest and Posttest Measures

The pretest (and identical posttest) was a researcher-constructed instrument comprised of combinations of rhythm patterns that had been presented in the initial learning phase (the test appears in the appendix). Rhythm patterns selected for the test were based on lists provided by three elementary general music specialists in the Hastings Public Schools. Each of the general music specialists provided the investigator with a detailed list of patterns and rhythm values that had been presented to students through December of their fifth-grade year, and the accompanying Kodaly syllables that
had been used. The format and design of the test was suggested to the investigator in a telephone conversation with Dr. Froseth, and closely resembles the test constructed and used by Searle (1985).

The test consisted of eleven examples, each four measures long. Seven of the examples were written on a single pitch (B-flat for band students, and D for strings). The remaining four test items used pitches common to beginning band and orchestra students. Multiple-pitched items were written using identical rhythms as the single-pitched test items. For example, etude number six and etude number eight are rhythmically identical, but etude number six is a simple melody on multiple pitches, while etude number eight remains on a single pitch. All of the remaining multiple-pitched test examples were similarly paired, incorporating the pitches D, E, F-sharp and G on the d string for orchestra, and concert B-flat, C, D and E-flat for band. By pairing the etudes it was hoped that differences in the students’ abilities to perform single-pitched versus melodic rhythms might be observed.

Additionally, test examples on the pretest and identical posttest were presented in three different types: five items were sight-read, three items were presented by the investigator and practiced during the instruction phase of the study, and three items that students were allowed to practice on their own just prior to recording the test. Sight-reading, teacher-prepared, and self-directed etudes were mixed and presented in random order on the test. This approach was used in an attempt to prevent measuring only the sight-reading ability of the student. For the purpose of this study, sight-reading examples consisted of the four-measure long etudes that appeared on the test, which students had
not seen prior to their performance. Etudes were comprised from familiar rhythm patterns that students had experienced as four-beat flash cards).

The students were audio recorded by the investigator as they performed test items on their orchestra or band instruments during their customary lesson time. The identical background music used during the instruction phase of the study was played during the student’s recording session. Students were asked to listen and play with the beat. The instructor started each etude for each student by saying, “One, Two, Ready, Go.” The pretest recordings took place after the fifth week of instruction, during February of 2004. The posttest recordings took place after the twelfth week of instruction during May of 2004.

Instrumentation

The investigator used the drum machine function on a Yamaha Portable Grand DGX300 keyboard. The tempo was set at 70 bpm. The accompaniment feature was used in the key of B-flat for band students and D major for orchestra students. All of the recordings were made on a Maranz CDR 300 CD recorder, using an Audio Technica AT822 Stereo Microphone. Accompaniment CDs were played using a Sony CFD-S200 CD player.
Scoring the Test

CDs containing all of the pretest and posttest recordings and scoring sheets were sent to three of the elementary music specialists in the Hastings Public Schools, who served as judges. There was nothing in the judges’ materials that would indicate whether the recordings were pretest or posttest, control or treatment groups. In the scoring process, the judges were asked to evaluate each performance on two factors:

1. The student’s ability to perform the correct rhythm pattern apart from his/her ability to synchronize;

2. The student’s ability to synchronize his/her performance with rhythmic accompaniment.

For each measure, judges were first asked to assign one point if the student was in sync, and zero if the student was not in sync with the pulse of the background music. After scoring students on their ability to synchronize, judges were asked to listen to the examples a second time, and to assess students on the accuracy of their performances apart from their ability to synchronize. Judges scored these rhythmic performances as follows:

3 Points = The measure is accurate as performed.

2 Points = The rhythm pattern is mostly accurate, but rhythmically unstable.

1 Point = The rhythm pattern is so rhythmically unstable it is mostly unrecognizable.
0 Points = The pattern is completely unrecognizable.

As a result, there were two scores for each test item: one for synchronization, and one for rhythm pattern accuracy. Since the present inquiry focused on the rhythmic abilities of the students, judges were instructed to disregard any problems with intonation or accurate pitch, and focus solely on the rhythmic performance.

**Pilot Study**

The investigator determined that a test would need to be constructed for this research. A pilot study to ensure the usefulness of a researcher-constructed instrument seemed to be a reasonable course of action. After examining the Watkins Farnum Performance Scale, and the test created by Searle (1985) the investigator modeled the test used in the present study closely on Searle’s work. The investigator also contacted and discussed the test format once with Dr. Froseth by telephone. Froseth advised the use of sight-reading, teacher-prepared and student-prepared items to allow for more variation in the testing instrument.

The investigator randomly divided the fifth-grade string players of 2002-2003 into control and treatment groups. Students were presented with rhythm lessons from January through May of 2003, and played both a pretest and posttest—all in similar fashion to the method described in detail for the actual study. Twelve students played for the pretest, and fourteen for the posttest.

The same three elementary music specialists who eventually served as judges for the formal research study evaluated the recordings for the pilot test. Through the pilot test results, it was determined that instructions to the judges were clear and
understandable, and that the three judges evidenced a high degree of inter-rater reliability, as reflected by Pearson Product Moment Correlation Coefficients, that ranged from $r = .82$ on the pretest synchronization scores to $r = .97$ on the posttest synchronization scores, pretest rhythm pattern scores $r = .95$, and posttest rhythm pattern scores $r = .90$.

Through the pilot study, it was determined that a possible ceiling effect might come into play, where several items received perfect scores by more than half of the participants. Those test items were adjusted, and were made more difficult on the test’s final form.

It was further determined that single and multiple-pitched test items should be rhythmically identical. Several etudes were paired (as previously described) and adjustments made so that one etude remained on a single pitch, the other moved through multiple pitches, but the items remained rhythmically identical. By pairing the etudes it was hoped that differences in the students’ abilities to perform single-pitched versus melodic rhythms might be observed. Test items were presented in random order so that rhythmically identical items appeared with no particular relationship to one another. The investigator did not make any mention of rhythmic similarities to the students.

It was determined that the tempo used in the pilot study was faster than many students could play accurately. Based on these results, the tempo was reduced from approximately 88 bpm to 70 bpm in the study.

Finally, judges commented that it would be much easier for them to score recordings accurately if the students began to play more uniformly (some did a good job
of starting on the beat while others did not). It was decided that the investigator would start each student by saying, “One, two, ready, play.”

All of the changes based on the results of the pilot study were made and applied to the final investigation. The formal research study began in January of the following school year, so that no student who had participated in the pilot would be a part of the final research.
CHAPTER 4

RESULTS

The purpose of this study was to investigate the effect of specific transfer instruction on the rhythmic performance abilities of beginning instrumental students. The researcher attempted to determine the effectiveness of the Phillips’ method as a teaching strategy that promoted transfer-of-learning. This chapter presents information on test scoring procedures and the results of data analysis for the research questions.

Restatement of the Research Questions

Question 1: Does an instructional sequence designed to develop rhythmic ability improve students’ performance of rhythmic patterns on orchestra and band instruments?

Question 2: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ ability to perform in sync with an imposed tempo?
Question 3: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ overall ability to perform rhythmic patterns (i.e., rhythmic performance and synchronization scores combined)?

Question 4: Are there differences between the control and treatment groups’ rhythmic performances of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 5: Are there differences between the control and treatment groups’ abilities to synchronize with an imposed tempo when performing multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 6: Are there differences between the control and treatment group’s overall performances (i.e., rhythmic performance and synchronization combined) of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Scoring Procedures

Fifth grade students in the band and orchestra programs of the Hastings Public Schools were randomly assigned to a treatment or a control group. There were 31 students in the treatment group and 36 students in the control group, (N=67). Within the treatment group, 19 students played band instruments, 12 students played strings. Within the control group, 26 students played band instruments, 10 played strings. (23 string students agreed to participate in the study. One student dropped out of orchestra prior to
the final recording. 50 band students agreed to participate, but five moved away, dropped band, or were otherwise unavailable to complete the final recording in May).

The students received a total of 12, six-minute rhythm sessions over twelve weeks, for a total of 72 minutes of instruction. During the first five weeks of the study, each group received identical instruction. At the conclusion of the fifth week of instruction, students were recorded as they performed a pretest, which consisted of eleven four-measure etudes. Beginning with the sixth week of instruction, members of the treatment group received lessons that incorporated the use of their instruments with transfer instruction, while the control group continued rhythmic activities without the use of their instruments for a total of seven weeks. The posttest, which was identical to the pretest, was recorded immediately following the twelve-week study period.

In order to address the research questions more thoroughly, the pretest and identical posttest were scored considering two different factors of rhythmic performance: the ability of the student to perform a rhythm pattern from written notation, and the ability of the student to perform the rhythms in sync with a musical accompaniment—simulating the conditions under which all ensemble musicians perform. Consequently, judges scoring the performances were asked to evaluate each performance on two factors:

1. The student’s ability to perform the correct rhythm pattern apart from his/her ability to synchronize;

2. The student’s ability to synchronize his/her performance with rhythmic accompaniment.
Each of the judges had participated in the pilot study, completed one-year prior to the present research, which allowed them the opportunity to practice the scoring process. The judges were asked for feedback following the pilot study, and adjustments were made to the process based on their suggestions (see Chapter 3). All three judges indicated that the directions were clear and that they were able to complete the scoring process as instructed (see Appendix C). Judges were given CDs and scoring sheets. No indication was given identifying recordings as pretest or posttest, control or treatment. Each judge listened to and scored one-hundred-and-thirty-four performances. Calculation of inter-rater reliability revealed that judges’ ratings demonstrated a high degree of reliability (see Table 2).

<table>
<thead>
<tr>
<th></th>
<th>Pretest $r$</th>
<th>Posttest $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control total scores</td>
<td>0.93</td>
<td>0.91</td>
</tr>
<tr>
<td>Control synchronization scores</td>
<td>0.90</td>
<td>0.81</td>
</tr>
<tr>
<td>Control rhythm pattern scores</td>
<td>0.89</td>
<td>0.92</td>
</tr>
<tr>
<td>Treatment total scores</td>
<td>0.88</td>
<td>0.97</td>
</tr>
<tr>
<td>Treatment synchronization</td>
<td>0.89</td>
<td>0.95</td>
</tr>
<tr>
<td>Treatment rhythm pattern scores</td>
<td>0.82</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Table 2

*Inter-Judge Reliability on Pretest and Posttest Scores*
Comparison of IMMA Composite Scores of the Control and Treatment Groups

All fourth grade students in the Hastings Public Schools routinely take the Intermediate Measures of Musical Aptitude (IMMA) test. Study participants’ scores were obtained by the investigator. All of the control group member’s scores on the IMMA were available, \( n = 36 \), however four scores of treatment group members were not. The four missing scores represent children who either moved in to the district after the test was given, or were absent from class during the time allotted for testing. It was coincidental that the missing scores were all within the treatment group. Twenty-seven IMMA scores of treatment group members were compared with thirty-six scores of control group members using a one-way ANOVA, which revealed no significant differences between the control and treatment groups on the IMMA composite scores prior to the study period.

Presentation of Data

Band and orchestra students were randomly assigned to a treatment or control group and pretested and posttested on their ability to perform rhythmic patterns. Subjects were scored on their ability to perform rhythmic patterns as well as their ability to synchronize their performance with an imposed tempo. These two evaluations were analyzed separately and in combination (i.e., by summing a total, composite score) in order to provide a more detailed image of treatment effects.
Question 1: Does an instructional sequence designed to develop rhythmic ability improve students’ performance of rhythmic patterns on orchestra and band instruments?

Table 3 provides means and standard deviations for treatment and control groups’ pretest and posttest rhythm pattern performance scores based upon principal instrument (band/orchestra). The table shows comparable means and standard deviations in the band and orchestra, treatment and control groups, with few notable differences.

A 2 (treatment/control) X 2(band/orchestra) Analysis of Covariance revealed significant pretest to posttest gain scores, but no significant main effects or interactions between groups (see Table 4). Based on these findings, the addition of transfer steps did not significantly affect student’s overall ability to accurately perform rhythmic patterns.
<table>
<thead>
<tr>
<th>Condition</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>54.88</td>
<td>11.35</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>52.47</td>
<td>12.58</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>58.70</td>
<td>8.14</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>54.75</td>
<td>10.85</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>54.87</td>
<td>11.96</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>54.45</td>
<td>7.78</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>54.81</td>
<td>11.00</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>53.86</td>
<td>12.14</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>56.77</td>
<td>8.09</td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>61.01</td>
<td>11.17</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>59.69</td>
<td>11.04</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>63.10</td>
<td>11.55</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>58.85</td>
<td>9.28</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>58.74</td>
<td>8.57</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>59.15</td>
<td>11.45</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>59.85</td>
<td>10.18</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>59.14</td>
<td>9.58</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>61.30</td>
<td>11.40</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 3**

*Means (M) and Standard Deviations (SD) of Pretest and Posttest Rhythm Pattern Scores*

*Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>1</td>
<td>41.11</td>
<td>.00**</td>
<td>.40</td>
</tr>
<tr>
<td>Treatment (A)</td>
<td>1</td>
<td>.82</td>
<td>.37</td>
<td>.01</td>
</tr>
<tr>
<td>Instrument (B)</td>
<td>1</td>
<td>.01</td>
<td>.93</td>
<td>.00</td>
</tr>
<tr>
<td>Treatment X Instrument (AB)</td>
<td>1</td>
<td>.05</td>
<td>.83</td>
<td>.00</td>
</tr>
<tr>
<td>Error (SS/AB)</td>
<td>62</td>
<td>(64.73)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent mean square error.

** $p < .01$

Table 4

*Analysis of Covariance for Posttest Rhythm Pattern Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Rhythm Pattern Scores Served as Covariate*
Question 2: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ ability to perform in sync with an imposed tempo?

Table 5 provides means and standard deviations for treatment and control groups’ pretest and posttest synchronization scores based upon principal instrument (band/orchestra). Evidenced in the table are slightly higher mean scores for the treatment group (band and orchestra). Interestingly, the orchestra treatment group’s posttest mean was the highest ($M = 66.60$), while the orchestra control group’s posttest mean was the lowest ($M = 48.71$). However, the total posttest mean scores of the band students (control + treatment) and orchestra students (control + treatment) are virtually the same ($M = 58.52$ and $M = 58.47$, respectively).

A 2 (treatment/control) X 2(band/orchestra) Analysis of Covariance revealed that posttest scores were significantly higher ($p<.001$) than pretest scores ($M = 49.90$, to $M = 58.50$, respectively). However, no other significant main effects or interactions were found between groups. It is important to note though that the treatment group’s synchronization scores were greater than the control group’s scores by a margin that approached significance ($p = .06$) as shown in Table 6. Based on these overall findings, the addition of transfer steps did not significantly affect student’s overall ability to perform rhythms in sync with an imposed tempo, however the difference between mean scores of the treatment and control groups may merit further investigation.
<table>
<thead>
<tr>
<th>Condition</th>
<th>( N )</th>
<th>( M )</th>
<th>( SD )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>52.03</td>
<td>19.73</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>53.11</td>
<td>21.07</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>50.32</td>
<td>18.16</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>48.06</td>
<td>19.69</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>49.68</td>
<td>21.53</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>43.86</td>
<td>13.90</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>51.13</td>
<td>21.17</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>47.38</td>
<td>16.32</td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>63.78</td>
<td>24.89</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>62.00</td>
<td>24.62</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>66.60</td>
<td>26.14</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>53.96</td>
<td>20.65</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>55.97</td>
<td>19.94</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>48.71</td>
<td>22.60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
<td>58.50</td>
<td>23.06</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>58.52</td>
<td>21.98</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>58.47</td>
<td>25.69</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 5**

*Means (M) and Standard Deviations (SD) of Pretest and Posttest Synchronization Scores*

*Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>1</td>
<td>76.62</td>
<td>.00**</td>
<td>.55</td>
</tr>
<tr>
<td>Treatment (A)</td>
<td>1</td>
<td>3.62</td>
<td>.06</td>
<td>.06</td>
</tr>
<tr>
<td>Instrument (B)</td>
<td>1</td>
<td>0.33</td>
<td>.57</td>
<td>.01</td>
</tr>
<tr>
<td>Treatment X Instrument (AB)</td>
<td>1</td>
<td>1.32</td>
<td>.26</td>
<td>.02</td>
</tr>
<tr>
<td>Error (SS/AB)</td>
<td>62</td>
<td>(237.81)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent mean square error.

**$p < .01$**

**Table 6**

*Analysis of Covariance for Posttest Synchronization Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Synchronization Scores Served as Covariate*
Question 3: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ overall ability to perform rhythmic patterns (i.e., rhythmic performance and synchronization scores combined)?

Table 7 provides means and standard deviations for treatment and control groups’ overall pretest and posttest performance scores (i.e., ability to recognize the rhythmic pattern plus the ability to sync with an imposed tempo) based upon principal instrument (band/orchestra). The Table shows comparable means and standard deviations in the band and orchestra, treatment and control groups, with few notable differences.

A 2 (treatment/control) X 2 (band/orchestra) Analysis of Covariance revealed that posttest scores were significantly higher ($p<.001$) than pretest scores ($M = 53.83$, to $M = 59.58$, respectively). However, no other significant main effects or interactions were found between groups (see Table 8). Based on these findings, the addition of transfer steps did not significantly affect student’s overall performance of rhythm patterns.
<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>54.31</td>
<td>12.29</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>52.60</td>
<td>14.35</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>57.02</td>
<td>9.96</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>53.41</td>
<td>12.17</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>53.83</td>
<td>13.41</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>52.33</td>
<td>8.64</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>53.83</td>
<td>12.29</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>53.31</td>
<td>13.53</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>54.89</td>
<td>9.47</td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>61.56</td>
<td>13.71</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>60.15</td>
<td>13.65</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>63.80</td>
<td>14.10</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>57.87</td>
<td>10.93</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>58.20</td>
<td>10.43</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>57.06</td>
<td>12.71</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>59.58</td>
<td>12.33</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>59.02</td>
<td>11.79</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>60.74</td>
<td>13.60</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 7**

Means (M) and Standard Deviations (SD) of Pretest and Posttest Total Scores Reported by Treatment Group and Instrument (Band/Orchestra)
Table 8

*Analysis of Covariance for Posttest Total Scores by Treatment Group and Instrument (Band/Orchestra) where Pretest Total Scores Served as Covariate*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>1</td>
<td>57.90</td>
<td>.00**</td>
<td>.48</td>
</tr>
<tr>
<td>Treatment (A)</td>
<td>1</td>
<td>1.79</td>
<td>.19</td>
<td>.03</td>
</tr>
<tr>
<td>Instrument (B)</td>
<td>1</td>
<td>0.01</td>
<td>.92</td>
<td>.00</td>
</tr>
<tr>
<td>Treatment X Instrument (AB)</td>
<td>1</td>
<td>.02</td>
<td>.89</td>
<td>.00</td>
</tr>
<tr>
<td>Error (SS/AB)</td>
<td>62</td>
<td>(80.97)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent mean square error.

** $p < .01$
Question 4: Are there differences between the control and treatment groups’ rhythmic performances of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

To determine the answer to research questions #4, #5 and #6, each test score was divided into etudes that were played on a single pitch and etudes played on multiple pitches. The total points possible for single-pitch etudes was 112; total points possible for multiple-pitched etudes was 64. Scores are reported by percentage correct in order to account for composite score differences arising from the unequal number of excerpts occurring on the testing instrument.

Tables 9 and 10 provide means and standard deviations for treatment and control groups’ pretest and posttest rhythm pattern scores on single and multiple pitched excerpts based upon principal instrument (band/orchestra). Posttest means were slightly higher in the treatment groups than the control groups for both single-pitched and multiple-pitched etudes. On single-pitched etudes the posttest means across all groups are quite similar. On multiple-pitched etudes, orchestra students in the treatment group had the highest posttest scores overall ($M = 84.49$, $SD = 16.61$), band treatment ($M = 76.83$, $SD = 16.85$).

In response to question four, a 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) repeated measures analysis of variance revealed that all subjects scored significantly better ($p < .05$) on the rhythm pattern accuracy of single-pitched versus multiple-pitched etudes. Further, a significant interaction occurred between the type of excerpt presentation and pretest/posttest, indicating more dramatic gains from pretest to posttest in the multiple pitch excerpts.
(see Figure 1). All students, regardless of treatment, made more pronounced gains in their ability to accurately perform melodic rhythms than they did on single pitched rhythms. Again, subjects scored significantly higher on the posttest than the pretest. No significant differences were evidenced based on treatment or control group membership. The full analysis is displayed in Table 11.

![Figure 1. Line graph depicting significant interaction between excerpt type and test on mean rhythm pattern scores.](image)
<table>
<thead>
<tr>
<th>Condition</th>
<th></th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-pitched Etudes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>76.70</td>
<td>15.20</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>74.71</td>
<td>17.26</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>79.86</td>
<td>11.17</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>76.70</td>
<td>14.09</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>76.73</td>
<td>16.07</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>76.63</td>
<td>7.43</td>
</tr>
<tr>
<td>Total Single-pitch</td>
<td>67</td>
<td>76.70</td>
<td>14.50</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>75.87</td>
<td>16.42</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>78.39</td>
<td>9.57</td>
</tr>
<tr>
<td>Multiple-pitched Etudes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>66.82</td>
<td>18.15</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>61.37</td>
<td>19.68</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>75.47</td>
<td>11.50</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>66.53</td>
<td>18.24</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>66.91</td>
<td>18.86</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>65.56</td>
<td>17.47</td>
</tr>
<tr>
<td>Total Multiple-pitch</td>
<td>67</td>
<td>66.67</td>
<td>18.06</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>64.57</td>
<td>19.18</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>70.96</td>
<td>15.02</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

Table 9

*Means (M) and Standard Deviations (SD) of Pretest Single-pitch and Multiple-pitch Rhythm Pattern Scores Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>82.25</td>
<td>14.86</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>81.16</td>
<td>14.96</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>83.96</td>
<td>15.20</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>79.77</td>
<td>13.41</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>79.91</td>
<td>11.40</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>79.40</td>
<td>18.39</td>
</tr>
<tr>
<td><strong>Total Single-pitch</strong></td>
<td>67</td>
<td>80.92</td>
<td>14.04</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>80.44</td>
<td>12.88</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>81.89</td>
<td>16.47</td>
</tr>
<tr>
<td><strong>Multiple-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>79.79</td>
<td>16.91</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>76.83</td>
<td>16.85</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>84.49</td>
<td>16.61</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>76.12</td>
<td>15.90</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>75.51</td>
<td>16.67</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>77.92</td>
<td>14.36</td>
</tr>
<tr>
<td><strong>Total Multiple-pitch</strong></td>
<td>67</td>
<td>77.85</td>
<td>16.35</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>76.07</td>
<td>16.57</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>81.50</td>
<td>15.63</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 10**

*Means (M) and Standard Deviations (SD) of Posttest Single-pitch and Multiple-pitch Rhythm Pattern Scores Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group (G)</td>
<td>1</td>
<td>0.48</td>
<td>.50</td>
<td>.01</td>
</tr>
<tr>
<td>Instrument (I)</td>
<td>1</td>
<td>1.18</td>
<td>.28</td>
<td>.02</td>
</tr>
<tr>
<td>Group X Instrument (GI)</td>
<td>1</td>
<td>1.11</td>
<td>.30</td>
<td>.02</td>
</tr>
<tr>
<td>Error (SS/GI)</td>
<td>63</td>
<td>(700.47)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test (T)</td>
<td>1</td>
<td>24.40</td>
<td>.00**</td>
<td>.28</td>
</tr>
<tr>
<td>Single/Multiple (SPMP)</td>
<td>1</td>
<td>18.37</td>
<td>.00**</td>
<td>.23</td>
</tr>
<tr>
<td>SPMP x I</td>
<td>1</td>
<td>1.89</td>
<td>.18</td>
<td>.03</td>
</tr>
<tr>
<td>SPMP x G</td>
<td>1</td>
<td>0.22</td>
<td>.64</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x G x I</td>
<td>1</td>
<td>1.16</td>
<td>.29</td>
<td>.02</td>
</tr>
<tr>
<td>T x I</td>
<td>1</td>
<td>0.19</td>
<td>.67</td>
<td>.00</td>
</tr>
<tr>
<td>T x G</td>
<td>1</td>
<td>0.42</td>
<td>.52</td>
<td>.01</td>
</tr>
<tr>
<td>T x I x G</td>
<td>1</td>
<td>0.94</td>
<td>.34</td>
<td>.02</td>
</tr>
<tr>
<td>SPMP x T</td>
<td>1</td>
<td>15.50</td>
<td>.00**</td>
<td>.20</td>
</tr>
<tr>
<td>SPMP x T x I</td>
<td>1</td>
<td>0.00</td>
<td>.99</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T x G</td>
<td>1</td>
<td>0.02</td>
<td>.89</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T x I x G</td>
<td>1</td>
<td>1.26</td>
<td>.27</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>63</td>
<td>(49.17)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent mean square error.

** p < .01

**Table 11**

2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) Repeated Measures Analysis Of Variance Rhythm Pattern Performance Scores
Question 5: Are there differences between the control and treatment groups’ abilities to synchronize with an imposed tempo when performing multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Tables 12 and 13 provide means and standard deviations for treatment and control groups’ pretest and posttest synchronization scores on single and multiple pitched excerpts based upon principal instrument (band/orchestra). Scores are reported by percentage correct in order to account for composite score differences arising from the unequal number of excerpts occurring on the testing instrument.

It is interesting to note the differences specifically between the orchestra control and orchestra treatment group means. On posttest single-pitch synchronization, the orchestra treatment group mean score was \( M = 70.64, SD = 26.27 \), compared to the orchestra control group mean \( M = 52.38, SD = 24.42 \) as show in Table 13. This finding was one of the largest differences observed. Similarly, on posttest multiple-pitch synchronization, the orchestra treatment group mean score was \( M = 59.38, SD = 27.30 \), compared to the orchestra control group mean \( M = 42.29, SD = 24.33 \). The posttest mean scores of band students were somewhat higher in favor of the treatment groups, but did not differ by as wide a margin as the orchestra means.

A 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) repeated measures analysis of variance revealed that students in all groups were significantly better able to synchronize their performances of single-pitched etudes than multiple-pitched etudes \( (p < .05) \). That is, all subjects scored significantly better on the synchronization of single-pitched versus multiple-pitched etudes. A significant interaction occurred between the type of excerpt presentation and
pretest/posttest, indicating more dramatic gains from pretest to posttest in the multiple pitch excerpts (see Figure 2). In other words, all students, regardless of treatment, made more pronounced gains in their ability to accurately synchronize rhythms on multiple pitched excerpts than they did on single pitched excerpts. Again, subjects scored significantly higher on the posttest than the pretest. No significant differences were evidenced based on treatment or control group membership. The full analysis is displayed in Table 14.

Figure 2. Line graph depicting significant interaction between excerpt type and test on mean synchronization scores.
<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>59.83</td>
<td>21.84</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>61.34</td>
<td>22.50</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>57.44</td>
<td>21.51</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>54.83</td>
<td>20.87</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>56.09</td>
<td>23.48</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>51.55</td>
<td>12.11</td>
</tr>
<tr>
<td>Total Single-pitch</td>
<td>67</td>
<td>57.14</td>
<td>21.31</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>58.31</td>
<td>22.96</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>54.76</td>
<td>17.73</td>
</tr>
<tr>
<td><strong>Multiple-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>38.71</td>
<td>20.46</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>39.26</td>
<td>22.26</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>37.85</td>
<td>18.16</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>36.23</td>
<td>22.41</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>38.46</td>
<td>23.50</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>30.42</td>
<td>19.18</td>
</tr>
<tr>
<td>Total Multiple-pitch</td>
<td>67</td>
<td>37.38</td>
<td>21.41</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>38.80</td>
<td>22.73</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>34.47</td>
<td>18.56</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 12**

*Means (M) and Standard Deviations (SD) of Pretest Single-pitch and Multiple-pitch Synchronization Scores Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>68.97</td>
<td>24.67</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>67.92</td>
<td>24.29</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>70.64</td>
<td>26.27</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>58.83</td>
<td>22.46</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>61.31</td>
<td>21.65</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>52.38</td>
<td>24.42</td>
</tr>
<tr>
<td><strong>Total Single-pitch</strong></td>
<td>67</td>
<td>63.52</td>
<td>23.88</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>64.10</td>
<td>22.77</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>62.34</td>
<td>26.52</td>
</tr>
<tr>
<td><strong>Multiple-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>54.64</td>
<td>27.32</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>51.64</td>
<td>27.64</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>59.38</td>
<td>27.30</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>45.49</td>
<td>23.22</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>46.72</td>
<td>23.15</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>42.29</td>
<td>24.33</td>
</tr>
<tr>
<td><strong>Total Multiple-pitch</strong></td>
<td>67</td>
<td>49.72</td>
<td>25.42</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>48.80</td>
<td>24.96</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>51.61</td>
<td>26.83</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 13**

Means (*M*) and Standard Deviations (*SD*) of Posttest Single-pitch and Multiple-pitch

Synchronization Scores Reported by Treatment Group and Instrument (Band/Orchestra)
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group (G)</td>
<td>1</td>
<td>2.49</td>
<td>.12</td>
<td>.04</td>
</tr>
<tr>
<td>Instrument (I)</td>
<td>1</td>
<td>0.25</td>
<td>.62</td>
<td>.00</td>
</tr>
<tr>
<td>Group X Instrument (GI)</td>
<td>1</td>
<td>0.55</td>
<td>.46</td>
<td>.01</td>
</tr>
<tr>
<td>Error (SS/GI)</td>
<td>63</td>
<td>(1606.14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test (T)</td>
<td>1</td>
<td>24.63</td>
<td>.00**</td>
<td>.28</td>
</tr>
<tr>
<td>Single/Multiple (SPMP)</td>
<td>1</td>
<td>81.61</td>
<td>.00**</td>
<td>.56</td>
</tr>
<tr>
<td>SPMP x I</td>
<td>1</td>
<td>0.34</td>
<td>.56</td>
<td>.01</td>
</tr>
<tr>
<td>SPMP x G</td>
<td>1</td>
<td>0.16</td>
<td>.70</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x G x I</td>
<td>1</td>
<td>0.20</td>
<td>.66</td>
<td>.00</td>
</tr>
<tr>
<td>T x I</td>
<td>1</td>
<td>0.87</td>
<td>.36</td>
<td>.01</td>
</tr>
<tr>
<td>T x G</td>
<td>1</td>
<td>2.92</td>
<td>.09</td>
<td>.04</td>
</tr>
<tr>
<td>T x I x G</td>
<td>1</td>
<td>1.05</td>
<td>.31</td>
<td>.02</td>
</tr>
<tr>
<td>SPMP x T</td>
<td>1</td>
<td>7.02</td>
<td>.01**</td>
<td>.10</td>
</tr>
<tr>
<td>SPMP x T x I</td>
<td>1</td>
<td>0.98</td>
<td>.33</td>
<td>.02</td>
</tr>
<tr>
<td>SPMP x T x G</td>
<td>1</td>
<td>0.00</td>
<td>1.00</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T x I x G</td>
<td>1</td>
<td>0.27</td>
<td>0.61</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td>63</td>
<td>(103.32)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. Values in parenthesis represent mean square error.*

** $p < .01$

**Table 14**

2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) Repeated Measures Analysis Of Variance Synchronization Scores
Question 6: Are there differences between the control and treatment group’s overall performances (i.e., rhythmic performance and synchronization combined) of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Tables 15 and 16 provide means and standard deviations for the treatment and control groups’ pretest and posttest overall performance scores (i.e., ability to perform the rhythmic pattern plus the ability to sync with an imposed tempo) based upon principal instrument (band/orchestra). This analysis compared multiple-pitched and single-pitched etude performance. On single-pitched etudes, the treatment posttest single-pitch mean ($M = 78.93$, $SD = 17.08$) was somewhat greater than the control group posttest single-pitch mean ($M = 74.54$, $SD = 14.70$). On multiple-pitched etudes posttest scores were again slightly higher in the treatment group than the control: treatment posttest multiple-pitch ($M = 73.51$, $SD = 18.95$); control posttest multiple-pitch ($M = 68.50$, $SD = 15.65$). The orchestra treatment group had by far the highest posttest mean score ($M = 78.21$, $SD = 18.64$).

In order to address research question six, a 2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiple-pitch) repeated measures analysis of variance revealed no significant differences between band and orchestra students’ overall rhythmic performances of multiple-pitched versus single-pitched etudes. Students in all groups earned significantly higher total scores on their performances of single-pitched etudes versus multiple-pitched etudes ($p < .05$). A significant interaction occurred between the type of excerpt presentation and pretest/posttest, indicating more dramatic gains from pretest to posttest in the multiple pitch excerpts (see Figure 3). In other words, all students, regardless of treatment, made
more pronounced gains in their ability to perform melodic rhythms overall than they did on single pitched rhythms. Again, subjects scored significantly higher on the posttest than the pretest. No significant differences were evidenced based on treatment or control group membership. The full analysis is displayed in Table 17.

Figure 3. Line graph depicting significant interaction between excerpt type and test on mean total scores.
<table>
<thead>
<tr>
<th>Condition</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td><strong>Single-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>72.51</td>
<td>16.34</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>71.41</td>
<td>18.17</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>74.26</td>
<td>13.52</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>71.23</td>
<td>15.13</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>71.57</td>
<td>17.19</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>70.36</td>
<td>8.30</td>
</tr>
<tr>
<td><strong>Total Single-pitch</strong></td>
<td>67</td>
<td>71.82</td>
<td>15.60</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>71.50</td>
<td>17.41</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>72.48</td>
<td>11.37</td>
</tr>
<tr>
<td><strong>Multiple-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>59.80</td>
<td>17.79</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>55.84</td>
<td>19.86</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>66.06</td>
<td>12.17</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>58.96</td>
<td>18.62</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>59.80</td>
<td>19.45</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>56.77</td>
<td>17.05</td>
</tr>
<tr>
<td><strong>Total Multiple-pitch</strong></td>
<td>67</td>
<td>59.34</td>
<td>18.11</td>
</tr>
<tr>
<td>Band</td>
<td>45</td>
<td>58.13</td>
<td>19.50</td>
</tr>
<tr>
<td>Orchestra</td>
<td>22</td>
<td>61.84</td>
<td>14.99</td>
</tr>
</tbody>
</table>

*Note.* All means are reported in terms of percentage correct.

**Table 15**

*Means ($M$) and Standard Deviations ($SD$) of Pretest Single-pitch and Multiple-pitch Total Scores Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Condition</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$N$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td><strong>Single-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>78.93</td>
<td>17.10</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>77.85</td>
<td>17.16</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>80.63</td>
<td>17.56</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>74.54</td>
<td>14.70</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>75.26</td>
<td>13.23</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>72.65</td>
<td>18.68</td>
</tr>
<tr>
<td><strong>Total Single-pitch</strong></td>
<td>67</td>
<td>76.57</td>
<td>15.88</td>
</tr>
<tr>
<td><strong>Multiple-pitched Etudes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td>31</td>
<td>73.51</td>
<td>18.95</td>
</tr>
<tr>
<td>Band</td>
<td>19</td>
<td>70.53</td>
<td>19.03</td>
</tr>
<tr>
<td>Orchestra</td>
<td>12</td>
<td>78.21</td>
<td>18.64</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>68.50</td>
<td>16.65</td>
</tr>
<tr>
<td>Band</td>
<td>26</td>
<td>68.61</td>
<td>17.56</td>
</tr>
<tr>
<td>Orchestra</td>
<td>10</td>
<td>69.01</td>
<td>14.85</td>
</tr>
<tr>
<td><strong>Total Multiple-pitch</strong></td>
<td>67</td>
<td>70.82</td>
<td>17.79</td>
</tr>
</tbody>
</table>

**Note.** All means are reported in terms of percentage correct.

**Table 16**

*Means* ($M$) and *Standard Deviations* ($SD$) of Posttest Single-pitch and Multiple-pitch

*Total Scores Reported by Treatment Group and Instrument (Band/Orchestra)*
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group (G)</td>
<td>1</td>
<td>1.03</td>
<td>.31</td>
<td>.02</td>
</tr>
<tr>
<td>Instrument (I)</td>
<td>1</td>
<td>0.32</td>
<td>.57</td>
<td>.01</td>
</tr>
<tr>
<td>Group X Instrument (GI)</td>
<td>1</td>
<td>0.94</td>
<td>.34</td>
<td>.02</td>
</tr>
<tr>
<td>Error (SS/GI)</td>
<td>63</td>
<td>(851.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test (T)</td>
<td>1</td>
<td>28.36</td>
<td>.00**</td>
<td>.31</td>
</tr>
<tr>
<td>Single/Multiple (SPMP)</td>
<td>1</td>
<td>37.72</td>
<td>.00**</td>
<td>.37</td>
</tr>
<tr>
<td>SPMP x I</td>
<td>1</td>
<td>1.48</td>
<td>.23</td>
<td>.02</td>
</tr>
<tr>
<td>SPMP x G</td>
<td>1</td>
<td>0.05</td>
<td>.83</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x G x I</td>
<td>1</td>
<td>0.91</td>
<td>.34</td>
<td>.01</td>
</tr>
<tr>
<td>T x I</td>
<td>1</td>
<td>0.00</td>
<td>.98</td>
<td>.00</td>
</tr>
<tr>
<td>T x G</td>
<td>1</td>
<td>1.07</td>
<td>.30</td>
<td>.02</td>
</tr>
<tr>
<td>T x I x G</td>
<td>1</td>
<td>0.16</td>
<td>.69</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T</td>
<td>1</td>
<td>15.28</td>
<td>.00**</td>
<td>.20</td>
</tr>
<tr>
<td>SPMP x T x I</td>
<td>1</td>
<td>0.13</td>
<td>.72</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T x G</td>
<td>1</td>
<td>0.01</td>
<td>.92</td>
<td>.00</td>
</tr>
<tr>
<td>SPMP x T x I x G</td>
<td>1</td>
<td>1.07</td>
<td>.31</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>63</td>
<td>(49.43)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Values in parenthesis represent mean square error.  
** $p < .01$

**Table 17**

2 (treatment/control) X 2(band/orchestra) X 2(pretest/posttest) X 2(single-pitch/multiples-pitch) Repeated Measures Analysis Of Variance on Total Scores
CHAPTER 5

CONCLUSION

Transfer refers to how previous learning influences current and future learning, and how past or current learning is applied or adapted to similar or novel situations. Transfer, then, isn’t so much an instructional and learning technique as a way of thinking, perceiving, and processing information. Therefore, it’s fundamental to all learning. Without it we couldn’t engage in our everyday thinking and reasoning nor even acquire the most basic of motor skills; transfer is responsible for the simplest of ideas and for the highest achievements of humankind. (Haskell, 2001, p. 23).

The purpose of this study was to examine the effectiveness of a series of transfer steps on the rhythmic performance abilities of beginning instrumentalists. This chapter is organized into (a) summary of research, (b) discussion of results, (c) recommendations for future research and (d) implications for teachers.

Summary of Research

The specific questions under investigation concerned the assessment of transfer of learning from rhythmic patterns by rote to reading those patterns while playing an orchestra or band instrument. The study was designed to assess the effectiveness of the Phillips’ method as a learning sequence that aids instrumental students in the acquisition of rhythm reading and performance accuracy.
The specific research questions that guided this inquiry were:

Question 1: Does an instructional sequence designed to develop rhythmic ability improve students’ performance of rhythmic patterns on orchestra and band instruments?

Question 2: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ ability to perform in sync with an imposed tempo?

Question 3: Does an instructional sequence designed to develop rhythmic ability improve band and orchestra students’ overall ability to perform rhythmic patterns (i.e., rhythmic performance and synchronization scores combined)?

Question 4: Are there differences between the control and treatment groups’ rhythmic performances of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 5: Are there differences between the control and treatment groups’ abilities to synchronize with an imposed tempo when performing multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?

Question 6: Are there differences between the control and treatment groups’ overall performances (i.e., rhythmic performance and synchronization combined) of multiple-pitched rhythmic patterns versus single-pitched rhythmic patterns?
Study Design

Subjects in the study ($N = 67$) were children who were beginning fifth-grade instrumental students. Students in the band and orchestra classes were randomly assigned to control or treatment groups. After the fifth week of the study period, all of the participants were audio-recorded as they performed the researcher-designed pretest. The pretest (and identical posttest) consisted of eleven four-measure etudes. Four etudes were composed using up to four different pitches. The remaining seven etudes were to be played on a single pitch. At the completion of the treatment period students were audio-recorded as they performed the posttest.

During rhythm lessons conducted by the investigator, students in the control group clapped, moved rhythmically, or chanted rhythm patterns in a call-and-response format, and performed rhythm patterns as presented on flash cards by chanting Kodaly syllables. Students in the experimental group participated in identical activities for the first half of the study. During the second half, students in the experimental group used their instruments to play their responses to the teacher’s call-and-answer, and to perform rhythm patterns as presented on flash cards. Students in the treatment group were asked to perform on a single pitch, as well as on multiple pitches during the treatment phase of the study.
Summary of Results

In the scoring process, judges were asked to rate:

1. The student’s ability to perform the correct rhythm pattern apart from his/her ability to synchronize;

2. The student’s ability to synchronize his/her performance with rhythmic accompaniment.

For each measure, judges assigned one point if the student was in sync, and zero points if the student was not in sync with the pulse of the background music. After they had scored the student on ability to synchronize, judges were asked to listen to the performance a second time, and to use a four-point rubric to assess the rhythmic accuracy of the performance apart from the ability to synchronize. It was the investigator’s intention to determine (to the extent possible) whether the student could perform the excerpt correctly and in sync, could not synchronize to the imposed pulse, or could not perform the pattern.

Consequently, for each test there were scores for synchronization, pattern performance accuracy, and a composite score (i.e., total) combining the two. Further, to analyze students’ ability to perform single-pitch versus multiple pitch etudes, scores were divided accordingly.

The analysis of question one revealed significant pretest to posttest gain scores, but no significant main effects for treatment or primary instrument, nor interaction
effects. Based on these findings, the addition of transfer steps did not significantly affect student’s overall ability to perform rhythmic patterns accurately. Since students in both groups showed significant gain scores from pretest to posttest in several of the analyses, it appears that in this particular study, use of the instrument was not an integral part of student learning.

Due to the long duration of the study (January through May), and the ongoing participation of all subjects in band or orchestra lessons, rehearsals, and general music classes, it was impossible to control all exposure to rhythm instruction. Therefore, some portion of the gain scores must be considered the result of maturation, or instruction received outside of the study groups.

The analysis of question two revealed significant pretest to posttest gain scores, but no significant main effects for treatment or primary instrument, nor any interaction effects. The treatment group’s posttest synchronization scores were greater than the control group’s scores by a margin that did approach significance ($p = .06$), however. Based on these findings, the addition of transfer steps did not significantly affect student’s overall ability to perform rhythms in sync with an imposed tempo, however the aforementioned result may merit further investigation.

In response to question three analysis once again showed significant pretest to posttest gain scores, but no significant main effects for treatment or principal instrument, no interaction effects. Based on these findings, the addition of transfer steps did not significantly affect student’s overall performance of rhythm patterns.

Questions four, five and six revealed several points of interest, where several repeated and consistent significant differences were found. The analysis of question four
found that all groups made significant pretest to posttest gains on both single-pitched and multiple-pitched etudes. However, the four-way repeated measures ANOVA revealed two further differences in greater depth: All subjects scored significantly better on the rhythm pattern accuracy of single-pitched versus multiple-pitched etudes, and the pretest to posttest gain scores were significantly higher on multiple-pitched rhythms than single-pitched rhythms across all groups. All students made tremendous gains in their ability to accurately perform melodic rhythms.

This finding is encouraging. It may suggest that the Phillips’ method is an effective learning sequence that aids instrumental students in the acquisition of rhythm reading and performance accuracy on melodic material. As there were no significant interactions between groups, however, its efficacy in improving student’s application of rhythm skills to orchestra and band instruments cannot be supported by this study.

Similar findings were discovered in response to question five. Consistent with the findings for question four, the students in all groups were significantly better able to synchronize their performances on the posttest versus the pretest, and all subjects (treatment and control, band and orchestra) scored significantly better on the synchronization of single-pitched versus multiple-pitched etudes.

Similarly, as was found in the analysis of question four, all subjects pretest to posttest synchronization gain scores were significantly more dramatic on multiple-pitched rhythms than single-pitched. All students made tremendous gains in their ability to synchronize their performance of melodic rhythms. (To see these results more easily, refer to the graphs in Figure 1, 2 and 3). Once again, there were no significant differences attributable to treatment or primary instrument.
The findings for question six were consistent with those for questions four and five. There were no significant differences attributable to primary instrument, students in all groups earned significantly better total scores on their performances of single-pitched etudes versus multiple-pitched etudes, pretest to posttest total gain scores were significantly more dramatic on multiple-pitched rhythms than single-pitched, and all groups made significant pretest to posttest gains. Again, there were no significant differences because of treatment, alone.

Discussion

The pronounced significant gains made by all students in the performance of melodic rhythms are perhaps the most enticing findings in this study. In most performing ensemble classes, teachers attempt to guide students toward independent musicianship. Certainly this term can be widely defined, but most music educators would agree that the ability to read and perform melodic rhythms in sync with an imposed tempo is a foundation skill that students must acquire. The findings of this study suggest that the Phillips’ method, as a whole, is effective in accomplishing this goal at the elementary level of instrumental music instruction. The present study cannot confirm whether the Phillips’ method specifically aids students in the application of rhythm skills on their orchestra or band instruments.

The significant gain scores of students in both the treatment and control groups are encouraging. While some portion of the gains must be attributed to maturation, these findings may also again suggest that the Phillips’ method is effective. It may be that the entire series of steps helps students understand and perform rhythm patterns on their
instruments, and that a distinct dividing line between activities with and without the instrument may not exist. Results of this study show no such division between groups at the elementary level as tested.

It could be argued, given the significant gain scores in all groups, that the Phillips’ method effectively develops rhythmic performance skills in its entirety—without an arbitrary division between using the instrument or not. If so, this study would seem to suggest that the Phillips’ method could be incorporated effectively into the elementary band or orchestra rehearsal, with or without instruments at the director’s discretion, based on the desired outcome. Further research with somewhat more advanced students is required to determine whether the treatment group would significantly outperform the control group on more demanding musical examples, or a control group using some other method.

Etudes in the researcher-constructed test used for this study were kept deliberately simple with respect to moving pitches. Etudes were composed using only the first four pitches introduced in the students’ method books. Four etudes were composed using up to four different pitches. The remaining seven etudes were written using a single pitch. Further research focused specifically on multiple-pitched etudes is required. Would further significant differences between the treatment and control groups be found if the test were comprised exclusively of melodic rhythm etudes?

At the elementary level of rhythm reading, students appear to be capable of significant gains with or without the instrument. The question whether or not these results would stand as students progress to more demanding musical examples remains to be answered. As no student received a perfect total score, there was no ceiling effect in
the present study. However, as will be discussed below, it is possible that the test used
was not sensitive enough to pick up further differences.

Recalling the findings of studies presented in the review of literature, the Phillips’
method provides an efficient combination of many factors (movement, consistent syllable
system, rote-to-note approach, rhythmic experience through multiple modalities, and
teacher modeling) shown to affect students’ rhythmic performance abilities positively.
The stepwise progression and repeated practice using multiple examples employed by the
Phillips’ method is consistent with recommendations made by Haskell:

If there’s one instructional method in the transfer literature that’s
agreed upon by just about every practitioner and researchers to
promote transfer, it’s the use of numerous examples. Study after
study clearly shows that students who are provided the
opportunities to study examples of a problem do better than
students who are merely given the opportunities to work out a
given problem. (Haskell, 2001, p. 15).

Another important, if anecdotal, point should be noted regarding the Phillips’
method. Students are engaged by the activities as presented and described in this study.
During the field visit of the investigator to Phillips’ classroom in Saline, students were
observed to be on task, and highly motivated to perform the activities led by Philips. It
can certainly be said that Phillips’ is a very charismatic and engaging instructor, but the
success of the teaching sequence is not unique to him personally. The investigator found
a similarly high degree of on-task behavior by students throughout the course of the
lessons presented in this study. The progression from one step to the next appears to be
engaging and challenging to students. They required little or no prompting to participate,
and seemed to do so willingly and eagerly. The use of the drum-machine or lively
background music, as opposed to a metronome, was perceived by many students as attractive and fun.

Perhaps some of the gain shown in this study might be attributed to the students’ willingness to interact with the teacher in this manner, thus more thoroughly taking in the information and experiences presented. A high degree of motivation, energized by success and praise characterize this learning sequence. Students, in chance encounters with the investigator, have repeatedly volunteered that they found participation in the rhythm classes “really fun.” While student perception of “fun” or “boring” cannot drive the development of school curriculum, willing learners are a necessary component of student achievement and the relative success or failure of any teaching method.

**Recommendations for Further Research**

In future research, the use of the bow should be carefully examined. At the level tested, the students in the orchestra did as well as those in the band. However, the wide margins found between the orchestra treatment and orchestra control groups were noteworthy if not significant. Findings at least alluded to the idea that the division between using the instrument (treatment) and not (control) during rhythm activities had more effect on string players than on winds, brass or percussion. In this study, demands on the use of the bow were kept deliberately simple. Students needed only the most basic, beginning bow stroke on a single string. Increasing right-hand complexity with string crossings and slurs challenges a string student’s ability to perform rhythmically in ways that will not similarly affect band students. The left and right hands of a string student are engaged in two very different tasks while playing, where the hands of wind, brass, and
percussion players perform more similar movements. For string students, a knowledge of, and experience with bow distribution is necessary for the accurate performance of more challenging rhythm patterns. Much helpful research could be conducted to help discover key teaching strategies in this area.

A standardized melodic-rhythm test designed for this age level would be a most useful tool in music education. The Watkin’s-Farnum Performance Inventory (WFPI) is the only test of this kind. Unfortunately, the difficulty level of the WFPI made it inappropriate for beginning instrumental students. Teachers who had access to a well-designed test of rhythmic performance skills would have a valuable assessment tool with which to measure student learning and teacher performance.

The teacher-designed test used for this study contained seven exercises performed on a single pitch, and four exercises performed on multiple pitches. In future research, a test comprised of all multiple-pitched exercises, more closely resembling the real performance demands of standard band or orchestra literature, would be of interest. Perhaps the test could be designed to gradually increase in difficulty as the student progressed through the etudes. Since students must become skilled at playing rhythm patterns on multiple pitches as they perform with their band and orchestra, it would be interesting to see how the treatment and control groups would perform.

During recording sessions the researcher observed that the ability to play in sync with the background music declined steeply for many students when the example contained moving pitches as compared to single-pitched examples. This seemed to be true despite the significant improvement in the multiple-pitch scores. Would the transfer steps outlined in this study make a significant difference in students’ abilities to
accurately perform multiple-pitched examples while synchronizing their efforts with the metronome? The test used for this study was most likely not sensitive enough in this area to answer the question. A similar test comprised entirely of multiple-pitched examples might have proven a more effective measurement tool.

It would also be interesting to see similar research done with slightly older children. Second and third year players would allow for a wider range of difficulty in test construction, and may allow for potential effects to occur. Complications occurred in the present study when fatigue became a factor for some wind and brass students. Regardless of their level of comprehension, some students’ breath control failed and their embouchures became exhausted before the entire test was completed.

**Implications for Teachers**

Rhythm is the organizing principle of musical performance. Rhythm is what makes music move. Rhythm is what holds music together. We learn rhythm best by listening and by moving. The ability to synchronize movement with music is an important prerequisite to the development of music listening, reading, writing, and performance skills. Moving well to music is also an aesthetic experience. (Froseth & Weikart, 1981, forward).

The research reviewed for this study provides various perspectives on the many facets involved in the complex task of teaching rhythm performance skills. An effective teaching sequence involves a combination of: rhythmic movement, an emphasis on rhythm pattern recognition through practice with multiple examples, a sound-before-symbol approach, guiding students to synchronize their efforts to a steady pulse (background music or metronome) within an appropriate tempo range, the use of a consistent syllable system, presenting rhythmic experiences through multiple modalities,
and teacher modeling. Each of these components, as revealed in the review of literature, has been shown to affect students’ rhythmic performance abilities positively.

Improving students’ abilities to perform rhythm patterns accurately and in sync with the other musicians in an ensemble involves consistent and repeated opportunities to practice the skills that we are asking of them. In order to perform a wide range of rhythm patterns accurately over a wide range of tempi, students must first develop an equally wide knowledge base through experience. The Phillips’ method is a compact, efficient pedagogical strategy, demonstrated to be effective in the significant gain scores shown in this study. The Phillips’ method can readily be incorporated into a few minutes of each rehearsal period. Teachers should use the principles outlined to ensure student success with orchestra or band literature; prepare the required rhythm patterns, time signature, and stylistic features (hooked bowing for example) before the students’ encounter them in literature. Then, one should remind students to use what they know.

Establishing a consistent, common musical language with students is a key element to consider. No syllable system has shown itself to be significantly more effective than another. In the Hastings Public Schools, the elementary music specialists teach the Kodaly system in grades K-5. For that reason, the researcher chose to use the Kodaly system in implementing the Phillips’ method. The Phillips’ system uses Du-de, Du-de, but agrees that any consistent system is applicable). By utilizing a consistent, common system, the researcher needed only to remind students of what they knew. When met with blank stares, the researcher would ask, “What did you call this pattern in Mrs. Amundson’s (the music specialist’s) room?” To which most replied, “Ta, ta, ti-ti ta!” When the researcher told the class that the syllables in orchestra (or band) were the
same, the reaction was visible: Students did not necessarily assume this was so. The information was clearly received by many as an “Ah-ha” moment. This is something practitioners should note, as some may have passed over such discussion as too obvious to require mention. According to Edwards, transfer can occur when we simply remind students to make transfers. The teacher must remind students to use what they already know to solve problems in similar situations. (Edwards. See Fowler, 1988, p. 135).

In implementing the Phillips’ method, a set of flashcards, and a drum-machine or a stereo are useful tools. A practitioner may use a metronome, or a simple set of claves will suffice, where the other devices are unavailable. Once students have progressed to more advanced skills, the principles outlined in the Phillips’ method can be practiced using rhythm studies on scale pitches and in melodic patterns, readily available in several published method books. The Phillips’ method can also be used with short segments of the literature being studied.

Instrumental music educators must give serious consideration to common classroom practices where rhythm skills are concerned. Suzuki and Gordon have both written extensively on the idea that music learning is analogous to a child’s acquisition of language. A child first hears, then learns to speak his or her native language. Knowledge of the rules of grammar and spelling come after much of the spoken language has been developed. For instance, we would not begin to chant “C-A-T” from the blackboard with children who had not first heard and spoken the word “cat.” The counting lessons we conduct from the blackboard, however, might be considered similar practice. Why is this clear to us in the example of the English language, but not so in the acquisition of musical language? Gordon states:
Consider the letters of the alphabet in language. When used in isolation, they relate primarily to spelling and writing a language and are not designed to assist us in listening to and understanding speech or in reading words. Similarly, the names of individual notes are the alphabet of music. Note-value names simply serve in learning to notate music, but they contribute little, if anything, to the audiation process or to reading rhythm patterns as opposed to reading a series of isolated notes. Just as students with satisfactory readiness should perform to learn, not learn to perform, they should read to learn, not learn to read. (Gordon, 2000, p. 4).

Haskell concludes ominously:

Based on my reading of the transfer research and from my years of teaching experience, I have come to believe this: Unless schools create cultures of transfer, teach about transfer, and instill a spirit of transfer, requiring a well-learned knowledge base, and practice and drill of some systematic sort, teachers can adopt any instructional method they like in the classroom but, with few exceptions, neither significant learning nor significant transfer will take place. (Haskell, 2001, p. 186).

When developing rhythm performance skills is the goal, the researcher strongly advocates that instrumental music educators move away from the blackboard (e.g. theoretical, notational, mathematical) discussion strategy. This assertion is based on the compilation of research presented here, where effective strategies have been shown to include rhythmic movement, an emphasis on rhythm pattern recognition through practice with multiple examples, a sound-before-symbol approach, guiding students to synchronize their efforts to a steady pulse (background music or metronome) within an appropriate tempo range, the use of a consistent syllable system, presenting rhythmic experiences through multiple modalities, and teacher modeling. Gordon states:
Few musicians would deny that what students have been and are typically being taught about rhythm hinders their musical development; however, few teachers realize the enormous difference between being told about rhythm and learning to perform rhythmically. (Gordon, 2000, p. 2).

Further,

Rhythm is movement and cannot be understood apart from movement as it interacts with breathing. Thus, rhythm, movement and breathing are inseparable. Rhythm must be felt—it only begs the question to intellectualize about it. (Gordon, 2000, p. 2).

And finally,

It should be clear that when rhythm is taught in terms of music theory and notation apart from movement, the appeal is divorced from the experience itself and rests solely with time and the brain. As a result, there is no alternative but to teach counting, note values, and definitions, as they relate to notation. And that leads to emphasizing the relative time-values of individual isolated notes rather than the collection of durations that take on musical meaning. (Gordon, 2000, p. 3).

While there is a legitimate need for students to know the proper terminology for the symbols that make up music notation, we must give serious thought to when and where such discussions might be most effective. It is the writer’s assertion that educators should not discard the practice of presenting notation, terminology, and music theory as a part of our curriculum. We must, however, turn away from the blackboard, as too often our instruction begins there and ends there. Our emphasis must not be on telling our students about music. Let us spend what precious time we have making music.
REFERENCES


December 15, 2003

Dear Parent,

Beginning in January, I will be conducting a research study, under the direction of Dr. Robert Gillespie, with the fifth grade band and orchestra students. The study will compare two methods of teaching rhythm reading to beginning instrumental students. It is my hope that this project will help determine which method is most effective in developing young orchestra and band students’ performing abilities. In particular, this study will focus on areas of transfer of learning—in other words, helping students better apply what they have already learned in new circumstances.

Participation in the research project will consist of attending short instruction sessions that will be held during the student’s normal band and orchestra rehearsal time. At the beginning and at the end of the study, I will ask students to meet with me individually to record some examples of their playing.

Participation in the study will not hurt your child in any way, and all of the data I collect will be kept confidential. For example, no student will be identified in the research report. All student names are removed from any forms, recordings, or any materials that could potentially identify an individual to any one other than myself.

If you have any questions or wish to know more about this study, please do not hesitate to contact me. This study is being conducted as a part of the requirements for my dissertation and the completion of my PhD in music education.

Thank you for your help and serious consideration!

Andrea Olijnek
Orchestra Program Director
Hastings Public Schools
APPENDIX B

PERMISSION TO PARTICIPATE

CONSENT FOR PARTICIPATION IN SOCIAL
AND BEHAVIORAL RESEARCH

THE EFFECTS OF SPECIFIC TRANSFER ACTIVITIES ON FIFTH GRADE
ORCHESTRA AND BAND STUDENTS’ RHYTHMIC PERFORMANCE

Protocol number: 2003B0256

Principal Investigator: Dr. Robert Gillespie

I consent to my child’s participation in research being conducted by Dr. Robert Gillespie of The Ohio State University and his assistant and associate, Andrea Olijnek.

The investigator has explained the purpose of the study, the procedures that will be followed, and the amount of time it will take. I understand the possible benefits, if any, of my child’s participation.

I know that I can choose not to participate without penalty to my child. If I agree to participate, my child can withdraw from the study at any time, and there will be no penalty.

I consent to the use of audiotapes and/or videotapes. I understand how the tapes will be used for this study.

I have had a chance to ask questions and to obtain answers to my questions. I can contact the investigators at The Ohio State University. If I have questions about my rights as a research participant, I can call the OSU Office of Research Risks Protection.
I have read this form or I have had it read to me. I sign it freely and voluntarily. A copy has been given to me.

**Print the name of the participant:**

______________________________________________________

Date: __________________________

Signed: __________________________

(Participant)

Signed: __________________________

(Principal Investigator or his authorized representative)

Signed: __________________________

(Person authorized to consent for participant, if required)

Witness: __________________________

(When required)
APPENDIX C

JUDGING INSTRUCTIONS

Dear Judges,

The CDs in this package are the final data gathered for my dissertation. The study was designed to investigate the role of transfer of learning in the development of an instrumentalist’s rhythmic performing skills. You, as a panel, had a very high degree of agreement on the pilot test. Please be as consistent as possible, using the standards and decisions you made in the pilot.

Please use a separate copy of the test/score sheet for each student. Put the student’s number on the top sheet in the blank provided. Please use the correct sheet for each type of instrument.

Scoring: For every example played, please answer these two questions:

Does the student perform the rhythm patterns accurately?

Can the student play the rhythm patterns accurately AND in sync with the background music (which functions as a metronome)?

The measure will be the unit scored. Each example is four measures in length.

For every measure, score 1 point if the student is in sync, and 0 if the student is not in sync with the pulse of the background music. This should be a yes or no response. For items that are questionable, make your decision based on your knowledge of fifth grade music making. I recommend putting the 1s and 0s above each measure on the test/score sheet as you listen. This will also help me identify any measures that stand out as problem spots on the test. If a measure is played incorrectly, whether the student is in sync or not, score 0. I am not investigating the accuracy of the pitches in the pitched rhythm section. Disregard any problems with intonation or accurate pitch, and focus solely on the rhythmic performance.

After you have scored the student on their ability to synchronize, listen to the example a second time. Using the following scale, score the student on the accuracy of
their performance APART from their ability to synchronize. Your scores may be put on the same score sheet.

Each measure should be assigned one of the following scores:

3 Points = The measure is accurate as performed. (Recall that we are judging by the standards reasonably applied to fifth graders. Consistence is the important aspect to maintain).

2 Points = The rhythm pattern is mostly accurate, but rhythmically unstable.

1 Point = The rhythm pattern is so rhythmically unstable it is barely recognizable.

0 Points = The pattern is unrecognizable.

Please place your total score (add up everything) on the blank provided. If you have any questions or problems, please contact me. When you have finished scoring, I would very much appreciate hearing your feedback about the test and the scoring process. Please return your data to me on or before September 1. I recognize that this will be a significant time commitment from each of you—for which I am very grateful.

Thanks so much!
APPENDIX D

FIELD NOTES

Session Log

- **Tuesday 1/6:** Orchestra session #1. All students together. 6 min. movement activities—clapping together and echoes. Marching and clapping.

- **Monday 1/12:** Band session #1. All students together. 6 min. movement activities—clapping together and echoes. Marching and clapping.

- **Tuesday 1/13:** Orchestra session #2: Continue movement, clapping, marching, tapping in palms. Echo clapped the following patterns (no notation):

  Ta ta ta ta  
  R titi R ta  
  Titi ta R R  
  Ta-o ti-ti ta  
  Titi titi ta-o  
  Titi ta titi ta  
  R Ta-o-o  
  Titi titi titi ta  
  Ta-o ta ta  
  Titi titi titi titi titi  
  Ta ta ta-o  
  Ta ta titi ta

- **Monday 1/19:** No Band session due to Martin Luther King holiday.

- **Tuesday 1/20:** No Orchestra session due to Martin Luther King holiday.

- **Monday 1/26:** Band session #2, same as Orchestra session #2 above.
• **Tuesday, 1/27:** Orchestra session #3. Clapping, echo clapping, chanting, echo chanting by rote. Echo chanting with flashcards (notation visible). Students look and chant (reading flash card). Patterns included:

<table>
<thead>
<tr>
<th>Ta ta tika tika ta (new)</th>
<th>Ta ta titi ta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ta-o ta ta</td>
<td>Titi ta R R</td>
</tr>
<tr>
<td>Ta ta ta-o</td>
<td>Ta ta ta ta</td>
</tr>
<tr>
<td>Tika titi ta-o (new)</td>
<td>R Ta-o-o</td>
</tr>
<tr>
<td>Titi titi titi ta</td>
<td>Titi titi ta-o</td>
</tr>
<tr>
<td>Ta titi ta titi (new)</td>
<td>Ta-o titi ta</td>
</tr>
<tr>
<td>Ta ta-o ta (new)</td>
<td>R titi R ta</td>
</tr>
<tr>
<td>Ta R ta R (new)</td>
<td>Titi ta titi ta</td>
</tr>
<tr>
<td>Ta R R ta (new)</td>
<td></td>
</tr>
</tbody>
</table>

• **Monday 2/2:** No Band session due to snow day.

• **Tuesday 2/3:** No Orchestra session due to snow day.

• **Monday, 2/9:** Band session #3 same as orchestra session #3 above.

• **Tuesday 2/10:** Orchestra session #4. Chanted and clapped “teacher directed” items from test—by rote, and then reading together. Began pretest recordings. Split into control and treatment groups next session.

• **Monday 2/16:** No Band session due to President’s Day holiday.

• **Tuesday 2/17:** Orchestra session #5. Broke into treatment and control groups by giving students either a red (control) or blue (treatment) card. Treatment group chanted patterns listed for sessions 2 & 3. No new patterns introduced. Air bowing while chanting, echoed the teacher playing familiar patterns with the bow on open D. Read familiar patterns and played with the bow on open D.

  Control group clapped familiar patterns, marched in place while chanting familiar patterns, read patterns and chanted. Teacher clapped patterns—students said syllables in response. Teacher chanted familiar patterns—students clapped in response. Continuing pretest recordings.

• **Monday 2/23:** Band session #4. Chanted and clapped “teacher directed” items from test—by rote, and then reading together. Began pretest recordings on 3/3. Split into control and treatment groups next session.

• **Tuesday 2/24:** Orchestra session #6. Treatment and control groups. Treatment group chanted, then played 4-measure patterns on open D. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure).
Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

Patterns include all of the following—drawn at random:

- Ta ta tika-tika ta
- Ti-ti ti-ti ti-ti ta
- Ta ti-ti ta ti-ti
- Tika-tika ti-ti ta-o
- Ta R R Ta
- Ta ta ti-ti ta
- Ti-ti ta ti-ti ta
- Ta ta ta ta
- R ti-ti R ta
- Ta-o ta ta
- Ta ta ta

- **Monday 3/1:** Band session #5. Broke into treatment and control groups by giving students either a red (control) or blue (treatment) card. Treatment group chanted patterns listed for sessions 2 & 3. No new patterns introduced. “Sizzled” each pattern—hissing air through the teeth as if playing an instrument, echoed the teacher hissing patterns while pretending to hold a band instrument, blowing into it. Read familiar patterns and chanted or sizzled in response.

  Control group clapped familiar patterns, marched in place while chanting familiar patterns, read patterns and chanted. Teacher clapped patterns—students said syllables in response. Teacher chanted familiar patterns—students clapped in response. Continuing pretest recordings.

- **Tuesday 3/2:** Orchestra session #7. Continuing practice. Treatment group chanted, then played 4-measure patterns on open D. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure). Added left hand pitches so that one card was played on D, the next on E, the next on D, and the last on E.

  Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

- **Monday 3/8:** Band session #6. Treatment and control groups. Treatment group chanted, then played 4-measure patterns on concert B-flat using band instruments. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure).
Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

Patterns include all of the following—drawn at random:

- Ta ta tika-tika ta  
- Ti-ti ti-ti ti-ti ta  
- Ta ti-ti ta ti-ti  
- Tika-tika ti-ti ta-o  
- Ta R R Ta  
- Ta ta ti-ti ta  
- Ti-ti ta ti-ti ta  
- Ta ta ta-o  
- R ti-ti R ta  
- Ta-o ta ta  
- Ta ta ta

**Tuesday 3/9:** Orchestra session #8. Treatment played teacher-directed exercises on their instruments. Control clapped and chanted teacher-directed exercises using syllables.

**Monday 3/15:** Band session #7. Continuing practice. Treatment group chanted, then played 4-measure patterns on open B-flat. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure). Added pitches so that one card was played on B-flat, the next on C, the next on D, and the last on E-flat.

Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

**Tuesday 3/16:** Orchestra session #9. Continuing practice. Treatment group chanted, then played 4-measure patterns on open D. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure). Added left hand pitches so that one card was played on D, the next on E, the next on F-sharp, and the last on G.

Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

**Week of March 22:** Spring break. Band recordings finished on 3/29 as a result of break and testing in students’ regular classes.
• **Monday 3/29:** Band session #8. Continuing practice. Treatment group chanted, then played 4-measure patterns on open B-flat. Patterns were created by drawing four cards at random from the stack of flashcards. (Each card = one measure). Added pitches so that one card was played on B-flat, the next on C, the next on D, and the last on E-flat.

Control group chanted, clapped, and marched, performing similar 4-measure patterns by drawing cards at random. No references made to playing the instruments.

• **Tuesday 3/30:** Orchestra session #10. Treatment played teacher-directed exercises on their instruments. Control clapped and chanted teacher-directed exercises using syllables.
Violin Test Items

Etude 1: Prepared with teacher help.

Etude 2: Sight reading.


Etude 4: Self-directed.

Etude 5: Prepared with teacher help.

Etude 6: Self-directed.
Etude 7: Sight reading.

Etude 8: Self directed.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.
Viola Test Items

Etude 1: Prepared with teacher help.

Etude 2: Sight reading.


Etude 4: Self-directed.

Etude 5: Prepared with teacher help.

Etude 6: Self-directed.
Etude 7: Sight reading.

Etude 8: Self directed.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.
Cello Test Items

Etude 1: Prepared with teacher help.

Etude 2: Sight reading.


Etude 4: Self-directed.

Etude 5: Prepared with teacher help.

Etude 6: Self-directed.
Etude 7: Sight reading.

Etude 8: Self directed.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.
Flute or Oboe Test Items

Etude 1: Prepared with teacher help.

Etude 2: Sight reading.


Etude 4: Self-directed.

Etude 5: Prepared with teacher help.

Etude 6: Self-directed.
Etude 7: Sight reading.

Etude 8: Self directed, student prepared.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.
Trumpet or Clarinet Test Items

Etude 1: Prepared with teacher help.  

Etude 2: Sight reading.  


Etude 4: Self-directed.  

Etude 5: Prepared with teacher help.  

Etude 6: Self-directed.
Etude 7: Sight Reading.

Etude 8: Self directed.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.
Trombone Test Items

Etude 1: Prepared with teacher help.

Etude 2: Sight reading.


Etude 4: Self-directed.

Etude 5: Prepared with teacher help.

Etude 6: Self-directed.

126
Etude 7: Sight Reading.

Etude 8: Self directed.

Etude 9: Sight reading.

Etude 10: Sight reading.

Etude 11: Sight reading.