

**The Effects Of Length Of Instruction On  
Rhythm-Reading Learning And Retention**

by

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## ABSTRACT

This study analyzed the effectiveness of instructional time on rhythm-reading learning and retention. Second-grade students ( $N = 128$ ) received either five-minutes or ten-minutes of rhythm-reading instruction using techniques from Feierabend's (2001) *Conversational Solfège* and practice during regularly scheduled weekly music class. After three consecutive weeks of treatment, students were individually administered posttest one. Two weeks pass without any instruction or review on rhythm-reading. Posttest two was individually administered. Results from posttest one suggest five-minutes ( $p < .001$ ) and ten-minutes ( $p < .001$ ) of instruction is effective. A Univariate ANOVA was conducted and revealed no statistical significance between the groups ( $p = .421$ ). Posttest two revealed students were able to retain rhythm-reading skill ( $p < .001$ ) and grouping was not statistically significant ( $p = .244$ ).

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## **CHAPTER 1**

### **INTRODUCTION**

#### **Statement of the Problem**

Music reading is an important topic for every music educator. Since making music or being a musician does not necessarily require one to possess music reading abilities, music specialists may question the necessity of teaching music reading (Gordon, 2012; Hodges, 1992; McPherson & Gabrielsson, 2002; Mills & McPherson, 2006). Though the National Standards for Music Education (NAfME, 2013) explicitly support teaching music reading in standard number 5, "Reading and notating music," questions remain regarding how and when music reading should be taught (Gudmundsdottir, 2010; Hodges, 1992; Hodges & Nolker, 2011; McPherson & Gabrielsson, 2002). Music educators are still experimenting to discover the most efficient and effective way to instruct students on reading music notation (Bobbitt, 1970; Demorest, 1998; Hodges & Nolker, 2011; Kuehne, 2010; Reifinger, 2006).

While there are several hundred studies on music reading, few are replicated or can be grouped together to formulate foundational conclusions on music reading skills (Hodges & Nolker, 2011). This is partially due to a lack of a theoretical underpinning regarding music reading (Lehmann & McArther, 2002). It seems natural to compare music reading research to language reading research; however, researchers caution against such comparisons (Gordon, 2012; Hodges, 1992; Hodges & Nolker, 2011). According to the National Reading Panel (2000), there are over 100,000 studies on language reading. When compared to the several hundreds of

studies on music reading, it is no surprise that music reading is lacking in a comprehensive theory; however, the research comparing music reading to language reading is still beneficial.

Mills and McPherson (2006) note some parallels that can be drawn between language and music reading development, such as the application of listening and speaking a language before reading and writing it. McPherson and Gabrielsson (2002) suggest application of the same process to music reading by first reading pieces already known by ear. Sloboda (2005) suggests eyes looking ahead of what is being played and reading patterns. He also notes practice and experience with symbolic reading improves playing predictable patterns, and these are key components to successful music reading. While such findings align with language reading development (National Reading Panel, 2000), a conclusive music reading theory is still absent, yet some music researchers have projected a music learning theory (Boardman, 1988a, 1988b, 1989; Gordon, 1971, 2012).

After several years of teaching music, Gordon (1971) introduced his music learning theory, giving a possible explanation of how people learn music. Music learning theory is the comprehensive process involved in teaching audiation (Gordon, 2012). Gordon (2012) contends that through understanding music, people “can learn to be tolerant of and appreciate many types of music” (p. 33) because meaning has been given to the music. Understanding the music begins with audiation, which is an ongoing “process of assimilating and comprehending (not simply rehearsing) music momentarily heard performed or heard sometime in the past” (Gordon, 2012, p. 3). Audiation can be taught through appropriate knowledge and experiences with parents and teachers collaborating to meet students’ individual needs. “The theory illustrates how the types and stages of audiation progress as students are exposed to music skills that interact with tonal and rhythm content and context in familiar and unfamiliar music” (Gordon, 2012, p. 93).

Furthermore, Gordon (2012) clearly delineates between method and technique. Method is why, what, and when to teach in addition to how students learn, while technique is how to teach. Specifically, techniques are the aids and activities used to achieve sequential objectives. As a result of extensive research, consecutive rhythmic and melodic learning sequences progressing from basic to complex are established, and classroom and performance activities should correspond with such learning sequences (Gordon, 2012).

Boardman (1988a) combines components of educational theorists and psychologists Goodman, Morris, Langer, Gardner, and Bruner to develop the generative learning theory, which is based on three assumptions: the whole is greater than its parts, reality is represented by symbols and symbol systems, and knowledge is to be expanded. Boardman (1988a, 1988b, 1989) emphasizes concept continuity in lessons and the value in teaching concepts, like notation, as they interact with the musical whole. This means the songs and activities selected to sing and play should contain the rhythmic, expressive, and melodic components to be learned. Concept sequencing should be carefully planned and implemented upon passing assessments of current skills, which supports Gordon (2012).

In the generative learning theory, Boardman (1988b) reminds readers of Bruner's (1966) modes of knowledge representation, and that people demonstrate knowledge through the enactive, iconic, and symbolic modes. The structure of the generative learning theory (1988a, 1988b, 1989) compliments Gordon's *Learning Sequences in Music* (2012). Although there are several theoretical suggestions for how to teach music, Costanza and Russell (1992) find no significant differences among methods, such as Gordon (2012) and Boardman (1988a, 1988b, 1989), and they conclude any method delivered by an active and capable teacher can be effective.

Wolf (1976) suggests a sight-reading theory that satisfies musicians and psychologists. After interviewing four professional musicians who are skilled sight-readers, the investigator devised a cognitive map with a seven-step explanation toward sight-reading. Excellent sight-readers read patterns of notes that are registered with either visual, auditory, or kinesthetic imagery. The type of imagery used varies among individuals. The sight-reader then seeks to match what is seen with familiar patterns stored in long-term memory. Matched information is then filtered into short-term memory, where chunks of information fill one of the seven slots of short-term memory. These information chunks send messages to the body parts that must engage to perform the music.

Wolf (1976) proposes unskilled sight-readers fill the seven slots of short-term memory with details more consistent with note-by-note readers instead of pattern readers. Verification of this theory was sought by interviewing four professional musicians that profess to sight-reading more slowly and deliberately and carefully analyzing the notation. The author further notes that the unskilled sight-reading subjects are better at memorizing music, and the skilled sight-reading subjects find memorizing music challenging; thus, he hypothesizes skilled sight-readers depend on short-term memory, while unskilled sight-readers favor exercising long-term memory. This sight-reading theory aligns with Ausubel's (1962) learning theory, specifically reception learning, yet it has not been empirically tested.

There is still a need for organizing the existing research and theory into a more comprehensive and clear system for both researchers and practitioners, and further research is warranted on music reading to help reach the goal of a comprehensive theory of music reading. Hodges and Nolker (2012) suggest future research efforts be engineered toward more basic research to better understand music reading processes, applied research in efficiency in teaching

music literacy, and “greater attention to connections between basic and applied research” (p. 80). This study will compare the length of instruction on the rhythm-reading of quarter notes and paired eighth notes with second-grade students.

### **Research Questions**

There are five research questions for this study regarding rhythm-reading instruction on quarter notes and eighth notes to second-grade students.

1. How effective is five-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
2. How effective is ten-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
3. Is there a difference on rhythm-reading achievement between students who received five-minutes of instruction and students who received ten-minutes of instruction?
4. After two weeks of no rhythm-reading instruction, will students retain rhythm-reading achievement?
5. After two weeks of no rhythm-reading instruction, is there a difference in rhythm-reading retention achievement between students who received five-minutes of weekly instruction and students who received ten-minutes of weekly instruction?

### **Significance of the Study**

Answers to these questions could assist elementary music teachers and private music lesson instructors with curriculum planning and implementation. Since specialists’ time with students is often limited, effective planning is crucial to optimize student development. In addition, the findings will add to the existing body of knowledge on music reading research to potentially aid in the solidification of a music learning theory.

## **Definition of Terms**

1. Rhythm-reading instruction – Explicit instruction of rhythmic notation and durational value
2. Melodic instruction – Explicit instruction of note location on a staff and its relationship to other locations on the staff
3. Sight-reading – When a musician is reading and performing a piece of music for the first time
4. Mnemonic or mnemonic devise – The use of an assigned verbal cue to speak rhythm patterns, such as “1 & 2 &,” “du du du-day,” “pie pie ap-ple pie,” and “ta ta ti-ti ta.”
5. Subdivision approach – A type of rhythm-reading instruction where smaller durational values for notes are taught by subdividing notes of longer durational value. This approach is often accompanied with “1 & 2 &” counting, where subjects speak aloud the mnemonics only where the note lies within the measure. The other mnemonics needed to sustain the note duration are thought silently.
6. Generative or additive approach – A type of rhythm-reading instruction where the smallest durational valued notes are taught first. Notes with longer durational value are added to the smaller units.
7. Length of instruction – The amount of time spent on rhythm-reading, melodic reading, or sight-reading instruction.

## **Limitations and Delimitations of the Study**

There are possible methodological limitations, limitations of the researcher, and delimitations for this study. Methodological limitations include sample size, lack of prior research with instructional time as a research variable, and self-reported data. The minimum

sample size for this study was 50, but 128 students are included. While there is a decent amount of research on music reading, the majority of it regards high school and middle school instrumental students. There is also a respectable amount research on high school choral students; however, the number research studies involving elementary-aged children is minimal, specifically second-grade students. The researcher is the subjects' music teacher, which could lead to bias. This study is delimited to students in the second-grade at the specific school in which this study occurred. In addition, students with a severe intellectual disability that come to music instruction with an aide were excluded from this study. The unique sample available for this study may not be generalizable beyond the specific population from which the sample is drawn.

### **Assumptions**

1. It was assumed that all respondents will give their best efforts on the pretest and posttests.
2. It was assumed that all respondents will participate to the best of their abilities in class activities.

### **Organization of the Study**

In closing, this study explores the amount of instructional time spent on rhythm-reading quarter notes and eighth notes on second-grade students. The next chapter contains the review of related literature. The remaining chapters look at the methods, analysis of the data, results, and conclusions.

## **CHAPTER 2**

### **REVIEW OF LITERATURE**

#### **Background**

Beginning in the late 1800s and continuing through today, musicians around the world realized music education's shortcomings and sought to improve music education by laying the foundation for methodological approaches. While Émile Jaques-Dalcroze, Carl Orff, Zoltán Kodály, Shinichi Suzuki, Edwin Gordon, and John Feierabend are separated by time and location, their philosophies and learning theories share the same ideals and overlap in some practices. All agree on music's unique aesthetic value, active learning through authentic experiences, and the importance of music education on individuals from childhood throughout life, yet there are variations in each pedagogical focus. While the instructional strategies are often used in elementary music classrooms, the music learning skills and sequencing are appropriate for teaching middle school, high school, and adult learners (Shehan, 1986).

Swiss music educator Émile Jaques-Dalcroze combined solfège, eurhythmics, and improvisation to develop musicianship in his students. This combination leads to a foundation of musicianship through inner ear development, an inner muscular sense, and creative expression. Dalcroze believed music learning required mental, physical, and emotional alertness, thus he encouraged his students to express music with their whole bodies (Mead, 1996). Dalcroze held training the body to physically respond to music creates neural connections in the brain to link



the mind and body (Shehan, 1986). The music and movement connection made by Dalcroze surfaces is many other music pedagogical approaches.

The Orff-*Schulwerk* approach implements imitation, exploration, improvisation, and creating through singing, speaking, playing instruments, and movement. Rhythm is the foundation to the Orff-*Schulwerk*, and active learning and participation builds upon rhythmic learning leading to the ultimate goal of improvisation. Developed by Germany's Carl Orff and Gunild Keetman, Orff found music and movement inseparable, acknowledging Dalcroze's contributions when he designed his music school, or *Schulwerk* (Shehan, 1986). The Orff-*Schulwerk* emphasizes active music making by participants in a non-threatening, cooperative environment (Warner, 1991).

The Kodály approach, designed by colleagues and students of Hungarian music educator Zoltán Kodály, uses folk music, singing, and solfège as the core of instruction for music literacy and development of the complete musician (Shehan, 1986). Melodic and rhythmic sequences are developmentally appropriate and increase in difficulty, and moveable-do solfège syllables, “ta” and “ti-ti” rhythmic syllables, and the pentatonic scale are used in this approach. The Kodály method credits the work of Dalcroze and implements rhythmic movement as a component of instruction. Preparation of a musical concept, a simple presentation of the concept, and repeated practice of the concept lead students to mastery (Choksy, 1981).

While the Suzuki approach is focused on instrumental instruction, Shinichi Suzuki's understanding of early instruction, listening experiences, performance technique, and motivation are relevant and valuable contributions to music education methodology (Mehl, 2009; Shehan, 1986). Suzuki called his approach the “Mother Tongue Method” based on how children learn language through repeated hearings and in an environment of love (Suzuki, 1969). Nurturing

musical instruction at a very young age through private and group lessons combined with parental involvement are key aspects of the Suzuki approach (Shehan, 1986). Modifications of Suzuki's techniques and his approach are applicable in other music learning settings.

Edwin Gordon has demonstrated a lifelong interest in the potential of individuals to learn music, music instruction content, and music learning sequences (Shehan, 1986). As a result of extensive research, Gordon claims "audiation," or inner hearing, is the key to music learning and understanding. Like the previous mentioned music educators, Gordon believes in a sound-before-sight and the role of movement in music learning and instruction. He has also written learning sequences for music instruction and created curricula for general and instrumental instruction (Gordon, 2012).

John Feierabend combines the philosophies of Kodály and Gordon to develop innate musicianship in his method called *Conversational Solfège* (Feierabend, 2001). This 12-step progression to music literacy begins with repeated hearings of age-appropriate American folk songs and chants using sequential rhythmic and melodic patterns. The 12-steps include imitation, decoding, improvising, and composing using the prescribed rhythmic and melodic patterns. Instructional techniques are provided in the front of the manual and include movement and repeated hearings, which provide flexibility in lesson delivery. Like Gordon and Suzuki, reading and writing music are the final stages of music learning and understanding (Feierabend, 2001).

Émile Jaques-Dalcroze, Carl Orff, Zoltán Kodály, Shinichi Suzuki, Edwin Gordon, and John Feierabend have made significant contributions in music education philosophies and share ideas in effective music instruction. Active music making experiences, movement, sound-before-sight, and music's aesthetic significance correspond among these prominent music

educators. While these men were separated by time and geographic locations, their philosophical similarities and interpretations support the universalism of music education (Shehan, 1986). Their contributions to music education are evident in today's music classrooms at every level.

While music literacy may not be a strategic component of each of these philosophies, it is still a fundamental element in music instruction. Music reading is a widely-researched area and encompasses melodic and rhythm-reading. Several studies accredit the effectiveness of solmization on melodic reading (Henry & Demorest, 1994; Cassidy, 1993; Killian, 1991). Melodic pattern instruction has also been found effective (Grutzmacher, 1987; MacKnight, 1975; Richardson, 1971; Henry, 2004).

Rhythm-reading research suggests explicit rhythm-reading instruction is effective for elementary, middle, and high school students in a variety of settings, including general music class, choir, and band (Agre, 1991; Anderson, 1981; Barnes, 1964; Bebeau, 1982; Boyle, 1970; Colley, 1987; Drake, 1968; Egbert, 1990; Fust, 2006; Gauthier & Dunn, 2004; Heim, 1973; Jetter, 1985; Kendall, 1988; Major, 1982; McCuiston, 1990; McDonald, 1991; Palmer, 1976; Pierce, 1992; Rogers, 1996; Stevens, 1992; Williams, 1987). Efficient instruction in rhythm-reading is important because music educators at every level have minimal time to impart maximum knowledge and understanding of music partnered with authentic musical experiences.

This remainder of this chapter provides an extensive review of the literature and research related to rhythm-reading instruction. Specifically, the chapter is divided into four large sections: approaches to rhythm-reading instruction, counting systems or mnemonics used in rhythm-reading instruction, demographical influences on rhythm-reading, and length of rhythm-reading instructional time.

## Approaches

There are several approaches to teaching music in general that include specific rhythm reading information. For clarification, information about and related research for these approaches are organized into several subheadings.

### Presentation Mode

Before rhythm-reading instruction begins, a theoretical question is posed. Should sound be presented before symbol, or should the symbol be presented with the sound? Traditional approaches are deductive, presenting the notation just before the sound is introduced, or the two are introduced simultaneously (Bebeau, 1982; Colley, 1987; Egbert, 1990; Fust, 2006; Gauthier & Dunn, 2004; Heim, 1973; Jetter, 1995; Kendall, 1988; Major, 1982; McCuiston, 1990; McDonald, 1991; Palmer, 1976; Persellin, 1992; Rogers, 1996; Shehan, 1987; Stevens, 1992; Williams, 1987).

Some approaches, such as Orff-*Schulwerk*, are inductive, where multiple experiences in speech, singing, rhythm, moving, and playing occur before notation is visually presented (Saliba, 1990). Research reveals both approaches can be successful (Bebeau, 1982; Egbert, 1990; Fust, 2006; Gauthier & Dunn, 2004; Kendall, 1988; Major, 1982; McCuiston, 1990; McDonald, 1991; Palmer, 1976; Persellin, 1992; Shehan, 1987; Stevens, 1992; Williams, 1987). The studies in this section are divided by elementary, instrumental, and choral settings.

**Elementary setting.** Shehan (1987) analyzed four presentation approaches, aural, aural-mnemonic, aural-visual, and aural-visual-mnemonic for rhythm-reading and short-term retention on novice second- and sixth-grade musicians. Forty-nine subjects were randomly assigned to combinations of mode and rhythm using the Graeco-Latin square design. Each subject had a 15-minute individual testing session where four 8-beat rhythms were presented through a recording

using one of the four modes. Subjects were asked to memorize the rhythm and perform the phrase on a woodblock. The researcher recorded the number of attempts each participant needed to play the rhythm correctly. Up to ten attempts were allowed.

Shehan's (1987) results show that presentation modes were quite different for rhythm-reading and short-term retention. The rhythm phrases and order of rhythmic presentation were not statistically significant. The best presentation mode for both grades was aural-visual-mnemonic. This mode reduced the number of attempts necessary for an accurate performance.

Persellin (1992) examined the role of learning modality presentation on rhythm pattern recall in a total of 105 first-, third-, and fifth-grade students who received regular music instruction from a specialist. Students were randomly assigned a learning modality of presentation: visual, aural, kinesthetic, or a combination of those modalities and were given 10 attempts to reproduce six rhythm patterns via clapping or tapping. The entire process took about 15-minutes per student. Persellin (1992) found the lowest score was the visual only presentation ( $p < .05$ ) for first-grade students. As a result, she suggested rhythmic experiences presented kinesthetically or aurally are more appropriate for first grade students. All other modalities and combinations were successful, yet none reached statistical significance. While presentation modality results from Persellin (1992) neither confirm nor refute Shehan (1987), the absence of a mnemonic possibly influenced results. Grade level, the presence or absence of a music teacher providing instruction, and performance modality are factors that may have contributed to the differences in presentation modality results.

Atterbury (1983) measured the effectiveness of three presentation modes of rhythms when used with 7- and 8-year old students ( $N = 40$ ) in North Carolina. Half of each age group was identified by state standardized testing as readers with learning disabilities. The other half

of each age group were children with normal reading achievement. The investigator individually administered 10 tests over two weeks, which included a set of three author-created rhythm perception tests, six author-created rhythm performance tests, and the rhythm section of the *Primary Measures of Music Audiation* (Gordon, 1979).

On the rhythm perception tests, 10 one-measure rhythms were recorded and presented in three ways: (1) tapped on a woodblock, (2) played on a piano, and (3) tapped on a woodblock with someone speaking “ta ti-ti” syllables. The rhythm performance tests contained the same three presentation modes as the perception tests (see 1, 2, and 3 above). The first three responses were join-in responses, while the last three responses were echoed. Statistical significance was reported on presentation mode with Scheffé post hoc tests indicating the tapped and spoken presentation as the best for both groups. Although the rhythms were not visually presented, the effectiveness of the aural-mnemonic approach used by Atterbury still support Shehan (1987), who found the aural-visual-mnemonic approach most effective.

McCuistion (1990) investigated the effectiveness of four music reading methods, specifically analyzing the isolation of melody and rhythm and the use of iconic and standardized notation. Four intact groups of first-grade students ( $N = 110$ ) were randomly assigned two four different treatment methods, while a fifth class served as the control. Classes met twice a week for 30-minutes per session for 16 sessions. The treatment occurred during the last three months of the school year. The control class studied timbre, whereas the four treatment groups received rhythmic and melodic reading instruction.

As previously stated, there were four treatment methods in McCuistion’s study. Method I taught rhythm and melody in the same class period and used standard notation. Method II taught rhythm and melody in the same class period, but notation began with iconic notation and

gradually shifted to standard notation. Method III taught rhythm and melody separately and used standard notation. Rhythm was taught during the first eight sessions, and melody only was taught during the last eight lessons. Like Method III, Method IV also taught rhythm and melody separately. Rhythm was taught only in the first eight sessions, and melody was taught during the last eight sessions. The difference Methods III and IV is the addition of iconic notation in Method IV. The icons were later transitioned to standard notation. A fifth group was used as the control and did not receive rhythmic or melodic reading instruction.

Following treatment, students were individually administered an investigator-constructed Tonal/Rhythmic Recognition posttest consisting of 36-multiple choice items. Students heard an aural stimuli and chose one of three notation choices that represented what was heard. Items one through 18 were played once, and items 19 through 36 were played twice.

ANOVA results indicate statistical significance between the control and experimental groups on the posttest,  $F(4, 105) = 12.89, p < .05$ . Statistical significance was not reached between experimental groups on posttest items that were played once, yet statistical significance was reached on posttest items played twice. Methods I and III scored higher ( $p < .05$ ) than Methods II and IV. McCuistion (1990) does not provide possible explanations for this difference, but she does recommend it as an area for further research. Regardless, these findings support Persellin (1992) that rhythm-reading instruction can be successful with first-grade children.

While McCuistion (1990) found the simultaneous presentation and separate presentations of rhythmic and melodic notations effective for first-grade students, Gordon (2012) recommended rhythm and melody being presented separately as part of his learning sequences. Gordon (2012) also emphasized rote learning of rhythmic and melodic patterns before their

visual presentation, which contradicts Shehan (1987). According to Gordon (2012), inner hearing, or audiation, is the key component to developing independent musicianship.

McDonald (1991) measured the effectiveness of Gordon's music learning theory versus the traditional "notation first" presentation in beginning recorder instruction. Twenty-seven third-grade students at a university laboratory school were randomly assigned into two groups: the Gordon group, and the traditional group. Demographic information and *Primary Measures of Music Audiation* (Gordon, 1979) scores were used to assess equality of groups. The investigator instructed both groups in learning five songs on the recorder. Sessions were 15-minutes weekly for 12 weeks.

The songs were presented from easiest to hardest melodically and rhythmically to both groups. The Gordon group learned the songs first through rote, learning the pitches and rhythms separately phrase-by-phrase. Pitches and rhythms were then combined and played on the recorder. The traditional group learned the songs by looking at the notation, marking phrases, determining the form, clapping the rhythm, saying pitch names while fingering, and then playing and singing the song. Posttests were administered during the last week of the semester. One posttest was the same music aptitude test used as a pretest. The other was an investigator-constructed performance test that was graded on a rating scale using three dimensions: melodic accuracy, rhythmic accuracy, and executive skills accuracy. The performance posttest was judged by the investigator and a separate judge experienced in music.

Statistical significance was reached between the Gordon group and the traditional group on rhythmic performance ( $p < .001$ ) and on the music aptitude test ( $p < .05$ ) in favor of the Gordon group. Analysis of the individual songs also supports the Gordon group learned the songs quicker and easier than the traditional group, yet both methods were effective in teaching



beginning third-grade recorder students. These findings indicate the rote presentation of the songs and the separate presentation of melody and rhythm were more effective than the notation first approach, which contradicts Shehan (1987) and McCuistion (1990). McDonald's (1991) findings align with Persellin (1992), who found the aural and kinesthetic approaches to rhythm effective in third-grade students.

Many presentation modes are successful in the elementary setting, and three studies focus solely on rhythmic presentation. Shehan (1987) found rhythms presented aurally, visually, and with a mnemonic enabled novice second- and sixth-grade students to reproduce the rhythm with the least attempts. Persellin (1992) presented rhythms either visually, aurally, and kinesthetically to musically experienced first-, third-, and fifth-grade students. First-grade students scored lowest on visual presentation, so presenting rhythms aurally or kinesthetically to these students is most appropriate. Statistical significance was not reached on any other mode, suggesting all modalities are appropriate for third- and fifth- grade children. Atterbury (1983) also studied presentation mode on first- and second-grade children identified through state standardized testing as readers with normal ability or readers with learning disabilities. She presented rhythms by tapping on a woodblock, playing on a piano, or tapping on a woodblock while saying "ta ti-ti." The tapping combined with mnemonics was most effective for both groups.

Presenting rhythm and melody simultaneously or separately is the focus of McCuistion (1990) and McDonald (1991). While both researchers found both presentations successful, McDonald (1991) found separating rhythm-reading and melodic reading more effective for third-grade recorder students. In addition, rhythms and melodies were learned by rote before notation was presented. McCuistion (1990) found the first-grade groups that learned rhythm and melody reading separately were more effective on identifying notation of aural posttest items played

twice. In conclusion, rhythms can be successfully presented in many ways in the elementary classroom.

**Instrumental setting.** Stevens (1992) questioned the effectiveness of Gordon's skill learning theory and a traditional approach on beginning wind students' abilities to play a song by ear. At a private, Christian school in Pennsylvania, 24 beginning band students in fourth-through ninth-grades took the *Music Aptitude Profile* (Gordon, 1965), which was used to assign students to one of two groups, the traditional group and then treatment group.

Students in both groups received one 20-minute instructional/treatment session each week for 20 weeks. Students in the traditional group received lessons by the investigator using the *First Division Band Method* book (Weber, 1968), which presents notation with sound. These students did not sing during lessons, but instead, they progressed through sequential exercises in the book on their instruments. Students in the treatment group were first taught to sing songs by ear, learned by rote, and to echo rhythms and tonal sequences suggested by Gordon (1977). These songs and sequences were later played on their instruments. Students were presented notation after familiar and unfamiliar sequences were aurally identifiable. Both groups could play in major and minor keys and were given assignments to practice at home.

After 20 weeks, students in both groups were individually administered a posttest. Students were given the first notes of "Bingo" and "The Farmer in the Dell" and given 10-minutes to figure out how to play each song on their instrument. The researcher recorded each performance, which was scored by the researcher and two independent judges. The researcher concluded that while the control group mean was higher neither method was superior ( $d = -0.143$ ); however, no actual  $p$ -value was provided. The researcher states these results imply unequal groups. Stevens (1992) also stated the inability to generalize results due to a possible

lack of a representative subject sample of the same aged population. While the study has several weaknesses, it does support that a traditional approach of music reading instruction and Gordon's learning sequences in a beginning band setting do not hinder a student's ability to play by ear.

Kendall (1988) investigated presentation approaches on rhythmic and melodic sight-reading in fifth-grade beginning instrumental students. Some subjects received an aural and kinesthetic, or modeling, approach ( $n = 42$ ), while others received an aural, kinesthetic, and visual, or comprehensive, approach ( $n = 34$ ). Specifically, the investigator questioned if there were advantages to teaching using the modeling method and does the process of learning to read music interfere with the aural and technical performance aspects in fifth-grade beginning band students. Intact, heterogeneous instrumental classes were randomly assigned a treatment, and treatments occurred twice a week during 50-minute classes for 16-weeks. The comprehensive group used music textbooks and audio materials, and the modeling group were taught the same material through teacher demonstration on an instrument followed by student imitation.

Four researcher-designed posttests measured aural musicianship, instrumental performance, and melodic and rhythmic sight-reading skills. A MANOVA on the four dependent variables reached statistical significance,  $\Lambda = .425$ ,  $F(4) = 22.65$ ,  $p < .001$ , in favor of the comprehensive group. This supports Shehan's (1987) findings that older students quickly grasp the aural-visual-mnemonic presentation. Univariate analysis of variance on the dependent variables further revealed statistically significant differences favoring the comprehensive treatment on the Verbal Association Test ( $p < .05$ ), which measured the aural skill. Statistical significance was also reached on the Melodic and Rhythmic Sight-Reading Test ( $p < .05$ ).

Kendall (1988) concludes teaching music reading does not impede learning of instrumental skills to beginning band students, and both treatments were effective in teaching

students aural musicianship skills. This aligns with Stevens (1992), who found the Gordon and traditional approaches do not hinder students' abilities to play by ear. Kendall's (1988) results also imply the visual presentation of notation is more effective in assisting upper-elementary students develop melodic verbal association skills.

Pierce (1992) measured the effectiveness of four approaches of rhythm-reading on performance accuracy with sixth-grade intermediate level and advanced middle school subjects ( $N = 64$ ). The four approaches to reading and practicing rhythms were subdividing them and (1) clapping, (2) counting aloud, (3) sizzling, or (4) clapping and counting the rhythm aloud. The four approaches were taught during regular instruction to all students before treatment, which was administered individually by someone under the supervision of the researcher. During the brief treatment, four melodies were individually shown to the participant, and a different approach was assigned to each melody. Subjects were given unlimited rehearsal time before the assessment, and students had unlimited attempts to perform the exercise correctly before the assessment. The researcher admitted these two factors became a weakness in the study.

Once the student was ready, the proctor gave two performance criterion from (1) clapping, (2) counting aloud, (3) sizzling, or (4) clapping and counting. Subjects performed the rhythm and melody at two different, randomly assigned tempi. Statistical significance was not reached among rhythm-reading approach; however, the clapping and counting method took the most rehearsal time, and the sizzle method required the least amount of learning time. Pierce (1992) credits the sizzle method as the best replication of playing a wind instrument. These findings further support Shehan (1987) that the aural-visual-mnemonic approach is successful among older elementary students.

In Boyle's (1970) frequently cited study, the effectiveness of tapping the foot to the beat while clapping a rhythm was measured in junior high instrumental students ( $N = 191$ ). Twenty-two band directors in the Midwest were instructed to spend 30-minutes a week for 14 weeks rehearsing rhythms from *A Rhythm a Day* (Hudadoff, 1963) with students tapping the beat with their foot and clapping the rhythm. There were two control classes that did not implement foot tapping. Treatment occurred during the spring semester. Pretests were given before the first week, and posttest were administered the last week. Results reveal statistical significance was reached ( $p < .01$ ) between the control and experimental groups in favor of the experimental group. These findings suggest the use of kinesthetic is effective in rhythm-reading performance, which supports Persellin (1992) and McDonald (1991).

Kelly (1997) questioned the use of kinesthetic cues on rhythmic performance accuracy and measured the effectiveness of teaching basic conducting skills to fifth-grade beginning band students ( $N = 151$ ). Four beginning bands were randomly assigned to receive the conducting treatment, while four other beginning bands were randomly assigned as the control. All students were administered individual rhythmic performance tests, and all bands were recorded and scored on specific elements by seven judges. Treatment consisted of the first 10-minutes of class being led by either the investigator or replicator in conducting and playing warm-ups. Control classes were still led in warm-ups by the investigator or replicator for the first 10-minutes of class. Treatment lasted 10 weeks, and individual and ensemble posttests were administered.

Results of an ANCOVA reveal a statistically significant difference,  $F(1) = 103.9750$ ,  $p < .001$ , between the experimental and control groups on individual rhythm performance scores in favor of the experimental group, indicating the conducting instruction effective in improving individual rhythmic performance. As for the ensemble performances, mean gains are greater for

the experimental groups in the rhythm, style, dynamic, phrasing, and general performance categories; however, statistical significance was only reached in rhythm,  $F(1) = 40.917, p = .008$ , and phrasing,  $F(1) = 45.997, p = .007$ . Mean scores for the control group actually decreased in every area. These outcomes support the addition of kinesthetic cues, such as conducting, can also aid in rhythm-reading instruction, which parallels Boyle (1970), McDonald (1991), and Persellin (1992).

Like the elementary setting, many presentation modes or approaches are also successful in the middle school and junior high instrumental settings. Stevens (1992) compared the rote approach and notation first approaches on beginning band members' abilities to play by ear and found neither method hindered students' abilities to play by ear. Kendall (1988) measured sight-reading ability of beginning band students who were presented rhythms and melodies either aurally and kinesthetically or visually, aurally, and kinesthetically. Both groups achieved sight-reading success; however, the group that was presented rhythms and melodies aurally, visually, and kinesthetically outperformed the group that was aurally and kinesthetically presented rhythms and melodies and reached statistical significance.

Pierce (1992) assessed rhythmic performance accuracy when intermediate and advanced band students clap, count aloud, sizzle, or clap and count aloud the rhythm before playing it. Statistical significance was not reached, but sizzling the rhythm took the least amount of time, while clapping and counting aloud took the longest rehearsal time.

Boyle (1970) and Kelly (1997) studied the effectiveness of specific kinesthetic actions on rhythm-reading performance, and both found their kinesthetic actions successful. Boyle (1970) implemented tapping a foot to the beat in junior high bands. Results found the foot tapping groups more effective than groups that did not tap their feet, reaching statistical significance.

Kelly (1997) measured the effectiveness of students conducting on their rhythm-reading performance, and groups implementing conducting outperformed bands that did not teach conducting techniques to its members and reached statistical significance. In conclusion, aural, visual, and kinesthetic approaches are effective in the middle school and junior high instrumental settings.

**Choral setting.** Egbert (1990) studied the effects of rhythm-reading instruction on sight-singing performance in the high school choral setting. Forty-six students were randomly assigned to two groups. The control group received melodic sight-singing instruction and only rote practiced rhythmic problems, while the experimental group received the same melodic sight-singing instruction with a systematic program of rhythm-reading instruction based on Gordon's (1977) learning skills sequences and designed by the investigator. The control and experimental groups met on alternating weekdays, and the instructor spent 10-minutes at the beginning of each class meeting for 22 sessions on the prescribed sight-singing exercises. This meant the control group spent 10-minutes on melodic passages and only rote practiced rhythms when a problem arose. The experimental group spend 3.5 minutes practicing rhythm-reading, and the remaining 6.5 minutes of the treatment were spent reading melodies. After two weeks of instruction, the researcher realized the set goals would be too challenging for the students to accomplish in the designated time frame, yet the study continued as designed.

Results reveal no statistically significant differences between groups on the individual and ensemble posttests, yet both groups reached statistical significance on the individual rhythm-reading component than on the melodic reading components,  $F(1) = 97.72, p < .05$ . This is interesting considering the control group never received systematic rhythm-reading instruction, suggesting rote learning occurred. There were also gains from pretest to posttest in ensemble

sight-singing, but results did not reach statistical significance. Egbert (1990) was very transparent in his reflection of the study and concluded that the amount of instructional time combined with the amount of repetition is a key component to music reading mastery and student morale. In summary, repetition and rehearsal time spent on rhythm and melody reading is effective in the high school choral setting.

### **Programmed Instruction**

Programmed instruction is technology that enables a student to be self-instructed through the presentation of sequential material in a book, video, audio recording, computer program, or similar device. The material must be presented in small steps, and the student can move at his or her own pace through the material by checking answers to progress (Vargas & Vargas, 1991). There are several studies in a variety of music classroom settings that suggest programmed instruction is effective (Anderson, 1982; Barnes, 1964; Bobbitt, 1970; Heim, 1973).

Bobbitt (1970) suggested several components to effective programmed instruction, especially in the elementary setting. These findings were based on observations of successful implementation of programmed instruction at an elementary school. First, teachers should watch the pacing of the materials in order to avoid distractions and boredom. Programmed instruction should begin no later than third-grade but can be introduced on a limited basis in first-grade. In addition, the materials used should be able to handle large groups of students, since music class time is limited; furthermore, separate the material to be learned into small steps and place them in a logical sequence. Allow concepts to be repeated in order to be reinforced and immediately applied.

Barnes (1964) studied the effectiveness of programmed instruction in music fundamentals on elementary education majors enrolled in a music class. Forty-two



undergraduate students were enrolled in two sections of the class. One group served as the experimental group and obtained instruction on basic music symbols and their functions, intervals, keys, scales, and solfège. The other section was the control group and did not receive programmed instruction but studied the same content. Classes met daily for one quarter and were 48-minutes long, but only items learned during the first five weeks of class were used in the study. A researcher-developed book served as the programmed instruction used for the experimental group. A 100-item posttest was administered at the end of the five weeks. Both groups showed music fundamental learning occurred, but results showed the experimental group outperformed the control group ( $p < .01$ ), demonstrating music fundamentals can be taught through programmed instruction.

The use of programmed instruction in teaching rhythm-reading was researched by Heim (1972) and Anderson (1981). In a frequently cited study, Heim (1973) compared rhythmic performance of 13- to 18-year-old music students receiving rhythm-reading instruction from a traditional teacher-taught method to students receiving self-instruction through a programmed course ( $N = 50$ ). The investigator used the first nine rhythms of the 14 exercises of the *Watkins Farnum Performance Scale* as the pretest and posttest. Students who needed elementary rhythm-reading instruction were selected from the pretest (high school subjects,  $n = 30$ ; elementary school subjects,  $n = 20$ ), and groups were assigned by matched pairs. High school students received 40-minutes of daily music instruction either in a beginning band class taught by the investigator or from one of the two non-auditioned mixed choir classes not taught by the researcher. The sixth-grade elementary students were from a different school in a nearby town and received music instruction from a specialist twice a week for an undisclosed amount of time per session, which was a weakness in the study.

Students receiving programmed instruction were presented tape recorded rhythms played on one pitch on a piano and were asked to follow along in a printed booklet. Following this, subjects were to play the rhythm by speaking or singing or by performing on their instrument to a tape recorded metronome and voice counting the meter. Subjects were to stop the tape and practice the rhythm until confident before progressing to the next rhythm. Rhythms included five meters, three types of rests, and eight different durational notes. Taped instruction was less than two hours, and pilot testing revealed it took an extra half hour of time for rehearsal.

During treatment, high school participants in the experimental group would go to a practice room during free time and listen to an audio tape with directions, follow along in the rhythm booklet, and pause the tape to rehearse rhythms. Students unable to rehearse during free time would take the materials home for the evening. Sixth-grade students in the experimental group would take home the audio and printed materials twice a week for four weeks. It is also unknown exactly how much time the sixth-grade programmed instruction students spent in treatment, since it was a self-directed method. Students in the teacher-led instruction group used the same rhythm booklet designed by the investigator for a total of two and a half hours of instruction. High school subjects in the teacher-led group received 20-minutes of rhythm-reading instruction daily for two weeks. Sixth-grade students received 20-minutes of rhythm-reading instruction twice a week for four weeks. The control, teacher-taught groups received just over two and a half hours of instruction using the same printed rhythm booklets as the experimental groups.

Results show an increase on rhythm-reading performance for all students. Statistical significance was reached by both experimental,  $t(9.27)$ ,  $p < .05$ , and control groups,  $t(7.77)$ ,  $p < .05$ , revealing teacher-led and programmed instruction as effective in rhythm-reading instruction.

Comparing the mean gains of the experimental and control groups in a second  $t$ -test support the programmed instruction group as more effective because statistical significance was reached,  $t(3.2), p < .05$ ; however, when comparing high school and sixth-grade separately on the difference in achievement as a result of teaching method, the sixth-grade students did not reach statistical significance,  $t(0.8), p > .05$ . Results of Heim (1973) and Barnes (1964) suggest programmed instruction is more effective in high school and college settings.

Anderson (1981) also studied the effectiveness of programmed instruction on sixth-grade students, but his sixth-grade students were clarinetists in an instrumental program and were randomly selected ( $N = 40$ ). The researcher measured the effectiveness of tape-recorded aural models for home practice using an experimental pretest-posttest control group design with a delayed second posttest. Treatment lasted for eight weeks, where subjects in the experimental group were provided a cassette tape of solo clarinet performing exercises that both groups studied. Both groups rehearsed the same exercises in class and were to pass of as many exercises as possible during treatment. All subjects also submitted weekly practice charts.

The posttest, which was the same as the pretest, was administered, which included four exercises from the *Watkins-Farnum Performance Test* and a researcher-designed Practiced Performance Evaluation Test. Pitch-reading, rhythm-reading, tempo accuracy, and intonation accuracy were evaluated. Both groups reached statistical significance between pretest and posttest I in pitch-reading,  $F(1, 76) = 93.09, p < .001$ , and rhythm-reading,  $F(1, 76) = 4.76, p < .032$ . Results did not reach statistical significance between the groups in any area, yet results still support the use of programmed instruction as a successful tool to assist students with rhythm-reading, which supports Heim (1973); furthermore, Anderson's (1981) findings

corroborate Heim (1973) and Barnes (1964) that college and high school settings find programmed instruction more effective.

Self-instruction on sequential material can be effective in upper elementary, high school, and college settings yet is more effective with high school and college students (Anderson, 1981; Barnes, 1964; Heim, 1973). Bobbit (1970) encourages programmed instruction designers for the elementary setting to be able to be used in a whole group setting, sequential with small chunks of knowledge being presented, and implemented with appropriate pacing.

Barnes (1964) implemented a self-constructed programmed instruction on college education students and found it effective in teaching music fundamentals. Heim (1973) taught 13-year-old and 18-year old music students elementary rhythm-reading in his self-constructed programmed instruction booklet. Both groups improved in rhythm-reading, but the high-school students outperformed the sixth-grade students and reached statistical significance. Anderson (1981) measured the effectiveness of programmed instruction on sixth-grade clarinet players' pitch-reading, rhythm-reading, tempo accuracy, and intonation accuracy. Students with and without programmed instruction statistically increased scores on pitch-reading and rhythm-reading, but statistical significance was not reached between groups in any category. In summary, programmed instruction is an effective approach to teaching rhythm-reading to upper elementary, high school, and college students and in instrumental settings.

### **Notation Variations**

Changing parts of music notation, such as using colored or iconic notation, has been researched and bring varied results (Agre, 1991; Byo, 1988; Gauthier & Dunn, 2004; McCuiston, 1990; Rogers, 1996). Byo (1988) wondered if barlines helped, hindered, or did not affect accurate rhythmic performance. Thirty middle school band students and 30 graduate and

undergraduate instrumental music majors were given two age and ability appropriate rhythms to perform. Five types of durational notes were used in the rhythms. One rhythm had barlines and a time signature, while the other rhythm did not. Performances were recorded and scored. A Wilcoxon Matched-Pairs Signed Ranks test found no statistical significant differences in the middle school and college subjects on whether time signature and barline omission effected rhythm-reading accuracy. Results indicate barlines neither help nor hinder rhythm-reading accuracy of experienced middle school and college instrumentalists.

Rogers (1996) studied the effects of rhythm-reading instruction using colored notation on rhythmic performance and transferability to uncolored notation. First ( $n = 85$ ) and second-grade students ( $n = 49$ ) from two northeastern schools with similar socio-economic status were administered 10-minutes of rhythm-reading instruction for 23-weeks. Treatments were administered October through March, and participants received regular music instruction from a specialist. Neither grade level had received rhythm-reading instruction, so students in both grades were taught the same rhythms. The treatment groups used colored notation that was randomly varied each week, while the control group used black notation. Both groups were given a posttest of two rhythms of three measures. One rhythm had colored notation, and the other had black notation. Results did not reach statistical significance between groups when reading black notation; however, statistical significance was reached ( $p < .05$ ) in favor of the treatment group on reading colored notation.

The use of icons as rhythmic notation is a common practice with elementary music specialists. McCuiston (1990) had two of four treatment groups of first-grade students ( $N = 110$ ) that learned iconic notation before standard notation for rhythms. Both the standard notation and iconic notation treatment groups reached statistical significance on the investigator-constructed

posttest ( $p < .05$ ), indicating that the implementation of iconic notation was effective in rhythm-reading instruction. Posttest items one through 18 were played once, while items 19 through 36 were played twice. Students were given three notational choices and selected the choice heard on the recording. The groups that used iconic notation reached statistical significance on items played twice ( $p < .05$ ), while the groups using just standard notation did not. The reason for the difference is unknown, yet it is valuable to recognize that the implementation of iconic notation also did not hinder rhythmic performance.

Gauthier and Dunn (2004) also employed iconic notation in rhythm-reading instruction to fifty-six first-grade subjects. One group used large elephants to symbolize quarter notes, and small elephants were used to denote eighth notes. The other group had long bars representing quarter notes, and shorter bars signified eighth notes. The same songs, chants, listening activities, and rhythm-reading activities were used in both groups, and the researcher met with the groups six times to administer treatments.

Students were individually given a 10-item investigator-constructed posttest identical to the pretest using the appropriate icons for their assigned groups. Both groups reached statistical significance ( $p < .05$ ) on a paired-sample t-test when comparing pretest to posttest. Values for the elephant and bar groups were  $t(-7.767)$  and  $t(-15.191)$ , respectively. While results between the groups also reached statistical significance in favor of the bar group,  $t(5.204)$ ,  $p < .000$ , there were other variables implemented in the study, such as different counting approaches by each group, that could affect the results. Regardless of group differences, results still favor the effectiveness of iconic rhythmic notation on first-grade students, which aligns with McCuiston (1990).

Agre (1991) used icons as a transitional step between rote rhythm instruction and standard music notation. Ninety-six third-grade students were presented long and short lines that were accompanied by saying the words “long” and “short,” which lasted the duration of the note value. Eighth notes were always short, while quarter, half, and whole notes had appropriate length lines as icons. The word “long” was always used for quarter, half, and whole notes.

Students were administered a 35-item investigator-constructed pretest, which also served as the posttest, consisting of three sections. In part one, subjects imitated one and two measure rhythms presented aurally. In part two, students matched icons with standardized notation. In part three, students identified notation by name and recognized it in rhythm patterns. Results were statistically significant from pretest to posttest for boys,  $t(42) = 10.62$ ,  $p < .001$ , and girls,  $t(52) = 12.13$ ,  $p < .001$ , indicating the use of icons as a transition to standardized notation is effective. This further supports findings on the effectiveness of iconic notation on elementary children (Gauthier & Dunn, 2004; McCuiston, 1990). In addition, Agre’s (1991) findings support research that mnemonics as an effective aid in rhythm-reading instruction (Shehan, 1987; Atterbury, 1983; Pierce, 1992).

A wide range of notational variations have been studied (Agre, 1991; Byo, 1988; Gauthier & Dunn, 2004; McCuiston, 1990; Rogers, 1996). Byo (1988) found bar lines neither help nor hinder middle school and college music students’ abilities rhythm-reading accuracy. Rogers (1996) discovered colored notation neither helped nor hindered rhythm-reading accuracy. McCuiston (1990) and Agre (1991) successfully presented iconic notation before standard notation to elementary students. Gauthier and Dunn (2004) compared the use of large and small icons to long and short icons. While both icons were effective in rhythm-reading instruction, the

long and short icons were more effective. In summary, research on notational variations is eclectic and varied.

## **Conservation**

Conservation is a component of Piaget's theory of cognitive development that refers to a child logically determining that the amount of material remains the same regardless of container shape or size (Piaget, 1968). Conservation generally refers to the concrete operational stage. Since music is an aural art, questions about the relevance of conservation to music and music concepts are posed. Several studies investigated this and agreed conservation is applicable to music. Specifically, conservation in music can be taught to children learning music concepts (Foley, 1975; Pfloderer, 1964; Zimmerman & Sechrest, 1970).

Zimmerman and Sechrest (1970) conducted a study similar to Pfloderer (1964) analyzing the effects of brief instruction of seven musical concepts: rhythm, harmony, contour, interval, mode, tempo, and change of instrument. Subjects were five-, seven-, nine-, and 13-year olds from three elementary schools and two junior high schools and had no private music instruction experience (N = 198). Subjects were randomly assigned to control and experimental groups. Both groups listened to training tapes followed by a 30-minute assessment with one of three experimenters. The experimental training tape played the first six measures of "America" followed by one of the seven deformations. Discussion of the deformation was discussed. The same procedure was repeated changing to a new deformation until all seven changes were experienced. The control training tape did not use comparisons, but instead, phrases from the elementary repertoire were played with a deformation that was then discussed.

The test tape used the same procedure as the experimental training tape but used phrases from Bartók's *For Children*. Only four of the stimuli was used for the test. An eighth stimuli of



no change was added. Participants responded “same” or “different” and explained their answers. While results did not reach statistical significance between groups, type of stimulus did,  $F(1, 7) = 119.07, p > .01$ . The experimental group consistently outscored the control group on all stimuli except on the no change category. All ages also scored the highest on the no change stimuli. Instrument change, followed by harmony, were the next highest scoring stimuli. These findings imply children can identify aural changes, such as rhythmic and harmonic changes, and that brief, focused instruction on such concepts is effective.

Foley (1975) studied the effectiveness of rhythmic and tonal conservation in second-grade students. In this quasi-experimental design, three of six second-grade classrooms ( $N = 150$ ) in Minnesota were randomly selected as experimental groups receiving daily tonal and rhythmic conservation training during music. Three second-grade classrooms in the same school system were chosen as the control groups. The control classes did not have conservation training during music and had regular music instruction from their music teacher. Music teachers in the experimental classes were the students’ regular music teachers, and they received written and verbal training in the treatment method. All students received 20-minutes of daily music instruction for six days. In the treatment groups, 10-minutes of each class was designated as conservation training.

Scores on the posttest were higher from pretest to posttest in the experimental group, reaching statistical significance,  $F(1) = 7.9432, p < .01$ , suggesting conservation ability improves with training. The control group did not reach statistical significance from pretest to posttest, but there was an increase in raw scores from pretest to posttest. A *t*-test was used to determine if there was a statistically significant difference between the gains scores in the experimental and control groups. Statistical significance for a one-tailed test was reached,  $t(1.65), p < .05$ , on the

immediate posttest in favor of the experimental group; however, delayed posttest results were not statistically significant. Foley (1975) suggests the delayed posttest was given the last week of the school year as a reason for possible insignificance. According to this study, tonal and rhythmic pattern conservation can be improved through training. This study also supports explicit instruction of musical ideas administered in a short period of time to second-graders as effective, which also concurs with Zimmerman and Sechrest (1970). In conclusion, conservation research in music agrees that conservation is possible in music, can be taught to elementary students, and can be improved with training (Foley, 1975; Zimmerman & Sechrest, 1970).

### **Counting Systems and Mnemonics**

There are specific studies that addressed counting systems and mnemonics in rhythm reading. These are organized below using subheadings for clarification and categorization.

#### **Subdivision**

Subdivision is a rhythmic counting approach where larger beats are divided into their smaller parts. This is the commonly referred to as the traditional approach, and the counting system is “1 & 2 &.” This frequently taught method of rhythm-reading instruction has been the focus of many research studies (Bebeau, 1982; Brittin, 2001; Drake, 1968; Fust, 2006; Gauthier & Dunn, 2004; Major, 1982; Williams, 1987). This section is organized by type of setting: elementary, instrumental, and choral.

**Elementary setting.** In a frequently cited study, Bebeau (1982) conducted two experiments comparing the effectiveness of subdivision to a speech cue method where specific words are assigned to specific notes or rests. In the first experiment, students in the traditional approach had to subdivide beats and count them aloud while clapping the rhythm, while speech cue students had a specific kinesthetic motion to accompany the matching speech and rhythm

clapping. The researcher divided her 27 third-grade students into two treatment groups through matched pairs on pretested rhythm-reading scores and grade-point average. Each group received 15-minutes of daily rhythm instruction in their assigned method for 18 sessions. Students who were absent were given a lesson the following day when they returned.

The posttest, which was the same 23 rhythms from the pretest, was administered to students individually. Twenty-one items measured the student's rhythm-reading ability, while the last two items measured the ability of the students to keep a steady beat. Results from a *t*-test revealed the subdivision group,  $t(11.26)$ , and speech cue group,  $t(14.84)$ , reached statistical significance ( $p < .01$ ) when comparing pretest to posttest, suggesting both methods as effective for rhythm-reading instruction. In addition, these results uphold other research supporting the use of mnemonics in rhythm-reading instruction (Atterbury, 1983; Gauthier and Dunn, 2004; Pierce, 1992; Shehan, 1987). Statistical significance was also reached,  $t(.11)$ ,  $p < .05$ , when comparing the effectiveness between the groups in favor of the speech cue group. In addition, the large effect size ( $d = 1.215$ ) demonstrates a difference on rhythm-reading scores between groups, favoring the speech cue group.

For the second experiment, the investigator replicated the study using another music teacher at a different school in the same area. A second research question of transferability of speech cue method to music specialist untrained in Kodály or Orff was also addressed. The teacher implementing the treatments had 15-years of experience in the subdivision approach and received one hour of training in the speech cue process. Eighty third-grade students were randomly assigned to the two treatment groups. Students in the replication also received 18 lessons of 15-minutes each, and all procedures and materials used were identical to the first

experiment. Two students were lost to attrition because make-up lessons were not feasible. Students were measured using the same investigator-constructed assessment containing 23-items.

Statistical significance was again reached ( $p < .01$ ) in both groups when comparing pretest to posttest. *T*-test values of the subdivision and speech cue groups were  $t(13.92)$  and  $t(16.66)$ , respectively. While gains were not as statistically significant as the first part of the study, results still show both groups achieved success with regular, explicit instruction in rhythm-reading, again supporting subdivision and other mnemonics as effective in rhythm-reading instruction (Atterbury, 1983; Gauthier and Dunn, 2004; Pierce, 1992; Shehan, 1987). While differences between posttest scores of the two groups were not statistically significant, gain score differences were statistically significant ( $p < .05$ ) in favor of the speech cue group; however, the effect size was moderate ( $d = .424$ ). These results support that music specialists can successfully teach rhythm-reading instruction through the speech cue method after receiving little training.

Williams (1987) compared the use of subdivision and the durational methods on rhythm-reading accuracy on 76 fifth-grade students in the Midwest. The durational method assigns a specific mnemonic to the type of note. For example, quarter notes are always articulated “ta,” and an eighth note is always articulated “ti” regardless to its placement in a measure. Three intact classes were randomly assigned as a control or treatment group. Treatment groups received instruction using subdivision or the durational method, and the control group received no rhythm-reading instruction. An investigator-constructed pretest was given, including a 10-item written rhythm segment and 2-item verbal rhythm-reading exercises.

Treatment took place in the music classroom and was given by the researcher. Content was the same for both groups with the only difference being type of methodological approach.

New symbols were introduced on a chalkboard in each lesson followed by practice exercises on flashcards. Students also practiced rhythmic dictation on individual chalkboards. Treatment was 20-minutes for seven consecutive lessons, and the last lesson served as a review. The investigator-constructed posttest was administered, which included a 25-item written rhythm posttest and five item verbal rhythm-reading posttest.

Statistical significance was reached ( $p < .000$ ) for aggregated data when measuring written rhythm pretest to posttest,  $t(5.44)$ , and verbal rhythm-reading posttest,  $t(7.92)$ . Results of the written rhythm posttest show treatment group reached statistical significance,  $F(2) = 4.221$ ,  $p = .019$ , but post hoc analysis was not conducted. Instead, a separate ANOVA measuring between groups was conducted, and it did not reach statistical significance. Statistical significance was also reached in treatment groups on the verbal rhythm-reading posttest,  $F(2) = 6.284$ ,  $p = .003$ , but post hoc analysis was again not conducted. Again, a separate ANOVA was conducted measuring statistical significance between groups, and statistical significance was not reached. The author reports the durational group produced the higher mean, yet further conclusions cannot be made about this data. The researcher possibly commits a type II error by failing to not reject the hypothesis of is subdivision or the durational counting method more efficient in rhythm-reading instruction.

Gauthier and Dunn (2004) compared the additive and subdivision rhythm-reading counting approaches on two intact classes of first-grade students at a private school ( $N = 56$ ). The participants had not received formal music instruction in kindergarten, and the assessments and study occurred during the first four weeks of the school year during regular scheduled music class. One class was randomly selected to receive the subdivision approach, while the other class received rhythm-reading instruction using an approach that established the eighth note as

the beat. The researcher called this group the additive approach group because long sounds are twice as long as short sounds.

An author-constructed 10-item pretest of quarter note and eighth note rhythms was individually administered. While rhythms were identical on the pretest for both groups, the visual and aural preparatory presentations differed. The subdivision group used large and small elephant icons, and the examiner said, “One two read-y go,” before each item was to be performed. The researcher did this in order to establish the quarter note as the beat. The additive approach group used bar icons that showed durational length of the note. The test administrator also said, “One and two and read-y go,” before each item was to be performed, which established the eighth note as the beat. Responses were video recorded.

One of the researchers met with students six times to administer treatments. The same songs, chants, listening, and rhythm-reading activities were used in both groups. Only the counting approach and icons were different. Further details, such as minutes of instruction, were omitted. Individual posttests identical to the pretest were given concluding treatment.

Gauthier and Dunn’s (2004) results of a paired-sample *t*-test reveal both groups reached statistical significance ( $p < .001$ ) when comparing pretest to posttest. Values of the subdivision and additive groups were  $t(-7.767)$ ,  $t(-15.191)$ , respectively. These results suggest subdivision and the additive approach are effective in rhythm-reading instruction for first-grade students, which also support Bebeau (1982), who found subdivision and the implementation of another counting system and mnemonic effective in elementary settings. These findings also support Atterbury (1983) and Shehan (1987) who found the implementation of mnemonics effective in rhythm-reading performance.

Results also reached statistical significance ( $p < .001$ ) when comparing posttest scores of the additive group to the subdivision group,  $t(5.204)$ , in favor of the additive group, which parallels Bebeau's (1982) findings that the speech cue group outperformed the subdivision group. Gauthier and Dunn (2004) conclude that while the additive approach was more effective than the subdivision approach in this case, results cannot be generalized due to the small sample size.

The effectiveness of subdivision counting is effective in the elementary setting, although other counting approaches and mnemonics are more effective (Bebeau, 1982; Williams, 1987; Gauthier & Dunn, 2004). Bebeau (1982) found speech cues with kinesthetic motions more effective in rhythm-reading performance than the subdivision group. Williams (1987) compared subdivision to the durational method, where a specific mnemonic to a specific note, and the durational method was found more effective. Gauthier and Dunn (2004) found the additive approach, where the smallest duration serves as the beat, more effective than subdivision. In summary, other counting approaches and mnemonics are more effective than subdivision counting in the elementary classroom.

**Instrumental setting.** In Drake's (1968) frequently cited study, the rhythmic performance of 32 randomly selected college freshman in the marching band at Purdue University was assessed. Specifically, beat reproductions, beat steadiness, and beat subdivision accuracy were measured and compared between two groups of 16 students ( $N = 32$ ). The control group was told that practice has a positive effect on their ability to play the rhythms, while the experimental group was told imaged subdivisions of the beat has a positive effect on their ability to play the rhythms. After five-minutes of practice time on eight items similar to the actual items, the posttest was administered. The experimental group showed gains in all three

variables, and the control group only improved in beat reproduction and beat steadiness. Statistical significance was reached between the two groups only in beat reproduction variances,  $F(1) = 22.99, p < .01$ ; however, the interaction of groups by test did not reach statistical significance, implying that the influence of the experimental treatment cannot be attributed to the score increase.

While the use of imaged subdivisions did not reach statistical significance in improving subjects' ability to perform rhythms, Drake (1968) did conclude beat reproduction, beat steadiness, and beat subdivision accuracy can be objectively and precisely measured. Individuals differ widely in the ability to perform rhythms, and subjects tended to shorten beats or play faster than the given beat when playing rhythms; furthermore, there is no relationship between the overall ranking of subjects and the type of instrument played, high school rank, or years of private instruction. These findings support the ability to accurately assess rhythm-reading and performance, which is valuable in conducting rhythm research.

Brittin (2001) surveyed seventh-, eighth-, and ninth-grade honor band students ( $N = 125$ ) on which counting methods were used by their current and previous band directors and elementary music teachers. Students were also asked to complete three rhythm tasks: writing in the counts, completing a measure with proper rhythm, and selecting the correct rhythm of a folk song. Most current and former band directors (69%) use the subdivision method, or "1 & 2 &," for counting. Students who had elementary music and were taught to count "1 & 2 &" had statistically significant lower scores,  $U = 30, p < .01$ , than students who reported using a mnemonic system, such as "ta ti-ti," in elementary music. Further comparison between students using "ta ti-ti" in elementary school ( $n = 10$ ) to students taught to count "1 & 2 &" in elementary school ( $n = 16$ ) revealed the former had statistically higher overall scores,  $U = 28.5, p < .01$ . The



means of the “ta ti-ti” and “1 & 2 &” students were  $\mu = 19.9$ ,  $\mu = 16.1$ , respectively. These results validate Bebeau (1982) and Gauthier and Dunn (2004), who also found mnemonics and the subdivision counting methods effective in rhythm-reading instruction. These findings further support research that mnemonics used for counting are more effective than subdivision in rhythm-reading performance (Atterbury, 1983; Bebeau, 1982; Gauthier & Dunn, 2004; Pierce, 1992).

Fust (2006) conducted a study measuring the effectiveness of subdivision and the “Takadimi” rhythm-reading approaches on four sixth-grade woodwind students in the same beginning band. The researcher gave the four participants individual, 30-minute lessons once a week for five weeks. Although subjects were already familiar with the “1 & 2 &” counting system before implementation of the study, two of the subjects were instructed on the “Takadimi” system during treatment. The other two participants continued using “1 & 2 &” for treatment. The *Premier Performance Band Method Book One* (Sueta, 1999) was used for instruction because it does not favor any counting system. In addition, the researcher created a rhythm sheet that accompanied the text. During the lessons, the teacher demonstrated each rhythm by clapping and counting aloud followed by student imitation.

Lessons were videotaped and transcribed. The researcher kept a journal, and all subjects were interviewed at the conclusion of the five weeks. All three data sources were triangulated and analyzed for themes that were then interpreted. Both groups achieved the same rhythmic accuracy, progress in rhythm accuracy, and progress in syllable placement. Analysis reveals that rhythmic mistakes fell into six categories: holding a note or rest too long, holding a note or rest too short, wrong syllable used, unsteady pulse, stops/hesitates due to rushing, incorrect rhythm due to other reason. Students using the “Takadimi” system played without hesitations and used

correct syllables with more proficiency than the “1 & 2 &” students based on observational data. Further observational data revealed “Takadimi” students tended to play a note longer or shorter than written. Interview data revealed students view subdividing rhythms as more difficult to count and play than “Takadimi.” In addition, the syllables used in “Takadimi” are fun. A student using “1 & 2 &” counting found it easier to play a rhythm after counting it because it creates beat awareness. In conclusion, both counting methods are successful, which supports existing research (Bebeau, 1982; Brittin, 2001; Gauthier and Dunn, 2004). The investigator also concluded the students were more successful after counting the rhythm aloud before performing on an instrument.

Subdivision is commonly used and effective in instrumental settings. Like the elementary setting, some research results also reveal other counting systems as more effective (Brittin, 2001; Fust, 2006). Drake (1968) investigated beat reproductions, beat steadiness, and beat subdivision accuracy in college band students, and the subdivision group improved in beat reproduction. Britton (2001) surveyed middle school honor band students on rhythm systems used by their elementary music teachers and band directors. Students using Kodály’s “ta ti-ti” system had higher means and outperformed peers who used subdivision counting. Fust (2006) taught two instrumental students to use “Takadimi” in private lessons, and the other two instrumental students used subdivision counting in their private lessons. Performance results reveal “Takadimi” students did not hesitate and used correct syllables better than their subdividing peers. Interview data shows mixed results. Some students preferring “Takadimi” over subdivision, and others preferred subdivision counting. Regardless, subdivision and other counting methods are effective in instrumental classrooms.

**Choral setting.** Major (1982) measured the effectiveness of subdivision and imitation approaches on rhythmic performance accuracy by students in a mixed high school choir. Three mixed choirs, each with approximately 60 students, in three separate high schools were selected for the population. Sampling procedures began by administering as a pretest to all members in the three choirs. Scores were analyzed and divided into three rhythmic ability levels of high, middle, low. Students were selected and matched in order for each rhythmic ability level to allow equal representation in each choirs ( $N = 96$ ).

Two of the choirs received a rhythm-reading instruction treatment that was administered 4-minutes each day for 10 weeks. One treatment choir used subdivision as explained in rhythmic examples in a booklet. The investigator constructed a *Subdivision Rhythm Booklet*, which was used during each choir rehearsal. This booklet contained rhythms written using the mathematical subdivision of the note value. A rhythm-building scheme showing relationships to other note values was also presented in this booklet. For this choir, the director maintained a pulse visually and aurally during rhythm practice. Each rhythm was also counted arithmetically. Students clapped, tapped, or sang on a neutral syllable while the director performed the written pattern. Student and director roles were then reversed. Subjects then clapped the subdivisions while singing the written rhythm.

The second treatment choir used imitation. The investigator-constructed *Imitation Rhythm Booklet* was used during the daily rhythm instruction time. Instead of mathematical subdivisions and a rhythm-building scheme, each rhythm in the book indicated where the pulse lied in the rhythm. The choir instructor, who was not the same one used in the subdivision group, would establish a pulse and perform the rhythm pattern. Students would replicate the rhythm. No other information was given to this choir.

The third choir served as the control with rhythm instruction occurring naturally during the rehearsal. There was not daily choir time devoted to rhythm-reading instruction. The subdivision and imitation treatments were monitored by the investigator, but the control group was not monitored. After 10 weeks of treatment, a posttest was individually administered, and results were analyzed.

Results of a three-way ANOVA show statistically significant differences among treatment groups for Rhythmic Accuracy,  $F(2, 79) = 7.080, p \leq .01$ , with Sheffé post hoc results favoring the subdivision group. For Maintenance of Steady Pulse, statistical significance was reached among treatment groups,  $F(2, 79) = 10.595, p \leq .01$ , with the subdivision group again demonstrating favorable differences in Sheffé post hoc results. Major (1982) concludes that rhythm-reading instruction using booklets and the subdivision method are superior to rote, imitation rhythmic instruction in by students in mixed high school choirs. Similar studies have been conducted in the elementary and instrumental settings with contradictory results (Bebeau, 1982; Britton, 2001; Fust, 2006; Gauthier & Dunn, 2004). Major's (1982) finding support research that notation and mnemonics should accompany rhythm-reading (Atterbury, 1983; Bebeau, 1982; Fust, 2006; Gauthier & Dunn, 2004; Pierce, 1992). In conclusion, subdivision and rote learning are effective in the high school choral setting, but the subdivision approach is more effective.

### **Mnemonics**

Mnemonics in rhythm-reading instruction are words, syllables, or sounds that are verbalized in reading rhythms. Often in rhythm-reading instruction, a specific syllable or word is assigned to a certain note, such as "ta" or "du" being said to represent a quarter note. Research suggests mnemonics, like counting beats aloud, result in increased rhythmic performance

accuracy (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Colley, 1987; Fust, 2006; Major, 1982; Pierce, 1992; Shehan, 1987).

Shehan (1987) had second- and sixth-grade children without formal music experience ( $N = 49$ ) reproduce rhythm patterns that were presented in different ways. Results show the aural-verbal-mnemonic presentation required the least number of attempts to replicate a rhythm accurately for students in both grades. Atterbury (1983) used three presentation modes to readers with normal ability ( $n = 20$ ) and readers with learning-disabilities ( $n = 20$ ), and results reveal all students found the addition of mnemonics helpful in rhythm pattern perception and performance. Agre (1991) had students saying “long” or “short” when reading barred rhythmic icons. Pierce (1992) found sizzling notational durations when reading a rhythm takes the least amount of instructional time compared to counting aloud, clapping, or the combination of clapping and counting aloud in middle school intermediate and advanced band students ( $N = 64$ ). Fust (2006) and Major (1982) had experimental and control groups count rhythms aloud, and both groups increased in rhythm-reading performance, suggesting mnemonics did not hinder rhythm-reading ability. These studies help establish the value of implanting mnemonics in rhythm-reading instruction to elementary and middle school students with different musical training and experiences.

Jetter (1985) measured the effectiveness of the one note – one rhythm method of rhythm-reading instruction on third-grade students ( $N = 87$ ) in a middle class neighborhood. The one note – one rhythm model assigns specific mnemonics to a type of note. For example, a quarter note is always read as “ta,” and half notes are always read as “too,” regardless of placement within a measure. A pretest-posttest design was used, and treatment occurred 15-minutes for three months during weekly music instruction. All students received the treatment.

The pretest and posttest used the same eight rhythms and were administered individually. On the pretest, students could use any syllable and read the rhythm; however, syllables learned during treatment were used on the posttest. Results of the posttest revealed 99% of subjects read the posttest with four or less errors. No *p*-values or other statistical data was reported; however, it can be deduced the method was effective. This further supports the effectiveness of mnemonics in rhythm-reading instruction (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Fust, 2006; Major, 1982; Pierce, 1992; Shehan, 1987).

A frequently cited study by Palmer (1976) compared the effectiveness of Gordon's syllables (1971) and a similar rote before note approach by Richards (1971) in fourth-grade students. This quasi-experimental design used six total classes at three schools as subjects ( $N = 136$ ). One school, whose music specialist was not the researcher, had two control classes. The researcher randomly assigned the treatments to the intact classes at the two schools where she was the existing music specialist. One class was assigned the Richards treatment, and one was assigned the Gordon treatment in each of the treatment schools. Treatments were administered in 20-minute sessions three times a week for five months. Throughout treatment, various observations were made to ensure moderator fidelity of the treatments.

The *Music Aptitude Profile* (Gordon, 1965) was administered as a pretest. Investigator-constructed written and performance tests on rhythm were administered as a pretest and posttest. Results were analyzed through the analysis of several MANCOVAs that were conducted using rhythm written and performance achievement gain scores. When music aptitude scores were used as the covariate, statistical significance was reached between the control group and the aggregated treatment groups,  $F(2, 131) = 94.93, p < .0001$ , supporting research that the

implementation of mnemonics is effective in rhythm-reading instruction (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Fust, 2006; Jetter, 1985; Major, 1982; Pierce, 1992; Shehan, 1987).

A second MANCOVA was conducted using music aptitude scores as a covariate to measure statistical significance between the Richards and Gordon groups. There was no statistically significant difference between the Gordon and Richards approaches in either written or performance achievement; however, univariate analysis reached statistical significance for performance achievement gain scores,  $F(1, 132) = 180.12, p < .03$ , between the Gordon and Richards approaches and in favor of the Gordon syllables. The author is cautious to remind the reader that the gain scores between the two groups were only 3.6 points, and the sample size is so small that results do not clearly indicate the Gordon approach better than Richards.

Colley (1987) compared the effectiveness of different mnemonics using the same rhythm-reading approach for second- and third-grade students ( $N = 160$ ) in a quasi-experimental design. Classes were randomly assigned a treatment of using Gordon mnemonics, Kodály mnemonics, or a word mnemonic to use during rhythm-reading while remaining instruction remained identical. The word mnemonic group is similar to the speech cue group used by Bebeau (1982). The control classes, which were at two other schools, received no rhythm-reading instruction and had a different music instructor. A total of 5.25 hours were spent in instruction of 12 rhythmic concepts. After nine treatment sessions given over 11 weeks that included winter break, the findings support accuracy of rhythm recognition, rhythm dictation, and rhythm-reading performances differ depending on which mnemonic is used.

Explicit rhythm-reading instruction using mnemonics reached statistical significance ( $p < .0001$ ) over control groups that did not receive such instruction. Regarding rhythm recognition, the Gordon group displayed the largest effect size ( $d = 0.955$ ) followed by the word group ( $d =$

0.9). The Kodály group showed a small effect size ( $d = 0.3$ ). Rhythmic dictation results reveal the word group with the largest effect size ( $d = 1.38$ ) followed by the Gordon group ( $d = 0.79$ ) and the Kodály group ( $d = -0.265$ ). Rhythmic performance expose the largest effect sizes for the word, Gordon, and Kodály groups,  $d = 1.99$ ,  $d = 1.24$ ,  $d = 0.711$ , respectively.

Colley (1987) admits that possible differences in gains among the groups may not be exclusively influenced by the treatment variable. This could be supported by the researcher's observations regarding student enthusiasm in different groups. The schedule of group lessons or lesson format redundancy may have influenced student enthusiasm. Regardless, findings support research that mnemonics are a beneficial tool in rhythm-reading (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Fust, 2006; Major, 1982; Palmer, 1976; Pierce, 1992; Shehan, 1987).

In summary, several studies find the use of mnemonics effective in rhythm-reading instruction in a variety of settings (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Colley, 1987; Fust, 2006; Jetter, 1985; Major, 1982; Palmer, 1976; Pierce, 1992; Shehan, 1987). Shehan (1987) and Atterbury (1983) found the addition of a mnemonic most effective in rhythmic performance. Pierce (1992) found sizzling took the least amount of rehearsal time when compared to other approaches. Fust (2006) and Major (1982) had students reading rhythms aloud using mnemonics that were effective. Bebeau (1982), Agre (1991), and Jetter (1985) assigned a specific word or syllable to specific durational notations and achieved success. Palmer (1976) compared the use of Gordon's mnemonics to Richard's mnemonics and found both nearly equally effective. Colley (1987) compared effectiveness of Gordon, Kodály, and word mnemonics, and results reveal all were successful in rhythm-reading performance. Clearly, using any mnemonic is better than not using a mnemonic in rhythm-reading instruction.



## Demographics

There is a growing body of research on the influence of demographics on rhythm-reading achievement (Agre, 1991; Atterbury, 1983; Kendall, 1988; Persellin, 1992; Schleuter & Schleuter, 1985; Shehan, 1987; Williams, 1987; Zimmerman & Sechrest, 1970). This section is subdivided by gender, maturation, and academic achievement.

### Gender

Schleuter & Schleuter (1985) examined the relationship of gender on the rhythmic responses of clapping, chanting, and stepping. Children in kindergarten, first-, second-, and third-grades were the subjects ( $N = 99$ ). Testing occurred at the end of the school year, so all subjects had received at least one year of music class instruction. Subjects received one hour of music instruction per week for eight months. The examiner individually administered an investigator-constructed Rhythm Response Test consisting of 12 tape-recorded rhythm patterns that subjects were to repeat either by chanting, clapping, or stepping. Results of an ANOVA show statistical significance was reached,  $F(1) = .039, p < .039$ . Post hoc results reveal girls outperformed boys in grades one, two, and three, and the investigators state the small sample size of kindergarten girls ( $n = 5$ ) to boys ( $n = 14$ ) as a possible reason for its exclusion.

These results contradict Agre (1991), who found no statistically significant difference between boys and girls on rhythmic performance achievement in third-grade students. These results also contradict Williams (1987) who found no differences between genders on a written rhythm posttest or on a verbal rhythmic performance posttest of fifth-grade students. Kendall (1988) also analyzed gender differences in fifth-grade beginning band students on rhythmic performance and found no statistically significant differences. In conclusion, only Schleuter and Schleuter (1985) found differences in gender on rhythmic performance.

## **Maturation**

Several studies agree that rhythmic performance achievement increases with maturation (Atterbury, 1983; Persellin, 1992; Schleuter & Schleuter, 1985; Shehan, 1987; Zimmerman & Sechrest, 1970). Zimmerman and Sechrest (1970) questioned the effectiveness of conservation in music on five-, seven-, nine-, and 13-year old children. Before the assessment, subjects were briefly trained on seven musical concepts: rhythm, harmony, contour, interval, mode, tempo, and change of instrument. A recording of the beginning of “America” was played, followed by a second playing where one of the seven concepts was changed or nothing was changed. As expected, the older children scored higher than younger children, yet an interaction occurred between age and type of stimulus changed,  $F(21) = 6.07, p < .01$ . Post hoc analysis revealed the changing of an instrument, addition of harmony, or no change between the playing of example one and two produced the highest scores in all age groups. Findings also show accuracy increased as age increased.

Atterbury (1983) studied rhythm pattern perception and performance in seven- and eight-year old children who were identified by a standardized state exam as a normal reader or learning-disabled reader. Subjects were individually administered listening tests and identify if two patterns performed were the same or different. There was an interaction between age and group,  $F(1, 36) = 5.48, p = .02$ . Further analysis reveal a statistically significant difference in rhythm pattern recognitions exists between the two reading-ability levels of seven-year old subjects but not eight-year olds. No suggestions or reasoning are provided, but the area of age difference and reading academic ability on rhythm pattern perception warrants further research.

Schleuter and Schleuter (1985) studied the relationship of grade level to certain rhythmic responses in kindergarten, first-, second-, and third-grade students. Subjects had weekly music

instruction for eight months before being tested. Students were given 12 rhythms to echo by either clapping, chanting, or stepping. As expected, mean scores increased in size in all responses across grade levels, which align with other research (Persellin, 1992; Shehan, 1987; Zimmerman & Sechrest, 1970).

Main effects for grade level is statistically significant,  $F(3) = 6.80, p < .001$ . Statistical significance was also reached on the interaction of rhythm responses by grade level,  $F(6) = 2.55, p < .05$ , which indicated differences among clapping, chanting, and stepping in all grades. ANOVA results reached statistical significance on the Rhythm Response Test,  $F(2) = 13.77, p < .000$ . Post hoc results reveal kindergarten and first-grade students scored highest on the chanting response, while first- and second-grade students scored higher on clapping. Stepping received the lowest response scores with all grades except kindergarten, where clapping was the same.

The means for clapping a rhythmic response reached statistical significance ( $p < .05$ ) between each grade. Chanting a rhythmic response reached statistical significance ( $p < .05$ ) only between kindergarten and third-grade students. The means for stepping in second- and third-grade students reached statistical significance ( $p < .05$ ), and both reached statistical significance when measured to kindergarten and first-grade.

Shehan (1987) also measured maturation differences between second- and sixth-grade children ( $N = 49$ ) on rhythmic performances presented in different modes. Sixth-grade students averaged 2.9 attempts for an accurate rhythmic performance, while second-grade students averaged 6.6 attempts. These findings support research that performance accuracy increases with maturation.

Persellin (1992) assessed the maturation differences on rhythm pattern recall in first-, third-, and fifth-grade children ( $N = 105$ ). Grade level reached statistical significance ( $p < .001$ ),

with the greatest increase in scores occurring between first- ( $\mu = 23.0$ ) and third-grades ( $\mu = 37.9$ ). The smallest learning increase manifested between third- ( $\mu = 37.9$ ) and fifth-grades ( $\mu = 46.8$ ). Maturation findings align with others that older students learn faster, implying maturation is a key factor in class time allotment of rhythm-reading instruction.

In conclusion, several studies examine the role of maturation on music learning, and results agree that ability and accuracy increase with age (Atterbury, 1983; Persellin, 1992; Schleuter & Schleuter, 1985; Shehan, 1987; Zimmerman & Sechrest, 1970).

### **Academic Achievement**

Research suggests academic achievement may influence rhythmic performance (Agre, 1991; Atterbury, 1983; Williams, 1987). Atterbury (1983) compared rhythm pattern perception and performance of seven- and eight-year old readers with learning-disabilities to readers who could read normally ( $N = 20$ ). Students were administered the rhythm section of a music aptitude test, and readers of normal ability outperformed readers with a learning-disability, reaching statistical significance,  $F(1) = 7.17, p < .01$ .

Statistical significance was reached in reading-ability group,  $F(1, 36) = 16.37, p < .01$ , with the readers of normal ability scoring higher than the students with a reading learning-disability on all author-constructed rhythm pattern tests. For the rhythm perception and rhythm performance tests, the investigator presented rhythms presented tapped on a woodblock, played on a piano, and by tapping on a woodblock while someone says the rhythms using “ta ti-ti” mnemonics. On the performance test, three rhythms were join-in responses, and the other three were echo responses.

A statistically significant difference occurred between the students with different reading abilities on join-in and echo tasks,  $F(2, 72) = 7.85, p < .01$ , with the normal-readers performing

nearly twice as accurately as the learning-disabled readers on both tasks. Scheffé post hoc analysis reveal the tapped and spoken presentation was better than the tapped and melodic, supporting the implementation of mnemonics aiding both groups of children. The author concludes simple rhythms are perceived similarly by both groups; however, difficult rhythms are perceived differently in children in the reading groups.

Agre (1991) implemented a three step process of practicing rhythms by rote, presenting long and short line icons, followed by the presentation of standardized notation to teach rhythm-reading to third-grade students in Missouri. Students were classified by achievement on a state standardized math test into students of high ( $n = 17$ ), middle ( $n = 43$ ), and low ( $n = 36$ ) achievement. The study was a pretest-treatment-posttest design, with the same 35-item investigator-constructed pretest serving as the posttest. Treatment occurred during regularly scheduled 25-minute music classes, three times a week, for seven weeks.

There was a statistically significant difference in pretest scores between students with high and low math achievement,  $t(4.69)$ ,  $p < .001$ , with the high group scoring eight points higher. There was a statistically significant gain for all achievement levels from pretest to posttest ( $p < .001$ ). All grades averaged a 13- to 14-point gain from pretest to posttest, yet statistical significance was still reached between high and low achievers on the posttest,  $t(3.70)$ ,  $p < .001$ . These results support Atterbury (1983) and that academic achievement influences rhythmic performance.

Williams (1987) measured the effectiveness of the subdivision and durational counting methods on rhythm-reading instruction in fifth-grade students ( $N = 97$ ). Specifically, one of the hypotheses questioned the effectiveness of treatment on students with different academic levels. Academic achievement was determined by a state standardized test. Intact classes were

randomly assigned the control group, the subdivision treatment, or the durational treatment. Treatment occurred weekly for 20-minutes for seven consecutive weeks.

The written rhythm test and verbal rhythm-reading test were used as pretest and posttest. Statistical significance was reached in academic achievement on written rhythm posttest,  $F(1) = 7.767, p < .007$ , and on the verbal rhythm-reading posttest,  $F(2) = 5.174, p < .008$ . This suggests academic achievers is a factor in rhythm learning; however, the appropriate post hoc test were not run to determine between group differences. In summary, several researchers find academic achievement influences music achievement, specifically rhythm achievement, yet students with learning disabilities are still able to grow in musical achievement (Agre, 1991; Atterbury, 1983; Williams, 1987).

### **Length of Instructional Time**

A wide range of instructional time is spent teaching rhythm-reading to subjects in many studies. Egbert (1990) concluded the amount of instructional time combined with concept repetition are effective rhythm-reading instructional strategies. In his study, a total of 77-minutes over nine weeks was found effective in teaching 15 different rhythmic elements in the choral setting, but the researcher conceded that was too many rhythmic elements for that period of time for study participants. Major (1982) found three and a third hours of rhythm-reading instruction over 10-weeks effective in a choral setting.

Studies in the instrumental setting spend a great deal more time on instruction, but there are other components, such as instrument playing techniques, sharing this instructional time. Boyle (1970) found seven hours of foot-tapping instruction over 14 weeks effective. Kelly (1997) found 4.16 hours over 10 weeks of instruction on conducting and rhythm-reading practice effective. Kendall (1988) spent over 26.66 hours of instruction over 16 weeks, but the main

focus was teaching aural musicianship and instrument performance skills. Stevens (1992) spent 13.33 hours teaching beginning band students basic performance skills and how to melodies play by ear over 20 weeks.

In the elementary setting, studies focused on explicit rhythm-reading instruction range from 15-minutes to 20 hours of rhythm-reading instruction. Shehan (1987) and Persellin (1992) found students could reproduce rhythms presented visually in one 15-minute session. Williams (1987) spend two and a third hours on rhythm-reading instruction over seven weeks. McCuiston (1990) found three hours of rhythm-reading instruction over eight weeks effective, while McDonald (1991) found three hours over 12 weeks of rhythm-reading instruction on the recorder effective. Rogers (1996) spent 3.83 hours teaching rhythms using colored notation over 23 weeks. Participants in Bebeau's (1982) study studied rhythms for four and a half hours over 18 consecutive days. Palmer (1976) spent at least 20 hours on rhythm-reading instruction over a five month period. Agre (1991), Colley (1987), and Gauthier and Dunn (2004) did not provide enough information to specify the total time spent on rhythm-reading instruction, yet there were between six and 21 sessions.

Time spent on rhythm-reading instruction varies from 15-minutes to 20 hours in the choral, instrumental, and elementary setting. In addition, these studies ranged from six lessons to 23 weeks of instruction on rhythm-reading instruction. Often, secondary music teachers see their students daily or every other day, while elementary music teachers meet their classes with less frequency. Since instructional time is limited for music specialists, knowledge of the minimal amount of time spent on rhythm-reading instruction for student mastery could lead to increased teacher efficacy and decreased student boredom.

## Summary

A review of the research literature reveals rhythm-reading instruction is effective in the choral, instrumental, and elementary settings using a variety of approaches, counting methods, and mnemonics. Much of the research occurred during the last 35 years. Nine studies used instrumental students, and two studies used high school choral students. Two studies had college participants, and 11 studies were conducted in the elementary setting. All students are capable of rhythm-reading achievement when appropriately presented for their age and ability level.

While a wide range of instructional time was spent on rhythm-reading with success, music teachers have limited time with students to achieve program goals. Proficient music reading skills impact student performance and music achievement. There is a void of research on the effects of instructional time on rhythm-reading achievement. In addition, there is a void on retention of learning in rhythm-reading achievement. Further research is needed on the effects of length of rhythm-reading instructional time on learning and retention to increase teacher efficacy and ensure student attention.



## CHAPTER 3

### METHOD

#### Restatement of Purpose of Study and Research Questions

This chapter describes the population, instrumentation, procedures, data collection, and data analysis to be implemented in this study. The purpose of this study is to measure the effectiveness of five-minutes and ten-minutes of rhythm-reading instruction on second-grade students. One-sample *t*-tests, a Univariate ANOVA, and an experimental, repeated-measure ANOVA, posttest-delayed posttest design will be used to answer the following research questions.

1. How effective is five-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
2. How effective is ten-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
3. Is there a difference on rhythm-reading achievement between students who received five-minutes of instruction and students who received ten-minutes of instruction?
4. After two weeks of no rhythm-reading instruction, will students retain rhythm-reading achievement?
5. After two weeks of no rhythm-reading instruction, is there a difference in rhythm-reading retention achievement between students who received five-minutes of weekly instruction and students who received ten-minutes of weekly instruction?

## School and Participants

The eligible participants for this study were second-grade students ( $N = 166$ ) from an elementary school that includes kindergarten, first grade, and second grade. The elementary school is in a town that is centered around a medium-to-large sized university in the southern United States. All second-grade students in this school were eligible to participate in this study except three students in the self-contained exceptional learner class. These three exceptional students had excessive absences in music class throughout the year that could have affected rhythm-reading preparation. In addition, one student is non-verbal, and the other two students have processing and verbal limitations. The working population for this study consisted of 83 males and 80 females ( $n = 163$ ) divided among 8 different intact second-grade homeroom classes. The cultural breakdown for the working population was Caucasian ( $n = 104$ ), African-American ( $n = 41$ ), Asian ( $n = 10$ ), Hispanic ( $n = 6$ ), and Multi-race ( $n = 2$ ) students. Fifty-one (31%) students received a free or reduced lunch, while the remaining 112 (69%) students did not. Student ages ranged from 7 to 9 years. Data for students who missed one or more of the three treatment sessions were not included in analysis; however, they did participate in all three of the testing sessions.

The students in this school received one 45-minute music lesson each week from a music specialist, who is also the researcher. Almost all of the participants have had group music instruction by two different music specialists once a week for two school years. The reason for this was a reconfiguration of the school system. Originally, the system had one kindergarten school and the remaining elementary schools contained grades 1 through 5. In the fall of 2013, the system split all schools into two different levels, either a kindergarten through grade 2, or grade 3 through grade 5. Because of the reconfiguration, the researcher was also the new music

specialist in this school; furthermore, it is unknown the exact amount of prior rhythm-reading instruction students received in their two previous years in school (kindergarten and first grade). The working population for this study consisted of students whose parents or guardians consented to have them participate in the study. According to Cohen (1988), a minimum of 25 participants per group ( $N = 50$ ) were needed for this study to produce a medium effect size ( $\eta^2 = .08$ ).

### **Instrumentation**

The researcher directly measured reading four-beat rhythms using patterns from unit one of *Conversational Solfège* (Feierabend, 2001), which focused on quarter notes and paired eighth notes. The process through which the researcher measured rhythm reading ability was based on *Conversational Solfège* (Feierabend, 2001). Patterns Set 1A (Figure 1) is a series of eight patterns used in rhythm-reading instruction and activities during the study, making these patterns familiar to students. Patterns Set 1B (Figure 2) were not used in instruction and thus were unfamiliar to the students.



Figure 1. Patterns Set 1A from *Conversational Solfège* (Feierabend, 2001).  
Used with permission by GIA Publications.



Figure 2. Patterns Set 1B from *Conversational Solfège* (Feierabend, 2001).  
Used with permission by GIA Publications.

### Pretest

A pretest measuring rhythm-reading ability was individually administered to participants.

Two rhythms from patterns set 1A and two rhythms from patterns set 1B created the assessment (Figure 3).

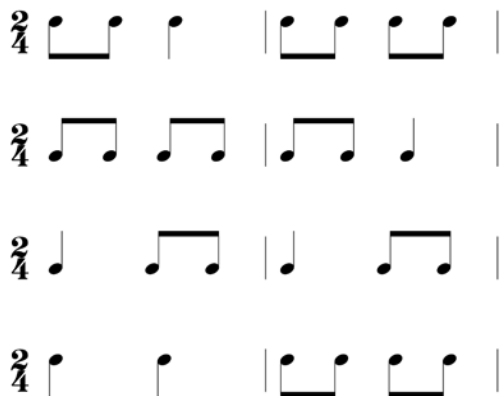


Figure 3. Pretest Rhythms.

## Posttest I and II

Following treatment, posttest I was individually administered to students to measure rhythm-reading ability. It is comprised of two rhythms from pattern set 1A and two rhythms from pattern set 1B (Figure 4). These rhythms were different than the ones used in the pretest. Posttest II was individually administered to students to measure retention of rhythm-reading ability following two weeks of no instruction. Posttest II contained the same rhythms used in the pretest but in a different order (Figure 5).

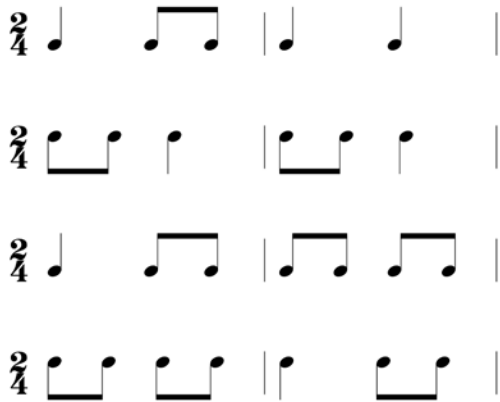


Figure 4. Posttest I Rhythms.

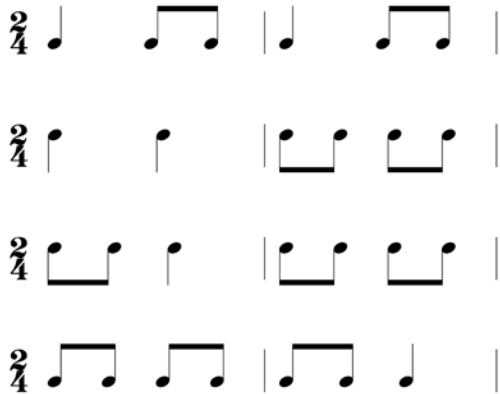


Figure 5. Posttest II Rhythms.

### **Pre- and Post-test Administration**

During planning periods the week before treatment, the researcher individually assessed participants' abilities of rhythm-reading performance by showing a four-beat rhythm and asking students to read it. Students were shown one rhythm at a time on a piece of paper, and the researcher used a script with both researcher and participant instructions (Appendix A). If the student was unable to read two rhythms, the pretest ended. If the student attempted to read a rhythm, the pretest continued. Student participants' attempts at reading the rhythm(s) were audio recorded using a free voice recorder application on an iPad 2 (64GB hard drive) and subsequently played for the scoring judge.

Posttest I was administered immediately following treatment in the third week of instruction. Posttest II was administered two weeks after the treatment period. During those two weeks, student participants received no additional rhythm-reading instruction or review. Both posttests used the same presentation and recording procedures as the pretest using the posttest script found in Appendix A.

### **Pre- and Post-test Scoring**

Pretest, posttest I, and posttest II scoring was identical, since the tests were identical in format. One point was awarded for each note performed with the correct syllable and duration. Pilot study testing revealed the need to account for rhythmic performance to a steady beat; therefore, an additional point was awarded for each four-beat rhythm pattern performed with a steady beat. Each rhythm pattern had a five-point maximum, making the total maximum score for each test 20-points. The researcher and an additional trained judge scored each students' performance.

## **Procedures**

Several steps occurred before testing and treatments began. Internal Review Board (IRB) approval for any research conducted by faculty and students was obtained. To that end, there were several steps completed before IRB approval was granted. First, permission to conduct a research study in this school was achieved by completing a required research application with the school system. Once this was granted, the school principal composed a letter for the IRB showing support for conducting the research at the school. The IRB application was then submitted with school and school system supporting documents.

Though this is a research study, all of the students in the second-grade will receive the treatment as their normal music instruction. Those student participants who did not want to participate in the research study or whose parents or guardians did not want to participate did not submit an IRB-approved form. It must be noted that since the treatment and testing was part of the regular music study at this school, all students did participate in pretest, treatment, and posttest sessions. Data for those who withdrew were not used in this study, but they were used for the normal musical learning assessment at the school.

After IRB approval was gained, information letters, and consent forms (Appendix B) were sent home with eligible students. Due to the many English language learners in the population, a school system endorsed form in the parents' primary language was also attached to the paperwork stating the importance of the attached document and to have it translated. There was no incentive for participation in the study. Returned forms were kept in the grade level chair's classroom in a manila envelope in a locked filing cabinet until the completion of the pretest, treatment, and two posttests. Once the data collection process was completed, those students who had a consent form had their data analyzed.



There were two treatment groups for this study: Group 1 and Group 2. Treatment occurred during three consecutive regularly scheduled music class sessions. Classes met for 45-minutes in each lesson, but the treatment period was only five- or ten-minutes of the total lesson time (45 minutes). Group 1 received five-minutes of rhythm-reading instruction in each lesson, for a total of 15-minutes of instruction/treatment. Group 2 received ten-minutes of rhythm-reading instruction in each lesson, for a total of 30-minutes of instruction/treatment. The researcher-teacher used a timer in each class to ensure that the each group received the correct amount of rhythm instruction time (five-minutes for Group 1 and ten-minutes for Group 2). The researcher followed the same sequence of activities for both groups; however, when the timer rang, the researcher immediately quit the rhythm-reading activity and transitioned to the next activity, which was a singing activity. Following each rhythm lesson session in each group, the researcher marked the place in the lesson where the timer ended.

Treatments involved techniques suggested in steps six and seven of Feierabend's *Conversational Solfège* (2001). The sequence of techniques, or activities, remained the same for both groups in all teaching/treatment sessions. Results from an initial pilot study, suggested that students got faster at activity execution with each lesson; therefore, six techniques, or activities, were planned for instruction. Fewer techniques were implemented in the first session, and more activities were used in the final session.

During each treatment session, both groups began with "Choral Reading" (whole group visual presentation and reading) of Pattern Set 1A on the board. The researcher read the first rhythm aloud using Gordon mnemonics while pointing to the notation. This was followed by a brief pause followed by the researcher providing a tempo and counting the students into reading the rhythm allowed, saying "1 – 2 – Ready – Go." As a whole group, students repeated the

syllables as the researcher pointed to each note. This process was repeated for the remaining seven rhythms of Pattern Set 1A. When students made an error, the researcher pointed to the rhythm and read it aloud correctly for the students. The students then looked at the rhythm and repeated it in the same fashion as above, with the researcher counting them off.

Following the “Choral Reading” of Pattern Set 1A on the board, “Flashcards” were used. Each pattern from set 1A was placed on a flashcard. Students viewed a flashcard and were given a brief moment of silence to think each pattern. The researcher counted the students off providing a tempo, saying “1 – 2 – Ready – Go.” The students read the pattern aloud as a whole group. Students were permitted to lightly tap the rhythm in addition to speaking it if desired. When students made an error, the researcher instructed all students to carefully think the rhythm again to themselves and then to speak it aloud again. The researcher counted them off again in the same way as before. The flashcard order varied for each lesson to ensure students were not memorizing rhythms in order.

Next, a game called “Stop and Go” was played with Pattern Set 1A on the board. In this game, students alternated between speaking and inner hearing parts of the rhythm. For example, the teacher asked the boys to speak only the quarter notes, while girls speak only the eighth notes. Then, students switched roles. The rhythmic performance was repeated if students made an error. Other performance options for this activity included speaking alternating measures, specific beats, or specific rhythm patterns and inner hear the rest of the rhythm. It was important for the researcher to have some flexibility in the presentation of this game in order to prevent boredom among students.

Students then played “Read and Remember.” The teacher displayed a flashcard for four-beats and instructed students to think the rhythm. The flashcard was removed, and students were

asked to recall the pattern from the card in a choral response. Following “Read and Remember,” students played “Take a Reading Walk.” The researcher prepared paper plates with a Pattern Set 1A rhythm on each plate. There was one plate for each student, and plates were placed in a circle. All students read the four-beat pattern on the plate in front of them at the same time. Students walk in the circle for four-beats to the right and stop in front of the next plate. All students then read the rhythm on their new plate. The reading and rotating repeated until either the timer buzzed or until all students had read all the patterns. The final activity was “I Think I Made an Error.” The researcher displayed a rhythm on a flashcard and read the pattern aloud purposefully making one error. As a group, students identified where the error occurred, followed by speaking the rhythm correctly.

### **Data Collection and Analysis**

All students participated in the pretest, treatment, and posttest sessions. As previously stated, the rhythm-reading pretest was individually administered one week before treatment during the researcher’s planning time. Posttest I was individually administered in the class immediately following the third treatment session. Posttest II individually administered following an additional two weeks of no rhythm-reading instruction.

All data were entered into SPSS. One-sample *t*-tests, a univariate ANOVA, and a repeated measures ANOVA were run to examine the effects of five- and ten-minutes of rhythm-reading instruction and retention. In addition, descriptive statistics were reported.

## **CHAPTER 4**

### **RESULTS**

This chapter provides the results of data analysis and findings of this study. It begins with demographic data about the respondents followed by the reporting of the results of data analysis for each research question.

#### **Sample**

While 133 students submitted consent forms, only 128 are counted in the sample. Three students were absent during treatment. As a result, their data was incomplete and not used in this study. Exploratory analysis revealed four outliers on posttest one and six outliers on posttest two. The lowest scoring outliers on posttest two were eliminated because they misread all quarter notes as “du day” and paired eighth-notes as “du.” These students scored four-points out of 20 possible for an accurate steady beat. The remaining four outliers scored between six-points and 12-points on posttest one. While they were still outliers on posttest two, all of their raw scores increased by at least one-point and were included in analysis. Demographically, the sample included 65 males and 63 females. In addition, ethnicities for the sample were Caucasian ( $n = 84$ ), African-American ( $n = 24$ ), Asian ( $n = 10$ ), Hispanic ( $n = 3$ ), and Multi-race ( $n = 2$ ). Finally, the five-minute group had 67 students, and ten-minute group had 61 students.

#### **Test Results for Each Group**

The results for each student in the five-minute group and each student in the ten-minute group are reported in this section. As stated in the method section, the pretest, posttest 1 and posttest 2

each included a total of 20-points per judge, and the scores were determined by the researcher and an independent additional judge. The absolute value of difference in rater scores was two. An interrater reliability coefficient,  $r = 0.97$ , was obtained for posttest one, and an interrater reliability coefficient,  $r = 0.99$ , was obtained on posttest two. All students scored zero on the pretest. Since the absolute value of difference was small and a high interrater reliability coefficient was reached for all scores, only the researcher's scores were used in data analysis. Table 1 lists the raw data for the pre- and posttest scores for each student in the five-minute group. Table 2 lists the pre- and posttest scores for the ten-minute group.

Table 1

*Five-Minute Group Pre-and Posttest Scores – Judges 1 and 2*

Student	Pretest	Judge 1	Judge 2	Judge 1	Judge 2
		Posttest 1	Posttest 1	Posttest 2	Posttest 2
1	0	17	17	20	20
2	0	16	18	18	18
3	0	17	17	17	17
4	0	20	20	20	20
5	0	16	17	18	19
6	0	17	19	20	20
7	0	19	19	20	20
8	0	19	19	19	19
9	0	17	17	20	19
10	0	14	15	17	16
11	0	19	18	19	19
12	0	18	18	20	20
13	0	19	20	20	20
14	0	19	19	20	20
15	0	20	20	20	20
16	0	18	18	20	20
17	0	20	20	20	20
18	0	20	20	20	20
19	0	13	12	14	13
20	0	14	15	18	18
21	0	20	20	20	20
22	0	16	16	18	18

Table Continues

Table 1 (continued)

Student	Pretest	Judge 1	Judge 2	Judge 1	Judge 2
		Posttest 1	Posttest 1	Posttest 2	Posttest 2
23	0	20	20	20	20
24	0	18	19	20	20
25	0	16	17	20	20
26	0	18	19	20	20
27	0	20	20	20	20
28	0	18	18	20	20
29	0	17	17	20	20
30	0	10	10	12	12
31	0	20	19	20	20
32	0	12	14	15	15
33	0	20	20	20	20
34	0	18	18	19	19
35	0	16	17	17	18
36	0	20	20	20	20
37	0	20	20	19	19
38	0	20	20	20	20
39	0	18	19	20	20
40	0	19	19	19	19
41	0	18	20	19	19
42	0	18	18	18	18
43	0	17	17	20	20
44	0	17	17	17	15
45	0	18	18	19	19
46	0	20	19	5	4
47	0	18	19	18	18
48	0	18	18	18	18
49	0	17	16	17	16
50	0	18	18	18	18
51	0	18	18	19	19
52	0	16	16	19	19
53	0	18	18	19	19
54	0	20	20	20	20
55	0	20	20	19	19
56	0	20	20	15	15
57	0	19	18	20	20
58	0	16	17	17	17
59	0	17	17	18	17
60	0	19	19	19	19
61	0	20	19	20	20
62	0	17	17	19	19

Table Continues

Table 1 (continued)

Student	Pretest	Judge 1	Judge 2	Judge 1	Judge 2
		Posttest 1	Posttest 1	Posttest 2	Posttest 2
63	0	20	20	20	20
64	0	20	20	20	20
65	0	19	19	20	19
66	0	19	20	20	20
67	0	19	19	19	19

*Note.* All students scored a “0” on the pretest.

Table 2

*Ten-Minute Group Pre- and Posttest Scores*

Student	Pretest	Judge 1	Judge 2	Judge 1	Judge 2
		Posttest 1	Posttest 1	Posttest 2	Posttest 2
1	0	20	19	20	20
2	0	19	19	20	20
3	0	15	15	20	20
4	0	17	17	19	19
5	0	15	15	19	19
6	0	20	20	20	20
7	0	20	20	20	20
8	0	18	17	19	19
9	0	18	17	20	20
10	0	18	18	4	4
11	0	18	18	20	20
12	0	20	20	19	19
13	0	18	18	19	20
14	0	20	20	20	20
15	0	16	16	17	18
16	0	19	18	20	20
17	0	19	18	20	20
18	0	20	20	17	17
19	0	20	20	16	16
20	0	17	17	20	20
21	0	17	16	20	20
22	0	19	20	19	19
23	0	20	19	17	17
24	0	20	20	20	20
25	0	20	20	20	20
26	0	20	20	20	20

Table Continues

Table 2 (continued)

Student	Pretest	Judge 1	Judge 2	Judge 1	Judge 2
		Posttest 1	Posttest 1	Posttest 2	Posttest 2
27	0	19	18	20	20
28	0	20	20	20	20
29	0	6	6	10	10
30	0	19	18	20	20
31	0	19	19	20	20
32	0	20	20	20	20
33	0	19	19	20	20
34	0	18	18	19	19
35	0	15	15	20	20
36	0	16	16	13	13
37	0	14	15	20	20
38	0	20	19	19	17
39	0	19	20	19	19
40	0	17	16	16	16
41	0	8	9	13	13
42	0	20	20	19	20
43	0	20	20	20	20
44	0	20	20	20	20
45	0	19	19	20	20
46	0	20	20	20	20
47	0	15	16	16	16
48	0	19	19	20	20
49	0	19	19	19	19
50	0	16	14	16	16
51	0	18	18	19	19
52	0	19	19	20	20
53	0	19	19	20	20
54	0	15	15	20	20
55	0	19	19	15	15
56	0	20	20	19	19
57	0	15	16	19	19
58	0	16	16	20	20
59	0	20	20	20	20
60	0	16	16	20	20
61	0	18	18	20	20

*Note.* All students scored a “0” on the pretest.



## Comparative Findings

In order to test the effectiveness of five-minutes of weekly rhythm-reading instruction over three consecutive weeks, a one-sample *t*-test was conducted. Table 3 presents descriptive statistics for both groups on the pretest and both posttests. The test value was zero because all pretest scores were zero, thus there was no variability within the group. Assumptions of one-sample *t*-tests are random sampling, interval scale, and normal distribution; however, the assumption that the population is normally distributed was not reflected in the sample (skewness = -1.81). According to Mertler and Vannatta (2010), the assumption could be made if scores were transformed by reflecting and inverting them. Using the transformed scores, there was a statistically significant difference for the five-minute group ( $M = 18.18$ ,  $SD = 1.946$ ) on rhythm-reading ability,  $t(66) = 13.375$ ,  $p < .001$ . These results suggest five-minutes of weekly rhythm-reading instruction over three consecutive weeks is effective.

A one-sample *t*-test comparing the effectiveness of ten-minutes of weekly rhythm-reading instruction administered over three consecutive weeks was conducted. There was no variability within the group because all students scored zero on the pretest, making the test value zero. Assumptions of one-sample *t*-tests are random sampling, interval scale, and normal distribution. Using the transformed scores, statistical significance was reached for the ten-minute group ( $M = 17.85$ ,  $SD = 2.613$ ) on rhythm-reading ability,  $t(60) = 12.110$ ,  $p < .001$ . These results suggest ten-minutes of weekly rhythm-reading instruction over three consecutive weeks is effective.

A univariate ANOVA was conducted to compare the effect of group on rhythm-reading scores from pretest to posttest one. Assumptions for ANOVAs are normal distribution, random and independent sampling, and equal variance. Using transformed scores, Levene's test

confirmed equal variances between the groups ( $p = .629$ ). With an alpha level of .05, a univariate ANOVA showed no statistically significant difference between groups on rhythm-reading ability,  $F(1,1) = .003$ ,  $p = .957$ , suggesting five-minutes of rhythm-reading instruction is as effective as ten-minutes.

A repeated measures ANOVA was conducted to measure the rhythm-reading retention. Using transformed scores, assumptions for the repeated measure ANOVA are met. Two outliers were excluded from all analysis, and the dependent variable is test scores. Statistical significance was reached between posttest one and posttest two,  $F(1, 126) = 26.219$ ,  $p < .001$ , with the higher mean at posttest two. Statistical significance was not reached between groups,  $F(1, 126) = 1.326$ ,  $p = .252$ , suggesting five-minutes of weekly rhythm-reading instruction for three weeks is equally as effective as ten-minutes.

Table 3

*Pretest and Posttests descriptive statistics*

Group	<i>n</i>	<u>Pretest</u> <i>M(SD)</i>	<u>Posttest 1</u> <i>M(SD)</i>	<u>Posttest 2</u> <i>M(SD)</i>
Five-minute	67	0(0)	18.18(1.946)	18.79(1.737)
Ten-minute	61	0(0)	17.85(2.163)	18.84(2.091)

## **CHAPTER 5**

### **DISCUSSION**

This chapter contains a summary, conclusions, discussion, and recommendations for further research.

#### **Summary**

More research is needed to develop and solidify theories on music reading, and ideally, this study will contribute to the growing body of music literacy literature. This study measured the effects on length of instruction time on rhythm-reading learning and retention. The research questions were

1. How effective is five-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
2. How effective is ten-minutes of rhythm-reading instruction delivered weekly for three consecutive weeks?
3. Is there a difference on rhythm-reading achievement between students who received five-minutes of instruction and students who received ten-minutes of instruction?
4. After two weeks of no rhythm-reading instruction, will students retain rhythm-reading achievement?
5. After two weeks of no rhythm-reading instruction, is there a difference in rhythm-reading retention achievement between students who received five-minutes of weekly instruction and students who received ten-minutes of weekly instruction?

Literature suggests explicit rhythm-reading instruction is effective for elementary, middle, and high school students in general music class, choir, and band settings (Agre, 1991; Anderson, 1981; Barnes, 1964; Bebeau, 1982; Boyle, 1970; Colley, 1987; Drake, 1968; Egbert, 1990; Fust, 2006; Gauthier & Dunn, 2004; Heim, 1973; Jetter, 1985; Kendall, 1988; Major, 1982; McCuiston, 1990; McDonald, 1991; Palmer, 1976; Pierce, 1992; Rogers, 1996; Stevens, 1992; Williams, 1987). A large body of literature supports presenting the notation simultaneously with the sound and presenting the sound before the notation as effective (Bebeau, 1982; Egbert, 1990; Fust, 2006; Gauthier & Dunn, 2004; Kendall, 1988; Major, 1982; McCuiston, 1990; McDonald, 1991; Palmer, 1976; Persellin, 1992; Shehan, 1987; Stevens, 1992; Williams, 1987). The use of programmed instruction is also effective in various classroom settings (Anderson, 1982; Barnes, 1964; Bobbitt, 1970; Heim, 1973). Notation variations, such as the use of icons, colored notes, or barlines, bring varied results (Agre, 1991; Byo, 1988; Gauthier & Dunn, 2004; McCuiston, 1990; Rogers, 1996). Research suggests conservation in music can be taught (Foley, 1975; Pfloderer, 1964; Zimmerman & Sechrest, 1970).

Counting systems and the use of mnemonics are effective in all settings when teaching rhythm-reading, although results for which method is more effective vary from setting and student age (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Brittin, 2001; Colley, 1987; Drake, 1968; Fust, 2006; Gauthier & Dunn, 2004; Major, 1982; Pierce, 1992; Shehan, 1987; Williams, 1987). There are also studies analyzing demographic influence on rhythm-reading achievement (Agre, 1991; Atterbury, 1983; Kendall, 1988; Persellin, 1992; Schleuter & Schleuter, 1985; Shehan, 1987; Williams, 1987; Zimmerman & Sechrest, 1970).

Second-grade students in an elementary school in a major university town in the southeastern United States were given weekly rhythm-reading instruction on quarter note and paired eighth

note rhythms for three consecutive weeks. Prior to instruction, all students scored zero on an individually administered pretest that consisted of four rhythms. Half of the intact classes received ten-minutes of weekly instruction, while the other half received five-minutes of weekly instruction. Immediately following the third treatment session, a posttest of four rhythms that students individually read aloud was administered. Results suggest both five-minutes ( $p < .001$ ) and ten-minutes ( $p < .001$ ) of instruction is effective for three weeks, and there was not a statistical significance reached between the groups ( $p = .421$ ). A second posttest was individually administered to all students after two weeks of no rhythm-reading instruction. Results suggest rhythm-reading ability was retained ( $p < .001$ ), and statistical significance was not reached between the groups ( $p = .244$ ).

### **Conclusions**

Findings suggest five-minutes of rhythm-reading instruction for three consecutive weeks is a sufficient length of instructional time for teaching second-grade students basic quarter note and paired eighth-note rhythms; furthermore, students are able to retain rhythm-reading knowledge after two-weeks of no instruction.

### **Discussion**

While this study does not fully answer the questions regarding how and when music reading should be taught (Gudmundsdottir, 2010; Hodges, 1992; Hodges & Nolker, 2011; McPherson & Gabrielsson, 2002), it does provide data to help narrow the answer by suggesting some rhythm-reading basics can be effectively taught to second-grade students in as little as five-minutes a week. These findings align with existing research that explicit rhythm-reading instruction is effective in the elementary general music setting (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Colley, 1987; Foley, 1975; Gauthier & Dunn, 2004; Jetter, 1985; McCuiston,

1990; McDonald, 1991; Palmer, 1976; Persellin, 1992; Richards, 1971; Rogers, 1996; Shehan, 1987; Williams, 1987; Zimmerman & Sechrest, 1970). Feierabend's (2001) *Conversational Solfège* utilizes a sound-before-sight approach to music literacy and was used throughout the year to prepare students to read rhythms; therefore, findings support existing sound-before-sight research as an effective rhythm-reading approach in the elementary setting (McCuiston, 1990; McDonald, 1991). This study supports McCuiston (1990), whose research suggests elementary students can be successfully taught standard notation without iconic representation first. Several studies support the effectiveness of mnemonics in teaching rhythm-reading (Agre, 1991; Atterbury, 1983; Bebeau, 1982; Colley, 1987; Fust, 2006; Major, 1982; Pierce, 1992; Shehan, 1987), and this study's use of Gordon's "du" and "du-day" can be added to this body of literature. Since existing research supports rhythmic performance accuracy increasing with maturation (Atterbury, 1983; Persellin, 1992; Schleuter & Schleuter, 1985; Shehan, 1987; Zimmerman & Sechrest, 1970), perhaps five-minutes of intense rhythm-reading instruction could be effective with older students.

During exploratory analysis, four cases were outliers on posttest one and six cases on posttest two. The two lowest-scoring outliers on posttest two reversed the quarter notes and eighth-notes. The remaining four cases showed improvement from posttest one to posttest two. A further look into these four students revealed one has an IEP for reading and math. A second student has failed math and reading for the existing school year and will repeat second-grade. A third student received English language learning services throughout the school year, and the remaining student received no services and passed second-grade. Three of these individual cases align with existing research suggesting the potential influence of academic achievement,

specifically in reading or math, on rhythmic performance (Agre, 1991; Atterbury, 1983; Williams, 1987).

There are other factors that may have influenced performance scores. First, the treatments were fast-paced and intense. The researcher is very energetic when teaching and instructs every class with a sense of urgency and anticipation, whether conducting a study or not; therefore, teacher affect could be an influencing factor on test performances, learning, and retention. Wright, Horn, and Sanders (1997) credit the teacher as the foremost influence on student learning. In addition, Marzano's (2003) meta-analysis determined instructional strategies, classroom management, and classroom curriculum design as the three teacher-level factors impacting student achievement. Students were very engaged during treatment due to quickly changing activities and active participation, which also could have impacted scores.

Another potential factor influencing scores is the use of an iPad 2 to individually record students reading rhythms. While the researcher had individually assessed students through oral performance throughout the school year, this was the first time the students were audio recorded. When asked to individually read rhythms on the first posttest, the iPad 2 was visible to the students, potentially causing some to become nervous and misread the first rhythm. Usually, the remaining three rhythms were read correctly. For the second posttest, the iPad 2 was again visible; however, it did not seem to make the students uncomfortable. This could be why students frequently missed reading the first rhythm correctly on posttest one and why the posttest two mean is statistically significantly higher.

The higher mean on the second posttest is interesting. Students received no music instruction from the researcher during the two weeks between the posttests, partly because of spring break. Students were administered the second posttest during the first music class

immediately following spring break. Research indicates a strong positive correlation between sleep and memory function (Curcio, Ferrara, & Gennaro, 2006; Peigneux, Laureys, Delbeuck, et al., 2001; Smith, 1995). The lack of quality and quantity of sleep “can seriously impair students’ cognitive functioning and behavioural performance” (Curcio, Ferrara, & Gennaro, 2006, p. 332), such as impaired mood and daytime sleepiness. Perhaps, the week of spring break enabled students to return to school well-rested, which could have caused scores on the second posttest to increase.

In conclusion, there are many possible factors could have effected rhythm-reading ability; however, both groups reached statistical significance in rhythm-reading ability ( $p < .001$ ) from pretest to posttest one suggesting five- and ten-minutes of weekly rhythm-reading instruction for three weeks is effective. Since statistical significance between groups was not reached on posttest one ( $p = .252$ ), one can conclude that five-minutes of instruction is just as effective as ten-minutes of instruction. Statistical significance was reached between posttest one and posttest two ( $p < .001$ ) with the higher mean at posttest two, which suggests students retained and even improved in rhythm-reading ability after two weeks of no instruction.

### **Limitations**

There were limitations of the researcher for this study and methodological limitations. The researcher was the subjects’ music teacher, which could lead to bias. Several accommodations were made to prevent bias. A timer was used during treatment administration. Pretest and posttest scores were given by the investigator and an independent judge. Consent forms were not collected until the conclusion of the study to prevent coercion. To avoid the Hawthorne effect, the study was not mentioned to the students, and it occurred as part of regular music instruction.



The researcher and additional judge encountered an issue with scoring regarding what to do when students self-correct the rhythm-reading performance. The researcher and judge paused the recording, agreed to not count the mistake, and count the correction. Sometimes, this would result in the student losing a point for missing the steady beat; however, if the student started re-reading the rhythm from the beginning and performed it correctly with a steady beat, all five-points were awarded for that rhythm. Self-correcting occurred several times and should be considered in how to score should this study be replicated. In addition, students should be informed what to do if they realize a rhythm has been performed incorrectly.

As previously stated, this was the first time students were individually audio recorded for an assessment. Students frequently misread the first rhythm on posttest one, but the remaining three rhythms were read correctly. Students did not seem as nervous or distracted by the iPad on the delayed posttest, which could attribute to the higher mean. Sometimes, students knew they had performed the rhythm incorrectly and would grimace but refrain from verbalizing their disappointment. If replicating the study, individual audio recorded assessments should be a regular routine, and students should be informed what to do if they realize a mistake has been made.

### **Further Research**

While this study answered some questions regarding the effective of instructional time on rhythm-reading learning and retention in second-grade students, many new questions arise. When analyzing the raw data, it appears students with IEPs, failing students, and students receiving English language learning services performed slightly below everyone else. This is the case with more than just the outliers mentioned earlier. Music reading research on mainstreamed exceptional learners, English language learners (ELLs), and failing students in the elementary

music classroom is very limited or nonexistent. There is a growing body of literature on using music to help ELLs in reading, but specifically, there is a lack of research on ELLs and music reading in any music setting at any age.

There appears to be a possible positive correlation between seven- to nine-year-old students who struggle in reading and math and music reading (Atterbury, 1983). Investigating this relationship could help educators understand how to more effectively teach these learners but could also enlighten an area in developing a music reading theory. Since there is not an agreed upon music literacy learning theory, more research is still needed on music reading.

Investigation into the effects of holiday and summer breaks and morning or afternoon instructional time on music reading skill is another area worth investigating. If this study was replicated during a time of the school year when there are no holidays or breaks from school, would results be the same? How much music reading review is needed at the start of a new school year to regain a high level of music reading skill? Study participants had regular scheduled music after lunch and near the end of the school day. Does the time of instruction, such as having music in the morning or in the afternoon, affect learning and retention?

Results of this study suggest five-minutes of weekly rhythm-reading instruction is effective for second-grade students. Is the same true for other grades, specifically elementary and early childhood grades? What if frequency of instruction were increased? Would the results be the same? Why were students able to retain, and some improve, rhythm-reading skill after two weeks without instruction? If this study were replicated using basic three-pitch melodic patterns, would the results be the same? Does teacher affect or high student engagement impact music reading skill? If different activities had been used to practice reading rhythms, would

results be the same? In conclusion, many questions and areas for further research remain unanswered.

### **Implications**

Since students are able to learn basic rhythm-reading skills and retain it after 15-minutes of total instruction, music teachers can more effectively plan and implement music literacy into their lessons. Student learning and experiencing other aspects of music can increase due to the little time needed for rhythm-reading instruction. In addition, students may be more engaged and stay focused because the rhythm-reading teaching segment can be short. Teachers can slightly relax when students are absent or miss a week of instruction because student retention level is still high or has improved. In regards to helping develop a music reading learning theory, this study will hopefully guide future research in music literacy.

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## APPENDIX A

### Pretest Script and Flow

<p style="text-align: center;"><u>Researcher says:</u> I'm going to show you a rhythm. I know that you may or may not be able to read it. When I show it to you, tell me if you can read it.</p> <p style="text-align: center;">Researcher shows the student Rhythm #1.</p> <p style="text-align: center;"><u>Researcher says:</u> Can you please read this rhythm for me?</p>	
<p><b>Student says he/she can read rhythm #1</b></p> <p style="text-align: center;"><u>Researcher says:</u> Great! Will you please read it for me?</p> <p style="text-align: center;">Student reads the rhythm.</p> <p style="text-align: center;"><u>Researcher records the response.</u></p>	<p><b>Student says he/she cannot read rhythm #1</b></p> <p style="text-align: center;"><u>Researcher says:</u> That's alright. Let's try another one.</p>
<p style="text-align: center;">Researcher shows the student Rhythm #2.</p> <p style="text-align: center;"><u>Researcher says:</u> Can you please read this rhythm for me?</p>	
<p><b>Student says he/she can read rhythm #2</b></p> <p style="text-align: center;"><u>Researcher says:</u> Great! Will you please read it for me?</p> <p style="text-align: center;">Student reads the rhythm.</p> <p style="text-align: center;"><u>Researcher records the response.</u></p>	<p><b>Student says he/she cannot read rhythm #2</b></p> <p style="text-align: center;"><u>Researcher says:</u> That's fine. Thank you!</p> <p style="text-align: center;"><b>Pre-test ends.</b></p>
<p style="text-align: center;">Researcher shows the student Rhythm #2.</p> <p style="text-align: center;"><u>Researcher says:</u> Can you please read this rhythm for me?</p>	
<p><b>Student says he/she can read rhythm #3</b></p> <p style="text-align: center;"><u>Researcher says:</u> Great! Will you please read it for me?</p> <p style="text-align: center;">Student reads the rhythm.</p> <p style="text-align: center;"><u>Researcher records the response.</u></p>	<p><b>Student says he/she cannot read rhythm #3</b></p> <p style="text-align: center;"><u>Researcher says:</u> That's alright. Let's try another one.</p>

<p>Researcher shows the student Rhythm #4.</p> <p><u>Researcher says:</u> Can you please read this rhythm for me?</p>	
<p><b>Student says he/she can read rhythm #4</b></p> <p style="padding-left: 40px;"><u>Researcher says:</u> Great! Will you please read it for me?</p> <p style="padding-left: 40px;">Student reads the rhythm.</p> <p style="padding-left: 40px;"><u>Researcher records the response.</u></p> <p style="padding-left: 40px;"><u>Researcher says:</u> You've read all of the rhythms. Thank you!</p> <p style="text-align: center;"><b>Pre-test ends.</b></p>	<p><b>Student says he/she cannot read rhythm #4</b></p> <p style="padding-left: 40px;"><u>Researcher says:</u> That's fine. Thank you!</p> <p style="text-align: center;"><b>Pre-test ends.</b></p>

### Posttest I and II Script

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**Researcher says:** I'm going to show you a few rhythms, and I would like for you to read them out loud. If you want, you may also clap or tap it while you're saying them.

---

**Researcher says:** Here's the first one. Will you please read it for me?

Researcher shows the student Rhythm #1

**Researcher says:** Are you ready?

When student says he/she is ready,

**Researcher says:** Okay. I'm going to count you off. 1 – 2 – Ready – Go.

Student reads the rhythm.

Researcher records the response for rhythm #1.

---

**Researcher says:** Okay. Will you please read rhythm number two for me?

Researcher shows the student Rhythm #2.

**Researcher says:** Are you ready?

When student says he/she is ready,

**Researcher says:** Okay. I'm going to count you off. 1 – 2 – Ready – Go.

Student reads the rhythm.

Researcher records the response for rhythm #2.

---

**Researcher says:** Okay. Let's try another one.

Researcher shows the student Rhythm #3.

**Researcher says:** Are you ready?

When student says he/she is ready,

**Researcher says:** Okay. I'm going to count you off. 1 – 2 – Ready – Go.

Student reads the rhythm.

Researcher records the response for rhythm #3.

---

**Researcher says:** Okay, here's the last one.

Researcher shows the student Rhythm #4.

**Researcher says:** Are you ready?

When student says he/she is ready,

**Researcher says:** Okay. I'm going to count you off. 1 – 2 – Ready – Go.

Student reads the rhythm.

Researcher records the response for rhythm #4.

---

**Researcher says:** Thank you! You are finished!

# APPENDIX B

## IRB Consent/Assent Form



COLLEGE OF EDUCATION  
CURRICULUM AND TEACHING

### PARENTAL PERMISSION/CHILD ASSENT for a Research Study entitled

*"Effects of instructional time on rhythm-reading learning and retention"*

Your son or daughter is invited to participate in a research study to measure the effectiveness of time spent practicing reading rhythms. The study is being conducted by Kelly Hollingsworth, a doctoral student, under the direction of Dr. Jane Kuehne, Associate Professor, in the Auburn University Department of Curriculum and Teaching. Your son or daughter is invited to participate because he or she is in the second-grade. Since your child is under age 18 we must have your permission to include him or her in the study.

**What will be involved if your son/daughter participates?** If you decide to allow him/her to participate in this research study, his/her assessment score on reading rhythms will be used in analysis. Your child's rhythm reading will be audio recorded in a private classroom and scored. Audio recordings will be deleted after scores are recorded. All students will receive rhythm-reading instruction during regular music instruction, and Mrs. Hollingsworth will not know who has participated until completion of the study. Your child's total time commitment will be only 10-minutes outside of regular music instruction.

**Are there any risks or discomforts?** The risks associated with participating in this study are breach of confidentiality and coercion. To minimize these risks, all returned forms will be placed in a sealed envelope and remain unopened until completion of the study and final grades submitted. Once all pre- and posttest data is collected, those students who have a form will have their data confidentially recorded and anonymously analyzed.

**Are there any benefits to your son/daughter or others?** Benefits include helping elementary music teachers better understand elements of teaching rhythms to children. We/I cannot promise you that your child will receive any or all of the benefits described.

**Will there be compensation or costs for participating?** No. There is no compensation or cost for participating.

**If you (or your child) change your mind about your child's participation,** your child can be withdrawn from the study at any time. Your child's participation is completely voluntary. If you choose to withdraw your child, your child's data can be withdrawn as long as it is identifiable. Your decision about whether or not to allow your child to participate or to stop participating will not jeopardize your or your child's future relations with Auburn University, the College of Education, or Cary Woods Elementary School.

**Your child's privacy will be protected.** Any information obtained in connection with this study will remain confidential. Mrs. Hollingsworth will not know who has participated until the study is complete. The data collected will be protected by Kelly Hollingsworth and destroyed within one year. Information obtained through your child's participation may be used to fulfill Mrs. Hollingsworth's educational requirements, published in a professional journal, or presented at a professional meeting.

**If you (or your child) have questions about this study,** contact Kelly Hollingsworth at khollingsworth@auburnschools.org or 334-887-4940 or Dr. Jane Kuehne at kuehnmj@auburn.edu. A copy of this document will be given to you to keep.

**If you have questions about your child's rights as a research participant,** you may contact the Auburn University Office of Human Subjects Research or the Institutional Review Board by phone (334)-844-5966 or e-mail at hsubjec@auburn.edu or IRBChair@auburn.edu.

**HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH FOR YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR CHILD'S SIGNATURE INDICATES HIS/HER WILLINGNESS TO PARTICIPATE AND FOR AUDIO RECORDINGS OF YOUR CHILD TO BE USED FOR ANALYSIS PURPOSES AND TO BE DESTROYED AT THE END OF THE RESEARCH.**

Kelly J. Hollingsworth  
Investigator's Printed Name

Kelly Hollingsworth 2/26/14  
Investigator's Signature Date

\_\_\_\_\_  
Minor's Printed Name

\_\_\_\_\_  
Minor's Signature Date

\_\_\_\_\_  
Parent/Guardian's Printed Name

\_\_\_\_\_  
Parent/Guardian's Signature Date

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## **APPENDIX C**

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